Temi di discussione

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by Silvia Del Prete, Cristina Demma, Iconio Garrì, Marco Piazza and Giovanni Soggia

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THE HETEROGENOUS EFFECTS OF BANK MERGERS AND ACQUISITIONS ON CREDIT TO FIRMS: EVIDENCE FROM ITALIAN MACRO-REGIONS

by Silvia Del Prete*, Cristina Demma**, Iconio Garrì***, Marco Piazza§ and Giovanni Soggia§§

Abstract

The literature has shown that in the short- and medium-term bank mergers and acquisitions (M&As) may generate a temporary reduction in firm credit. Using bank-firm matched data, this paper investigates the impact of M&As involving Italian banks over the period 2009-2019 on credit to firms, exploring possible heterogeneities across several dimensions. During a 3-year time window after each deal, we detect a reduction in loans to firms financed by target banks, in line with the existing evidence. The drop is smaller for infra-group mergers, when the target is healthy or is the firm's main bank, while is larger for southern firms, independently of bank location. Other things being equal, we suggest that this "South effect" is mainly related to the negative externalities that characterize the business environment in Southern Italy, for which southern firms are more likely to be subject to a severe selection after a bank reorganization.

Contents

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* Bank of Italy, Florence Branch.
** Bank of Italy, Palermo Branch.
*** Bank of Italy, Catanzaro Branch.
§ Bank of Italy, Bologna Branch.
§§ Bank of Italy, Cagliari Branch.

1. Introduction and motivation[1]

The South of Italy is historically characterized by a lower degree of financial intermediation compared with the Centre and North: in 2019, the ratio between bank loans to non-financial firms and the total economic value added was equal to 28 and 49 percent in the South and in the Centre and North, respectively.[2] In addition, bank loans represent the main source of funding for firms in both areas, especially in the South where firms have lower financial diversification opportunities (Albareto et al., 2022).

Several papers have shown that bank mergers and acquisitions (henceforth M&As) are beneficial in the long-run, increasing bank size, economies of scale and diversification of revenues (Amel et al., 2004), and generating positive spillovers on credit pricing and allocation (see for Italy, Panetta et al., 2009). However, a vast literature has emphasized that bank consolidations may produce transition costs in the short- medium-run, determining a temporary reduction in firm credit by target banks, related to the re-allocation process among consolidated and non-consolidated intermediaries (Bonaccorsi di Patti and Gobbi, 2007). Furthermore, in the transition period after a deal, diversification portfolio strategies or credit re-allocation may hit more severely some groups of firms or sectors, perceived as riskier or more financially fragile by newly consolidated banks (Beretta and Del Prete, 2013), therefore producing heterogeneous effects.

In the last 20 years, the banking consolidation process that took place in Italy, particularly pronounced in the early 2000s, and the reform of the cooperative banking sector drastically reduced the number of Italian banks, especially those located in the South.[3] In this context, our paper aims at verifying whether and to what extent during the period 2009-2019 bank M&As determined a declined of credit to Italian non-financial firms.

The paper innovates the existing literature mainly in two ways. Firstly, the impact of the banking consolidation has been typically investigated during non-crisis periods, whereas our paper focus on a decade that includes the "double crisis" (the Great Financial Crisis of 2008-09 and the subsequent Sovereign Debt Crisis in the euro area of 2011-12), as well as the ensuing economic recovery. It is important to notice that during the period under investigation, credit to Italian firms declined relative to the pre-crisis period. The rationing effects post-M&As could be amplified in crisis periods by the bank "de-risking" process,

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[2] Alternative measures, based on the ratio between outstanding total bank loans and the corresponding economic value added (net of non-financial private sector) in the different areas of the country, confirm similar evidence (50 and 75 percent in 2018, for South and Centre and North, respectively).
[3] At the end of 2019 only 17 southern banks (excluding 77 mutual banks reshaped in cooperative banking groups in the same year) did not belong to central-northern banking groups. They were 135 at the end of 2008 (see for more details Table 1).

connected to the deterioration of bank balance sheets, deriving from the increasing share of non-performing loans (NPLs), and producing adverse impacts on bank performance and capital adequacy[4].

Secondly, we outline the heterogeneous effects produced by bank M&As on firm credit along different dimensions. Specifically, we distinguish: crisis and recovery periods, short and medium–run effects post-M&As; consolidations as acquisitions or mergers, and for the latter within the same banking group *versus* non intra-group deals; the main aim of each deal, distinguishing those with a strategic focus from those aimed at turning around the target bank, whose balance sheet situation was severely impaired; the special role of the target as the main bank for its borrowing firms; the geographical reach of bidder and target involved in a deal, as their area of concentration of branches, especially when local banks are consolidated.

As far as geographical issues, a special focus is devoted to the heterogeneity between the South and the Centre and North of Italy. Since the consolidation has often involved many southern intermediaries targeted by non-southern ones, it is worth to investigate if southern firms are particularly affected by the bank consolidation process. Indeed, the transition costs stemming from bank consolidations could be amplified by the characteristics of the economic areas in which firms operate. Actually, southern firms usually operate in economic areas with less public infrastructures (Bucci et al., 2021), a pervasive judicial inefficiency and less business-friendly environment (Schiantarelli et al., 2020), or are located in regions that have been more affected by the adverse impact of the latest economic crises (Accetturo et al., 2022). Moreover, other things being equal, southern firms are more financially fragile, because they are smaller and have fewer financial alternatives to bank credit in the local financial markets where they operate. In addition, firms located in the South are generally financed by small banks, which have been often acquired by intermediaries headquartered in the Centre and North. Therefore, such mergers are likely to be accompanied by a refocusing of the strategic priorities, and might have a potentially greater impact on the credit granted to the borrowing firms involved in those deals.

We focus on the outstanding credit by target banks to non-financial firms and ignore the impact of bank M&As on interest rates and collateral, as well as the evolution of the quality of credit after bank consolidations, whose investigation needs a special attention in dedicated analyses. However, international evidence on credit riskiness suggests a general reduction in non-performing loans after bank M&As during the 2008-crisis, with positive impacts on the financial stability (Maslak and Senel, 2019).

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[4] The double crisis has negatively affected both the Italian banking and economic systems: in the period under analysis, the defaults of many non-financial companies have generated a progressive deterioration in bank credit quality, therefore constraining the capability of banks to further extend new loans to the economy. Accornero et al. (2017) found that the negative correlation between NPL ratios and credit growth is mostly generated by changes in firms' conditions and contractions in their demand for credit; the subsequent increase in banks' provisions, due to the exogenous emergence of new NPLs, can cause a negative adjustment in credit supply. In this context, the bank consolidation process has intensified, involving a higher share of total assets, mainly in order to turnaround non-healthy intermediaries (see Section 3).

To implement our analysis, we build a unique dataset, based on very granular bank-firm credit relationships, along the period 2009-2019, drawn from the Central Credit Register. Information on banks' characteristics, their balance sheets and the features of each consolidation are drawn from the Bank of Italy's Supervisory Reports. The dataset is complemented with the characteristics of the Italian non-financial corporations borrowing by consolidated banks, which are drawn from Cerved and INPS databases.

In the econometric exercise, we use a propensity score matching technique to find a suitable control group to consolidated banks involved in M&As (the "treatment" is the event of being acquired or merged). We therefore focus on target banks in M&As, which are hit the most by the organizational shock stemming from consolidations. The empirical analysis follows a Difference-in-Differences (DID) strategy, in which the impact of the organizational shock on credit to non-financial firms by target banks is identified by comparing firms borrowing from each of the intermediaries involved in M&As to non-financial borrowers of banks properly matched in the control group, before and after each M&A event occurs. Treated firms are defined as those borrowing from banks exposed to M&As as target intermediaries. We control for possible confounding effects brought by demand shocks by adding a fixed effect for all firms belonging to a given 'industry-size-region' group (Degryse et al., 2019). As anticipated, the average treatment effect emerging post-consolidation is then tested in splitting samples along different characteristics of the deals, as well as along features at the bank and firm level.

During the period 2009-2019, we detect that the amount of outstanding loans to non-financial firms financed by consolidated banks declines on average by around 2 percent compared with other firms in the 3-year time window following the event. The effect is stronger when the target bank is merged into, rather than acquired by another bank, and in aggregations aimed at rescuing the target bank, while it is milder when the main bank that finances a given firm is involved, signaling more protection for closer bank-firm credit relations. Moreover, we show that the impact of bank consolidations has some heterogeneity at geographical level, both for bank- and firm-perspectives. On the one hand, the reduction of firm credit post-event is less severe in those deals for which the bidder was already present in the local markets where the target's branches share was significant or for local mutual banks. Both results could be linked to a better prior knowledge of the local business environment by consolidated banks that could support credit supply. On the other hand, considering firm-level characteristics, a more intense negative effect emerges for firms located in southern regions, especially for small (less than 20 employees) or more financially fragile enterprises. However, when we focus on southern firms financed by southern target banks, especially those consolidated by non-southern intermediaries, we find no additional significant impact of such M&As on firms' loans.

This result suggests that the "South effect" we detect on credit could be related to some negative externalities faced by firms established in southern regions, which increase their riskiness, other things being equal, rather than to the relocation of the southern target banks' headquarters in other geographical areas. Furthermore, in aggregate, in the examined period

the consolidation of southern intermediaries by banks headquartered outside that area may have not affected the bank funding of southern borrowers.

The rest of the paper is organized as follows. Section 2 reviews the main literature on the topic and points out some expected results from our empirical analysis. Section 3 takes a broader historical view on the Italian bank consolidation process since the early 1990s to date, tracing stylized facts on the southern and the central-northern financial systems; this analysis is also aimed at highlighting the peculiarities of the M&As occurred in the period under examination. Section 4 presents our main sources of data, bank and M&As characteristics, while Section 5 describes our econometric set-up and the identification strategy followed in the empirical analysis. Section 6 reports and discusses our main econometric results on the short-term impact of bank consolidations on firm credit, while Section 7 presents some robustness checks. Finally, Section 8 highlights some concluding remarks.

2. A literature review

A vast literature, also connected to the real effects of finance during the crises, has shown how credit restrictions can adversely affect economic activity, accentuating adverse fluctuations during recessions. The supply of bank credit to the production system can suffer shocks resulting from external (exogenous) constraints or from reorganization processes inside the financial market. Whatever the cause, the credit squeeze is able to amplify the depressive effects connected to the financial turmoil, or to structural adverse factors, which are typical of economies more dependent on external finance. This is the case of the Italian non-financial corporations, especially smaller and medium-sized firms (SMEs) or those located in economically more disadvantaged areas, such as the South of the country.[5]

The first channel of shock occurs typically during economic and financial crisis, in which the credit crunch is induced by liquidity or capital constraints in some interbank markets, which do not allow banks to support firms in their production activity, with real effects on economic outcomes (Del Prete and Federico, 2014 and 2020; Paravisini et al., 2015; Cingano et al., 2016; Berton et al., 2018; Manaresi and Pierri, 2018). The second supply restriction channel is typically connected to the reorganization process within the financial market, through bank M&As, and is induced by organizational re-shaping that could stimulate banks to change their lending strategies.[6]

In normal times, several studies show that bank M&As imply a temporary reduction in credit for already entrusted borrowing firms, and especially in bank-oriented countries such

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[5] Concerning the financing of southern firms for which balance sheet data are available in the Cerved database, at the end of 2019 the share of bank loans on total financial debts was equal to 67 percent *versus* 45 percent for central-northern companies. Furthermore, during the period 2009-2019 this share was fairly constant in the South, while it declined in the Centre and North, indicating a widening gap in financial diversification capacity of firms headquartered in the two areas (Albareto et al., 2022). For a comprehensive analysis on South economy and South financial system during 1990s, see Panetta, 2003.

[6] In principle, small and local institutions are believed to be more vulnerable to these changes. In many countries, and primarily in Italy, consolidation in the banking sector reduced the number of small banks and led to significant changes in market shares (Bonaccorsi di Patti and Gobbi, 2001).

as Italy (Buono and Formai, 2018; Banerjee et al., 2017; Beretta and Del Prete, 2013; Degryse et al., 2011; Bonaccorsi di Patti and Gobbi, 2007; Fiordelisi, 2009; Sapienza, 2002; Berger and Udell, 2002). The main message behind all this evidence is that, due to frictions in bank-firm credit relationships, firms borrowing from consolidated banks cannot – at least in the short-run – completely replace dropped credit relationships by asking for new loans to new financing intermediaries. Moreover, temporary reduction in credit can in turn generate real adverse effects on firm investments, trade, sales or employment, as suggested by some recent papers on the banking consolidation process in Italy (Bonaccorsi di Patti and Gobbi, 2007; Buono and Formai, 2018; Modena, 2020), which also suggest as these adverse effects could be further amplified during crises.

Other papers have also shown that bank M&As are beneficial in the long-run. Even though gains on cost-efficiency stemming from bank consolidations are mixed and could depend on country-specific characteristics, there is a large consensus on benefits deriving by increasing bank size, economies of scale and diversification of revenues (Amel et al., 2004), as well as by spillovers on pricing and credit allocation (Panetta et al., 2009).

However, in the short- medium-run bank consolidations may produce some transition costs, determining a temporary reduction in firm credit by target banks, which could be heterogeneous across groups of firms or banks. Indeed, the empirical literature on the subject suggests that banks involved in M&As can reduce temporarily corporate lending to borrowers of the target bank for several reasons.

Firstly, bank consolidations generate larger and organizationally more complex intermediaries, which can pursue a different lending strategy relative to the single banks involved in a deal, with a re-composition of the consolidated portfolio towards larger and less risky firms in terms of customers, sectors, geographical areas (Focarelli et al. 2002; Berger et al., 1999; Amel et al., 2004; Sapienza, 2002; Bonaccorsi di Patti and Gobbi, 2007).

Secondly, the screening process of the consolidated bank can change considerably, moving from more relationship-based lending techniques, employing soft information, typically for smaller and local banks, to credit assessment techniques more anchored to hard information, stemming from balance sheet data (e.g. credit scoring systems),[7] which are known to have a pro-cyclical effect (Cannari et al., 2010; Del Prete et al., 2017). In this case – other things being equal – larger and consolidated banks are more likely to reduce their lending to small businesses. Moreover, larger banks stemming from M&As could decrease their exposition towards borrowers already financed by both bidder and target, in order to implement diversification policies in their loan portfolio and mitigate the extent of sector-size-area concentration (Sapienza, 2002; Beretta and Del Prete, 2013).

Thirdly, the negative effect of M&As on firm credit may also be attributable to internal organizational changes following bank consolidations: the higher turnover of local branch loan officers (Beretta and Del Prete, 2012), to better control their activity, as well as the closing of branches after a consolidation to reduce costs (Galardo et al., 2020), can lead to a loss of private soft information, collected by face-to-face interactions within bank-firm

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[7] Panetta et al. (2009) suggest that in the period post M&As the credit assessment process could improve through an effective use of information, translating into lower lending interest rates to firms according to their risk-profile.

relation, which is difficult to pass on in the bank hierarchy (Stein, 2002), and which can translate in a temporary drop of credit relations post-mergers.

All in all, the implementation of post-consolidation diversification and re-allocation strategies can lead to a reduction of the consolidated bank's overall exposure to specific firms, sectors, geographical areas, resulting in a "selective" rationing towards smaller and riskier customers, mainly located in southern regions, more financially fragile (e.g. riskier) or belonging to less innovative sectors (Beretta and Del Prete, 2013).

Finally, bank deals targeting ailing banks can produce – all other things being equal – a more significant rationing effect (at least in the short-term), due to the implementation of asset quality review policies, compared to strategic aggregations motivated by efficiency gains or growth strategies.[8]

3. The Italian banking consolidation process and the southern financial system

3.1. A broader view: M&As in Italy since the 1990s

The financial system in the South of the country is almost exclusively characterized by the centrality of the banking system, with a currently significant presence of banks headquartered in the Centre and North, as a result of the intense consolidation process among banks since the 1990s (Beretta and Del Prete, 2013; Bonaccorsi di Patti and Gobbi, 2007; Sapienza, 2002).

Such process involved both banks headquartered in the Centre and North and those located in the South and led to a significant increase in the degree of concentration of the credit market in both areas (Table 1). Between 1993 and 2019, there were over 1,200 banks consolidated in mergers and acquisitions (M&As). Target banks' assets accounted on average for 12 percent of the total assets per year (Figure 1.a). These deals peaked in 1999 and in 2017, the most recent year in which their impact on the number of active banks was comparable to that registered at the end of the 1990s (Figure 1.b); the highest volume of funds involved in bank M&As was instead recorded in 2007. The process also continued during the double crisis, with the aim of gaining efficiency and rescuing banks in default. Between 2009 and 2019, during the period examined in this paper, there were 316 and 52 target banks involved, respectively, in mergers and in acquisitions of the majority of the bank capital. Moreover, during 2019, the implementation of the Italian reform of the mutual credit sector further changed the structure of the banking system, with the establishment of two cooperative credit groups, both based in the Centre and North of the country.[9]

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[8] During the recession, the sharp deterioration in credit and the need for banks to recover productivity and competitiveness led to a wave of M&As aimed at consolidating different credit institutions.

[9] Only 39 mutual credit banks, all based in South Tyrol, decided not to join any cooperative group while maintaining a greater degree of autonomy. A mutual bank headquartered in Tuscany changed its legal form becoming a limited company.

Figure 1. *Mergers and acquisitions in the Italian banking system* (1)

(a) Target banks *(units)*	(b) Target banks on active banks and share of target banks' assets involved in M&As *(percentage values)*

Relative to total assets, the aggregation process was more intense in the South, in which between 1993 and 2019 there were almost 350 target banks consolidated in M&As, which represented on average 28 percent of the total intermediated funds by banks headquartered in the same area, a percentage more than double relative to that recorded in the Centre and North. The consolidation process, jointly with the entry of all the southern mutual banks into the two Italian cooperative groups in 2019, led to a sharp reduction in the number of southern banks (Table 1). Indeed, at the end of 2019, only 17 intermediaries located in the South were not belonging to groups headquartered in the Centre and North (135 banks, in 2009). Also considering the 77 southern mutual banks joined in the two cooperative groups, in 2019 the number of southern banks not belonging to the other central-northern groups lowered to 94.

Most of the southern bank M&As involved small intermediaries, mainly set up in the form of mutual or cooperative banks. Moreover, those deals were carried out for over half of the events by banks located in the same area (Figure 2.a). However, by weighting deals for the intermediated funds by target banks, the consolidations with the central-northern intermediaries as bidders had a significantly greater impact than the others (Figure 2.b). The number of deals in which southern banks incorporated or acquired central-northern banks was instead very limited (only 5 intermediaries in the whole examined period), and concerned small target banks, mainly in the form of savings or mutual banks.

Figure 2. *Mergers and acquisitions involving southern target banks* (1)

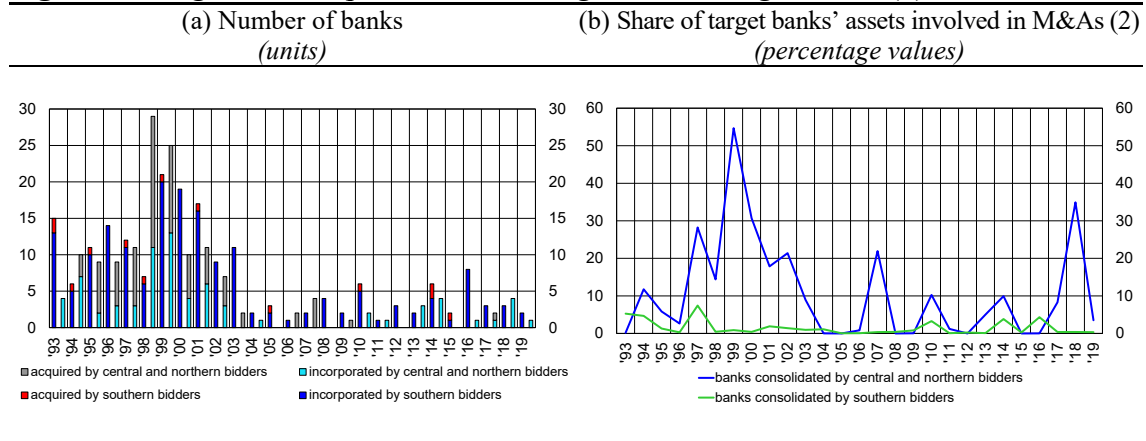| (a) Number of banks *(units)*	(b) Share of target banks' assets involved in M&As (2) *(percentage values)*

Source: Authors' elaboration on Bank of Italy's Supervisory Reports and Census of banks.
(1) These data do not include information about foreign banks. For 2019, the entrance of 226 mutual banks into the ICCREA and Cassa Centrale Banca banking groups, implementing the reform of the cooperative credit banks, is not considered among acquisitions. – (2) For every year, the share of target banks' assets is computed as the ratio between the value of target banks' total assets and the amount, at the beginning of the year, of total assets of banks headquartered in the South.

These trends have significantly increased the ownership of banks headquartered in the Centre and North in southern intermediaries; consequently, the share of the former in financing southern households and firms grew considerably until the 2000s (Figure 3).

Figure 3. *Market share of loans granted to southern firms and households by banks located in the Centre and North* (1)
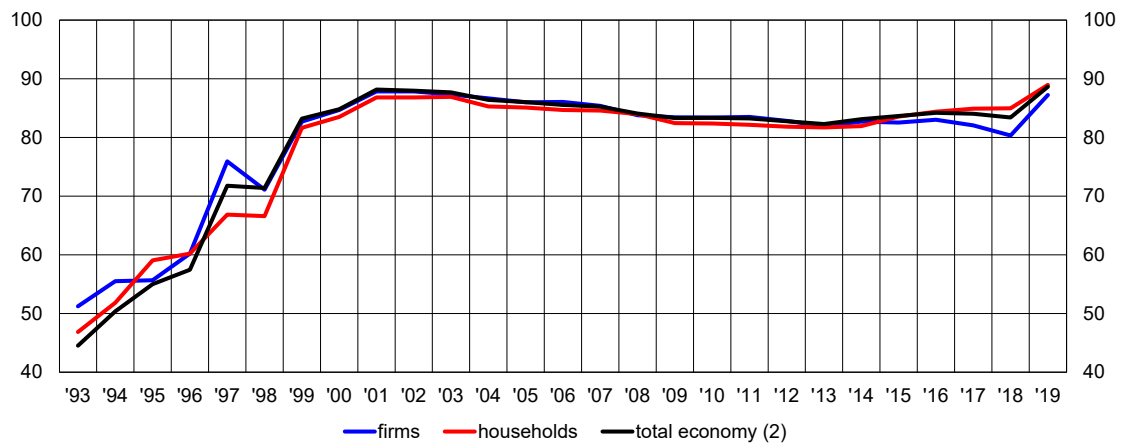
Source: Authors' elaboration on Bank of Italy's Supervisory Reports.
(1) Percentage values at the end of each year. These data do include loans granted by banks headquartered in Centre and North that do not belong to banking groups and loans granted by banking groups whose parent company is headquartered in the Centre and North regardless of the stand-alone bank's headquarter. These data do not include loans granted by "Cassa Depositi e Prestiti". – (2) It includes non-profit institutions serving households and unclassifiable and unclassified units.

At the beginning of the 1990s the largest share of loans to southern customers was provided by southern banks not belonging to banking groups located in the Centre and

North, while at the end of 2019 southern intermediaries provided only 7 percent of the overall total credit. The share of loans to the South provided by southern intermediaries slowed down also compared to the pre-crisis level (11 per cent in 2007).

3.2. *A focus on M&As involving weak target banks*

In studying bank consolidations across geographical areas during the crisis period, we are particularly interested in detecting M&As targeting very weak (ailing) banks. To identify these mergers, we analyse the target banks' economic and financial conditions in terms of capitalization and credit portfolio quality, two synthetic aspects reflecting good banks' health.

Taking into account the yearly distribution of the NPL ratio and of the equity ratio (as capital and reserves over total assets) across banks, we recognize M&As targeting weak banks as those events for which, in at least two of the last three years before the event, the target bank exhibited poor credit quality and low capital requirements (both belonging to the last quartile of the NPL ratio yearly-distribution and to the first decile of the equity ratio yearly-distribution, respectively; Table 2). Due to lacks in the empirical literature, we chose such thresholds in order to have criteria based on similar thresholds identified by the SSM at the European level during non-crisis period,[10] whilst varying over time and accounting for the higher level of bank riskiness in Italy during crises. Thus, the variability of our criteria allows to better calibrate our thresholds in quality and capital ratios according to the business cycle.

Furthermore, we take into consideration a time window lasting three years before the M&A event in order to limit seasonal effects and to focus on banks characterized by persistently weak balance sheets conditions, and thus more likely to be incorporated or acquired for turnaround purposes. We choose that the joint condition on NPL and capital ratios is satisfied in at least two over three years before each deal, in order to avoid bias in our data due to a potential "window-dressing" behaviors, implemented by target banks trying to improve their balance sheet conditions in the case of an expected M&A.

During the period 2009-2019, M&As of weak banks represented around 45 percent of the total deals; the share was rather similar distinguishing different institutional forms (mutual banks *versus* others) and bank size (medium-large banks *versus* small banks). However, there emerged significant differences according to the macro-regions of targets' headquarters: the share of turnaround M&As was double in those deals where the target bank was headquartered in the South relative to the Centre and North (74 and 40 percent, respectively; Figure 4.a). Furthermore, turnaround M&As represented the majority of the events for southern target banks, irrespective of their size and legal form, while strategic aggregations were more frequent for target banks headquartered in the Centre and North (Figure 4.b).

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[10] More in details, in the pre-crisis period the third quartile of NPL ratio in our sample was around 12.5 per cent, the value identified as a threshold for the higher incidence of NPLs over total loans for European banks (ECB, 2019). At the same time, the tenth quintile of the distribution of the equity ratio in our sample was around 4.5 per cent, the minimum requirement for Common Equity Tier 1 capital suggested for European banks.

Figure 4. *Target banks involved in M&As during the period 2009-2019, by purpose*

(a) Share of target banks involved in M&As by purpose and bank's target legal form, size and macro-region (1) (*percentage values*)	(b) Number of target banks involved in M&As by purpose and bank's target legal form, size and macro-region (1) (*units*)
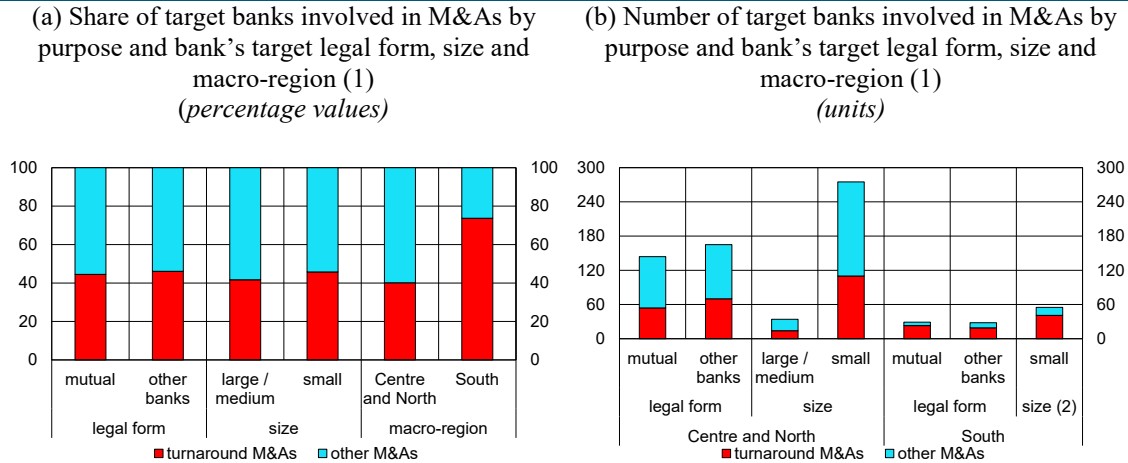
Source: Authors' elaborations on the Bank of Italy's Supervisory Reports.
(1) Large and medium banks are identified as banks reporting total assets greater than 9 billion of euros; the other banks are defined as small banks. – (2) Given the small number of operations, the composition of M&As involving southern larger and medium target banks is not reported.

4. Data

4.1. Data source

Using the bank-firm credit relationships during the period 2009-2019, under the recent economic crises, we investigate the heterogeneous impact of bank consolidations on credit granted to firms, in order to understand whether the effects of the bank consolidation process were heterogeneous across types of deals, banks' and firms' characteristics and, even more, geographical areas.

To this end, we build a rich dataset, which combines: *i) bank-firm credit relations*, available in the Central Credit Register; *ii) firm-level* data to check for credit demand factors by using the financial statements of Italian firms, their level of riskiness and the number of employees (drawn by Cerved and INPS database, respectively); *iii) bank-level* data (drawn by the Bank of Italy's Supervisory Reports) to control for structural bank characteristics or supply-side factors; *iv) data on M&As* (stemming from the Bank of Italy's Census of banks) to assess their timing and main purpose.

By exploiting the granularity of our unique dataset, we further enrich standard econometric set-ups, used so far in the empirical literature (see, among the others, Sapienza, 2002), in order to assess the impact of M&As on credit relations especially during the crisis period.

4.2. Detecting M&As heterogeneous characteristics

In our empirical exercises, run over a crisis period, we try paying particular attention to study whether bank mergers were able to generate heterogeneous effects along different

dimensions related to bank and firm characteristics, with a particular focus on their geographical location. Therefore, we investigate:

a) *The time-span of bank consolidations and the crisis period* (short- medium-run effects; crisis period *versus* normal times). The literature generally identifies a transition period (lasting 3-year post-merger) in which there would be some frictions for borrowing firms involved in M&As to implement compensatory actions to mitigate the effects of the organizational shock (i.e. searching alternative lenders; see Degryse et al., 2011). We focus on this time span, during which credit to borrowing firms extended by consolidated banks could reduce. Indeed, this negative impact seems to be temporary and it is usually reabsorbed in the long-term (Bonaccorsi di Patti and Gobbi, 2007). Moreover, we distinguish the crisis period to the subsequent recovery, in order to investigate different impacts on firm credit according to the business cycle.

b) *The type and the main aim of M&As* (mergers *versus* acquisitions; strategic aggregations or deals involving target banks with weak balance sheets). In the estimates, we first focus on credit relations of target banks, disentangling those really consolidated with other banks relative to those simply involved in acquisitions, which should preserve their independence and autonomy, with possibly less relevant effects on their credit relationships. Second, using indicators on bank health, we distinguish M&As with strategic purposes from deals which also have the effect of turning around target banks with weak economic and financial conditions. The goal is to capture how much consolidations are motivated by strategic reorganizations or are driven by bailout reasons, to turn-around the business of target banks.[11]

c) *The role of the target bank in credit relationships* (main bank *versus* other banks) *and other bank characteristics* (institutional form, local bank and local branch network concentration). We devote a special attention to the role of target banks in each credit relation, especially if they act as main bank, since the special and closer link among a given firm and its main bank could protect more credit relations from the M&A shock through a "banking relationship" channel. Moreover, other things being equal, the rationing effect could be less pronounced the higher the likelihood of the bidder to significantly enter into local markets through the acquisition of targets with a relevant share of local branches or through the consolidation of well-established mutual intermediaries.

d) *Borrowing firms' characteristics and the geographical reach of consolidated banks.* Effects on firm credit after bank consolidations could be different according to firm size, riskiness or location. Moreover, given that banks located in the Centre and North have usually incorporated banks headquartered in the South – often for turning around purposes –, we are interested in investigating whether these deals could have produced a greater rationing on credit relations for southern firms, which are generally smaller, financially more opaque, riskier, and located in areas facing greater negative externalities. Therefore, we jointly focus

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[11] In further analysis, having available some information on bank liquidations, a comparative assessment of the impact of bailout mergers could be carried out compared with a counterfactual scenario of potential bankruptcy.

on firms' and banks' location in order to investigate if a "South effect" is more related to firms' or banks' headquarter localization.

5. The econometric set-up

Following the methodology proposed by Bersch et al. (2020), we identify the effect of M&As on firm credit in two steps. First, through nearest-neighbor matching we find a set of banks to use as controls to compare with intermediaries that participate in M&As as targets, over the period 2010-2019.[12] Second, we consider firms borrowing from matched treated and control banks and we regress firm-level credit on treatment dummy variables; "group" fixed effects are included in the regression, i.e. the coefficients are identified on firms that face the same industrial, geographical and dimensional environment (Degryse et al. 2019).[13] Both steps are essential in taking into account possible endogeneity problems, particularly those stemming from demand-shocks that affect both firm-level outcomes and the likelihood of treatment. Thus, the main channel through which M&As have an impact on firms is by affecting banks' supply policies and, as we argue in the results section, this has a significant effect on firm credit (both in its level and on its growth rate).

5.1   The identification strategy: target banks and controls in a neighbor matching

To identify the proper control group, close to the target banks in terms of characteristics and probability of being treated, we run a propensity score matching, as in Bersch et al. (2020), who study the different transmission of bank distress shocks into already weakened bank-firm credit relations. To this end, they model a control group of neighbor banks, relative to those in financial distress (their treatment) by estimating a "nearest-neighbor matching", using a logit model to assess the probability of bank financial distress conditional on different bank characteristics.[14]

Similarly, we model the probability of being a target bank in a consolidation (our treatment)[15] on a set of bank-level controls, allowing us to take into account some structural bank features (size, institutional form, geographical headquarters, membership in a banking group, etc.) and other measures of bank performance, such as profitability, cost-efficiency, capital ratios and riskiness indicators, correlated with the main purposes of each deal. Thus, for each bank b and year t, during the period 2009-2019, we estimate a logit model $Prob_{b,t}$(treatment) where the dependent variable is equal to 1 if the bank b in year t was involved in a consolidation as target, and zero otherwise.

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[12] We exclude M&As occurred in 2009 in order to have at least one-year before each deal to investigate target banks conditions and their credit relations recorded in the Credit Register, which reports all bank-firm credit relationships over the threshold of 30,000 euros since the 1st January 2009.

[13] We apply a grouping at the level of year and "firm industry-region-size".

[14] Bersch et al. (2020) carry out the matching to obtain an appropriate control group of banks that can be traced over the same time span and have a similar likelihood of receiving the treatment. Therefore, they conduct the matching at the bank level and only later enrich the sample of nearest neighbors with firm data.

[15] Indeed, we need to have a single treatment event in the time windows observed for each bank in the sample. Focusing on target banks, which are more likely to drop credit-relations after a consolidation, reduces the event with multiple deals for each bank.

The model is specified as follows:

$$\Pr\bigl(Target\ bank_{b,t} = 1\bigr) = f\bigl(Bank\_structural\_features_{b,t-1}, Bank\_performance_{b,t-1}, \varepsilon_{b,t}\bigr)$$

(1)

Table 3 shows the output of the matching regression. As expected, all the bank-level features and performance indicators have the expected sign on the probability of treatment. In particular, the higher the bank portfolio riskiness (NPL ratio or, alternatively, bad loans ratio), the higher the probability of a bank being acquired or merged into other banks. Moreover, more profitable and better-capitalized banks (as measured by the ROA/ROE and the equity ratio) are less likely to be acquired or incorporated, other things being equal. Finally, small and mutual banks, and those headquartered in the Centre and North are more likely to be acquired or merged;[16] this is also the case for banks already affiliated in a banking group, but not in the role of the parent company bank.

The regression yields a *propensity-score* for banks involved in M&As either as targets or controls providing a measure of the likelihood for being a target bank in period *t* given the bank-level characteristics at time *t-1*. We perform nearest neighbor matching, selecting a maximum number of five neighbors[17] after imposing an exact matching on the following variables: bank type (mutual banks *versus* others), macro-region of the bank's headquarters (with five possible values), membership and role in a group (parent bank *versus* other banks belonging to a group), and the year of the deal.

Table 4 shows information on the propensity score matching. Out of roughly 350 target banks since 2010, we were able to match 323 of them (13 were not matched, while the rest did not have a propensity score to compare due to too many missing values in the observables). For each of our treated banks, we have at least one and up to five controls. These banks can become treated in subsequent periods, as long as the post period as a control bank does not overlap with the post period as a treated bank – i.e., treated banks can be control banks if the treatment is after 3 or more years from the event for which they appear as control, in order to avoid overlapping.[18] With the aim to improve further the matching process, we make sure that target banks are not matched with their bidders.

By comparing characteristics of treated and control banks, we obtain a picture of the quality of our matching and how relevant the treatment is. Table 5 shows statistics and test differences regarding bank covariates for treated and untreated banks, both matched and unmatched. As we can see by comparing columns (2) and (3) with column (1), even though the matching procedure does not eliminate completely the differences between treated and untreated banks, it plays an important role in reducing the distance between the two groups of intermediaries in all the main characteristics. This is particularly significant for the quality

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[16] This result is driven by the higher frequency of central-northern target banks (80 per cent of all target intermediaries).

[17] We apply a caliper of 0.25 and restrict the sample to common support.

[18] For each time window, the inclusion in the control groups of banks that have been treated in the past could lead to some drawbacks in the estimate of our parameters (Roth et al., 2022). Anyway, our main results are confirmed also excluding from the control groups these observations.

of credit portfolio, which in turn is fundamental, for instance, in identifying M&As of ailing banks. The only exception in the improvement brought by the matching process is bank size, which turns out to be higher for the group of banks in column (3). The tests on the differences between bank characteristics' means are shown in column (4), respectively reporting differences between columns (2) and (1), and between columns (3) and (1). We perform some robustness checks on the matching process in the robustness section (see Section 7): even though the matching can be improved at the cost of losing information, we show that the main results are not driven by the quality of the matching.

Table 6 compares characteristics of firms borrowing from treated banks and control banks in the year before the treatment. Firms in the first group are slightly larger, older, riskier and have a greater number of bank relationships and a larger amount of granted loans.

5.2 Regression analysis: a DID estimation strategy

Once we have constructed a suitable control group for the treated banks, we estimate the impact of M&As on firm credit by comparing borrowers from target intermediaries to borrowers from control banks. Firms borrowing solely from non-matched banks are dropped from the sample.

Ideally, we should perform Khwaja and Mian (2008) routine, which is a firm-time fixed effects model applied at the firm-bank-level in order to identify the coefficients on the same firms borrowing from both the treated and the matched control banks. However, this model entails two set of problems in our case. The first problem is that the number of firms that borrow at the same time from one treated bank and at least one of its controls is not large: a high share of non-financial corporations in our sample borrows from only one bank, and applying firm-time fixed effects implies eliminating them from the sample. The second problem is that firm-bank-level data may suffer from bumps after the consolidation process that can have little or no economic meaning, but may alter overall results. For instance, let's assume that a bank wants to acquire another bank and both the target and the bidder lend to the same firm. After the acquisition, the bidder might decide to concentrate specific credit relations or sector of firms within the target as one of its specialized branch. In this case, we could observe a positive jump in the credit to target borrowers and a negative one for bidder borrowers, despite the fact that the consolidation is merely a within-group transfer that should be cancelled out while evaluating the impact on overall firm credit.

For these reasons, we focus on total bank credit granted to a given firm, hence avoiding within-group bumps, and maintaining the largest possible sample for the estimates. We analyse each target bank in a 6-year time window: we follow firms that were "target" or "control" borrowers at *t-1* – being *t* the observation in the year when the consolidation occurs – for periods from *t-3* to *t+2* (i.e., three observations before and three observations after the M&A event). We exclude non-financial firms whose total loans were entirely classified as bad loans at *t-1* because for these borrowers granted credit goes to zero; the inclusion of these

firms would lead to an overestimation of the impact of bank M&As on credit to firms. We drop from the control group firms that were treated at least once in the period.[19]

Table 7 shows the size of the sample by year of observation and year of treatment. Some firms may appear multiple times within the sample, for instance when they borrow from a bank which acts as control for two different treated banks or when the same firm borrows from more than one treated bank.

The main equation to be estimated is the following:

$$Y_{f,t} = \beta * Post_{f,t} * Treated_{f,t} + \eta_{fm} + \theta_{bm} + \varphi_{gm,t} + \varepsilon_{fbgm,t} \tag{2}$$

where:

- f is the borrowing firm, b is the firm's main bank, i.e. that one presenting the higher share of loans among the selected intermediaries, g is the group of firms, and t is time;

- m is a unique identifier for each M&A operation, which is then attributed to both the firms borrowing from the treated banks and the firms borrowing from their matched controls; in order to identify the coefficients correctly, all fixed effects are interacted with this indicator;

- the dependent variable $Y_{f,t}$ is the log (or delta log) of total bank credit granted (drawn and undrawn) to a given firm f, at the end of each year t, during the period 2009-2019;

- the dummy $Post_{f,t}$ is equal to 1 for $t + \epsilon$, with $\epsilon \geq 0$, for firms borrowing from both treated and control banks, while the dummy $Treated_{f,t}$ is always equal to 1 for those who borrow from the target bank (notice that the inclusion of firm fixed effects makes it irrelevant to include the two variables separately);

- $\varphi_{gm,t}$ is the group fixed effect, similarly to Bersch et al. (2020) and Degryse et al. (2019): in order to control for demand shocks, we use "industry-size-region" group fixed effects to absorb demand-side and business cycle effects associated to each group of firms that may influence firm credit outcomes;

- η_{fm} is the firm fixed effect, θ_{bm} is the (main) bank fixed effect and, finally, $\varepsilon_{fbgm,t}$ is the error term.

Table 8 shows the composition of the full sample of firms recorded in the Central Credit Register and of the subsample of firms for which balance sheet data are available (Cerved subsample); the mean value of credit granted is larger for the latter given also their greater size. The composition of the full sample is very similar to the composition of the population of Italian firms in terms of size; the incidence of manufacturing firms is instead twice as that observed for the population, while the share of service firms is lower. Furthermore, the full sample is characterized by a slightly greater incidence of firms located in Centre and North. The share of manufacturing and large firms is even greater for the Cerved subsample.

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[19] Although a firm can be treated more than once in the period under investigation, in less than 30 percent of the cases firms are exposed to multiple treatments. We replicated the analysis (in unreported regressions) excluding target banks involved in multiple treatments, and all the results were confirmed.

6. The main econometric results: the impact of M&As on firm credit

6.1. The overall effect and the crisis period

Consistently with the extant empirical literature, during the period 2010-2019 target banks involved in M&As reduced corporate lending to Italian firms: our estimations (Table 9, column (I)) signal an overall average reduction of firm credit by 1.8 percent. We focus on a 3-year time window before and after bank M&As since this is the period in which some transition costs could emerge. Therefore, in the three years following any M&A event (our post-treatment time period), firms borrowing from target banks experience a reduction in their total bank loans close to 2 percent relative to similar firms borrowing from other banks in the control groups. We refer to this finding as our baseline result and we report it in all the tables in order to compare it with other estimates from splitting samples, devoted to investigating heterogeneous effects.[20] The magnitude of this short-term effect is slightly larger relative to that detected for Italian firms by Bonaccorsi di Patti and Gobbi (2007) over the period 1993-1999; they also find that the decline of credit after consolidation lasts 3-years and subsequently disappears, suggesting that firms are able to compensate for the negative shock in the long-run.

Distinguishing time windows during the crisis and the subsequent recovery, the negative impact appears to be larger for M&As carried out after 2014, when the economic crisis was over (Table 9, columns (II) and (III)). Indeed, in that period we observe the largest fraction (54 percent) and the largest number per year of M&As implemented for turning around non-healthy banks (18 against 11 during the period 2009-2014), i.e. the type of M&As with more negative effects on total loans (see below).[21] The intuition behind this result relies on the fact that the economic crisis affected the banking system with a certain delay.

Concerning the time-span of the impact after each deal, the negative effect experienced by borrowing firms after their target banks' consolidations is only slightly increasing over time (Table 9, column (IV) and Figure a1). Our results on the duration of the effect post-treatment are consistent with the hypothesis of the existence of a transition period during which some frictions for borrowing firms could emerge, due to the difficulty to switch in the short-run to other lenders to mitigate the organizational M&A shock (Degryse et al., 2011; Bonaccorsi di Patti and Gobbi, 2007). No "pre-trend" is detected in the years prior to bank consolidations, supporting the adverse impact stemming from target banks on their borrowing firms (Figure a1).

6.2. Disentangling mergers, acquisitions and turnaround deals

The fall of credit occurs in each kind of deals, both in acquisitions and in mergers, including intra-groups and other mergers (Table 10, columns (II)-(IV)). However, the magnitude of the adverse impact is somewhat heterogeneous, with a less severe drop in

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[20] The robustness of splitting sample results is confirmed by alternative regressions over the whole sample where we add interactions between the treatment effect and the firm or bank-level characteristics we focus on.
[21] In unreported regressions, excluding bank turnaround M&As from the econometric exercise, the drop in the credit granted to borrowing firms emerges only in the crisis period, while no significant effect is found in the years after 2014 during the economic recovery, supporting our economic interpretation.

mergers, especially in those different from infra-group deals. These results are in line with the evidence of the empirical literature (Beretta and Del Prete, 2013), suggesting that organizational adjustments after deals are more severe in mergers where target banks are consolidated in a newly and complex financial intermediary, with a drop of some credit relationships. On the contrary, acquisitions preserve banks' headquarters and reorganization could be less impactful. Related to this, infra-group mergers are more similar to acquisitions than to real consolidations among banks with a different governance and not belonging to the same banking group. Indeed, according to our results, firms experience a lower drop in their credit after an infra-group merger.

As regards the main purpose of bank M&As, we have identified deals involving weak target intermediaries as those with higher credit portfolio riskiness and lower equity ratios (see Section 3.2 for details), relative to deals with strategic or profitable purposes. According to our findings (Table 10, columns (V) and (VI)), as expected, firms borrowing from weak target banks suffer a greater drop in their bank credit. This result could be motivated by the bidder's need to reorganize and cut bad credit relationships inherited from non-healthy target banks in a more severe way than from other consolidated banks. Indeed, Maslak and Senel (2019) suggest that during the 2008 financial crisis, in the United States, many healthy banks acquired poorly performing target banks for diversification purposes, potentially driving the reduction in the systemic risk with beneficial effects on the financial stability.

6.3. The role of bank characteristics

Banks involved in M&As can play a strategic role in credit relationships whether they lend or not in multiple lending towards a given firm. According to the role of target banks in credit relationships, our estimates suggest that the adverse effect is less severe when the target bank is the firm's main bank. The smaller effect on firm credit may derive from closer bank-firm credit relations, as the main bank might be able to shield its borrowing firms more relative to other banks with which firms only have marginal credit relations. The reduction of bank loans is especially small in exclusive relations, signaling the "banking relationship channel" as an effective channel to preserve firms' credit from exogenous shocks (Table 11).[22]

Finally, focusing on the geographical reach of banks involved in M&As and considering the target branch networks, we distinguish those deals where a high share (greater than 75 percent) of the target's branches was located in a local market (province) where their bidder is already present with at least one branch, from the other deals.[23] Our results suggest that the drop of firm's credit is less severe when the bidder was already present in the provincial markets of its target, especially when the consolidated bank is well-established at local-level (Table 12, columns (II) and (III)). A possible intuition behind this result is that prior knowledge of the local business environment may support the bidder's credit supply towards firms borrowing from its target banks. Furthermore, the consolidation of banks with a higher concentration of branches at local level may represent a way to gain and reinforce the

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[22] This last evidence is strongly supported also in unreported regressions distinguishing exclusive credit relations from multiple ones. The credit rationing detected post-consolidations is entirely attributable to multiple relations and does not emerge for single-lender borrowers.

[23] We have run a test of sensitivity to the branch market threshold and our results are strongly robust.

presence of the bidder in strategic local credit markets. As far as the bank institutional form is concerned, when target intermediaries are mutual banks, firms appear to experience a significantly, albeit slightly, smaller drop in their credit, compared to what we observe for other banks (Table 12, columns (IV) and (V)). This can further suggest that closer bank-firm credit relations at local-level may protect firms from selections in a more effective way.

6.4. The role of firm characteristics

In order to focus on firm-level characteristics, we explore heterogeneity along different firm dimensions.

First, distinguishing M&As according to the location of the borrowing firms, our econometric results suggest that southern firms experience a more severe reduction after consolidations of their banks relative to similar firms located in other regions. Indeed, we find that southern firms face a cut in their bank loans that is twice the magnitude of the coefficient observed for other firms (-3.5 *versus* -1.6 percent, Table 13, columns (II) and (III)).

Second, we explore heterogeneity along firm size and *ex-ante* riskiness. On the one hand, we find that the negative correlation between firm size and the impact of M&As on the outstanding credit is not linear but U-shaped. Indeed, smaller firms (with less than 20 employees) experience a drop by -1.8 percent in their bank lending from target intermediaries, while medium-sized (between 20 and 50 employees) and larger firms (with more than 50 employees) face a reduction by -3.1 and -1.3 percent, respectively (Table 13, columns (IV)-(VI)). The U-shaped result is confirmed even if we define firm size according to total sales, alternatively. Focusing on the subsample of non-financial limited companies, recorded by Cerved database (representing more than two fifths of the Italian firms), we split firms in quartiles, according to the distribution of their sales on the year before the operation. In this case, we find that the negative impact of M&As on firm credit is larger for the second and the third quartile, while is smaller for the first and the last one (Table 13, columns (VII)-(X)). The main intuition behind this result is that there are less multi-borrowers among small firms and the role of the main bank is more crucial to protect credit relations (e.g., small firms are more reliant on their main bank), in line with previous results on main and non-main bank-firm credit relations. On the other hand, concerning firm *ex-ante* riskiness, we split the sample according to the Cerved firm rating, increasing in the level of riskiness. As expected, we detect a stronger negative effect for riskier firms, while no significant impact is found for the soundest ones (Table 13, columns XI-XIII). Focusing once again on the subsample of non-financial southern companies, recorded by Cerved database and reporting balance sheet data and Z-scores, we find that the negative effect detected on average for southern firms is larger for smaller companies and for those with a higher risk of default (Table 14).

6.5. Detecting the "South effect"

As stated previously, we are interested in further investigating whether the "South effect" on firm credit, previously detected after bank consolidations, is mainly attributable to firms' characteristics or to banks' features.

To this end, we follow a stepwise approach and estimate our baseline equation on the whole sample of Italian firms, adding progressively interactions between the treatment effect and dummies considering firms located in the South, borrowing from southern target banks, acquired by banks located in the Centre and North (Table 15). In our sample, half of the firms located in the South borrow (also) from banks headquartered in central-northern regions, while almost all the firms in the Centre and North borrow from banks located in the same area. Our main results on the interaction estimations suggest that the "South effect" we detected is associated with being a "southern firm", reflecting the negative externalities stemming from non-friendly economic environment, which increases their *risk-premium* in terms of credit rationing experienced after bank M&As (Table 15, column (II)). Indeed, the estimated coefficient becomes smaller in magnitude and loses statistical significance when we consider southern firms borrowing from southern target banks (Table 15, column (III)), especially those consolidated by bidder banks located in the Centre and North (the most frequent case in our sample; Table 15, column (IV)). The results obtained by estimating the effect of these variables in a single regression confirm that the "South effect" is mainly related to being a firm located in the South rather than to being a borrower from a southern bank (Table 15, column (V)).

7. Robustness checks

7.1 *Alternative definitions of the dependent variable*

In order to check our main results, we run a regression with the dependent variable approximating the dynamics of credit. To this end, we consider the difference in logarithm of the credit granted as the dependent variable, to give an approximate estimate on the effects of M&As on credit growth rate. The results in Table 16 (columns (II) and (III) and Figure a2) show that there is a significant reduction (1.3 percentage points) in the growth rate of firm credit.

7.2 *Perturbation in the sample*

We replicate the main regressions controlling for possible outliers in the sample. For instance, larger exposures to the banking system may drive the results and may also be a concern for reverse causality: the failure of a large firm may increase the probability of bank distress, which in turn can lead to a higher chance for those intermediaries of being the target of M&As. We drop the top and the bottom 5 percent of the distribution of the total credit granted to each firm: results are depicted in Table 17 (columns (II) and (III)) and, although the coefficient is slightly smaller than our baseline model, the estimates are essentially similar to those described above.

Another robustness check we run is excluding firms with too many banking relationships, as the literature suggests that some of the firms with a high number of lenders do not reflect genuine credit relations (Bottero et al., 2020). We thus eliminate the top 5 percent in the distribution of number of banking relationships and the results are virtually unchanged from the baseline estimates (Table 17, columns (IV) and (V)).

7.3 Different group fixed effects

We try to enrich the group fixed effects by adding the variable risk to the set of controls considered. On the one hand, this gives us a more precise grouping of firms; on the other hand, since risk is defined only for the Cerved subset of firms, we lose some observations and generate more singletons that are eventually dropped by the model. This, for instance, involves observations in one specific 'size-region-industry-risk' cluster that do not have counterparts to compare and are therefore excluded by the identification strategy. Nevertheless, the main results are in line with the findings discussed previously, although the magnitude of the coefficient is somewhat shrunk (Table 17, columns (VI) and (VII)).

7.4 Firm risk and South effect

We go further in depth on the impact of firm risk on outstanding credit in the post-M&A period involving southern firms, to better shed light whether the riskiness of firms acts as an additional channel for credit rationing post-bank M&As or it is already included in the *status* of being a company located in the South. To this end, after having controlled for the enriched group effect, defined at 'size-region-industry-risk' level, we also include in our estimates interaction terms between southern firms affected by bank M&As and dummies accounting for firm size and risk.[24] The estimates, shown in Table 18, suggest that, also controlling for all these characteristics, southern and riskier firms face a more significant decline in credit after bank M&As, respect to central-northern companies. Thus, firm size and riskiness being equal, our findings confirm that the drop in credit after M&As is especially driven by firm location, due to negative externalities in the economic environment of the South area.

7.5 Robustness on the matching

As it is common with matching procedures, in our model there is a trade-off between having the "perfect" match (i.e. one where the covariates in the treatment and control groups are virtually the same) and having enough information in the following step, where the treatment and control labels are attributed to the borrowing firms. In Section 5.1, we acknowledge the performed matching does not completely eliminate the differences in covariates across the two groups; thus, in this section, we improve the matching and we show that the main results are quantitatively comparable even with increasingly demanding matching requirements.

In the original matching, as previously specified, we insert a caliper of 0.25 and a common support prerequisite. We try to leverage on that by adding the following, more severe requirements:

- an upper bound to the common support (at 0.8, based on the distribution of the propensity score for the untreated group), hence limiting extreme values of the propensity score that may correspond to banks that are more difficult to match;

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[24] The dummy 'small' firms is equal to 1 if a given firm has less than 5 employees, while the dummy 'risky' firm is equal to 1 if a given firm exhibits a Z-score, computed by Cerved, greater than 7.

- keeping only matches with exactly five neighbors;

- an exact matching on bank class size, with seven possible values according to the definition provided in the Supervisory Reports;

- reducing the caliper from 0.25 to 0.1.

The resulting matching does perform better than the original one, as depicted in Figure a3. Specifically, panel b) shows that the modified matching performs better for all the main covariates, both in terms of standardized mean difference and variance ratio. In addition, the distribution of the propensity score on the matched sample, compared to raw data, is improved (Figure a4). However, the more demanding matching strategy decreases the number of treated banks with matched controls from 323 to 179.

We then focus on the firms borrowing from the 179 treated banks or their matched controls and estimate the model in equation (2), with the corresponding results in Table 19. Columns II and IV show that the coefficients of the regression are extremely similar to the baseline model (columns I and III); however, in the alternative matching model we lose roughly 75 percent of the observations[25] and the F-Stat for the joint significance of the coefficients is also severely cut. This reduction in sample size does not allow us to perform the sample splitting exercises described in Section 6, especially those highlighting the geographical differences between southern firms and the others. In the trade-off described at the beginning of this subsection (better matching *versus* less information) we prefer to stick to a less precise matching algorithm, which allows us to maintain a large enough sample, bearing in mind that the robustness of our main results is not affected by this decision, as this paragraph has tried to discuss.

7.6 Alternative modelling

In order to compare our model to a standard panel model (as in Bonaccorsi di Patti and Gobbi, 2007), we perform the following regression on the sample of firms borrowing from *all* the banks involved in M&As:

$$Y_{f,t} = \beta_1 * Post_{f,t} * Target_{f,t} + \beta_2 * Post_{f,t} * Bidder_{f,t} + \beta_1 * Post_{f,t} * Both_{f,t} + \eta_f + \theta_b + \varphi_{g,t} + \varepsilon_{fbg,t} \tag{3}$$

We estimate equation (3) on the whole sample of M&A participants, as either target or bidder. The dummy $Both_{f,t}$ is equal to 1 for firms that are exposed to both target and bidder banks. Other than that, the fixed effects structure is the same as in the matched diff-in-diff: differently to our main model in this case we do not have a proper control group and identification relies on the fact that firms are exposed to treatments in different times.

Results are displayed in Table 20: the overall coefficient for the firms borrowing from target banks is comparable with our findings in the main regression, as companies seem to experience a drop in bank credit by around 2 percent. Moreover, the addition of lags shows that in the medium-run the effects appear to be larger one or two years after the M&A, as in

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[25] A large part of the loss of information is due to the fact that in the more demanding matching model we are not able to match larger target banks.

our baseline model. Furthermore, there is some evidence that southern firms suffer from a sharper decline in bank lending. However, this model entails two problems: *a)* it appears to be overestimating the effect of M&As and *b)* it shows a positive bump on the year the M&A occurs, suggesting there may be a pre-trend that is not eliminated by applying the individual and group fixed effects. All in all, the matching procedure we described in Section 5 seems to be effective in solving both problems, as the control group provides a way to limit pre-trends and has a proper counterfactual to compare the post-consolidation period.

8. Concluding remarks

While the benefits of M&As tend to surface in the long-run, a vast empirical literature has recognized that bank consolidations can generate in the short- medium-run a temporary drop of credit granted to firms, stemming from the re-organization process after the deal, related essentially to bank growth or de-risking strategies. Furthermore, the implementation of such diversification and re-allocation policies can be heterogeneous across customers, leading to a more severe reduction of the consolidated bank's overall exposure towards specific firms, sectors, geographical areas, thus resulting in a "selective" reduction of credit for smaller and riskier customers. To study those effects during a crisis period and for different geographical areas, using matched bank-firm credit data over the period 2009-2019 and a Difference-in-Differences strategy, we investigate the heterogeneous effects of bank M&As on credit to firms, with a special attention on geographical differences. We focus on credit granted to Italian firms borrowing from banks involved in consolidations, as the evidence suggests that their borrowers could be the ones suffering the most from M&A shocks.

According to our econometric results, on average in the 3-year period following the event, the outstanding loans for firms financed by consolidated banks decline by around 2 percent, with a slightly stronger effect during the recovery period when many of these deals took place. The drop of credit is more severe: *i)* for firms borrowing from target banks involved in non-intra-group mergers than in acquisitions, as well as in turnaround deals; *ii)* when the target bank is not the firm's main intermediary or when the target bank is not a local mutual bank or it exhibits a lower share of branches in those provinces where the bidder was already present through almost a branch; *iii)* when the borrowing firms are medium-sized and riskier or when they are located in southern regions.

Focusing on southern firms financed by southern target banks and acquired by central-northern intermediaries, we find no significant impact on credit granted, signaling that the "South negative effect" we detected is mainly related to being a firm located in southern regions rather than to being a borrower of a southern bank or to the decision-making headquarters being moved towards the Centre and North.

There could be several causes as to why southern firms are more affected by M&A activities in the banking sector. We only point out that this "South negative effect" is mainly related to the "*additional risk premium*" faced by southern firms due a less business-friendly environment, characterized by inefficiency of justice and of administrative action, criminal

activities, poor infrastructures, etc. These context factors could create economic disadvantages for businesses through a selective credit rationing, increasing their risk premium especially after an M&A, when diversification portfolio and credit re-allocation strategies are more frequent.

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Tables

Table 1. *The Italian banking system* (1)

Types of banks	Centre and North			South		
	1995	2009	2019	1995	2009	2019
Banks in activity	707	655	393	313	216	137
of which: headquartered in the area	693	636	386	276	151	94
of which:						
Limited companies (banche spa)	156	217	112	43	29	8
Popular banks (banche popolari)	55	25	13	39	13	9
Mutual banks (banche di credito cooperativo)	424	312	182	194	109	77
Foreign banks (filiali di banche estere)	52	82	79	0	0	0
Others (2)	6	-	-	0	-	-
of which:						
Banks belonging to a banking groups	130	193	225	27	25	82
Independent banks	563	443	161	249	126	12
Banking groups headquartered in each area (3)	75	69	53	13	7	4
Banks belonging to a banking group headquartered to the area	140	211	306	18	9	5
Herfindahl-Hirschman Index (0-10.000)	250.0	261.5	697.9	425.7	314.2	723.5
Market share of loans to the first 3 banks (C3)	18.5	22.5	40.3	26.0	22.6	37.8
Market share of loans to the first 5 banks (C5)	28.0	29.4	50.5	36.8	33.2	49.0

Source: Authors' elaborations on the Bank of Italy's Supervisory Reports and Census of banks.
(1) Units at the end of the year. – (2) Including medium and long term financing institutions. – (3) The geographical reach of the banking groups is accounted according to the headquarters of the parent bank.

Table 2. *NPL ratio and equity ratio distribution*

Year	NPL ratio percentiles							Equity ratio percentiles						
	5°	10°	25°	50°	75°	90°	95°	5°	10°	25°	50°	75°	90°	95°
2009	0.1	1.2	5.3	8.9	13.5	18.9	25.6	2.6	5.1	7.5	9.7	12.9	17.6	24.2
2010	0.0	1.5	5.5	9.3	14.2	20.6	26.7	2.7	6.0	9.1	11.6	14.7	19.1	23.8
2011	0.1	1.8	6.6	10.7	16.2	23.0	29.3	3.5	6.3	9.4	11.7	14.7	19.4	23.6
2012	0.1	2.1	7.8	13.9	20.4	27.6	33.8	2.7	6.2	8.9	11.4	14.4	18.4	21.2
2013	0.1	2.9	9.6	16.8	24.1	32.6	40.5	3.0	6.6	9.4	12.0	14.9	18.9	22.1
2014	0.1	2.5	10.3	19.4	27.9	37.1	44.0	3.1	6.5	9.9	12.4	15.2	19.6	23.0
2015	0.1	1.9	10.0	20.0	28.6	37.8	46.7	2.7	6.6	10.8	13.5	16.5	19.9	22.8
2016	0.0	1.6	8.8	19.4	27.3	34.7	42.8	2.8	6.4	11.0	13.6	16.5	19.6	23.3
2017	0.0	0.9	6.6	16.6	24.5	32.1	37.5	2.6	6.3	10.9	13.8	16.7	20.2	23.7
2018	0.0	1.0	5.7	13.1	19.6	25.5	33.6	2.2	5.4	9.3	12.1	15.3	19.2	21.7
2019	0.0	0.6	4.6	10.7	15.9	20.8	28.1	1.5	5.3	9.1	11.4	14.8	18.8	21.4

Source: Authors' elaborations on the Bank of Italy's Supervisory Reports.

Table 3. *Matching regression (logit)*

Treatment= 1	(1) Target bank in M&As
Bank performance	
NPLs/total loans	0.040***
	(0.005)
ROE	-0.001
	(0.001)
ROA	-0.174***
	(0.031)
Liquidity ratio	0.127***
	(0.043)
Equity ratio	-0.010
	(0.008)
Costs/total assets	-15.343***
	(3.227)
Bank structural features	
Bank size (log tot assets)	-0.314***
	(0.053)
Mutual bank	0.726***
	(0.232)
Share loans to large firms	0.000
	(0.000)
Share loans to firms	0.004
	(0.004)
Share loans to SMEs	0.002
	(0.004)
Bank headquartered in North-West	-
Bank headquartered in North-East	0.048
	(0.181)
Bank headquartered in Centre	-0.055
	(0.187)
Bank headquartered in the South	-0.497**
	(0.229)
Bank headquartered in Islands	-1.036***
	(0.331)
Bank belonging to a banking group	3.265***
	(0.260)
Parent bank in a banking group	-2.587***
	(0.291)
Year FE	YES
Constant	1.771
	(1.182)
Pseudo R^2	0.196
Obs	5,567

Standard errors in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 4. *Matching results*

# matched neighbors	Treatment assignment Treated
0	13
1	8
2	7
3	8
4	32
5	268
Total	336

Table 5. *Statistical differences between target banks and their peers*

	(1) Treated banks		(2) Never treated banks, unmatched		(3) Never treated banks, matched		(4) Test on differences		(5) Sample sizes		
	mean	sd	mean	sd	mean	sd	b(2,1)	b(3,1)	N(1)	N(2)	N(3)
Bank size *(log total assets*	20.17	1.74	20.18	1.95	20.35	1.54	0.01	0.18*	1,193	2,478	2,320
NPLs/total loans	16.73	10.64	11.32	9.63	17.21	12.36	-5.41*	0.48	1,182	2,316	2,310
ROE	-0.48	9.02	5.06	19.10	2.73	14.86	5.54*	3.21*	1,167	2,294	2,230
ROA	-0.20	1.50	0.18	2.51	-0.06	1.78	0.38*	0.14*	1,167	2,426	2,282
Liquidity ratio	0.62	0.40	0.48	0.40	0.51	0.42	-0.14*	-0.11*	1,186	2,158	2,288
Equity ratio	12.68	5.99	12.03	8.54	13.15	7.06	-0.64*	0.47*	1,193	2,478	2,320
Costs/total assets	0.04	0.03	0.06	0.13	0.04	0.04	0.03*	-0.00	1,193	2,478	2,320
Mutual bank	0.61	0.49	0.52	0.50	0.58	0.49	-0.10*	-0.03	1,194	2,479	2,321
Share loans to large firms	0.78	0.58	1.07	0.78	0.98	0.73	0.29*	0.20*	1,162	1,900	2,115
Share loans to firms	64.01	12.90	61.59	17.81	62.32	17.56	-2.42*	-1.69*	1,162	1,913	2,115
Share loans to SMEs	38.01	18.49	39.00	20.53	39.06	20.33	0.99	1.05	1,162	1,913	2,115
Bank belonging to a banking group	0.32	0.47	0.16	0.37	0.22	0.41	-0.17*	-0.11*	1,194	2,479	2,321
Parent bank in a banking group	0.07	0.25	0.13	0.34	0.10	0.30	0.06*	0.03*	1,194	2,479	2,321

Table 6. *Comparison of firms of treated and control banks (1).*

	Control group		Treatment group		Differences	Number of observations	
						Control	Treatment
	mean	sd	mean	sd	t-test		
Risky firms (2) (3)	0.25	0.43	0.26	0.44	-0.02[*]	2,018,319	509,659
Firm age – number of years (2)	18.93	14.19	19.02	14.86	-0.09[*]	2,481,320	623,539
Firm sales – thousands of euros (2)	8,331.56	23,090.37	9,302.53	24,831.42	-970.97[*]	2,048,885	517,566
Employees – units (4)	23.28	54.89	25.27	58.24	-1.99[*]	2,661,779	655,103
Bank relationships – units	6.25	7.06	7.11	7.80	-0.86[*]	4,872,099	1,123,879
Single relationship firm (5)	0.18	0.38	0.15	0.36	0.02[*]	4,872,099	1,123,879
Granted total loans – thousands of euros	2,079.58	6,334.32	2,495.79	7,110.24	-416.21[*]	4,872,099	1,123,879

(1) Employees, firm sales, bank relationships and total loans are winsorized at the 1st and 99th percentiles. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. – (2) Subsample of firms registered in Cerved archive. – (3) Share of firms for which Cerved computes a Z-score equal to 7, 8, 9 or 10. – (4) Subsample of firms registered in the INPS archive. – (5) Share of firms having a single bank relationship.

Table 7. *Firm-observation by year of observation and year of treatment.*

	Year of the M&A event										
	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	Total
2009	792,341	628,062	297,819								1,718,222
2010	786,192	665,795	315,832	473,321							2,241,140
2011	726,455	622,871	331,928	500,510	695,235						2,876,999
2012	668,274	574,820	307,738	522,945	724,014	296,925					3,094,716
2013		529,365	284,012	483,622	753,038	306,977	360,188				2,717,202
2014			261,799	444,382	693,861	317,659	375,724	1,285,024			3,378,449
2015				408,924	637,553	296,258	393,413	1,347,499	273,746		3,357,393
2016					587,872	275,646	367,029	1,418,275	288,068	230,267	3,167,157
2017						258,984	344,457	1,316,512	303,958	242,158	2,466,069
2018							324,863	1,225,190	283,906	256,773	2,090,732
2019								1,143,409	265,554	242,973	1,651,936
Total	2,973,262	3,020,913	1,799,128	2,833,704	4,091,573	1,752,449	2,165,674	7,735,909	1,415,232	972,171	28,760,015

Table 8. *Descriptive evidence on the estimation sample*

	Full sample		Cerved subsample	
	Number of observations	%	Number of observations	%
		By firms' sector		
Manufacturing	5,558,742	19.3	3,598,271	28.4
Construction	3,686,970	12.8	1,637,508	12.9
Services	16,387,802	57.0	6,437,597	50.9
Other activities	3,051,013	10.6	977,302	7.7
Not classified	75,488	0.3	0	0.0
		By firms' headquarter		
Centre and North	22,997,167	80.0	10,238,335	80.9
South	5,762,848	20.0	2,412,343	19.1
		By firms' size		
<=20 employees	25,008,846	87.0	9,073,041	71.7
21-50 employees	2,111,701	7.3	1,979,449	15.7
>50 employees	1,639,468	5.7	1,598,188	12.6
Total firms	28,760,015	100.0	12,650,678	100.0
Credit granted (1)	381,788	-	943,008	-

Source: Authors' elaborations on Central Credit Register, Cerved and INPS data.
(1) Mean value in euros.

Table 9. *The effects of bank M&As on total firm loans by the timing of the deal* (1)

	Baseline	Crisis period: 2009-14	Non-crisis period: 2015-19	Timing of the deal
	(I)	(II)	(III)	(IV)
Post*M&A	-0.018***	-0.016***	-0.021***	
	(0.003)	(0.004)	(0.004)	
Treatment*(t-3)				-0.001
				(0.004)
Treatment*(t-2)				-0.001
				(0.003)
Treatment*(t)				-0.011***
				(0.002)
Treatment*(t+1)				-0.021***
				(0.003)
Treatment*(t+2)				-0.029***
				(0.004)
R^2	0.950	0.951	0.950	0.950
Adjusted R^2	0.936	0.936	0.936	0.936
F-Stat	37.39	15.24	24.11	10.82
Obs	28,760,015	14,718,580	14,041,435	28,760,015

(1) Dependent variable: log of credit granted to a given firm f at the end of each year t during the period 2009-2019. Regressions include industry-size-location-year group fixed effects, firm fixed effects and the main bank fixed effects, all interacted with M&A operation fixed effects. Standard errors in parentheses are double clustered at M&A operation-firm and M&A operation-bank level. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table 10. *The effects of bank M&As on total firm loans by type of deal and main purpose* (1)

	Baseline	By type of M&A			By M&A purpose	
		Intra-Group Mergers	Other Mergers	Acquisitions	Turnaround M&As	Other M&As
	(I)	(II)	(III)	(IV)	(V)	(VI)
Post*M&A	-0.018***	-0.014***	-0.027***	-0.018***	-0.028***	-0.013***
	(0.003)	(0.004)	(0.005)	(0.006)	(0.005)	(0.004)
R^2	0.950	0.951	0.949	0.947	0.949	0.951
Adjusted R^2	0.936	0.937	0.934	0.933	0.933	0.937
F-Stat	37.39	9.94	31.31	8.55	37.34	11.69
Obs	28,760,015	17,765,355	6,405,495	4,589,165	10,829,329	17,930,686

(1) Dependent variable: log of credit granted to a given firm f at the end of each year t during the period 2009-2019. Regressions include industry-size-location-year group fixed effects, firm fixed effects and the main bank fixed effects, all interacted with M&A operation fixed effects. Standard errors in parentheses are double clustered at M&A operation-firm and M&A operation-bank level. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table 11. *The effects of bank M&As on total firm loans by the role of target bank in credit relations* (1)

	Baseline (I)	Main bank (II)	Non-main bank (III)
Post*M&A	-0.018***	-0.010***	-0.019***
	(0.003)	(0.004)	(0.003)
R^2	0.950	0.936	0.940
Adjusted R^2	0.936	0.916	0.921
F-Stat	37.39	7.97	35.37
Obs	28,760,015	15,443,951	13,124,411

(1) Dependent variable: log of credit granted to a given firm f at the end of each year t during the period 2009-2019. Regressions include industry-size-location-year group fixed effects, firm fixed effects and the main bank fixed effects, all interacted with M&A operation fixed effects. Standard errors in parentheses are double clustered at M&A operation-firm and M&A operation-bank level. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table 12. *The effects of bank M&As on total firm loans by the geographical reach of bank-firm relationships and the target bank's institutional form* (1)

	Baseline	By relevance of share of the target's branches located in the provinces where the bidder operates through at least a branch (2)		By the target's institutional form	
		High	Low	Mutual bank	Other banks
	(I)	(II)	(III)	(IV)	(V)
Post*M&A	-0.018***	-0.010**	-0.024***	-0.014***	-0.019***
	(0.003)	(0.004)	(0.004)	(0.004)	(0.003)
R^2	0.950	0.953	0.948	0.947	0.950
Adjusted R^2	0.936	0.939	0.934	0.931	0.936
F-Stat	37.39	5.88	33.70	10.50	31.86
Obs	28,760,015	12,044,620	16,715,395	3,578,426	25,181,589

(1) Dependent variable: log of credit granted to a given firm f at the end of each year t during the period 2009-2019. Regressions include industry-size-location-year group fixed effects, firm fixed effects and the main bank fixed effects, all interacted with M&A operation fixed effects. Standard errors in parentheses are double clustered at M&A operation-firm and M&A operation-bank level. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. – (2) M&As with "high branch concentration" are defined as those where the target bank has at province-level a branch market share greater than 75 percent and where its bidder is already present with its branches; the other deals are defined as M&As with "low branch concentration".

Table 13. *The effects of bank M&As on total firm loans according to firms' characteristics* (1)

	Baseline	By firms' headquarters		By firm size according to the number of employees (2)			By firm size according to the sales distribution				By firm riskiness (3)		
		Southern firms	Other firms	Small	Medium	Large	I quartile	II quartile	III quartile	IV quartile	Safe	Vulnerable	Risky
	(I)	(II)	(III)	(IV)	(V)	(VI)	(VII)	(VIII)	(IX)	(X)	(XI)	(XII)	(XIII)
Post*M&A	-0.018***	-0.035***	-0.016***	-0.018***	-0.031***	-0.013**	-0.014**	-0.026***	-0.021***	-0.018***	-0.002	-0.011**	-0.027***
	(0.003)	(0.007)	(0.003)	(0.003)	(0.005)	(0.007)	(0.006)	(0.005)	(0.004)	(0.004)	(0.004)	(0.005)	(0.006)
R^2	0.950	0.936	0.953	0.932	0.912	0.925	0.901	0.873	0.869	0.912	0.965	0.951	0.915
Adjusted R^2	0.936	0.916	0.939	0.913	0.881	0.898	0.864	0.827	0.820	0.878	0.952	0.932	0.877
F-Stat	37.39	26.58	25.75	32.68	39.71	4.20	6.41	25.17	23.22	16.94	0.13	5.29	20.81
Obs	28,760,015	5,762,848	22,997,167	25,008,846	2,111,701	1,639,464	2,855,432	3,141,573	3,190,920	3,234,078	5,402,317	4,031,297	2,828,101

(1) Dependent variable: log of credit granted to a given firm *f* at the end of each year *t* during the period 2009-2019. Regressions include industry-size-location-year group fixed effects, firm fixed effects and the main bank fixed effects, all interacted with M&A operation fixed effects. Standard errors in parentheses are double clustered at M&A operation-firm and M&A operation-bank level. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. – (2) Small firms are defined as those with less than 20 employees; medium firms as those with a number of employees between 20 and 50; large firms as those with more than 50 employees. – (3) Subsample of firms for which Cerved computes the Z-score. Safe firms are defined as those with Z-score lower than 5; vulnerable firms as those with Z-score equals to 5 or 6; risky firms as those with Z-score equals to 7, 8, 9 and 10.

Table 14. *The effects of bank M&As on total firm loans for southern firms* (1)

	Baseline	Southern firms (2)	By size of southern firms (3)		By ex-ante riskiness of southern firms (4)	
			Small firms	Medium-large firms	Sound firms	Non sound firms
	(I)	(II)	(III)	(IV)	(V)	(VI)
Post*M&A	-0.018***	-0.035***	-0.046***	-0.034***	-0.026***	-0.039***
	(0.003)	(0.007)	(0.010)	(0.009)	(0.008)	(0.010)
R^2	0.950	0.936	0.881	0.916	0.956	0.919
Adjusted R^2	0.936	0.916	0.839	0.883	0.938	0.889
F-Stat	37.39	26.58	19.66	14.43	9.84	15.29
Obs	28,760,015	5,762,848	1,384,102	1,023,075	845,144	1,510,076

(1) Dependent variable: log of credit granted to a given firm *f* at the end of each year *t* during the period 2009-2019. Regressions include industry-size-location-year group fixed effects, firm fixed effects and the main bank fixed effects, all interacted with M&A operation fixed effects. Standard errors in parentheses are double clustered at M&A operation-firm and M&A operation-bank level. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. – (2) Total sample of southern firms with credit lines registered in the Central Credit Register. – (3) Subsample of firms with balance sheets registered in the Cerved archive. Small firms are defined as those for which, in the year before the M&A event, total sales were below the median value. – (4) Subsample of firms for which Cerved computes the Z-score. Sound firms are defined as those with Z-score lower than 5; non sound firms as those with Z-score between 5 and 10.

Table 15. *Effects of M&As on credit for firms borrowing from the target banks: detecting the "South effect"* (1)

	Baseline	Southern firms	Southern firms and southern target banks	Southern firms and southern target banks, non-southern bidders	Overall "South effect"
	(I)	(II)	(III)	(IV)	(V)
Post*M&A	-0.018***	-0.016***	-0.017***	-0.018***	-0.016***
	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)
Post*M&A*Southern firm		-0.019***			-0.024**
		(0.007)			(0.010)
Post*M&A*Southern firm*Southern target bank			-0.015*		-0.000
			(0.009)		(0.014)
Post*M&A*Southern firm*Southern target bank*Central-northern bidder bank				-0.012	0.011
				(0.011)	(0.015)
R^2	0.950	0.950	0.950	0.950	0.950
Adjusted R^2	0.936	0.936	0.936	0.936	0.936
F-Stat	37.40	24.33	21.58	19.74	15.52
Obs	28,760,015	28,760,015	28,760,015	28,760,015	28,760,015

(1) Dependent variable: log of credit granted to a given firm f at the end of each year t during the period 2009-2019. Regressions include industry-size-location-year group fixed effects, firm fixed effects and the main bank fixed effects, all interacted with M&A operation fixed effects. Standard errors in parentheses are double clustered at M&A operation-firm and M&A operation-bank level. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table 16. *Robustness checks: alternative definitions of the dependent variable* (1)

	Baseline (2) (3)	Dependent variable: Δlog(Credit granted) (2)	
	(I)	(II)	(III)
Post*M&A	-0.018***	-0.013***	
	(0.003)	(0.003)	
Treatment*(t-3)			0.000
			(.)
Treatment*(t-2)			0.002
			(0.002)
Treatment*(t)			-0.010***
			(0.003)
Treatment*(t+1)			-0.012***
			(0.003)
Treatment*(t+2)			-0.016***
			(0.004)
R^2	0.950	0.319	0.319
Adjusted R^2	0.936	0.068	0.068
F-Stat	37.39	17.81	6.72
Obs	28,760,015	22,673,834	22,673,834

(1) Regressions include industry-size-location-year group fixed effects, firm fixed effects and the main bank fixed effects, all interacted with M&A operation fixed effects. Standard errors in parentheses are double clustered at M&A operation-firm and M&A operation-bank level. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. – (2) Difference-in-Differences with fixed effects estimates. – (3) Dependent variable: log of credit granted to a given firm f at the end of each year t during the period 2009-2019. – (4) Linear probability. Dependent variable: dummy equal to 1 if the loan is classified as bad loan.

Table 17. *Robustness checks: perturbation in the sample and controlling for firm risk* (1)

	Baseline (2)	Perturbation in the sample (2)				Controlling for firms' risk (3)	
		Winsorizing the total credit granted to each firm at the top and the bottom 5 percent of the distribution		Subsample excluding the top 5 percent in the distribution of number of banking relationships			
	(I)	(II)	(III)	(IV)	(V)	(VI)	(VII)
Post*M&A	-0.018***	-0.014***		-0.018***		-0.010***	
	(0.003)	(0.003)		(0.003)		(0.004)	
Treatment*(t-3)			-0.002		-0.002		-0.005
			(0.004)		(0.004)		(0.006)
Treatment*(t-2)			-0.002		-0.002		-0.003
			(0.002)		(0.003)		(0.003)
Treatment*(t)			-0.009***		-0.010***		-0.008***
			(0.002)		(0.002)		(0.003)
Treatment*(t+1)			-0.017***		-0.020***		-0.013***
			(0.003)		(0.003)		(0.004)
Treatment*(t+2)			-0.023***		-0.029***		-0.018***
			(0.004)		(0.004)		(0.005)
R^2	0.950	0,948	0.948	0.940	0.940	0.951	0.951
Adjusted R^2	0.936	0,932	0.932	0.922	0.922	0.933	0.933
F-Stat	37.39	28,31	7.35	33.38	10.14	7.91	3.05
Obs	28.760.015	25.769.399	25,769,399	27,286,865	27,286,865	12,261,717	12,261,717

(1) Dependent variable: log of credit granted to a given firm *f* at the end of each year *t* during the period 2009-2019. Standard errors in parentheses are double clustered at M&A operation-firm and M&A operation-bank level. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. – (2) Regressions include industry-size-location-year group fixed effects, firm fixed effects and the main bank fixed effects, all interacted with M&A operation fixed effects. – (3) Regressions include risk-industry-size-location-year group fixed effects, firm fixed effects and the main bank fixed effects, all interacted with M&A operation fixed effects.

Table 18. *Robustness checks: controlling for southern firms' risk and size* (1)

	Southern firms	Southern firms' risk	Southern firms' risk and size
	(I)	(II)	(III)
Post*M&A	-0.008**	-0.003	-0.009**
	(0.004)	(0.004)	(0.004)
Post*M&A*Southern firms	-0.021***	-0.028***	-0.022***
	(0.008)	(0.008)	(0.009)
Post*M&A*Risky firms		-0.024***	
		(0.006)	
Post*M&A*Southern firms* Risky firms		0.029**	
		(0.011)	
Post*M&A*Small firms			0.002
			(0.004)
Post*M&A*Southern firms* Small firms			0.002
			(0.010)
R^2	0.951	0.951	0.951
Adjusted R^2	0.933	0.933	0.933
F-Stat	9.82	10.01	5.35
Obs	12,261,717	12,261,717	12,261,717

(1) Dependent variable: log of credit granted to a given firm f at the end of each year t during the period 2009-2019. Standard errors in parentheses are double clustered at M&A operation-firm and M&A operation-bank level. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. Regressions include risk-industry-size-location-year group fixed effects, firm fixed effects and the main bank fixed effects, all interacted with M&A operation fixed effects.

Table 19 *Robustness checks: alternative matching requirements* (1)

	Baseline	Alternative	Baseline	Alternative
	(I)	(II)	(III)	(IV)
Post*M&A	-0.018***	-0.019***		
	(0.003)	(0.005)		
Treatment*(t-3)			-0.001	-0.003
			(0.004)	(0.005)
Treatment*(t-2)			-0.001	0.004
			(0.003)	(0.003)
Treatment*(t)			-0.011***	-0.009***
			(0.002)	(0.003)
Treatment*(t+1)			-0.021***	-0.021***
			(0.003)	(0.005)
Treatment*(t+2)			-0.029***	-0.028***
			(0.004)	(0.007)
R^2	0.950	0.952	0.950	0.952
Adjusted R^2	0.936	0.937	0.936	0.937
F-Stat	37.39	15.04	10.82	5.03
Obs	28,760,015	7,251,121	28,760,015	7,251,121

(1) Dependent variable: log of credit granted to a given firm f at the end of each year t during the period 2009-2019. Regressions include industry-size-location-year group fixed effects, firm fixed effects and the main bank fixed effects, all interacted with M&A operation fixed effects. Standard errors in parentheses are double clustered at M&A operation-firm and M&A operation-bank level. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table 20. *Robustness checks: panel estimates* (1)

	Baseline (2)	Baseline panel (3)	Lagged (3)	Small firms (3) (4)	Southern firms (3)	Small and southern firms (3) (4)
	(I)	(II)	(II)	(III)	(IV)	(V)
Target		-0.024***	0.014**	0.013**	0.008	0.006
		(0.006)	(0.006)	(0.006)	(0.009)	(0.009)
Bidder		0.017***	0.049***	0.049***	0.050***	0.050***
		(0.006)	(0.005)	(0.005)	(0.007)	(0.007)
Both		-0.037***	0.075***	0.067***	0.053***	0.040***
		(0.013)	(0.010)	(0.010)	(0.013)	(0.012)
L1.Target			-0.017***	-0.018***	-0.023***	-0.023***
			(0.004)	(0.004)	(0.007)	(0.007)
L1.Bidder			-0.003	-0.002	-0.010	-0.011
			(0.006)	(0.006)	(0.010)	(0.010)
L1.Both			-0.010	-0.017**	0.007	0.006
			(0.008)	(0.008)	(0.017)	(0.018)
L2.Target			-0.046***	-0.046***	-0.052***	-0.051***
			(0.004)	(0.004)	(0.011)	(0.011)
L2.Bidder			-0.038***	-0.037***	-0.050***	-0.049***
			(0.005)	(0.005)	(0.011)	(0.012)
L2.Both			-0.151***	-0.157***	-0.226***	-0.229***
			(0.012)	(0.013)	(0.013)	(0.013)
R^2		0.890	0.912	0.899	0.894	0.881
Adjusted R^2		0.871	0.895	0.879	0.871	0.856
F-Stat		14.80	81.95	83.25	52.67	47.45
Obs		15,020,839	10,034,525	9,534,520	2,115,560	2,029,115

(1) Dependent variable: log of credit granted to a given firm f at the end of each year t during the period 2009-2019. Regressions include industry-size-location-year group fixed effects, firm fixed effects and main bank fixed effects. Standard errors in parentheses are double clustered at M&A operation-firm and M&A operation-bank level. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. – (2) Difference-in-Differences with fixed effects estimates. The fixed effects for this model are all interacted with M&A operation fixed effects. – (3) Panel estimates. – (4) Small firms are defined as those with less than 20 employees.
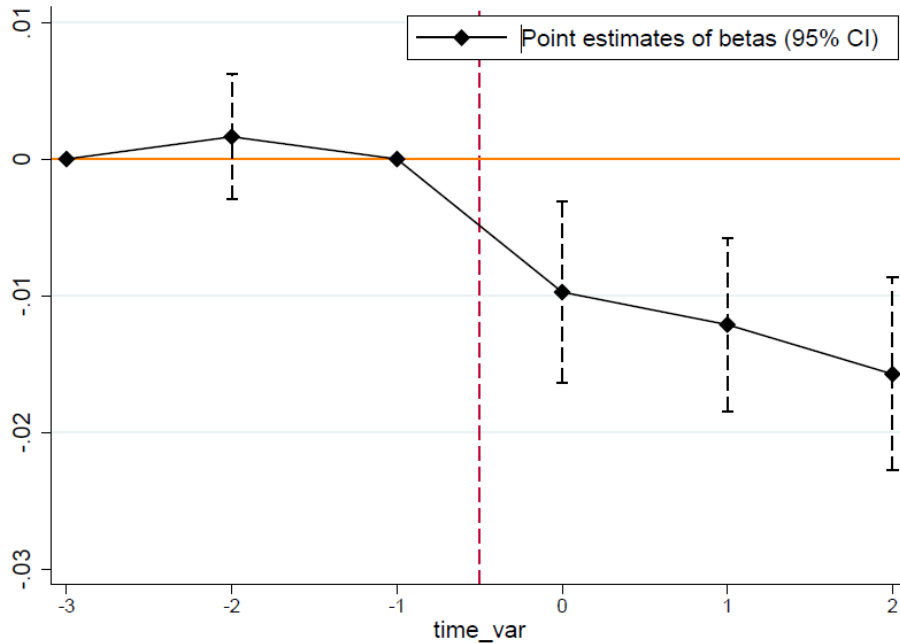
Figure a1: *The effects of bank M&As on total firm loans by the timing of the deal* (1)
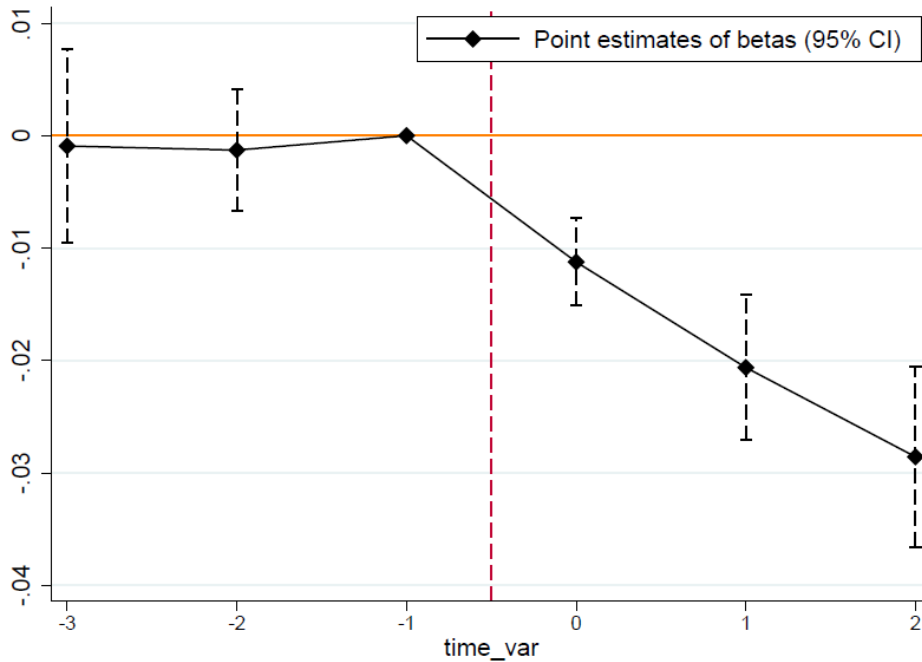
(1) The timelines refers to the year of the M&A. The graph shows the point estimates and confidence intervals of a regression where the dependent variable is the log of credit granted to a given firm *f* by a given bank *b* at the end of each year *t* during the period 2009-2019. The regression includes, among regressors, industry-size-location-year group fixed effects, firm fixed effects and the main bank fixed effects, all interacted with M&A operation fixed effects.

Figure a2: *The effects of bank M&As on the growth of total firm loans by the timing of the deal* (1)

(1) The timelines refers to the year of the M&A. The graph shows the point estimates and confidence intervals of a regression where the dependent variable is the difference in logarithm of the credit granted to a given firm *f* by a given bank *b* for each year *t* during the period 2009-2019. The regression includes, among regressors, industry-size-location-year group fixed effects, firm fixed effects and the main bank fixed effects, all interacted with M&A operation fixed effects.

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Figure a3. *Robustness checks: alternative matching requirements* (1)
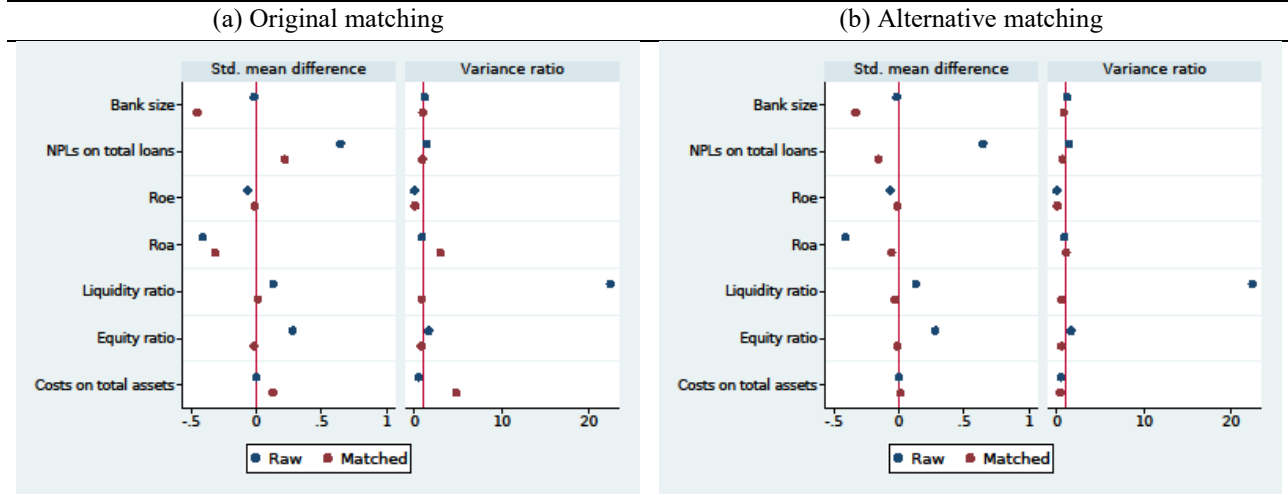
| (a) Original matching | (b) Alternative matching |

Source: Authors' elaboration on Bank of Italy's Supervisory Reports and Census of banks.
(1) The one in panel a is a 5-nearest-neighbor match with an exact matching on bank type, macro-region of the bank's headquarters, membership and role in a group, and year of the deal; it includes a caliper of 0.25 and the common support requirement for treated banks. The matching in panel b requires exactly 5 nearest neighbors, an additional exact matching on banks' class size, an upper bound on the propensity score at 0.8 and a caliper of 0.1.

Figure a4. *Robustness checks: alternative matching requirements, propensity score distribution* (1)
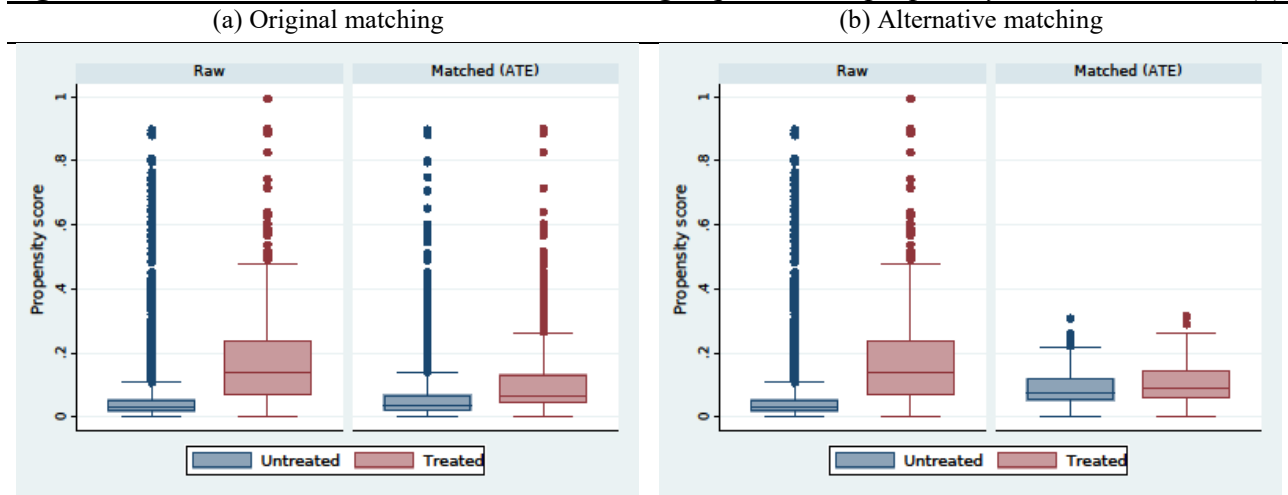
| (a) Original matching | (b) Alternative matching |

Source: Authors' elaboration on Bank of Italy's Supervisory Reports and Census of banks.
(1) The one in panel a is a 5-nearest-neighbor match with an exact matching on bank type, macro-region of the bank's headquarters, membership and role in a group, and year of the deal; it includes a caliper of 0.25 and the common support requirement for treated banks. The matching in panel b requires exactly 5 nearest neighbors, an additional exact matching on banks' class size, an upper bound on the propensity score at 0.8 and a caliper of 0.1.

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