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WEAK INSTITUTIONS AND CREDIT AVAILABILITY: THE IMPACT OF CRIME ON BANK LOANS

by

Emilia Bonaccorsi di Patti[*]

Abstract

This paper analyzes the relationship between the terms on bank loans and local crime rates, employing a sample of over 300,000 bank-firm relationships. Controlling for firm, market and bank characteristics the results show that where the crime rate is higher borrowers pay higher interest rates, pledge more collateral, and resort less to asset-backed loans and more to revolving credit lines than borrowers in low-crime areas. The evidence also suggests that access to credit is adversely affected by crime. The offenses that affect the loan market are those that exogenously increase firm fragility (extortion, organized crime) and raise loss given default (fraud, fraudulent bankruptcy).

JEL Codes: G21, K42, O16, O17.

Keywords: crime, governance and growth, financial development, credit markets, banks.

Contents

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1. Introduction[1]

The economic literature widely recognizes that poor governance and weak institutions have substantial repercussions on economic growth. The rent-seeking activities that flourish in the absence of effective protection of property rights can worsen a country's economic performance (Murphy, Shleifer and Vishny, (1993)).

The recent availability of measures of governance, quality of institutions and corruption has stimulated a growing body of empirical work on the effect of these factors on economic and financial variables (e.g. Kaufman, Kraay and Zoido-Lobaton (1999), Kaufman, Kraay and Mastruzzi 2007), Keefer and Knack (1995); and Mauro (1995)). The general conclusion is that the economic impact of governance is large. Institutional quality is the most important factor explaining cross-country differences in income levels, physical capital accumulation and factor productivity (Rodrik, Subramanian, and Trebbi (2004)).

There are many potential channels through which governance influences the decisions of economic agents and, consequently, investment and growth. One is that economic agents may have incentives to invest less because they fear expropriation of returns (Besley eand Coate (1995); Johnson, McMillan, and Woodruff, (2002)). In high crime countries, potential entrepreneurs have to face the risk of losses due to expropriation and additional costs for security and protection.

Evidence from survey data (World Bank 2005) shows that security and protection costs can amount to as much as 23 percent, and that losses due to crime are around 4.6 percent. The proportion of firms identifying crime, theft and disorder as major or severe obstacles to business operation and growth ranges from 17 percent in Europe and Central Asia to more than 50 percent in Latin American and the Caribbean. Even within developed countries crime can seriously affect the urban population and have indirect consequences on local economic conditions (Cullen and Levitt (1999)).

One sector of the economy where weak governance is likely to have a major impact is the bank credit market. Given the importance of credit availability for investment, inefficiencies in the banking sector are likely to have repercussions on growth. A first, direct, effect of crime on credit supply conditions is that on the costs of operating a bank. In high-crime areas banks will have to spend more on security and protection. Because they manage cash, banks face a higher risk of robbery than other businesses. When the higher costs of counter-measures are passed on to borrowers and consumers, crime reduces the equilibrium demand for banking services.

A second effect of crime is that in high-crime areas the quality of borrowers is more difficult to assess. Not only are borrowers are more fragile, but the signals that banks typically use to evaluate credit risk provide less information. In a world with asymmetric information, banks may be less willing to lend in high-crime areas because they cannot fully incorporate the higher default risk in the interest rate. Hold-up and moral hazard

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[1] The opinions expressed do not necessarily reflect those of the Bank of Italy or its staff. I thank for their suggestions Ugo Albertazzi, Nicola Coniglio, Antonio Falato and participants at the 2008 FIRS Conference in Anchorage and the Bank of Italy workshop in Perugia (February 2009). For comments on an earlier version, I also thank participants in the Micro Brown Bag Seminar at the Booth School of Business of the University of Chicago, and in the Offshore and Underground Finance Conference (October 2007) at Bocconi University.

problems could be worse in high crime areas if borrowers are more opaque because they have to hide payments for protection. If asymmetric information problems are severe and risk levels very high, there could be substantial credit rationing, especially if the banks do not know the local market very well. Demirguc Kunt and Maximovic (2005) find that intuitive descriptors of an efficient legal system, for example the efficiency of the court system, play a minor role in affecting firm growth, whereas corruption matters especially for small firms that are more financially constrained.

Finally, uncertainty about the future behavior of the parties involved is one of the key characteristics of financial transactions. A high incidence of fraud is likely to reduce the propensity of potential lenders to grant a loan not backed by collateral, because of the lower expected return. Empirical evidence shows that trust affects the degree of financial development and the mix of financial instruments that a community uses (Guiso, Sapienza and Zingales (2004)).

Based on data on Italian provinces, this study explores the empirical effect of crime on the supply of credit to firms and the characteristics of loan contracts, investigating the different mechanisms of high operating costs, risk, information opaqueness and trust. Italy has wide and relatively persistent differences in economic development, crime rates and financial development. Microeconomic data on a very large number of bank loans is available from the Central Credit Register. Information on the lender and the borrower for each loan can be used to control for a number of bank and borrower characteristics.

One important advantage of within-country data is that they make it possible to abstract from differences in the legal systems and focus on one outcome of poor governance, namely crime, controlling for local economic conditions.[2] The results from cross-country studies are more strongly affected by omitted variables. The second advantage of bank-firm data from one country is that the same banks are lending to similar firms located in different regions and many firms have multiple relationships, thus giving researchers a robust way of controlling for bank and borrower characteristics. Finally, the richness of the data is such as to permit testing a number of hypotheses on why crime affects credit terms and conditions.

This paper is related to the literature on the social cost of crime. Most of the relevant studies take the approach of adding up the losses from crime, including the value of lives lost due to murder, the resources spent on crime prevention, and other indirect costs (Anderson (1999)). Other studies estimate the social cost of crime by examining housing prices in communities with different levels of crime (Thaler (1975)). There is little evidence on the costs of crime in terms of underinvestment. Survey data indicate that entrepreneurs take the probability of expropriation and the costs of crime into account when they make business location choices (e.g. GEM (2000); British Chambers of Commerce (2004); Krkoska and Robeck (2006)).

This paper also relates to the literature on institutions and growth, as the availability of bank credit is a key factor of development, particularly for small firms. Recent cross-country studies find a positive relation between indices measuring the degree of rule of law or law enforcement and financial development, even when differences in the legal systems are taken into accounted.[3] The

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[2] In most studies that focus on the formal aspects of the law it is often difficult to separate the effect of these variables from the actual efficacy of the institutions. In particular, systems with laws that imply advanced protection of property rights, creditor rights, etc., tend to be characterized by relatively better law enforcement as well.

[3] A different strand of literature relates growth, financial development and the law (see Beck and Levine, 2003 for a survey), focusing on the content of the law in terms of property rights, creditor rights and investor protection.

positive effect of institutions on financial development is independent from the direct effect that these variables have on growth. Furthermore, there is evidence supporting the view that the effectiveness of institutions is as important as the legal design. Bae and Goyal (2009) find that terms on syndicated loans for a large sample of firms from different countries are influenced more strongly by the degree of enforceability of contracts than by indicators of creditor rights protection. Investigating the effects of crime on the functioning of credit markets can therefore be of more general relevance, given the impact that financial development and better access to credit have on growth.

The main results are the following. Firms located in high-crime areas pay interest rates that are around 30 basis points higher than those paid by similar firms in low-crime areas, comparing firms in provinces at the 25th and 75th percentiles of the distribution of the crime rate. Considering underreporting in crime statistics, the effect is much larger. The data provide evidence of heterogeneous effects of crime in relation to firm size (the spread charged to small firms is affected by crime). Furthermore, the incidence of crime is positively correlated with the share of collateralized loans and with differences in the composition of borrowing by firms. In further detail, the share of revolving credit lines is positively correlated with crime and the share of asset-backed lending (lending against accounts receivable) is negatively correlated. The data also suggest that the presence of crime where the firm operates reduces access to credit.

2. The data

A. Data on bank-borrower relationships

The data on the cost of credit, loan composition and collateral are obtained from the Central Credit Register, a system managed by the Bank of Italy that tracks the credit exposures of the clients of resident banks. Banks can submit inquiries to it about loan applicants, ,specifically regarding their total amount of borrowing outstanding and default history, in order to check their creditworthiness. The Central Credit Register includes borrowers with loan commitments or loans in place that exceed the threshold of €75,000.

The first source of data consists of the cross-section of all bank-borrower relationships observed at the end of the year 2000 referring to businesses. Banks report the size of the commitment, the type of loan, the amount of credit actually disbursed and whether the loan is collateralized. This information is also divided by type of loans, considering: i) loans backed by accounts receivable, ii) term loans, and iii) revolving credit lines. A subset of 68 banks also provides information on the interest rates charged on each of these types of loan.

The data on bank-firm relationships are then matched with information from firms' balance sheets and income statements in Cerved, a proprietary data base that collects information on approximately 500,000 firms yearly based on Italy's official company register. In the case of small firms, balance sheet information is limited to the main items. Cerved also provides a z score measuring the probability of default of the firm computed with linear discriminant analysis (see Altman, Marco and Varetto (1994) for details of the method), described below.

The resulting data set includes more than 515,000 bank-firm relationships referring to some 170,000 borrowers and 839 banks. The interest rate data are available for almost 330,000 relationships and 67 banks. In the main regressions only the complete data are used; in robustness tests the relationships of firms for which the Cerved data are missing

(sole proprietorships) are also used. The data on interest rates is winsorized at the 1st and 99th percentiles since extreme values tend to reflect measurement error.

B. Crime data

Crime data are published by the Italian National Institute of Statistics (Istat). The variable *CRIME* is the ratio of the total number of offenses in a province for which the authorities have opened a judicial procedure to the province's population. Yearly data for the period 1997-2000 are averaged over time. As discussed below, crime rates are computed for total offenses and for a number of different categories of crime. The use of province-level crime rates is consistent both with the definition of relevant credit markets adopted by the Italian Antitrust Authority in regard to small businesses and with prior research (Guiso et al. (2005)).

In general, crime statistics are biased by underreporting, especially as regards minor offenses. Underreporting is likely to affect areas with different true crime rates unequally, although the bias could go both ways. One advantage of the Italian data is that it is possible in part to control for differences across regions in the propensity to report a crime. Istat runs a survey in which participants are asked if they were victims of a crime, whether they reported it to the police, and, if not, why. The percentage of reported crimes varies significantly across Italy and can be employed as an inverse proxy of underreporting. The survey data refer to 1997-98 and can be aggregated by macro-regions (Italy has 5 of these in official statistics); unfortunately, the sample is too small to be representative for smaller aggregations such as provinces. The offenses included in the survey are defined as "crimes against the individual" and include theft, robbery and assault.

In the regressions the adjustment for underreporting is performed by including the variable *REPORT* among the explanatory variables. In robustness tests the types of crime that are subject to underreporting are corrected by multiplying the official rates by *1/REPORT*. One of the main reasons why respondents do not report a crime is that they think that the police cannot solve the problem; therefore, the coefficient of the variable *REPORT* is of interest in itself because it captures the effect on credit markets of the level of popular trust in the effectiveness of the police.

Table 1 reports descriptive statistics for the crime rate and other province-level variables for the 95 Italian provinces.

C. Environmental variables

Local credit market conditions are affected by the degree of competition in the banking industry and other supply characteristics. The other control variables are obtained from Istat and supervisory statistical reports to the Bank of Italy. The data are annual observations for 2000.

One important variable to be considered is the inefficiency of the courts in the different provinces, which has been shown to affect the development of credit markets (Bianco, Jappelli and Pagano (2005)) and the extent to which households are financially constrained (Fabbri and Padula (2004)). Although there is no evidence that it affects the cost of credit, it is likely to have an impact on other loan characteristics, which would be consistent with international evidence (Qian and Strahan (2005)). The variable *INEFF*, employed as a control, measures the average number of days it took to complete a first-level court civil trial in 1998 and is obtained from Istat (see Guiso, Sapienza and Zingales (2004)).

Other environmental variables control for economic and credit market conditions in each province: the log of value added for aggregate demand conditions and for differences in size between provinces (*LNGDP*); the Herfindahl-Hirschman index of concentration in the loan market (*HERF*) controls for differences in the degree of competition; the variable *BRANCHD* measures local branch density and is the ratio of the number of branches to the population (in thousands). This variable is included as a measure of spatial competition, since concentration may not be sufficient to describe the banking industry's local structure.

D. Firm and bank controls

Firm control variables are intended to capture differences in the demand for credit and in the solvency of the borrower. The following are included in the regressions. Firm size is measured by total assets, based on which I construct five size classes: less than €500,000, between €500,000 and €1.5 million, between €1.5 million and €5 million, between €5 million and €20 million, and more than 20 million. The share of tangible assets is measured by the ratio of fixed tangible assets to total assets (*FTANG*), while firm age is the log of the years of operation (*FAGE*). Both of these variables are proxies for opaqueness, because a firm with more tangible assets or one that has been on the market for a long time should be easier for potential lenders to evaluate. The share of tangible assets also controls for the availability of collateral. As an additional control for the degree of firm opaqueness I include a set of dummy variables for the legal form of the firm: *CORP* (corporation), *LLIAB* (small limited liability company), *COOP* (cooperative). The civil code establishes stricter accounting requirements for corporations and limited liability firms than for other businesses. Corporations differ from other limited liability companies because they have a higher initial capital requirement. The excluded category consists of other minor types of firms, mainly limited partnerships, typically more opaque than the other four types because they have minimal accounting requirements.

Firm profitability is measured by operating profits divided by total assets (*FPROF*). I include the variable *RATING*, a credit score measuring the probability of default generated by linear discriminant analysis (see Altman, Marco and Varetto (1994) for a description of the method). The z score is provided by CADS and maps a numerical score into 9 categories, with z's of 1 indicating the lowest credit risk and 9 the highest. CADS maps the score into four levels of risk: i) safe (score of 1 or 2), solvent (3, 4), vulnerable (5, 6), risky (7, 8, 9). Finally, industry dummies referring to the 22 industry classification, consistent with the SEC95, are included in the regressions.

Bank characteristics are absorbed by bank fixed effects in all the specifications. The share of branches of bank j in the province where the firm is located is included because the rate charged by each bank could depend on how important that bank is in the market, its reputation and its market share (*SHARE*). The sign of the coefficient is ambiguous: if the bank has a large share, it might use its market power to charge higher prices under the standard Structure-Conduct-Performance hypothesis, but on the other hand it might have a large share precisely because it is more efficient, in which case the relationship between rate and market share would be reversed. The bank-firm relationship variables and descriptive statistics are reported in Table 2.

3. The empirical analysis

The empirical model measuring the impact of crime on credit contracts is an equation that relates the terms of the loan (interest rate, collateral, etc.) for borrower i from bank j in province p

to the crime rate in province p, the characteristics of firm i and bank j, and other control variables for province p. The equation has the following form:

$$yi_{jp} = \alpha + \beta\ CRIMEp + \Gamma\ PROV\_CONTROLSp + \Delta\ FIRM\_CONTROLSi + \\ + \Phi\ BANK\_CONTROLSj + \varepsilon_{ijp} \quad (1)$$

In the cases of a binary dependent variable, the model is estimated with a Logit specification.

A. The cost of credit

In the first set of regressions the relationship between the interest rate and crime is explored. In addition to the average rate on all loans, the rates on four types of loans are analyzed: asset-backed lending (type 1), term loans with a maturity of 18 months or less (type 2ST), term loans with a maturity greater than 18 months (type 2LT), and revolving credit lines (type 3). Firm controls include the legal form of firm, firm size dummy variables, profitability, the share of tangible assets, the age of the firm (log of years of operation), the z score, and the industry dummies. Bank characteristics are controlled for with fixed effects. The only bank variable that varies by province is the bank's market share in the province where the firm has its headquarters. Market controls are the index of concentration, court inefficiency, branch density in the province, and per capita value added. For robustness, I also included the log of total credit outstanding for each pair given by firm i and bank j. This specification is not shown: the results are very similar, since quantity is partly endogenous with respect to price.

As shown in Table 3, the coefficient of *CRIME* is positive and statistically different from zero. The economic effect comparing a province at the 25^{th} and one at the 75^{th} percentile of the crime rate (from 22.5 to 34.1) is an increase in the cost of credit of 0.24, i.e. 24 basis points. The coefficient of *REPORT* is significant and negative, which is consistent with the intuition that credit markets tend to work more smoothly where there is more trust in institutions; the economic effect of increasing the reporting rate from the minimum (23.8 percent) to the maximum (42.5 percent) is a reduction in the rate of around 75 basis points. The combined effect of high crime and a low reporting rate is economically substantial. The difference between the average cost of credit in the province with the lowest crime rate (13.5) in the highest reporting area and the province with the highest crime rate (49.4) in the lowest reporting area is estimated at 150 basis points.

The coefficients of the control variables are mostly significant and have the expected sign. Large, more profitable firms, with more tangible assets and lower credit risk tend to pay less for credit. Controlling for size, corporations have a lower cost of credit than other firms, one explanation being that they are more transparent and have stricter accounting requirements. Court inefficiency has an adverse effect on the cost of credit, as found in other studies.

Columns 2 through 5 report the results for the cost of different types of loan. Crime increases the cost of all types of credit except revolving credit lines. The economic effect on the cost of loans secured by accounts receivable is the largest, around 31 basis points; the economic effect is 8 basis points for term loans with a maturity of less than 18 months and just 3.4 basis points for long-term loans. The variable *REPORT* is correlated negatively with the cost of the first three types of credit, again with a larger economic effect that is greater for loans against accounts receivable than for the other types of loan.

B. Heterogeneous effects across firms

The literature on financial intermediation suggests that small firms are more opaque and more subject to financing constraints than large firms. For these reasons they are more subject to market power and usually borrow close to home. Demirguc-Kunt and Maksimovic (2005) find that small and medium-sized enterprises interviewed in a survey for a large number of countries are more sensitive to the negative effect of corruption on growth. In addition, to the extent that crime increases firm opaqueness, we expect that the impact of crime on the cost of credit will vary inversely with firm size.

Large borrowers have access to larger credit markets and are better able to convey information on their quality. Disregarding this potential heterogeneity could bias the coefficient of *CRIME*. To take heterogeneity into account, I include an interaction term between the firm-size dummies and *CRIME*.

As reported in Table 4, the coefficients of the interaction terms between *CRIME* and the firm-size dummies are negative and statistically significant, indicating that the increase in the cost of credit associated with crime declines as firm size increases. In economic terms, there is no effect on largest size classes, as the derivative is not different from zero.

C. Collateral

Crime is likely to affect not only the cost of credit but other contractual arrangements too. According to most theories of collateral, banks use it as a device to reduce asymmetric information problems generated by moral hazard and/or adverse selection. The bankers' view is instead that collateral serves to reduce loss given default and the capital charge. Both of these explanations suggest that collateral should be more common in high-crime areas, either because firms are more opaque or because banks want to protect their investment in the presence of higher default risk. Evidence from cross-country data in Bae and Goyal (2009) is consistent with a negative relationship between collateral and enforcement of property rights.

The presence of collateral is related to the type of loan, *ceteris paribus*. For this reason I estimate three different regressions, respectively for total credit, short-term and medium-long term loans. The explanatory variables are the same ones employed in the interest rate regressions. The regression is estimated with different specifications. In the first specification the dependent variable is the share of collateralized credit. In the second specification the dependent variable is a binary variable equal to 1 if credit is partly or fully collateralized, 0 otherwise. In a third specification (not shown), the model is estimated as a Tobit, with the share of collateralized credit as the dependent variable, bounded by construction between 0 and 100. The results are very similar but the model does not perform very well in predicting the share of collateralized credit for observations that are not close to the mean. Furthermore, in the Tobit model bank controls are included instead of the very large number of fixed effects that makes the estimation too cumbersome and subject to potential estimation problems.

In Table 5, the results show that *CRIME* has a positive and statistically significant coefficient, indicating that firms in higher-crime areas tend to have a higher share of collateralized borrowing. Comparing the 25^{th} and 75^{th} percentiles, the economic effect is around 1 percentage point. It is larger for medium-long term loans, exceeding 2 percentage points. In the Logit specification the results are qualitatively similar. In economic terms, the probability of observing collateral rises by 1.2 percentage points when the crime rate increases from the 25^{th} to the 75^{th} percentile in the regression for total loans; for medium-long term loans, the probability increases by 3.5 percentage points.

In both models the interaction terms between firm size and crime have negative coefficients, suggesting that the increase in collateral associated with higher crime diminishes as firm size increase. Given the size of the coefficients, the effect of crime is close to zero for the fourth size class and negative, though small, for the largest borrowers.

D. Composition of loans and maturity

Crime could also affect credit supply conditions by modifying banks' incentives to make – and firms' demand for – different types of loans. In addition, for some kinds of loans, there could be credit rationing that is not reflected in prices. This section discusses the results of a set of regressions in which the composition of loans is related to the crime variables and the same set of controls employed in previous tests. Although these regressions cannot distinguish between demand and supply effects, the results can be read in combination with those on price and collateral to infer some conclusions on the effect of crime on the supply of credit. The dependent variables are the shares of each firm's loan commitments in each type of credit (loans against accounts receivable, short-term loans, long-term loans and revolving credit lines). The large number of bank fixed effects makes a Tobit specification unsuitable. A standard OLS model is therefore estimated, even though the dependent variables are portfolio shares bounded between 0 and 1. The results, reported in Table 6, show that crime is correlated negatively with the share of asset-backed loans (mainly loans against accounts receivable) and positively with the share of revolving credit lines. This finding is consistent with the need for banks to monitor firms more closely and to have more flexibility in determining the amount of borrowing in the short term (Diamond (2004)). Revolving credit lines are the most flexible type of loan from the lender's point of view, since the bank can monitor how much the firm uses and scale down the committed amount anytime if the firm's financial conditions become fragile. At the other end, loans against accounts receivable require a better knowledge of the businesses with which the borrower has relationships and increase risk in a very opaque or uncertain environment.

4. What drives the correlation between crime and the cost of credit?

A. Social disruption and types of offense

One alternative explanation of the correlation between *CRIME* and outcomes in credit markets could be that unobserved factors such as social disruption and poverty affect both the crime rate and loan contracts. To some extent, including a measure of default risk should control for any effect of the business environment on the average quality of borrowers. A second test is based on splitting the crime rate into its main components. If the social disruption hypothesis is true, all types of crime that tend to be related to poverty should be correlated to the cost of credit, including violent crime. This hypothesis is investigated by replacing *CRIME* in the regression with four crime rates computed on specific types of offense.

The first type consists of offenses against property and includes robbery, theft and dealing in stolen goods. These offences are positively correlated with wealth and economic activity and tend to be more common in urban areas. The second type consists of offences against individuals and includes injuries, private violence and threats, voluntary homicide and attempted homicide. The third type includes fraudulent bankruptcy, fraud and check fraud. They are grouped together on the hypothesis that they capture the likelihood that the counterparty in an economic transaction will

cheat. The fourth and last category comprises offenses that are believed to increase firm fragility and opaqueness, i.e. organized crime, mafia-related crime and extortion.

The estimation of the impact of the different types of crime on the interest rate is reported in Table 8. The first two types of crime have positive but insignificant coefficients. The third and fourth types, both of which imply a direct impact on firm behavior, do influence credit spreads. Violent crime does not affect the cost of credit. The economic effect of organized crime on the average cost of credit (comparing provinces at the 25^{th} and 75^{th} percentiles) amounts to an increase of 21 basis points. The economic effect of type 4 is smaller: firms located in a province with a high rate of fraud and economic crime (75^{th} percentile) pay 7 basis points more than similar firms located in provinces where the rate is low (25^{th} percentile).

The same types of crime that influence the cost of credit tend to be relevant also in the loan composition and collateral regressions. Type 3 crime reduces the use of loans against account receivables and increases the share of revolving credit lines. Type 4 (fraud) increase the likelihood of collateral and reduces the share of long term lending, which is an intuitive result.

B. Banks' operating costs

The first possible mechanism through which crime affects lending is operating costs. The finding that robberies do not affect the cost of credit suggests that the effect of crime is not driven by higher security expenses, although the hypothesis cannot be tested directly because there are no branch-level data on operating costs. Furthermore, a simple cost-based explanation does not necessarily predict any effect of crime on collateral and loan composition. An indirect way to test the relevance of this channel is to compare the effect of crime on the cost of credit across banks that operate in high- and low-crime areas, considering similar borrowers. In the baseline model *CRIME* is measured with reference to the location of the borrower. If the bank operates prevalently in other regions, it would have lower average security expenses. I compute the average of the crime rates for each bank, weighted by its share of branches in each province. I add to the regression the variable *WCRIME*. An observationally equivalent borrower will pay more at a bank that has most of its branches in high crime areas if the bank is charging an extra cost due to security expenses. The correlation between the two variables is 0.36. The results for the interest rate regressions show that *CRIME* remains significant and the coefficient is substantially the same; *WCRIME* has a positive and significant coefficient in the regression of the interest rate on term loans of up to 18 months and is not significantly different from zero in the other regressions.

In the loan composition regressions both *CRIME* and *WCRIME* have significant coefficients of the same sign: they are both associated with a higher share of revolving credit line commitments and a lower share of loans against accounts receivable. Similarly, *WCRIME* is statistically significant in the collateral regressions and always has a positive effect on the share and probability of observing a collateralized loans; the coefficient of *CRIME* in these regressions is unaffected by the presence of *WCRIME*. The same regressions are estimated dropping the observations for which *CRIME* and *WCRIME* are equal and the results are unchanged.

Overall, the conclusion is that crime has an impact both at the bank level and at the borrower level on non-price terms but does not affect the pricing that a bank applies to all of its customers. Banks that operate in high-crime areas tend to have more collateralized loans and to lend more in the form of revolving credit lines and less in that of loans against accounts receivable, holding constant customers' characteristics. Customers located in high-crime areas have a higher cost of credit from all banks, on average, controlling for all bank characteristics. The results only partially support a cost-based explanation and are not consistent with banks charging more to customers if they face higher costs related to crime. A plausible explanation for the effect of *WCRIME* on non-

price terms appears to be that greater risks and uncertainty is reflected in more prudent overall lending strategies for banks whose portfolio is more concentrated in high-crime areas.

C. Risk and loss given default

In the basic regression the credit risk of the borrower is controlled for with a z score measuring the probability of default. Two other important component of credit risk could affect the bank's decisions on pricing and other loan characteristics, and crime could have a substantial impact on both of them. One is the expected loss given default and the other is the volatility of the default rates of firms in a given class. *CRIME* could influence the loss given default in many ways. For example, if a firm defaults in a high-crime area, its assets are at greater risk of expropriation during the bankruptcy procedure, which typically takes many years. Or if there are "hidden" creditors that resort to illegal methods of enforcement, the residual creditors will be left with less assets to satisfy their claims. The inefficiency of the courts partly controls for the different length of bankruptcy procedures. The results show that it does affect the cost of credit since *INEFF* has a positive, significant coefficient in most of the regressions. It also affects the share and probability of collateralized lending.

The degree of inefficiency of the courts affects the loss given default because lengthy procedures are typically associated with higher legal fees, greater risk of deterioration of the debtor's assets, etc. I add an interaction term between *CRIME* and *INEFF* to all the regressions. The estimated coefficients of this term in the interest rate regressions are negative and statistically significant for loans secured by accounts receivable and both types of term loan (maturity up to 18 months, over 18 months). Court inefficiency mitigates the adverse effect of crime on the cost of credit, which does not seem to be consistent with a loss given default explanation. One possible interpretation is that the differential in the cost due to differences in crime rates diminishes if courts are inefficient because the benefit of low crime in terms of expected value of liquidated assets is offset by the loss from court inefficiency.

The interaction term has a qualitatively similar effect on the composition of loans. Loans against accounts receivable are used less extensively where crime rates are higher and courts are inefficient, but the interaction between the two variables has a positive coefficient, implying a mitigating effect of each variable on the other. The opposite holds for revolving credit lines, whose share increases with crime and court inefficiency. Interestingly, the interaction term between crime and judicial inefficiency is not significant in the collateral regressions, although the two variables have strong independent effects.

The second channel through which crime could affect credit risk and thus the terms of credit contracts is the accuracy of banks' default estimates based on historical data or experience, i.e. the volatility of the predicted probability of default. The probability of default of observationally equivalent firms should be harder to predict in a high-crime area than in a low-crime area. For one thing, the volatility of the underlying environment could be higher because of business conditions. Second, if fraud is more common, it represents an additional source of unsystematic risk that banks incorporate into their pricing, in line with the findings on the types of crime.

I test this hypothesis by estimating the probability of default of the firms in the sample for high- and low-crime provinces and comparing the prediction error and model's ability to explain default with a given set of explanatory variables. Crime could affect not only the average probability of default of a given firm, but also the accuracy of the estimate of such probability. Provinces can be divided into above and below median and a Logit regression of the probability of observing default of the firms in the sample estimated for a window of three years after the year of the sample.

I observe the borrowers in the three years following the sample year and verify if they default. In case of default by the third year, I construct a dummy *DEFAULT* equal to 1, zero otherwise. This dummy is regressed on observed firm characteristics and market controls. Comparing the high- and low-crime provinces, there are no substantial differences in the model fit, based on the Hosmer-Lemeshow test; in both models over 95 percent of observations are correctly classified, but these only include the negative outcomes (no default). The regression is unable to predict default based on the 0.5 predicted value threshold. Further testing is required to be able to reject the hypothesis of greater difficulty in predicting default given the firm's observable characteristics, although these finding would suggest that *CRIME* affects risk by increasing the probability of default, given the firm's rating.

The model is estimated adding *CRIME* to the variables on the right-hand side. The coefficient of *CRIME* is positive and statistically significant, indicating that the crime rate has an independent effect on default even controlling for the risk class of the firm (*RATING*). Raising *CRIME* from the 25^{th} to the 75^{th} percentile results in an increase in the default probability of 0.01, against the predicted default probability of 0.027. I also interact *CRIME* with *RATING* and find that the coefficient of the interaction term is insignificant. Since *CRIME* has a direct effect on default, controlling for *RATING*, as a robustness test the main regressions (interest rate, collateral and loan shares) are all estimated including among the explanatory variables a dummy equal to one if the firm will default in the following three years. This variable is a proxy for characteristics correlated with risk that the bank might observe and incorporate in the interest rate and other terms but are not included in the data.

In all of the regressions the coefficient of *CRIME* is statistically significant and its magnitude is increased by the inclusion of *DEFAULT* among the regressors. The dummy *DEFAULT* is significant and has a positive coefficient in the interest rate and loan composition regressions; it is not significant in the collateral regressions. On average, firms that will default within the three-year window pay a premium of around 1 percentage point compared with the other borrowers. The premium is charged on all types of loans. It amounts to about 34 basis points for term loans with a maturity beyond 18 months and 80 basis points for other loans.

D. Asymmetric information

The finding that large firms are unaffected by crime rates is consistent with the hypothesis that information asymmetries are exacerbated by crime, given that firm size is negatively correlated with opaqueness. The importance of information asymmetries in explaining the observed correlation between crime and the cost of credit can be tested by comparing banks that should be informed to a differing extent about local borrowers. A bank that is well established in the market is likely to possess local knowledge about borrowers. If firms are generally more opaque as a consequence of crime, an inside bank should be able to acquire soft information on borrowers' true financial and economic conditions. An outside bank will not be part of the local network and will have less access to such information. Similarly, a new entrant bank will need time to acquire local soft information[4].

I test this hypothesis by adding to the regression a dummy *REGB* equal to 1 if the bank is chartered in the same region as the province, 0 otherwise, and an interaction term of *REGB* and *CRIME*. However, the coefficient of the interaction term between *CRIME* and *REGB* is generally not statistically different from zero in the interest rate regressions.

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[4] An opposite effect can occur if banks that have less information choose not to lend to the riskier firms. Observed interest rates would be lower, on average, because, given the same broad observable characteristics (industry, size) the average credit risk of the pool of borrowers is lower.

Another proxy for firm opaqueness used in the literature is the share of tangible assets. Firms that use extensively human capital are more difficult to evaluate and their business harder to monitor as opposed to firms that employ mostly physical capital. I add the interaction term between *CRIME* and the share of the firm's tangible assets *FTANG* and find that the coefficient is never significant in the interest rate, collateral and loan composition regressions.

Finally, I interact *CRIME* with the legal type dummy variables *CORP*, *LLIAB* and *COOP*. One of the main differences between these types of businesses is the strictness of accounting requirements imposed by the Civil Code. Again, the interaction terms are not statistically different from zero in all the models estimated.

The general conclusion from these tests is that asymmetric information does not appear to be empirically relevant in explaining the effect of crime on the terms of loan contracts. However, one explanation could be that asymmetric information problems, expected to be worse in high-crime areas, induce more subtle restrictions of credit supply, especially for the very opaque firms that are not in the Central Credit Register. Firms that are in the register are already transparent enough to access credit markets. Furthermore, high-crime areas tend to show financial underdevelopment on the demand side as well, with firms tending to make extensive use of cash and to avoid resorting to banks and formal credit markets (Fabbri and Padula 2004). Banks could be unwilling to lend to certain types of borrowers in high-crime areas because they cannot ensure a positive return by increasing interest rates or requiring collateral if firms that are similar when judged by hard information could actually be different different, for example because accounting is not as reliable.

By definition, rationing is difficult to measure because we would like to know if firms with the same characteristics have different likelihoods of obtaining credit depending on the crime rate in the province where they are located. Unfortunately, there are no available data on loan application rejection rates. Furthermore, the fact that a firm responds that it would have wanted more credit on the same conditions but did not get it is not necessarily a good measure of rationing. I use resort to an alternative, the probability that a firm overdraws its credit lines. Overdrafts are very expensive and are used only if the firm cannot access other sources of funds; although they are not a measure of rationing, they do capture the extent to which the borrower is liquidity-constrained.

A second measure is the probability that a borrower with given characteristics (size, industry, etc.) has access to bank credit. The dependent variable is equal to 1 if the borrower is in the Central Credit Register, 0 otherwise. Since the register has an entry threshold, the dependent variable measures the probability that the borrower has bank credit (drawn or committed) of at least €75,000. Since the regression controls for firm size (sales and assets), it captures the probability that the firm borrows at least a given amount from the banking system. The results show that *CRIME* has a negative coefficient that is also statistically different from zero, as expected (Table 10). In economic terms the effect is around 5 percentage points for the 25^{th} versus 75^{th} percentile comparison, with an average estimated probability of 0.69 of being in the Central Credit Register's records. Similarly, the probability that a firm overdraws on its credit line is positively affected by *CRIME*; the magnitude of the effect is around 2.5 percentage points, with an estimated probability of overdrawing of 42.1. Further analysis is required to see whether there are

subsamples of firms for which these effects can be economically large. Overall, the results suggest that crime does influence access to bank credit in a way that is not mitigated by knowledge of the local market.

E. Culture or business environment?

Some recent studies have emphasized the role of cultural differences in economic transactions (Guiso, Sapienza and Zingales 2008). Banks may discriminate against borrowers from high-crime areas because they trust them less. Fraud is an important factor, as suggested by the results with crime types. However, it is not clear whether banks consider these borrowers more likely to cheat or whether the borrowers are more fragile because other agents in the economic environment tend to cheat more.

To test these two different channels – discrimination due to prejudice versus environment - I focus on a sample of small borrowers for whom it is possible to know the province of birth as well as the province where they operate their business. If the impact of crime is related to discrimination, we should find some effect of the crime rate of the province of birth even controlling for the crime rate of the province where the business is located. If crime has an impact through the business environment, the first variable should have no effect on credit supply conditions.

I resort to Central Credit Register data on sole proprietorships. In this case the identity of the business coincides with that of its owner. I construct the variable *CRIMEBIRTH* as the crime rate of the province where the business owner was born and add it to the regressions. The regression is modified since the firm control variables are missing for sole proprietorship, which do not have balance sheet data. As a proxy for size I use total credit granted to the firm, both drawn and undrawn. Industry dummies partly control for risk. The market control variables are the same as in all of the previous regressions.

Before adding *CRIMEBIRTH*, the interest rate and collateral regressions are estimated with the sample of sole proprietorships. The results are consistent with those for the other firms; the lack of balance sheet controls does not influence the general findings, except for the precision of the estimates, which are slightly less statistically significant.

In the regressions with both variables, the coefficient of *CRIMEBIRTH* is never statistically different from zero; the effect of *CRIME* is robust and very similar to that found in the main data set. These results suggest that the increase in the cost of credit and the greater use of collateral associated with higher crime are not the result of discrimination or an intrinsic characteristic of the borrower but have to do with the environment where borrowers operate.

5. Conclusion

The analysis in this paper provides evidence that the presence of crime has an adverse effect on credit terms and conditions for business borrowers. Controlling for a number of firm and market characteristics and including bank fixed effects in the regressions, the results show that crime has a statistically significant effect on the cost of short-term credit. Crime also increases the demand for collateral by banks and the composition of credit across different types of loans; firms in high-crime areas resort relatively less to loans against accounts receivable and more to revolving credit lines. The results are driven by organized crime, extortion and fraud. The findings suggests that crime, one of the outcomes of poor governance, not only has direct repercussions on economic

activity but also indirectly affects investment by reducing the availability of credit and distorting loan terms and conditions.

Tables

Table 1

Crime in Italian provinces and reporting rates

The data refer to the 95 Italian provinces; crime rates are averages of yearly rates for the period 1996-2000. The source is the National Institute of Statistics (Istat).

Variable	Definition	Mean	Min.	25th	75th	Max
CRIME	Number of offences for which the judiciary has started a procedure divided by province population (thousands).	30.14	13.48	22.55	34.15	79.44
CRIME1	Number of cases of robbery, theft and resale of stolen goods, divided by population (thousands).	25.71	10.05	18.69	30.10	61.16
CRIME2	Voluntary homicide, attempted homicide, assault, threats, private violence.	1.84	0.54	1.35	2.22	4.06
CRIME3	Fraudulent bankruptcy, fraud, check fraud.	0.14	0.03	0.07	0.18	0.48
CRIME4	Organized crime, mafia-related organized crime, extortion.	1.96	0.68	1.32	2.12	13.39
REPORT	Share of offenses against individuals reported to law enforcement officers, by geographic area (North- West, North-East, Center, South and Islands . Source: *Indagine sulla sicurezza dei cittadini*, Istat, 1998).	0.334	0.238	..	..	0.425

Table 2

Bank-firm relationships: Descriptive statistics

Variable	Definition	Mean	S. Dev	Min	Max
	Dependent Variables				
RATE	Weighted average interest rate on total credit drawn (fourth quarter of the year)	8.99	4.56	4.46	36.78
RATE_1	Interest rate on asset-backed loans	7.22	2.17	4.74	17.31
RATE_2ST	Interest rate on term loans, short term	7.15	3.24	1.18	36.78
RATE_2LT	Interest rate on term loans, medium-long term	6.64	1.60	2.87	36.78
RATE_3	Interest rate on revolving credit lines	13.46	11.19	4.46	72.86
SHARE_1	Ratio of loan commitments against accounts receivable to total commitments	43.26	36.96	0	100
SHARE_2ST	Ratio of term loan commitments with a maturity of less than 18 months to total commitments	9.98	22.69	0	100
SHARE_2LT	Ratio of term loan commitments with a maturity of 18 months or more to total commitments	14.46	29.76	0	100
SHARE_3	Ratio of revolving credit lines to total loan commitments	32.30	34.00	0	100
COLL_TOTAL	Share of collateralized total lending	11.76	29.15	0	100
COLL_ ST	Share of collateralized short-term loans	2.82	14.17	0	100
COLL_LT	Share of collateralized long-term loans	40.05	47.83	0	100
DCOLL_TOT	Dummy equal to 1 if the lending relationship is partly or fully collateralized, 0 otherwise	0.17	0.37	0	1
DCOLL_ST	Dummy equal to 1 if short-term lending is partly or fully collateralized, 0 otherwise	0.05	0.23	0	1
DCOLL_LT	Dummy equal to 1 if long-term lending is partly or fully collateralized, 0 otherwise	0.43	0.49	0	1
	Control Variables				
CORP	Corporation, dummy	0.26	0.44	0	1
LLIAB	Limited liability company	0.70	0.46	0	1
COOP	Cooperative, dummy	0.04	0.19	0	1
FSIZE2	Dummy equal to 1 if firm assets are between €0.5 million and €1.5 million, 0 otherwise	0.25	0.43	0	1
FSIZE3	Dummy equal to 1 if firm assets are between €1.5 million and 5 million, 0 otherwise	0.32	0.47	0	1
FSIZE4	Dummy equal to 1 if firm assets are between €5 million and 20 million, 0 otherwise	0.22	0.41	0	1
FSIZE5	Dummy equal to 1 if firm assets are greater than €20 million, 0 otherwise	0.09	0.28	0	1
FPROF	Operating profits/sales	0.018	6.831	-2351.5	699
FTANG	Tangible assets/total assets	0.21	0.20	0	1
FAGE	Log of years of operation (censored at 20)	2.68	1.20	0	7.60
RATING	z score (higher values imply higher risk)	5.19	1.78	1	9
HERFP	Herfindahl index of concentration of loan market (province)	0.07	0.03	0.04	0.23
INEFF	Inefficiency of the courts measured by length in years of a first-degree civil court trial, from Guiso, Sapienza and Zingales (2004).	3.15	1.02	1.44	8.32
VAPC	Per capita value added of the province where the firm is headquartered, thousands of euros.	20.64	4.32	9.70	27.56
LOGBRANCH	Log of province branches	6.20	0.85	3.47	7.74
MKTSHARE	Share of loans in market m issued by bank i	0.07	0.07	0	0.44
.No. obs.	(Sample with information on rates)	329827			

Table 3

Bank-firm relationships: Interest rates by loan type

The data refer to a cross-section for the year 2000. The dependent variable RATE is the effective interest rate charged on outstanding credit. RATE1 is the cost of loans secured by accounts receivable; RATE2ST is the cost of short-term loans; RATE2LT is the cost of term loans with a maturity of more than 18 months; RATE3 is the cost of revolving credit lines used. Standard errors are clustered at the province level and are Huber-White robust.

DEP. VAR.:	RATE		RATE_1		RATE_2ST		RATE_2LT		RATE_3	
	Coeff.	Sign.	Coeff.	Sign.	Coeff.	Sign.	Coeff.	Sign.	Coeff.	Sign.
CRIME	0.021	***	0.027	***	0.007	***	0.003	**	0.008	
	0.004		0.008		0.002		0.001		0.007	
REPORT	-3.911	***	-3.335	**	-1.427	***	-0.638	**	1.131	
	1.055		1.521		0.548		0.250		2.295	
SIZE2	-0.536	***	-0.774	***	-0.347	***	-0.152	***	-0.340	***
	0.041		0.170		0.066		0.021		0.099	
SIZE3	-1.100	***	-1.270	***	-0.713	***	-0.347	***	-0.816	***
	0.042		0.192		0.074		0.033		0.099	
SIZE4	-1.793	***	-1.940	***	-1.133	***	-0.531	***	-1.756	***
	0.060		0.204		0.090		0.038		0.159	
SIZE5	-2.493	***	-2.525	***	-1.584	***	-0.755	***	-3.327	***
	0.079		0.209		0.109		0.063		0.169	
CORP	-0.796	***	-0.779	*	-0.630	*	-0.308	***	-0.673	*
	0.149		0.442		0.352		0.099		0.385	
LLIAB	-0.441	***	-0.445		-0.412		-0.137		-0.160	
	0.152		0.433		0.359		0.094		0.390	
COOP	0.030		-0.414		-0.110		0.051		1.447	***
	0.181		0.447		0.382		0.113		0.428	
FPROFIT	-0.004	***	0.001		0.007	**	-0.003	***	-0.011	***
	0.001		0.002		0.003		0.0006		0.002	
FTANG	-0.546	***	0.318		-0.328	***	-0.160	***	-1.612	***
	0.064		0.212		0.104		0.044		0.182	
FAGE	0.005		0.003		-0.006		0.032	***	-0.185	***
	0.010		0.023		0.010		0.007		0.034	
RATING	0.083	***	0.013		0.156	***	0.067	***	-0.132	**
	0.020		0.044		0.013		0.005		0.047	
HERFMKT	0.294		1.026		-0.779		0.080		-0.521	
	1.053		1.869		0.884		0.460		3.334	
INEFF	0.114	***	0.058		0.041		0.013		0.226	***
	0.037		0.078		0.030		0.017		0.081	
VAPC	-0.103	***	-0.064	***	-0.070	***	-0.016	***	-0.080	**
	0.019		0.019		0.010		0.005		0.031	
LOGBRANCH	0.188	**	-0.054		0.191	***	0.092	***	0.440	**
	0.078		0.159		0.059		0.027		0.175	
MKTSHARE	-0.826	***	0.369		0.031		-0.027		-0.242	
	0.295		0.591		0.314		0.138		0.723	
CONSTANT	11.723	***	10.736	***	7.158	***	6.418	***	13.532	***
	0.508		1.227		0.603		0.220		1.371	
Bank fixed effects	YES		YES		YES		YES		YES	
Adj. R-squared	0.127		0.013		0.225		0.108		0.068	
No. obs.	329827		195518		58338		60510		278844	

Table 4

Bank-firm relationships: Interest rates by loan type

The data refer to a cross-section for the year 2000. The dependent variable RATE is the effective interest rate charged on outstanding credit. RATE1 is the cost of loans secured by accounts receivable; RATE2ST is the cost of short-term loans; RATE2LT is the cost of term loans with a maturity of more than 18 months; RATE3 is the cost of revolving credit lines used. Standard errors are clustered at the province level and are Huber-White robust. Firm controls are the same as in the specification in Table 3.

DEP. VAR.:	RATE		RATE_1		RATE_2ST		RATE_2LT		RATE_3	
	Coeff.	Sign.	Coeff.	Sign.	Coeff.	Sign.	Coeff.	Sign.	Coeff.	Sign.
CRIME	0.026	***	0.017	*	0.016	***	0.003		0.007	
	0.005		0.009		0.004		0.002		0.010	
SIZE2	-0.479	***	-1.510	***	-0.234		-0.180	***	-0.458	
	0.121		0.428		0.154		0.067		0.362	
SIZE3	-0.936	***	-1.465	***	-0.494	***	-0.362	***	-0.767	**
	0.114		0.443		0.178		0.103		0.308	
SIZE4	-1.492	***	-2.442	***	-0.569	***	-0.541	***	-1.803	***
	0.149		0.458		0.196		0.100		0.431	
SIZE5	-2.118	***	-2.544	***	-0.923	***	-0.641	***	-3.157	***
	0.196		0.449		0.193		0.189		0.421	
CRIME*SIZE2	-0.001		0.019	**	-0.003		0.001		0.003	
	0.003		0.008		0.004		0.002		0.009	
CRIME*SIZE3	-0.004	*	0.005		-0.005		0.000		-0-001	
	0.002		0.008		0.005		0.003		0.007	
CRIME*SIZE4	-0.008	**	0.013		-0.014	***	0.000		0.001	
	0.004		0.009		0.005		0.002		0.011	
CRIME*SIZE5	-0.009	**	0.0003		-0.016	***	-0.003		-0.004	
	0.005		0.008		0.004		0.005		0.008	
REPORT	-3.966	***	-3.347	**	-1.532	***	-0.649	**	1.115	
	1.060		1.522		0.556		0.249		2.311	
CONSTANT	11.564	***	11.118	***	6.800	***	6.429	***	13.546	***
	0.479		1.335		0.666		0.233		1.308	
Firm controls	YES		YES		YES		YES		YES	
Bank fixed effects	YES		YES		YES		YES		YES	
Adj. R-squared	0.127		0.013		0.226		0.108		0.068	
No. obs.	329827		195518		58338		60510		278844	

Table 5

Bank-firm relationships: Collateral

The data refer to a cross-section for the year 2000. In the OLS regressions the dependent variable is ratio of collateralized credit to total outstanding credit, referring to total loans (_TOTAL), short-term (_SHORT TERM) and long-term loans (_LONG TERM). In the Logit models the dependent variable is equal to 1 if the bank-firm relationships are partly or fully collateralized, considering respectively total credit, short-term and long-term credit. In the Logit models marginal effects are reported instead of coefficients. Standard errors are clustered at the province level and are Huber-White robust.

DEP. VAR.:	COLLATERAL TOTAL		COLLATERAL SHORT TERM		COLLATERAL LONG TERM	
	OLS	Logit	OLS	Logit	OLS	Logit
	Coeff.	dy/dx	Coeff.	dy/dx	Coeff.	dy/dx
CRIME	0.102 ***	0.001 ***	0.061 ***	0.0002	0.227 ***	0.003 ***
	0.019	0.0003	0.010	0.0002	0.064	0.001
SIZE2	1.196 **	0.027 ***	0.822 ***	0.007 *	7.776 **	0.120 ***
	0.448	0.006	0.274	0.004	1.265	0.015
SIZE3	0.931	0.042 ***	0.914 **	0.009	11.761 ***	0.187 ***
	0.567	0.014	0.422	0.007	1.391	0.019
SIZE4	1.666 **	0.076 ***	1.571 ***	0.017	16.639 ***	0.281 ***
	0.776	0.019	0.425	0.010	1.974	0.030
SIZE5	4.583 ***	0.165 ***	1.856 ***	0.035	22.915 ***	0.401 ***
	1.170	0.033	0.534	0.022	3.246	0.036
CRIME*SIZE2	-0.037 ***	-0.0006 ***	-0.035 ***	-0.0002 **	-0.091 ***	-0.001 ***
	0.012	0.0002	0.007	0.0001	0.038	0.0004
CRIME*SIZE3	-0.054 ***	-0.001 **	-0.050 ***	-0.0004 **	-0.113 ***	-0.002 ***
	0.014	0.0004	0.012	0.0002	0.034	0.0005
CRIME*SIZE4	-0.077 ***	-0.0016 ***	-0.072 ***	-0.0007 ***	-0.162 ***	-0.003 ***
	0.021	0.0004	0.011	0.0002	0.052	0.0008
CRIME*SIZE5	-0.130 ***	-0.0024 ***	-0.079 ***	-0.010 **	-0.299 ***	-0.004 ***
	0.029	-0.0006	0.014	-0.0004	0.079	0.001
REPORT	-7.324 ***	-0.207 ***	-4.314 ***	-0.145 ***	-15.016 *	-0.129 ***
	2.342	0.047	1.180	0.028	8.571	0.145
CONSTANT	5.329 ***	-	-1.793	-	17.076 ***	-
	2.318	-	1.271	-	5.888	-
Pred. prob.y=1		0.139		0.046		0.390
Firm controls	YES	YES	YES	YES	YES	YES
Bank fixed effects	YES	YES	YES	YES	YES	YES
Adj. R-squared	0.219	0.082	0.038	0.044	0.275	0.098
No. obs.	426622	393266	382364	354548	129166	117475

Table 6

Bank-firm relationships: Composition of loans

The data refer to a cross-section for the year 2000. The dependent variable is the share of firms' total bank credit available in the form of loans secured by accounts receivable (SHARE_1), short-term loans (SHARE_2ST), term loans with a maturity of more than 18 months (SHARE_2LT) and revolving credit lines (SHARE_3). Standard errors are clustered at the province level and are Huber-White robust.

DEP. VAR.:	SHARE_1		SHARE_2ST		SHARE_2LT		SHARE_3	
	Coeff.	Sign.	Coeff.	Sign.	Coeff.	Sign.	Coeff.	Sign.
CRIME	-0.216	***	-0.002		0.027		0.195	***
	0.053		0.029		0.016		0.027	
SIZE2	4.072	***	-0.015		-2.465	***	-1.592	
	0.804		0.547		0.582		1.131	
SIZE3	5.379	***	1.295		-3.458	***	-3.216	**
	0.925		0.921		0.699		1.318	
SIZE4	5.285	***	3.770	***	-3.904	***	-5.152	***
	1.187		1.182		0.919		1.076	
SIZE5	1.074		7.937	***	-1.252		-7.760	***
	1.378		1.048		1.228		1.343	
CRIME*SIZE2	-0.001		0.018	*	0.013		-0.029	
	0.018		0.010		0.015		0.029	
CRIME*SIZE3	0.002		0.030		0.005		-0.037	
	0.018		0.021		0.017		0.034	
CRIME*SIZE4	-0.020		0.032		0.008		-0.019	
	0.033		0.030		0.023		0.026	
CRIME*SIZE5	-0.093		0.035		-0.006		0.064	**
	0.037		0.027		0.031		0.030	
REPORT	13.875	*	7.862	***	-1.606		-20.131	***
	7.854		2.898		1.912		6.145	
CONSTANT	11.238	**	-113.272	***	14.832	***	59.359	***
	4.968		9.367		2.067		4.679	
Firm controls	YES		YES		YES		YES	
Bank fixed effects	YES		YES		YES		YES	
Adj. R-squared	0.258		0.120		0.363		0.214	
No. obs.	515396		515396		515396		515396	

Table 7

Cost of credit and types of crime

The data refer to a cross-section for the year 2000. The dependent variable RATE is the effective interest rate charged on outstanding credit. RATE1 is the cost of loans secured by accounts receivable; RATE2ST is the cost of short-term loans; RATE2LT is the cost of term loans with a maturity of more than 18 months; RATE3 is the cost of revolving credit lines used. Standard errors are clustered at the province level and are Huber-White robust. Firm controls are the same as the specification shown in Table 3.

DEP. VAR.:	RATE	RATE_1	RATE_2ST	RATE_2LT	RATE_3
	Coeff.	Coeff.	Coeff.	Coeff.	Coeff.
CRIME1	0.004	0.010	0.001	0.001	0.005
	0.004	0.012	0.004	0.002	0.013
CRIME2	0.060	0.107	-0.026	-0.007	-0.028
	0.053	0.129	0.059	0.027	0.169
CRIME3	1.929 ***	0.767	1.715 ***	-0.409	-2.037
	0.503	0.877	0.387	0.262	1.295
CRIME4	0.084 ***	0.092 ***	0.040 ***	0.025 ***	0.060 *
	0.014	0.020	0.012	0.008	0.035
REPORT	-2.399 ***	-1.890	-0.649	-0.431	1.358
	0.747	1.518	0.460	0.271	2.186
Firm controls	YES	YES	YES	YES	YES
Bank fixed effects	YES	YES	YES	YES	YES
Adj. R-squared	0.128	0.013	0.226	0.108	0.068
No. obs.	329827	195518	58338	60510	278844

Table 8

Collateral and types of crime

The data refer to a cross-section for the year 2000. In the OLS regressions the dependent variable is ratio of collateralized credit to total outstanding credit, referring to total loans (_TOTAL), short-term (_SHORT TERM) and long-term loans (_LONG TERM). In the Logit models the dependent variable is equal to 1 if the bank-firm relationships are partly or fully collateralized, considering respectively total credit, short term and long term credit. In the logit models marginal effects are reported instead of coefficients. Standard errors are clustered at the province level and are Huber-White robust.

DEP. VAR.:	COLLATERAL TOTAL OLS	COLLATERAL SHORT T. OLS	COLLATERAL LONG T. OLS
	Coeff.	Coeff.	Coeff.
CRIME1	0.029	0.002	0.051
	0.019	0.009	0.063
CRIME2	0.018	-0.033	-0.920
	0.233	0.110	0.802
CRIME3	2.139	3.328 ***	4.519
	2.010	0.682	6.048
CRIME4	0.104 **	0.046	0.685 ***
	0.044	0.036	0.213
REPORT	-5.872 **	-2.869 **	-9.007
	2.448	1.083	9.551
Firm controls	YES	YES	YES
Bank fixed effects	YES	YES	YES
Adj. R-squared	0.218	0.037	0.271
No. obs.	435561	390113	131893

Table 9

Composition of loans and types of crime

The data refer to a cross-section for the year 2000. The dependent variable is the actual share of firms' total bank credit available in the form of loans secured by accounts receivable (SHARE_1), short-term loans (SHARE_2ST), term loans with a maturity of more than 18 months (SHARE_2LT) and revolving credit lines (SHARE_3). Standard errors are clustered at the province level and are Huber-White robust.

DEP. VAR.:	SHARE_1		SHARE_2ST		SHARE_2LT		SHARE3	
	Coeff.	Sign.	Coeff.	Sign.	Coeff.	Sign.	Coeff.	Sign.
CRIME1	-0.017		-0.020		0.019		0.019	
	0.054		0.028		0.015		0.043	
CRIME2	-2.416	***	0.543		0.533	***	1.340	**
	0.726		0.341		0.188		0.574	
CRIME3	-24.074	***	0.207		0.458		23.409	***
	5.422		2.334		1.939		3.845	
CRIME4	-0.275		0.052		-0.109	**	0.332	**
	0.228		0.075		0.046		0.162	
REPORT	1.630		9.132	***	-2.097		-8.665	
	7.828		3.084		1.891		5.943	
Firm controls	YES		YES		YES		YES	
Bank fixed effects	YES		YES		YES		YES	
Adj. R-squared	0.259		0.123		0.364		0.216	
No. obs.	525872		525872		525872		525872	

Table 10

Proxies for access to credit

The data refer to a cross-section of firms for the year 2000. ACCESS is equal to 1 if the firm is in the Central Credit Register (excluding non-performing positions) because of loan commitments or credit drawn above the register's threshold. OVERDRAFT is equal to 1 if the firm has drawn more credit than its commitments. Marginal effects are reported instead of coefficients. Standard errors are clustered at the province level and are Huber-White robust.

DEP. VAR.:	ACCESS		ACCESS		OVERDRAFT		OVERDRAFT	
	dy/dx	Sign.	dy/dx	Sign.	dy/dx	Sign.	dy/dx	Sign.
CRIME	-0.004	***	-0.004	***	0.001		0.002	**
	0.0006		0.0006		0.0007		0.0007	
REPORT	0.429	***	0.436	***	-0.116		-0.120	
	0.147		0.148		0.126		0.125	
SIZE2	0.376	***	0.390	***	0.119	***	0.137	***
	0.007		0.008		0.005		0.010	
SIZE3	0.425	***	0.441	***	0.246	***	0.269	***
	0.007		0.192		0.006		0.014	
SIZE4	0.363	***	0.372	***	0.342	***	0.389	***
	0.008		0.009		0.010		0.016	
SIZE5	0.318	***	0.315	***	0.420	***	0.467	***
	0.008		0.008		0.012		0.017	
CRIME*SIZE2	-		-0.001	***	-		-0.002	*
	-		0.0002		-		0.001	
CRIME*SIZE3	-		-0.002	***	-		-0.003	**
	-		0.0004		-		0.001	
CRIME*SIZE4	-		-0.002	***	-		-0.006	***
	-		0.0005		-		0.002	
CRIME*SIZE5	-		0.0004		-		-0.009	**
	-		0.0007		-		0.004	
CORP	0.087	***	0.088	***	0.058	**	-0.308	***
	0.018		0.017		0.024		0.099	
LLIAB	0.068	***	0.068	***	0.046	**	-0.137	
	0.020		0.020		0.023		0.094	
COOP	-0.063	***	-0.063	***	-0.030		0.051	
	0.021		0.021		0.026		0.113	
FPROFIT	0.001		0.001		0.001	**	-0.003	***
	0.001		0.001		0.0005		0.0006	
FTANG	0.043	***	0.042	***	-0.024	***	-0.160	***
	0.006		0.006		0.008		0.044	
FAGE	0.029	***	0.028	***	0.003	***	0.032	***
	0.003		0.003		0.001		0.007	
RATING	0.025	***	0.025	***	0.091	***	0.067	***
	0.001		0.001		0.002		0.005	
HERFMKT	0.126		0.130		-0.143		0.080	
	0.107		0.107		0.100		0.460	
INEFF	-0.020	***	-0.021	***	0.012		0.013	
	0.007		0.008		0.007		0.017	
VAPC	0.015	***	0.014	***	0.001		-0.016	***
	0.003		0.003		0.002		0.005	
LOGBRANCH	-0.018		-0.018		-0.039	**	0.092	***
	0.013		0.013		0.016		0.027	
Pr(Y=1)	0.689		0.689		0.421		0.421	
Adj. R-squared	0.329		0.329		0.105		0.106	
No. obs.	285332		285332		172606		172606	

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