

Courts and Banks:

Effects of Judicial Enforcement on Credit Markets

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Abstract

The cost of enforcing contracts is a key determinant of market performance. We document this point with reference to the credit market in a model of opportunistic debtors and inefficient courts. According to the model, improvements in judicial efficiency should reduce credit rationing and increase lending, with an ambiguous effect on interest rates that depends on banking competition and on the type of judicial reform. These predictions are supported by panel data on Italian provinces and by cross-country evidence. In Italian provinces with longer trials or large backlogs of pending trials, credit is less widely available. International evidence also shows that the depth of mortgage markets is inversely related to the costs of mortgage foreclosure and other proxies for judicial inefficiency.

Keywords: enforcement, judicial efficiency, credit market, interest rates

JEL classification: G2, K4

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“May you have lawsuits - and win them.”
Old gypsy curse¹

1. Introduction

A borrower may default on a loan because he is unable (accidental default) or because, though potentially solvent, he is unwilling to repay (strategic default). Besides being intrinsically different, inability and unwillingness to repay depend on totally different factors. A borrower is unable to repay if his project fails, which may in turn depend on bad luck, incompetence, poor effort in managing the project, or a combination of all three factors.

A solvent borrower may be unwilling to repay if the gain from defaulting is greater than the perceived cost of the presumed sanctions. The perceived cost of these sanctions does not depend only on the lender's willingness to inflict them, but on the entire set of institutional arrangements governing the credit market. The law and its enforcement by the judiciary are central to these arrangements. Historically, countries have developed different legal systems, which feature varying degrees of protection of creditors' rights. But even countries with similar legal rules may enforce them to a differing extent, depending on the efficiency and honesty of their judiciary. And even within the same country, the efficiency of courts can vary a great deal, depending on the allocation of resources and the geographical distribution of the “demand for contract enforcement.”

By affecting the borrower's future willingness to pay, these features help determine the *ex ante* willingness of creditors to extend loans, and the terms they will ask. By the same token, they determine the effectiveness of credit markets in intermediating and allocating saving among alternative users.

This paper explores the impact of the judicial enforcement of debt contracts on the amount of lending, interest rates and default rates theoretically and empirically. We present a model of opportunistic debtors and inefficient courts. Judicial efficiency is measured by the fraction of inside or outside collateral that lenders can expect to recover from an insolvent borrower at the end of a trial. According to the model, an improvement in judicial efficiency unambiguously increases aggregate lending, by opening the credit market to borrowers with

¹ This double curse about the slowness of trials and the difficulty of obtaining damages once they are awarded is drawn from the *Financial Times*, Weekend December 12/13 1998, p. 3.

little collateral. The impact of judicial efficiency on the average interest rate is ambiguous, in that this depends on the structure of the credit market (competitive or monopolistic) and on the specific judicial reform (improvement in the recovery of inside or outside collateral).

We then test these predictions empirically, using two data sets. The first is a specially designed Italian panel on interest rates, lending, overdrafts, default rates, and indicators of judicial efficiency in each province. The second is a cross-country sample of mortgage lending, downpayment ratios and interest rates, plus measures of the cost and length of foreclosure procedures.

The evidence from both data sets is that judicial enforcement is important to the performance of credit markets. Our findings are that judicial efficiency correlates positively with the volume of lending and negatively with proxies for credit rationing. These results obtain also when in our panel data estimates we control for unobserved heterogeneity among judicial districts via fixed effects. The correlation with average interest rates and default rates is ambiguous, in line with the prediction of the model.

With the help of a simple illustrative model, in Section 2 we discuss the theoretical channels through which judicial efficiency can affect credit market performance. In Section 3 we present our province-level data and the corresponding regression results. Section 4 gives the international evidence on mortgage loan markets. Section 5 concludes.

2. A Model of Judicial Enforcement and Credit Markets

The key function of courts in credit relationships is to force solvent borrowers to repay when they fail to do so spontaneously. Hence poor judicial enforcement will increase opportunistic behavior on the part of borrowers: anticipating that creditors will be unable to recover their loans easily and cheaply via the courts, borrowers will be tempted to default. Lenders respond by reducing the availability of credit.

We illustrate how judicial inefficiency affects credit market performance in a model of risk-neutral banks facing a continuum of potential borrowers. Each borrower i has no liquid wealth but owns illiquid collateral C_i . He can invest in a project requiring a loan of size L_i ,

so that his collateral-loan ratio is $c_i \equiv C_i / L_i$. Projects succeed with common probability p and fail with probability $1 - p$. All successful projects yield $1 + \pi$ per unit invested, and failed projects yield zero. All projects have positive net present value (NPV), that is, their expected profitability exceeds the banks' cost of raising funds, \bar{r} :

$$p(1 + \pi) > 1 + \bar{r}.$$

Since \bar{r} is also the opportunity cost of capital for entrepreneurs, all of them would like to undertake their projects.

Banks can observe whether projects succeed or fail, so that there is no asymmetric information.² In either case the borrower can dispute the bank's claim. In case of dispute, the bank can attempt to recover the loan in court. But it will recover only a fraction ϕ_p of the project's revenue³ and a fraction ϕ_c of the collateral. The parameters ϕ_p and ϕ_c can be regarded as indicators of judicial efficiency. Both range from 0 (no enforcement) to 1 (perfect enforcement).

There are two possible interpretations of this assumption. First, by disputing the repayment and forcing the lender to go to court, the borrower retains a fraction of the loan $(1 - \phi_p)(1 + \pi) + (1 - \phi_c)c_i$ in case of success, and $(1 - \phi_c)c_i$ in case of failure. Since he can pocket part of the firm's revenue or consume part of the collateral, he has a clear incentive for opportunistic behavior. He will always dispute the lender's claim, whether the project has succeeded or failed.

A second interpretation is that these resources are not retained by the borrower, but dissipated by the judicial process itself (legal fees, mismanagement of the company during the trial, bribes taken by corrupt officials, etc.). In this interpretation, judicial costs effectively operate as a tax on credit transactions. In principle, this tax can be avoided by settling out of court, two parties having to agree on how to split the resources that they would have otherwise wasted. If judicial costs are borne entirely by the lender, the borrower will make a take-it-or-leave-it offer to repay $\phi_p(1 + \pi) + \phi_c c_i$ per dollar lent in case of success, and $\phi_c c_i$ in case of

² The model can also effectively capture the case where the lender cannot observe the outcome of the project. In this case, the borrower will always claim that the project has failed. Anticipating this, the lender will extend credit only if repayment is guaranteed by collateral. In the model, this case would obtain with $\phi_p=0$.

³ The subscript p stands for "project", since in this case the project itself acts as inside collateral.

failure. The lender will be indifferent between accepting this offer and taking the borrower to court. In this case, the borrower retains the entire cost of the trial, and the two alternative interpretations lead exactly to the same outcome. If judicial costs are more evenly distributed between the two parties, the borrower could keep only part of the cost of the trial. Even so, he will generally have an incentive to dispute the amount owed and thereby extract that portion from the lender.⁴

In short, borrowers reckon that lenders will be able to recover at most $\phi_p(1 + \pi) + \phi_c c_i$ per unit lent in case of success, and $\phi_c c_i$ otherwise. Thus the lending rate charged to borrower i , r_i , cannot exceed the limit:

$$1 + r_i \leq \phi_p(1 + \pi) + \phi_c c_i. \quad (1)$$

All banks know the success probability p , the projects' profitability π , the judicial efficiency parameters ϕ_p and ϕ_c , and the individual borrower's collateral-loan ratio c_i .

2.1 Competitive Banks

In equilibrium, expected profits are zero, so that the cost of funds equals the expected return per unit lent to borrower i :

$$1 + \bar{r} = p(1 + r_i) + (1 - p) \min[1 + r_i, \phi_c c_i]. \quad (2)$$

The last term states that when the project fails the lender recovers only a fraction of the collateral if this falls short of the principal plus interest due. Equation (2) defines the break-even interest rate r_i charged to each borrower:

$$1 + r_i = \frac{1 + \bar{r}}{p} - \frac{1 - p}{p} \min(1 + r_i, \phi_c c_i) \text{ for } c_i \geq c_{\min}, \quad (3)$$

where:

⁴ If lenders bear only a fraction γ of judicial costs, the borrower's take-it-or-leave-it offer will be accordingly reduced to $[1 - \gamma(1 - \phi_p)](1 + \pi) + [1 - \gamma(1 - \phi_c)]c_i$ in case of success and to $[1 - \gamma(1 - \phi_c)]c_i$ in case of failure. The feasibility condition (1) and all subsequent expressions must be redefined accordingly. All the comparative statics concerning an improvement in judicial efficiency are qualitatively unchanged.

$$c_{\min} = \frac{1 + \bar{r}}{\phi_c} - \frac{p\phi_p(1 + \pi)}{\phi_c}. \quad (4)$$

The minimum level of collateral in equation (4) is obtained by substituting (1) (taken with equality) into equation (3). Banks do not finance entrepreneurs with collateral-loan ratio below c_{\min} , even though with internal financing their projects would be profitable. Thus c_{\min} defines the region of credit rationing. This is due only to judicial inefficiency: with efficient courts ($\phi_c = \phi_p = 1$) all entrepreneurs would have access to credit.⁵

The zero-profit condition (3) defines two lending regions. If $\phi_c c_i > 1 + r_i$, collateral is large enough that loans are safe and competition equates the lending rate to the cost of capital. Setting $r_i = \bar{r}$ in equation (3) yields the level of collateral above which this happens:

$$\bar{c} = \frac{1 + \bar{r}}{\phi_c}. \quad (5)$$

In the second region, $\phi_c c_i < 1 + r_i$ or equivalently $c_i < \bar{c}$: collateral is not sufficient to shield the bank completely from loss if the project fails. To break even, the bank must offset this expected loss with a higher interest rate in case of success: from the standpoint of the bank, collateral and lending rates are substitutes. Therefore, for $c_{\min} < c_i < \bar{c}$, the zero-profit condition (3) defines a negative linear relation between the collateral-loan ratio c_i and the lending rate r_i . This is plotted as the segment AB in Figure 1. To the left of point A, there is credit rationing. To the right of point B, the lending rate equals the cost of capital.

All entrepreneurs will borrow, since their participation constraint is always met. To see this, note that the expected utility level of borrower i is:

$$u_i = p[(1 + \pi) + c_i - (1 + r_i)] + (1 - p)[c_i - \min(1 + r_i, \phi_c c_i)] \quad (6)$$

$$= \begin{cases} p(1 + \pi) - (1 + r_i) + c_i & \text{if } c_i \geq \bar{c} \\ p[(1 + \pi) - (1 + r_i)] + [1 - \phi_c(1 - p)]c_i & \text{if } c_i < \bar{c} \end{cases}$$

If the individual i does not borrow, however, his utility is just the collateral c_i . Using

⁵ Recall the positive-NPV condition $p(1 + \pi) > 1 + \bar{r}$. Then, setting $\phi_c = \phi_p = 1$ in equation (4) implies a negative c_{\min} .

equations (3) and (6), the participation constraint $u_i \geq c_i$ reduces to $p(1 + \pi) - (1 + \bar{r}) \geq 0$. Given the assumption that $\text{NPV} > 0$, this condition is always met.

Now consider an improvement in judicial efficiency. This can take two forms: an increase in ϕ_c or in ϕ_p , the fractions of external and internal collateral that lenders can recover. We examine these two cases in turn.

An increase in ϕ_c shifts the downward-sloping portion of the zero-profit locus inward from AB to A'B'. The minimum collateral declines to the level corresponding to A', and the region of credit rationing shrinks: the improvement in judicial efficiency turns some loss-making loans into viable ones. Borrowers with collateral ratios between c_{\min} and \bar{c} already had access to credit, but now they pay less interest. Therefore, for any given borrower i , the interest rate either decreases or stays unchanged. However, the *average* lending rate may also increase depending on how the composition of the borrowers' pool changes as the credit market expands. The effect on the average rate is negative when initially there is no credit rationing. This effect is attenuated and can even change sign depending on how many initially excluded borrowers gain access to credit when ϕ increases.⁶

Next, consider an increase in ϕ_p . In this case the downward-sloping portion of the zero-profit locus in Figure 2 expands from AB to A'B. As a consequence, the region of credit rationing shrinks and lending increases, in contrast with the previous experiment. The rates charged to those who were already borrowing are unchanged. To understand this difference, consider that in Figure 1 the increase in ϕ_c implies that borrowers effectively pledge more external collateral. Since the latter is a substitute for the interest rate, competition forces banks to lower rates. In Figure 2, instead, borrowers can pledge more internal collateral, which protects the bank only when the project succeeds. But for borrowers who were not credit-rationed, banks were already protected by inside collateral in case of success, so the zero-profit interest rate is unaffected. Borrowers who were previously rationed now have access to credit at a higher interest rate, since raising the rate is the only way the bank can exploit the

⁶ To see this, consider two examples. If borrowers' collateral-loan ratios are uniformly distributed between c_{\min} and \bar{c} , the average interest rate can be shown to decrease. Suppose instead that there are two groups of potential borrowers, A and B. Group A is a fraction q of the population and has collateral-loan ratio $c_A \geq \bar{c}$. Group B has collateral-loan ratio $c_B < c_{\min}$ and is drawn into the credit market after the increase in judicial efficiency. It is immediately clear that in this second example the average interest rate increases from its initial level \bar{r} .

increased inside collateral. Thus, unlike an increase in ϕ_c , an increase in ϕ_p always increases the average lending rate.

So far we have considered the probability of success as an exogenous parameter p common to all entrepreneurs: by assumption, judicial efficiency does not affect the default rate $1-p$. But in general the probability of a project's success is endogenous, being determined by entrepreneurial effort to avoid default. Consider a situation where lenders can observe (and contract upon) the entrepreneur's effort to avoid default, p_i . In Appendix 1, we show that in this case judicial efficiency tends to raise the average default rate, although it leaves the individual default probability unaffected. More specifically, the average default rate increases whenever there are some entrepreneurs who were denied credit before the judicial reform. The reason is that a more efficient judiciary reduces the region of credit rationing, opening the market to lower-grade borrowers.⁷ The deterioration of the borrower pool due to this endogenous response of p_i tends to raise the average interest rate, acting through a channel that is absent when p is exogenous. In the case of an increase in ϕ_p this effect reinforces the increase in the average interest rate. In the case of an increase in ϕ_c , it expands the region of parameters for which the average interest rate increases.

To summarize, under perfect competition an improvement in judicial efficiency reduces credit rationing and increases lending. It can also increase the average default rate if there was prior credit rationing. The effect on interest rates depends on the specifics of the reform: better recovery of external collateral (ϕ_c) has ambiguous effects, while better recovery of internal collateral (ϕ_p) raises interest rates.

⁷ The judicial reform may also raise the default rate via another channel. Banks are more protected by collateral in case of default, and so have less incentive to screen (collateral and screening being substitutes from their point of view). Less screening will increase the riskiness of their loans and the average default rate, as shown by Manove, Padilla and Pagano (2000).

2.2 Monopoly

To explore the effects of judicial reform in non-competitive credit markets, consider a situation in which the credit market is geographically segmented and banks are local monopolists. Since we assume that the demand for credit is inelastic, the monopolist extracts from borrower i the entire surplus, setting:

$$1 + r_i = \phi_p(1 + \pi_i) + \phi_c c_i, \text{ for } c_i \in [c_{\min}, c_{\max}], \quad (7)$$

where c_{\min} is given by equation (4). The maximum collateral c_{\max} that a borrower is willing to pledge is obtained by substituting equation (7) into the participation constraint:

$$u_i = p[(1 + \pi) + c_i - (1 + r_i)] + (1 - p)(1 - \phi_c)c_i \geq c_i,$$

which yields:

$$c_{\max} = \frac{p(1 + \pi)(1 - \phi_p)}{\phi_c}. \quad (8)$$

The interest rate that corresponds to this collateral level is $1 + r_{\max} = (1 + \pi)[\phi_p(1 - p) + p]$.

Equation (7) shows that, in contrast to the competitive case, under monopoly there is a positive correlation between the lending rate and the collateral-loan ratio. With no competition, the bank can charge higher rates to those who pledge more collateral. The correlation between r_i and c_i is graphed as the line AB in Figure 3. As under competition, if the collateral-loan ratio is lower than c_{\min} no credit is granted.

Figure 3 illustrates that an increase in ϕ_c shifts the AB locus upward and to the left. The new locus A'B' features lower c_{\min} and c_{\max} . So the credit-rationing region shrinks and lending increases, as under competition. Lending rates rises for all borrowers. An increase in ϕ_c effectively raises the pledgeable portion of collateral and so enables the bank to extract a higher surplus by raising interest rates. In Figure 4 we repeat the analysis for an increase in ϕ_p . In this case, the interest rate locus has a parallel upward shift, with similar qualitative effects. In short, under monopoly an improvement in judicial efficiency reduces credit rationing, increases lending and raises interest rates.

3. Evidence from a Panel of Judicial Districts

The model illustrates that improvements in judicial efficiency reduce credit rationing and increase aggregate lending. Interest rates can either rise or fall, depending on the competitive structure of the banking sector and on the specific channel through which judicial reforms enhance enforcement. We now bring empirical evidence to bear on these issues. In this section, we use panel data on lending to firms, credit rationing and interest rates in Italian provinces. In the next section, we will turn to international comparative evidence on mortgage markets.

3.1. Data

To study the relationship between judicial efficiency and credit market performance, we merge indicators of efficiency for 27 judicial districts with credit market data for 95 Italian provinces.

We rely on two indicators of judicial efficiency, using data from the Italian National Institute of Statistics (ISTAT). The first indicator is the length of ordinary civil trials from 1984 to 1998. It measures the time elapsing between the date of initial recording of a trial and that of the court sentence, for actions requiring adjudication of substantive rights concerning credit and commercial matters: loans, sale of real estate or goods, rentals, negotiable and quasi-negotiable instruments, and insurance.⁸ Enforcement cost is directly related to the length of the judicial process. A long trial increases legal expenses and, for disputed loans, the interest income forgone when collateral does not cover judicial costs. Moreover, during the trial, the creditor is exposed to the danger of asset substitution by the debtor and to unexpected changes in the value of collateral.

The second indicator of judicial efficiency is the number of civil suits pending per thousand inhabitants. It refers to all actions requiring adjudication of substantive rights, including appeal trials, from 1984 to 1998. The stock of trials pending is a key determinant of

⁸ A narrower classification of legal actions (e.g., loans only) produces too few observations for each district-year cell to compute reliable indicators of judicial efficiency. For the same reason we do not consider the length of appeals civil cases and bankruptcy procedures.

the duration of future trials; the two indicators are strongly correlated.

Our indicators of judicial efficiency vary considerably with judicial district and over time. The two graphs in Figure 5 display the national averages. The length of trials doubles from 26.3 months in 1984 to 52.9 in 1998. The number of trials pending per 1000 inhabitants increases from 23.4 in 1984 to 37.9 in 1996, then edging down to 35.7 in 1998. These trends may be explained by increasing assignment of judges and resources to criminal justice, to the increasing number and complexity of civil laws, and to litigation.

The graphs in Figure 6 break down the time series of the two indicators geographically. Trials are longer and backlogs are larger in the South and the Islands than in the North and Center. While the difference in the length of trials across regions is roughly constant, the backlog shows widening geographical disparities. In 1984 the number of trials pending was 20 in the North and 27 in the South; in 1998, 23 in the North and 44 in the South. Furthermore, the North shows more marked signs of improvement after 1993, when its backlog peaked at 27.4.

The bottom graphs in Figures 5 and 6, then, show that both the average number and the dispersion of trials pending increased between 1984 and 1998. In a panel regression framework, variability of the length of trials between different years and different districts is crucial to identify the effect of judicial efficiency on credit market performance.

Both of our indicators may suffer from measurement error. The cases used to measure length include many disputes on matters other than credit. The stock of trials pending refers to the even broader aggregate of all civil cases. Indirect evidence on the reliability of these indicators comes from a 1994 survey of 269 Italian banks, representing 90 per cent of total loans.⁹ The survey was designed by the Bank of Italy to gather information on credit recovery costs and procedures (both judicial and non-judicial), in the presence of insolvent borrowers. It allows us to compare our measures of judicial efficiency, which are based on ISTAT data, with the bank's own assessment of the length of the judicial procedures by region. Since the survey refers to 1994, we aggregate the ISTAT district-level judicial data by region (20 in total, with 1 to 9 provinces each) and relate the resulting measures to the self-reported indicator.

Figure 7 shows that the length of trials and the stock of trials pending based on ISTAT

⁹ Generale and Gobbi (1996) describe the survey and its main findings.

data correlate positively with the bank's reports. The self-reported measure of the length of trial has a 0.79 correlation with the ISTAT measure of the same variable (statistically significant at the 1 percent level) and a 0.45 correlation with the ISTAT-based backlog (significant at the 5 percent level). We take this as evidence that the two ISTAT-based indicators of judicial efficiency used in our empirical analysis track lenders' perceived credit collection costs reasonably well.¹⁰

We merge these indicators of judicial efficiency with measures of credit market performance: outstanding loans, indicators of credit rationing, interest rates on short-term loans to non-financial companies, ratio of non-performing to total loans and the Herfindhal index of loan concentration.

Loans granted is total lending to domestic companies in each province divided by provincial GDP. Credit rationing is proxied by the proportion of overdrawn credit lines to non-financial firms in each province, that is, lines for which credit is drawn above the amount initially granted by the bank. This is widely regarded as a good indicator of the "tightness" of the credit market because the cost of credit rises steeply when firms overdraw. Interest rates are provincial averages weighted by loans. The ratio of non-performing loans to total loans is a proxy of the default rate. All these variables are drawn from the database of the Italian public credit register (Centrale dei Rischi: see Appendix 2 for details on data sources and definitions). They are aggregated, for the 95 Italian provinces, from 1984 to 1995.

Table 1 reports unweighted provincial averages of the variables used in the empirical analysis for three sub-periods. The total number of observations is 1,140 (95 provinces for 12 years). The ratio of total outstanding lending to GDP increases from 31 to 41 percent. Credit rationing also increased, possibly a reflection of monetary policy tightening during Italy's run-up to the European Monetary Union. Both the lending rate and the T-bill rate decline over the sample period, reflecting disinflation. The differential between the two also narrows from 5 to 3.6 percentage points. The Herfindhal index declines from 17 to 15 percent, revealing increased competition in the loan market.

¹⁰ The self-reported indicator cannot be directly used in our regression analysis because it is available for only one year. Therefore, this variable is not identified in a panel data framework.

3.2. Descriptive Evidence

Figures 8, 9, 10 and 11 report evidence on the relation between credit market performance and judicial efficiency in the various judicial districts. Averages are taken over the 1984-95 period. Figure 8 indicates that the district average amount of lending is negatively correlated with the length of trials in a district and with the stock of trials pending. The correlation is statistically different from zero at standard significance levels. For instance, in a relatively efficient judicial district like Venice where trials last slightly more than 30 months and there are about 22 pending trials per 1000 inhabitants, lending is over 40 percent of GDP. In Reggio Calabria, where length exceeds 50 months and the backlog is about 50 trials per 1000 inhabitants, lending is equal to just 10 percent of GDP.

Figure 9 indicates that where trials are longer and the judicial backlog is heavier, our indicator of credit rationing is also higher: moving from Venice to Reggio Calabria, it approximately doubles. In Figure 10 we relate the interest rate spread (the difference between the lending rate and the T-bill rate) to the same indicators of judicial efficiency. Both correlation coefficients are positive and statistically different from zero at standard significance levels. The spread is more than 200 basis points greater in the least than in the most efficient districts. Figure 11 shows that, like the spread, the non-performing loan ratio is higher where courts are less efficient.

This descriptive evidence suggests that judicial efficiency is associated with a larger amount of lending, less credit rationing and lower interest rates, in accord with the model of Section 1 assuming banking competition. However, these relations could be spurious, because so far we have not controlled for other determinants of credit market performance. Furthermore, the cross-sectional evidence does not exploit the time-series dimension of the data set. As we shall see, this feature allows us to control not only for other covariates, but also for unobserved heterogeneity at the provincial level. Therefore, we turn to regression analysis.

3.3. Regression Analysis

In our regression analysis we relate lending, fraction of firms with overdraft loans, interest

rates and non-performing loans to length of trials and judicial backlog, controlling for credit market concentration, provincial GDP, calendar-year effects, and – in some specifications – provincial effects. Other things equal, we expect market concentration to reduce lending and raise interest rates, reflecting a less competitive credit market and possibly closer bank-firm relations, a further channel for higher interest rates and less lending according to Petersen and Rajan (1995). One would expect a larger GDP to increase the demand for loans and thereby raise interest rates. To avoid endogeneity, the GDP variable is lagged. Calendar-year dummies control for the effect of aggregate shocks on the credit market.

The upper panel of Table 2 reports OLS estimates, while the lower panel reports fixed-effect estimates, which control for unobserved heterogeneity at the province level. In the OLS regressions, the length of trials and the size of the backlog are associated with less lending, more overdraft loans, wider spreads and higher default rates. Each of these effects is statistically different from zero at the 1 percent level, and all are in keeping with the descriptive evidence of the previous section. In economic terms, moreover, the coefficients are very large. For instance, increasing the length of trials by 1 year is associated with a fall in the lending-GDP ratio of almost 7 percentage points and a 2-point increase in the percentage of firms with overdraft credit. An extra 10 trials pending per 1000 inhabitants is associated with a reduction of 4 percentage points in the lending ratio and an increase of over 2 in the overdraft percentage. The positive correlation between efficient judicial districts, lending and overdraft credit dovetails with the prediction of the model, insofar as overdrafts proxy for credit rationing.

The Herfindhal index is positively correlated with lending, interest rates and default rates, and is negatively correlated with the percentage of firms using overdraft credit, although the coefficient is statistically different from zero only for interest rates. This is consistent with previous studies of the Italian credit market based on individual loan contract data.¹¹ In general, the GDP coefficients are not statistically different from zero.

These results are subject to the objection that judicial efficiency could be correlated with omitted variables at the provincial level, such as credit risk or the efficiency of banks. The fixed-effect regressions reported in the lower panel of Table 2 control for such unobserved heterogeneity, provided that the variation of judicial efficiency in each province over time is

¹¹ See De Bonis and Ferrando (1997), D'Auria and Foglia (1997) and Sapienza (1997).

not correlated with that of these omitted variables. As one would expect, the impact of judicial efficiency on all the credit market variables is much attenuated compared with the OLS estimates and the descriptive evidence of the previous section.

However, the coefficient of the stock of trials pending maintains the same sign and remains significant in both the lending and the overdraft regressions. An additional 10 trials pending per 1000 inhabitants is associated with a reduction of 1.5 points in the lending-GDP ratio and an increase of 1 point in the percentage of firms with overdraft loans. Judicial backlog correlates negatively with the interest rate spread and with non-performing loans, overturning the descriptive evidence of Figures 10 and 11 and the OLS estimates, but this is quite reasonable in the framework of our model. Recall that in the model judicially less efficient districts may have lower average interest rates under competition, and should have lower rates under monopoly. Moreover, with the default rate endogenous, the model also predicts that they will be lower in the less efficient districts.

A caveat is that if the judicial process is excessively long or costly, private parties may bypass the courts for alternative forms of dispute settlement. The substitution of out-of-court settlement could be particularly significant in bankruptcies, suggesting that the relation between credit conditions and judicial enforcement may be non-linear. For short or moderate trials times, credit market performance (loans, interest rates, and so forth) respond to our indicators of judicial efficiency. Since beyond a critical length the relation between judicial efficiency and credit market performance may weaken or disappear, we introduce quadratic terms in the indicators of judicial efficiency in the specification of Table 2, but these prove to be not statistically different from zero.

To summarize, the econometric estimates obtained controlling for unobserved heterogeneity via province-level fixed effects confirm only part of the descriptive evidence of Figures 7 to 11. According to the estimates, the judicial districts with better legal enforcement display more lending activity and less credit rationing. These results are consistent with the model of Section 2, which predicts that judicial efficiency will increase lending and decrease credit rationing under competition and monopoly alike. On the whole, the estimates suggest that the correlation of judicial efficiency with interest rates and default rates is less robust. Again, this is in line with the model's predictions.

These results are also consistent with the findings of studies of other countries and

markets. Castelar Pineiro and Cabral (2001) and Cristini, Moya and Powell (2001) analyze how local variations in the effectiveness of the legal system in Argentina and Brazil have affected the development of credit markets. They find less lending and more non-performing loans in provinces or states with poor enforcement. Similar results are reported for household credit in the U.S. and Italy. In the United States, Meador (1982) and Jaffee (1985) found that mortgage interest rates were generally higher in states where the foreclosure process was longer and more costly. In Italy, Fabbri and Padula (2001) find that households located in judicially less efficient districts receive less credit, even after controlling for household characteristics.

4. International Evidence on Mortgage Markets

The market for mortgage loans is a potentially fruitful testing ground for the effects of the quality of judicial enforcement. First, this market is relatively homogeneous internationally, so that comparison is meaningful. Second, in the mortgage market an indicator of credit rationing is readily available: namely, the minimum down payment ratio. Finally, the performance of mortgage markets can be related to a set of indicators of the effectiveness of foreclosure procedures, available for a good number of industrialized countries.

The first three columns of Table 3 report the ratio of outstanding mortgage lending to GDP, the down payment ratio, and the spread between the lending and the borrowing rate in fourteen countries. Mortgage markets differ widely. In Canada, the United States, the United Kingdom, Sweden and Finland, the market is well developed, and the down payment is relatively low. In other countries (Belgium, Italy, Germany and Spain) the market is relatively thin and the down payment ratio is high.

The spread between borrowing and lending rates is an important indicator of mortgage market imperfections. Per se, a spread is not inconsistent with equilibrium models: it can stem from transaction costs or imperfect competition, and is negatively correlated with the equilibrium supply of loans. However, the presence of a spread is also consistent with asymmetric information or opportunistic behavior by borrowers. In these alternative models, there is no necessary relation between the spread and the supply of loans. For instance, in the model developed in Section 2 the spread is due to a particular form of transaction cost

(judicial inefficiency), but it can widen as well as narrow following judicial improvement.

In our sample of fourteen countries, differences in spreads are relatively small, while the variation in mortgage lending is huge. The spread ranges only from -2.3 percentage points in Spain (a country with comparatively low mortgage debt) to about 1.5 points in Italy and Austria (also with low levels of debt) and the United States (which has the largest mortgage debt). In short, there is simply no correlation between the spread and the size of the mortgage market. By contrast, the down payment ratio exhibits considerable variability. It is highest in Austria, Belgium, Germany, Italy, and Luxembourg, which unsurprisingly also have comparatively small mortgage markets.¹² The lack of correlation between the spread and the volume of lending (coefficient of 0.04) and the strong, negative correlation of the down payment ratio to volume (-0.63) are consistent with the model of Section 2.

Cross-country variability in the volume of mortgage lending, down payment ratios and interest rate spreads can be traced both to supply factors, including the cost and speed of foreclosure procedures, and to demand factors and regulation. Key demand factors are household earnings profiles, the age structure of the population, ownership preference, tax incentives for homeownership and debt, and intergenerational transfers. Regulation often imposes interest rate controls and minimum down payment ratios (until 1986 it was 50 percent in Italy). Here the analysis is descriptive, and we focus on international differences in judicial enforcement to explain the different performance of mortgage markets, without controlling for these additional factors.

Section 2 emphasizes that differences in the cost of repossessing and liquidating collateral can affect the performance of credit markets. Table 4 reports three indicators of judicial efficiency in the various countries. The first is a survey-based general assessment of the quality of judicial enforcement. The others are the length and the average cost of foreclosures on home mortgage loans.

On the basis of these indicators, Belgium, Germany, Italy and Spain feature more costly

¹² Chiuri and Jappelli (2001) explore the determinants of the international pattern of home ownership using the Luxembourg Income Study (LIS), a set of microeconomic data which they merge with aggregate panel data on mortgage loans and down payment ratios for fourteen OECD countries. After controlling for demographic characteristics, country effects, cohort effects and time effects, they find strong evidence that the availability of mortgage finance – as measured by outstanding mortgage lending and down payment ratios – affects the age-profile of home ownership, especially at the young end.

and slower procedures, and less efficient judicial systems in general.¹³ The Italian case stands out. Consistent with the data reported in Section 3, debt collection and repossession in case of foreclosure is very costly and time-consuming. It takes between 3 and 5 years to repossess, and legal expenses for foreclosure can be as high as 20 percent of the price. At the other extreme, the Netherlands, Canada, the United States and the United Kingdom have rapid mortgage foreclosure (one year or less, with a minimum of 2-3 months in the Netherlands) and much cheaper procedures.

Figure 12 plots the ratio of mortgage lending to GDP against two of our three indicators (duration of foreclosure and overall judicial efficiency). The size of the mortgage market correlates negatively with duration and positively with judicial efficiency: that is, the countries with better judicial systems also feature the broadest mortgage markets. Figure 13 suggests that judicial efficiency correlates negatively with down payment ratios, duration positively. That is, the countries with better judicial systems also have less credit rationing. Figure 14 shows that the spread correlates negatively with duration and positively with efficiency. That is, in countries with better judicial systems interest rates on loans are relatively higher.¹⁴ The patterns of Figures 12, 13 and 14 are summarized by the correlation matrix reported in Table 4. The correlations of lending volume and down payments with the three judicial efficiency indicators are statistically different from zero at standard significance levels. For spreads, only the positive correlation with the overall index of judicial efficiency is statistically different from zero.

The descriptive evidence reported in this section suggests that enforcement problems may be at the roots of the international differences in mortgage lending and in downpayment ratios. The evidence is consistent with the predictions of the theoretical model and with our findings for the panel of Italian provinces. It is also consistent with the findings of other recent

¹³ The three indicators of judicial efficiency are strongly correlated. For instance, duration correlates negatively with efficiency and positively with legal expense (see Table 4).

¹⁴ In contrast to the international comparison, some studies of mortgage markets in the United States report evidence that the cost of legal enforcement *increases* the cost of credit. Meador (1982) and Jaffee (1985) find that mortgage interest rates were generally higher in states where the law extended the length and expense of the foreclosure process. Similarly, Gropp, Scholz and White (1997) document that in states with more generous bankruptcy exemptions low-wealth households receive less credit and are charged higher interest rates. Alston (1984) reports that farm foreclosure moratorium laws in the 1930s led to fewer farm loans and to higher interest rates in the states that enacted them. Consistently with these findings, in states that facilitate the foreclosure process the rate of foreclosure is higher (Clauret, 1987) and the losses incurred by lenders are lower (Clauret and Herzog, 1990).

papers based on cross-country data. La Porta et al. (1997) consider indicators of creditor protection, origin of the legal system and respect of the law to explain the private debt-GNP ratio, using cross-country data, and find that respect of the law “has a large and statistically significant effect on the size of the capital market” (p. 1145). Padilla and Requejo (2001) produce estimates that qualify those results, using the same basic data but also controlling for variables that capture macroeconomic stability. In these expanded specifications, the efficiency of judicial enforcement appears to have more significant effects on credit markets than creditor protection *per se*, in contrast with the original La Porta et al. (1997) results.

5. Conclusions

Judicial inefficiency has high economic costs in credit markets. So far, these costs have never been measured. This paper takes a step in this direction by analyzing the effect of judicial efficiency on the availability and cost of credit, using a model of opportunistic debtors and inefficient courts. The model illustrates that improvements in judicial efficiency reduce credit rationing and increase the volume of lending. Interest rates can either increase or decrease, depending on the competitive structure of banks, on the specific channel through which judicial reforms improve lenders’ ability to repossess collateral, and on composition effects. For instance, greater judicial efficiency can open up the credit market to low-grade borrowers previously judged not creditworthy, and thereby raise the average default rate and the average interest rate.

These theoretical predictions receive support from panel data on Italian provinces and international data on mortgage markets. We construct a panel of Italian provinces merging judicial and credit market data. Controlling for unobserved heterogeneity at the provincial level, we find that where the backlog of pending trials is relatively large credit is less widely available, while the average interest rate and the default rate are lower.

International data also reveal that the depth of mortgage markets and the availability of mortgage credit related inversely to the costs of foreclosure and directly to indicators of judicial efficiency, providing further evidence that judicial efficiency is associated with financial market deepening and more abundant credit.

Appendix 1: The Model with Endogenous Default

Assume that the utility of entrepreneur i is:

$$u_i = p_i[(1 + \pi) + c_i - (1 + r_i)] + (1 - p_i)[c_i - \min(1 + r_i, \phi_c c_i)] - V_i(p_i) \quad (\text{A1})$$

where the disutility of effort $V_i(p_i)$ is an entrepreneur-specific, increasing and convex function of the success rate p_i . We assume that p_i and c_i are observable and that the terms of the contract can be conditioned upon them. Therefore the competitive interest rate charged to entrepreneur i reflects both. Entrepreneur i chooses his effort level p_i treating this interest rate r_i as an exogenous parameter. The first-order condition of the problem is:

$$\frac{\partial u_i}{\partial p_i} = [(1 + \pi) + c_i - (1 + r_i)] - [c_i - \min(1 + r_i, \phi_c c_i)] - V_i'(p_i) = 0 \quad (\text{A2})$$

The second-order condition for a maximum is satisfied due to the convexity of $V_i(p_i)$.

The competitive interest rate is given by:

$$1 + r_i = \frac{1 + \bar{r}}{p_i} - \frac{1 - p_i}{p_i} \min(1 + r_i, \phi_c c_i) \quad \text{for } c_i \geq c_{\min, i}, \quad (\text{A3})$$

where

$$c_{\min, i} = \frac{1 + \bar{r}}{\phi_c} - \frac{p_i \phi_p (1 + \pi)}{\phi_c} \quad (\text{A4})$$

is the minimum collateral that entrepreneur i must pledge to obtain credit. The higher the effort p_i , the lower the minimum collateral. In contrast with the case with constant p analyzed in the text (where the marginal borrower is identified only by his collateral), here condition (A4) identifies a set of marginal borrowers. All entrepreneurs with collateral c_i and success rate p_i that satisfy equation (A4) are marginal borrowers.

Replacing the competitive interest rate (A3) in the first-order condition (A2), one obtains the equilibrium success rate of any entrepreneur i :

$$V_i'(p_i) = 1 + \pi \quad (\text{A5})$$

irrespective of whether $\phi_c c_i$ is smaller or larger than $1 + r_i$. Condition (A5) establishes that, at the individual level, the equilibrium success rate depends only on project profitability and on preferences, and not on judicial efficiency. However, an increase in judicial efficiency can affect the *average* success rate via composition effects, depending on the prevalence of credit rationing prior to the

reform. From condition (A4), an increase in ϕ_c or in ϕ_p reduces the minimum required collateral $c_{\min,i}$ (given p_i) or, alternatively, reduces the minimum required effort p_i (given $c_{\min,i}$). Thus, a new group of borrowers will gain access to credit: they feature lower c_i , lower p_i or both. It follows that the average default rate of the pool of borrowers increases, whenever some borrowers were credit-rationed before the judicial reform. If, instead, no entrepreneurs were credit-rationed ($c_i > c_{\min,i}$ for all i), then the average default rate remains unchanged.

The interest rate charged to each individual borrower i rises along with his default rate. To see this, notice that the interest rate charged to entrepreneur i is a decreasing function of his probability of success p_i , and therefore an increasing function of his default rate:

$$\frac{\partial(1+r_i)}{\partial p_i} = \begin{cases} -\frac{1+\bar{r}}{p_i^2} < 0 & \text{if } c_i \geq c, \\ \frac{-(1+\bar{r}) + \phi_c c_i}{p_i^2} = \frac{\phi_c (c_i - \bar{c})}{p_i^2} < 0 & \text{if } c_i < c. \end{cases}$$

Appendix 2: Provincial Data

Credit market data are available for 95 Italian provinces for the period 1984-95. The data are drawn from the *Centrale dei Rischi* database. The *Centrale dei Rischi* is the Italian central credit register, managed by a department of the Bank of Italy. Between 1984 and 1995 it recorded data on each loan over 80 million lire (approximately Euro 40,000) granted by Italian banks to companies and individuals. These data are compulsorily filed by banks and made available upon request to individual banks to monitor the total exposure of their customers. In addition, 88 banks (accounting for over 70 percent of total bank lending) have agreed to file detailed information about the interest rates charged on each loan. These data, which are collected for monitoring purposes, are highly confidential.

Judicial data are available from 1984 to 1998 for 27 judicial districts. Each district is defined by the jurisdiction of an appeal's court and comprises one or more provinces. Table 5 reports the matching of provinces and judicial districts. Below we report the definition and source of the variables used in the estimation.

Length of trials, by judicial district (1984-98). Interval between the date of initial filing of a civil action and the date of the sentence, for actions requiring adjudication of substantive rights concerning the following matters: loans, sale of real estate or goods, rentals, negotiable and quasi-negotiable instruments, and insurance. Source: data kindly provided by the Italian National Institute of Statistics (ISTAT).

Stock of pending trials, by judicial district (1985-98). Number of pending civil trials, based on actions requiring adjudication of substantive rights and scaled by the population of the corresponding district. Source: *Annuario Statistico dei Procedimenti Giudiziari Civili*, various years, Italian National Institute of Statistics (ISTAT).

Loans granted, by province (1984-95). Total credit granted to domestic companies for loans above 80 millions lire. Source: *Centrale dei Rischi*.

Credit rationing, by province (1985-95). Proportion of credit lines overdraft (loans for which credit actually drawn exceeds credit granted) for a set of non-financial companies. The companies are those that are also present in the Company Account Data Service *Centrale dei Bilanci*, covering approximately 30,000 companies each year. Source: *Centrale dei Rischi*.

Lending rate, by province (1984-95). Lending rate on short-term loans in domestic currency to domestic companies, for a sample of 88 banks that reports on quarterly lending rates on loans exceeding 80 million lire. Data are aggregated by province weighting interest rates by loan size. Annual data are computed as averages of quarterly data. Source: *Centrale dei Rischi*.

Non-performing loans, by province (1984-95). Ratio of non-performing loans to total loans in domestic currency to domestic companies. Annual data are computed as averages of quarterly data. Source: *Centrale dei Rischi*.

Herfindhal index, by province (1985-95). The index is the sum of squared market shares of loans of all banks in each province. Source: *Centrale dei Rischi*.

Real GDP, by province (1985-95). Source: Banca d'Italia estimates based on data from Istituto Tagliacarne. The estimation method is described by Fabiani and Pellegrini (1997).

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Table 1

Panel of Italian Provinces: Descriptive Statistics

The table reports unweighted period averages of the variables used in the regression analysis. See Appendix 2 for the definition of the variables.

| Variable | 1984-87 | 1988-91 | 1992-95 |
|---|----------------|----------------|----------------|
| Length of trials, months | 30.00 | 40.08 | 44.15 |
| Stock of pending trials, per thousand inhabitants | 23.55 | 29.61 | 34.98 |
| Loans granted/GPD, percent | 31.23 | 39.75 | 40.67 |
| Credit overdrafts, percent | 11.48 | 15.23 | 19.44 |
| Lending rate, percent | 17.79 | 15.42 | 14.97 |
| T-bill rate, percent | 12.80 | 12.50 | 11.23 |
| Non-performing loans/GDP, percent | 2.34 | 1.24 | 2.14 |
| Herfindhal index, percent | 17.33 | 15.59 | 15.29 |
| Real GDP (trillion of lire) | 11.34 | 12.54 | 12.61 |
| Number of observations | 380 | 380 | 380 |

Table 2**Panel of Italian Provinces: Regression Analysis**

The dependent variables are the ratio of loans to GDP, an indicator of credit rationing (the fraction of loans for which credit used exceeds 100 percent of credit granted), the spread between the lending rate and the T-bill rate, and the ratio of values of non-performing loans to total loans. All variables are in percent. Each regression is estimated with a full set of year dummies. The sample consists of observations for 95 provinces from 1984 to 1995. T-statistics are reported in parenthesis.

| Ordinary Least Squares Estimates | | | | |
|---|-------------------|-------------------|----------------------|------------------------------------|
| Variable | Lending / GDP | Overdrafts | Interest rate spread | Non-performing loans / total loans |
| Length of trials, months | -0.583 (-7.59) | 0.181 (7.57) | 0.049 (12.10) | 0.047 (5.66) |
| Stock of pending trials, per thousand inhabitants | -0.438 (-7.40) | 0.214 (11.61) | 0.045 (14.53) | 0.022 (3.36) |
| Herfindhal index | 0.080 (1.04) | -0.007 (-0.30) | 0.014 (3.58) | 0.010 (1.21) |
| First lag of real GDP | 2.400 (3.18) | -0.072 (-0.31) | -0.022 (-0.55) | 0.029 (0.35) |
| Second lag of real GDP | -0.756 (-0.98) | 0.038 (0.16) | 0.001 (0.03) | -0.037 (-0.44) |
| Adjusted R square | 0.760 | 0.519 | 0.676 | 0.167 |

| Fixed Effect Estimates | | | | |
|---|-------------------|-------------------|----------------------|------------------------------------|
| Variable | Lending / GDP | Overdrafts | Interest rate spread | Non-performing loans / total loans |
| Length of trials, months | -0.002 (-0.05) | 0.011 (0.40) | 0.007 (1.90) | -0.012 (-0.98) |
| Stock of pending trials, per thousand inhabitants | -0.147 (-2.86) | 0.106 (3.72) | -0.005 (-1.47) | -0.045 (-3.45) |
| Herfindhal index | -0.209 (-3.11) | 0.113 (3.01) | 0.001 (0.25) | 0.054 (3.14) |
| First lag of real GDP | -0.451 (-1.46) | -0.118 (-0.69) | 0.026 (1.16) | 0.011 (0.14) |
| Second lag of real GDP | -0.238 (-0.81) | -0.055 (-0.34) | 0.001 (0.01) | -0.069 (-0.92) |

Table 3**Housing Finance, Costs and Duration of Housing Mortgage Foreclosure, and Efficiency of the Judicial System: International Comparison**

Outstanding mortgage loans over GDP are 1986-96 averages. Annual outstanding loans against mortgages in residential property is based on Table 14 in EU Mortgage Federation - Hypostat 1986-96 (1997) and annual GDP from IMF Financial Statistics. The downpayment ratio is the 1970-1995 average of minimum downpayment ratios for first-time buyers. The sources are Jappelli and Pagano (1994), EC Mortgage Federation (1996) and Maclennan, Muellbauer and Stephens (1998). Data refer to 1981-97. The interest rate spread is the average interest rate on mortgage loans less the corresponding long-term rate. Interest rates on mortgage loans are drawn from Hypostat 1986-96, Table 21. Long-term interest rates are drawn from OECD (1996). Data refer to 1986-96, except for Finland and Sweden (1990-96), Luxembourg (1986-87) and Spain (1993-96). Efficiency of the judicial system is an assessment of the entire legal environment as it affects business taken from the country-risk agency Business International Corporation. It is an average of 1980-83 and the scale goes from 0 to 10, with lower scores indicating lower efficiency levels. Source: La Porta et al. (1998). Legal expenses as percentage of the price of the mortgaged house and duration of housing mortgage foreclosure refer to 1990 and are drawn from European Mortgage Federation (1996). Data for duration in Austria, Canada, Luxembourg, and United States have been obtained directly by country experts.

| Country | Outstanding mortgage loans / GDP | Down-payment ratio | Interest rate spread on mortgage loans | Efficiency of the judicial system | Duration of mortgage foreclosure (in months) | Legal expenses as % of the mortgaged house price |
|----------------|----------------------------------|--------------------|--|-----------------------------------|--|--|
| Australia | 19.30 | 20.0 | n.a. | 10 | n.a. | n.a. |
| Austria | 4.24 | 30.0 | 1.52 | 9.5 | 13 | n.a. |
| Belgium | 20.08 | 22.5 | 1.02 | 9.5 | 24 | 16-23 |
| Canada | 41.32 | 22.5 | n.a. | 9.25 | 4.75 | n.a. |
| Finland | 32.35 | 17.5 | 1.23 | 10 | n.a. | n.a. |
| France | 22.02 | 20 | 0.95 | 8 | 10-12 | 12-18 |
| Germany | 28.92 | 27.5 | 1.10 | 9 | 12-18 | 6 |
| Italy | 5.49 | 42 | 1.47 | 6.75 | 36-60 | 18-20 |
| Luxembourg | 25.61 | 40 | -1.02 | n.a. | 12 | 2 |
| Netherlands | 43.29 | 25 | 0.41 | 10 | 2-3 | 11 |
| Spain | 15.01 | 20 | -2.30 | 6.25 | 36 | 5-15 |
| Sweden | 56.50 | 15 | 0.20 | 10 | n.a. | n.a. |
| United Kingdom | 51.87 | 9 | 1.08 | 10 | 12 | 4.75 |
| United States | 43.61 | 15.5 | 1.60 | 10 | 9 | n.a. |

Table 4**International Comparison of Mortgage Markets: Correlation Matrix**

The table reports the correlation matrix between indicators of housing finance (mortgage loans, downpayment ratios and interest rate spreads) and indicators of judicial efficiency (efficiency of judicial system, duration of mortgage foreclosure, and legal expenses as a percent of the mortgaged house price). The countries analyzed are the 14 countries listed in Table 3. Because of missing data, some of the correlation coefficients are obtained with fewer observations. The number in parenthesis is the significance level of each correlation coefficient.

| | Outstanding mortgage loans / GDP | Down-payment ratio | Interest rate spread on mortgage loans | Efficiency of the judicial system | Duration of mortgage foreclosure (in months) | Legal expenses as % of the mortgaged house price |
|--|----------------------------------|---------------------|--|-----------------------------------|--|--|
| Outstanding mortgage loans / GDP | 1.0000 | | | | | |
| Down-payment ratio | -0.6310 (0.0150) | 1.0000 | | | | |
| Interest rate spread on mortgage loans | 0.0482 (0.8818) | -0.0768 (0.8126) | 1.0000 | | | |
| Efficiency of the judicial system | 0.5969 (0.0313) | -0.4998 (0.0820) | 0.5159 (0.1043) | 1.0000 | | |
| Duration of mortgage foreclosure (months) | -0.6737 (0.0230) | 0.3944 (0.2300) | -0.1977 (0.5841) | -0.8105 (0.0045) | 1.0000 | |
| Legal expenses as % of the mortgaged house price | -0.5694 (0.1407) | 0.1015 (0.8110) | 0.3953 (0.3324) | -0.3016 (0.5110) | 0.5071 (0.1996) | 1.0000 |

Table 5**Matching Judicial Districts and Provinces**

The table reports the matching of judicial districts with the Italian provinces. The source is ISTAT, *Annuario dei Procedimenti Giudiziari Civili*, 1996.

| Judicial districts | Corresponding regions and provinces | Population in judicial districts in 1994 |
|--------------------|---|--|
| Turin | Piedmont (all provinces), Valle d'Aosta | 4,417,412 |
| Milan | Milan, Como, Varese, Pavia, Sondrio | 6,196,412 |
| Brescia | Brescia, Bergamo, Cremona, Mantua | 2,704,486 |
| Trento | Trentino-Alto Adige (all provinces) | 906,387 |
| Venice | Veneto (all provinces) | 4,418,139 |
| Trieste | Friuli-Venezia Giulia (all provinces) | 1,860,380 |
| Genoa | Liguria (all provinces) and Massa-Carrara | 1,191,768 |
| Bologna | Emilia Romagna (all provinces) | 3,922,564 |
| Florence | Tuscany (all provinces excluding Massa Carrara) | 3,326,434 |
| Perugia | Umbria (all provinces) | 820,529 |
| Ancona | Marche (all provinces) | 1,440,435 |
| Rome | Lazio (all provinces) | 5,189,728 |
| L'Aquila | Abruzzo (all provinces) | 1,262,802 |
| Campobasso | Molise (all provinces) | 331,776 |
| Naples | Naples, Avellino, Benevento, Caserta | 4,633,197 |
| Salerno | Salerno | 1,080,545 |
| Bari | Bari, Foggia | 2,248,896 |
| Lecce | Lecce, Brindisi, Taranto | 1,820,197 |
| Potenza | Basilicata (all provinces) | 610,082 |
| Catanzaro | Catanzaro, Cosenza | 1,500,461 |
| Reggio di Cal. | Reggio Calabria | 578,837 |
| Palermo | Palermo, Agrigento, Trapani | 2,147,955 |
| Messina | Messina | 665,591 |
| Caltanissetta | Caltanissetta, Enna | 443,664 |
| Catania | Catania, Ragusa, Siracusa, | 1,793,745 |
| Cagliari | Cagliari, Oristano | 1,068,333 |
| Sassari | Sassari, Nuoro | 589,765 |
| | | |
| All districts | | 57,170,57 |

Figure 1

An increase in recoverable outside collateral (ϕ_c) under competition

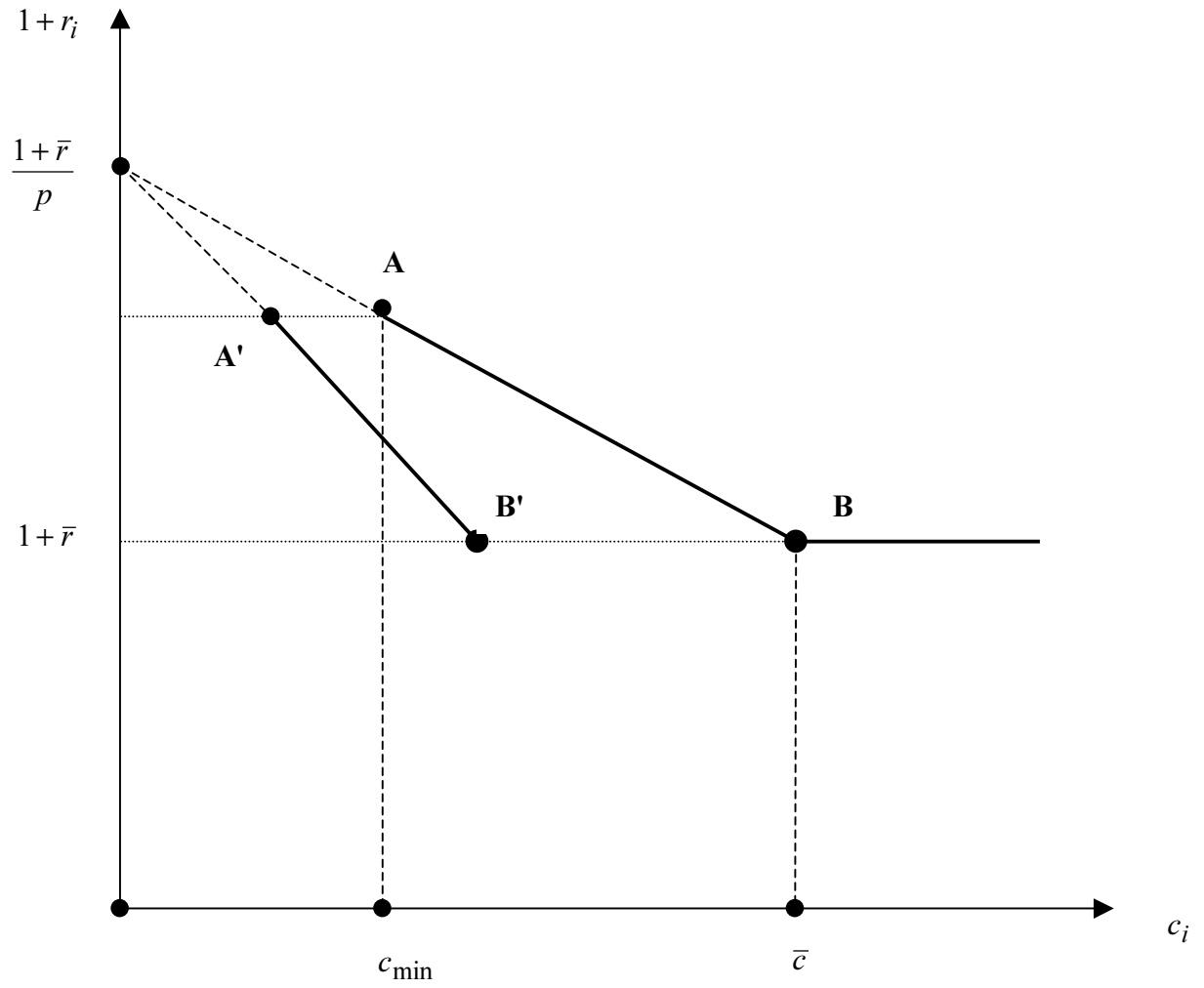


Figure 2

An increase in recoverable inside collateral (ϕ_p) under competition

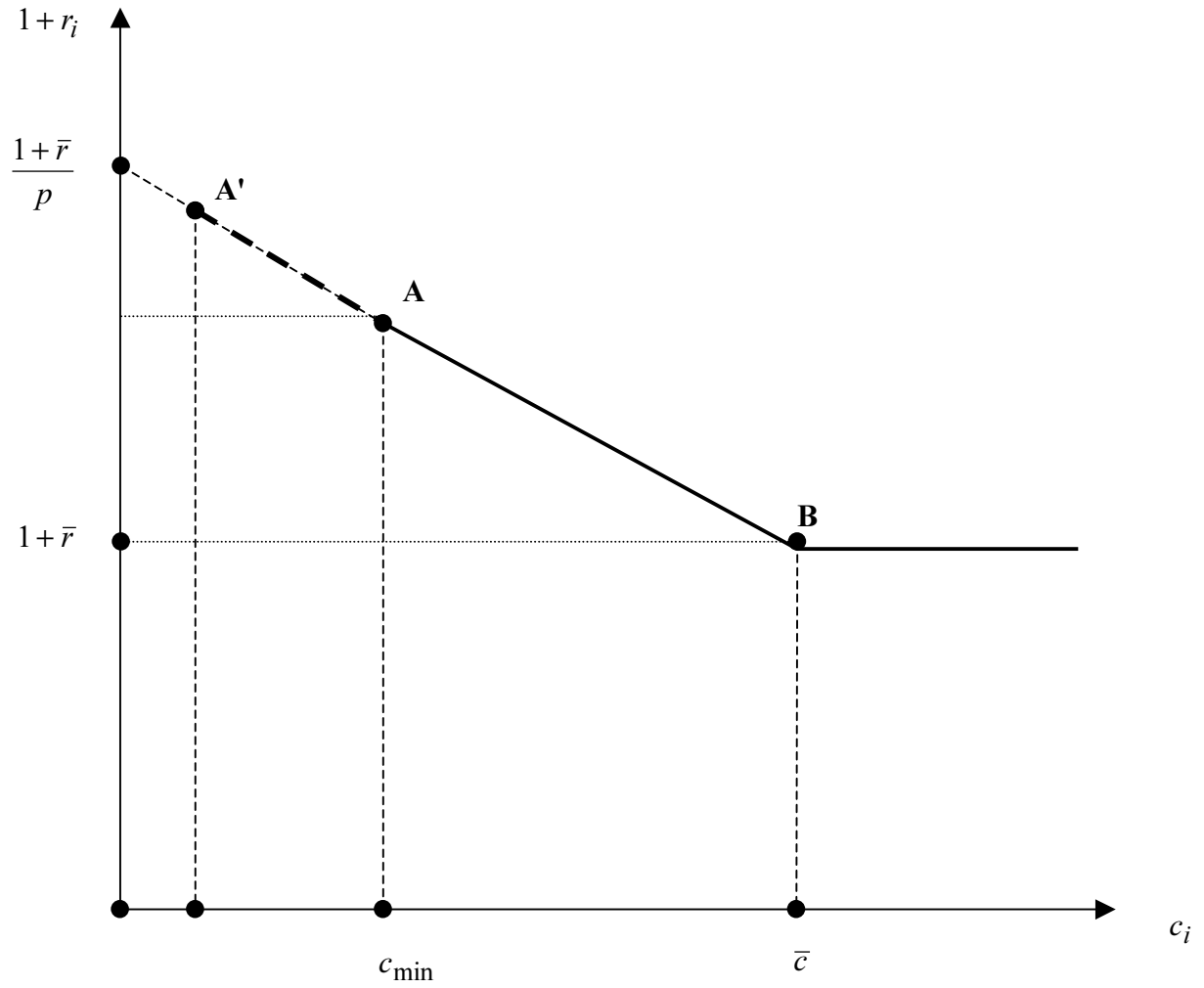


Figure 3

An increase in recoverable outside collateral (ϕ_c) under monopoly

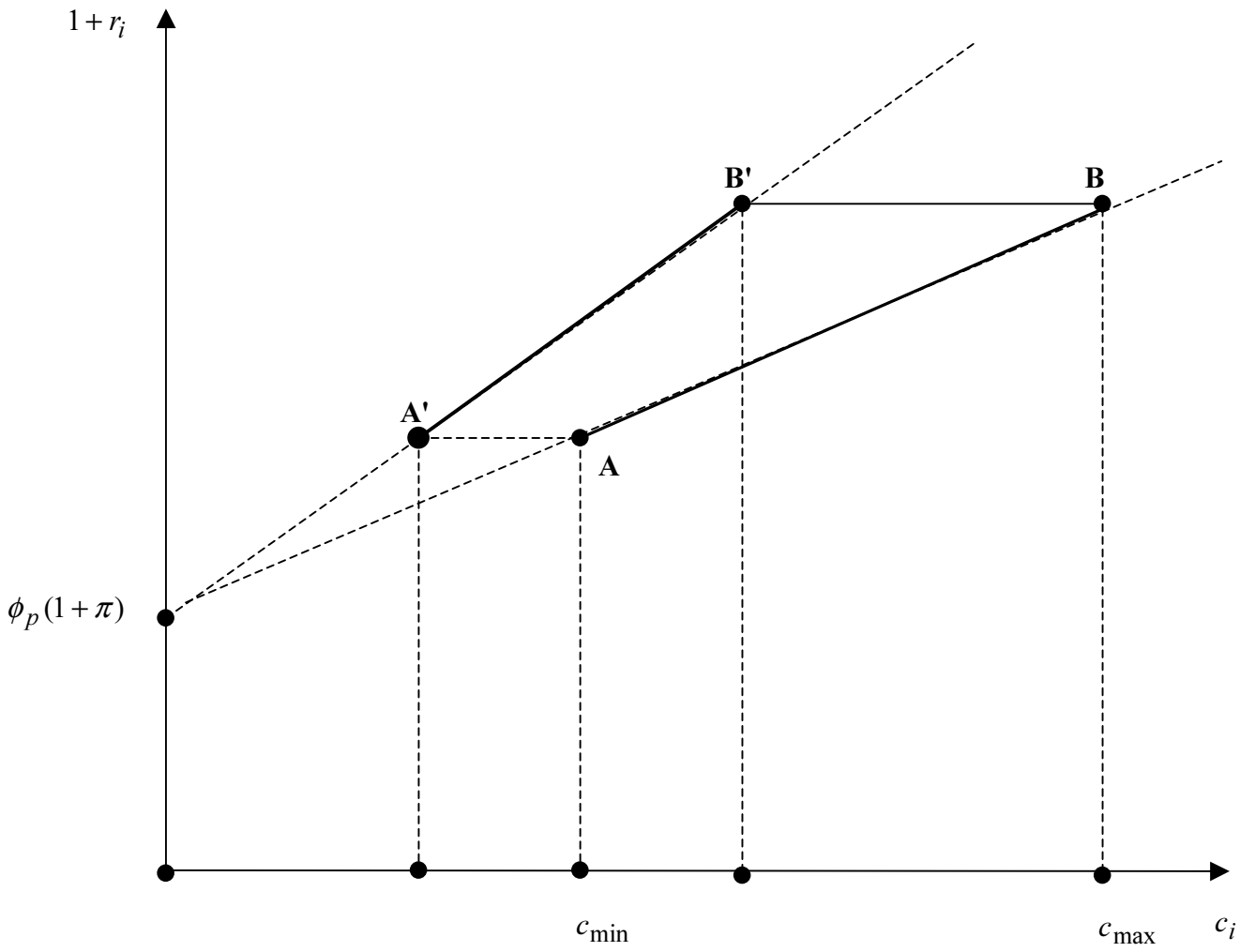


Figure 4

An increase in recoverable inside collateral (ϕ_p) under monopoly

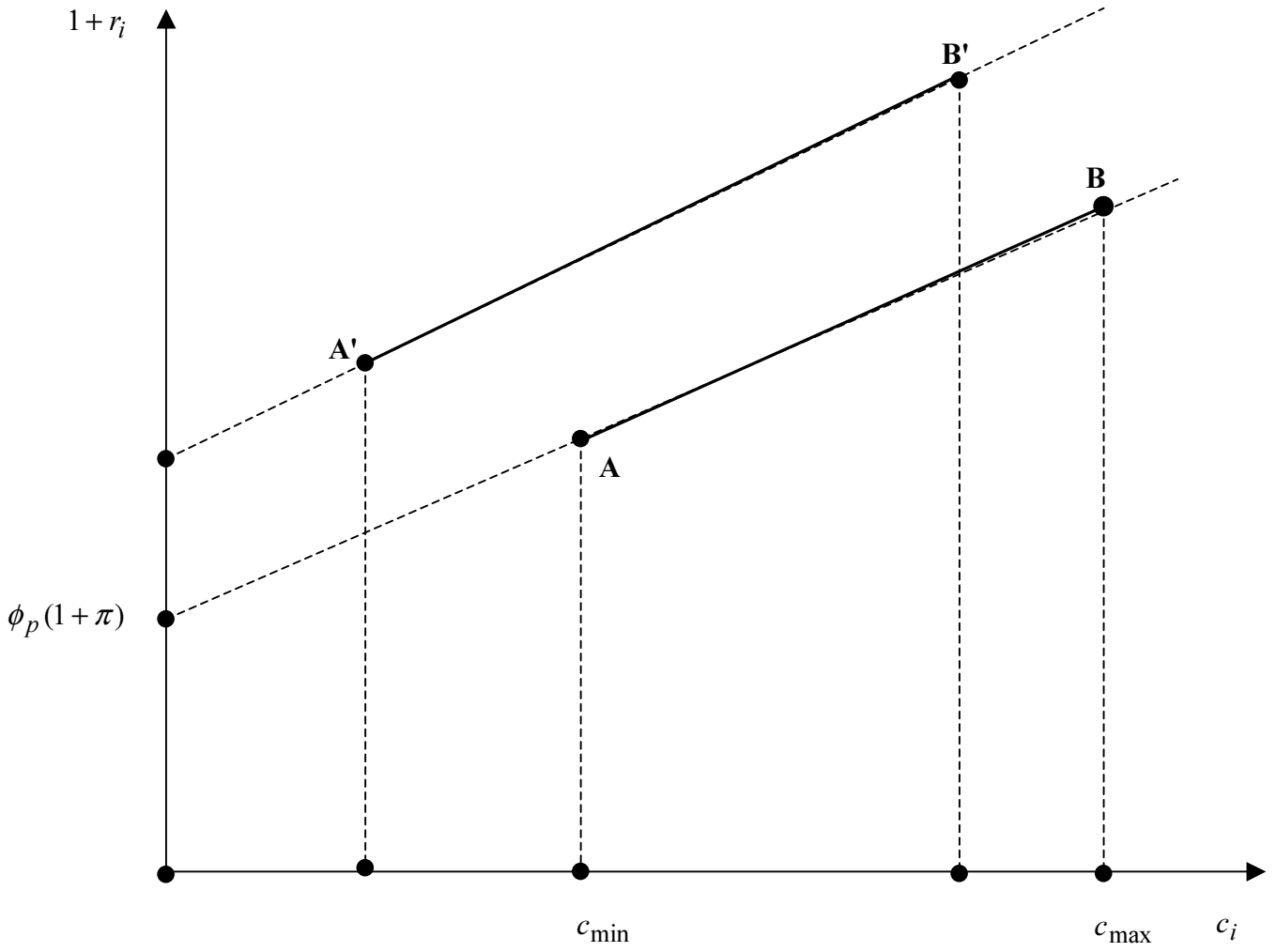


Figure 5

Indicators of Judicial Efficiency

The graphs display the average length of ordinary civil trials (in months) and the stock of pending civil trials (divided by the population of the district) in Italy from 1984 to 1998.

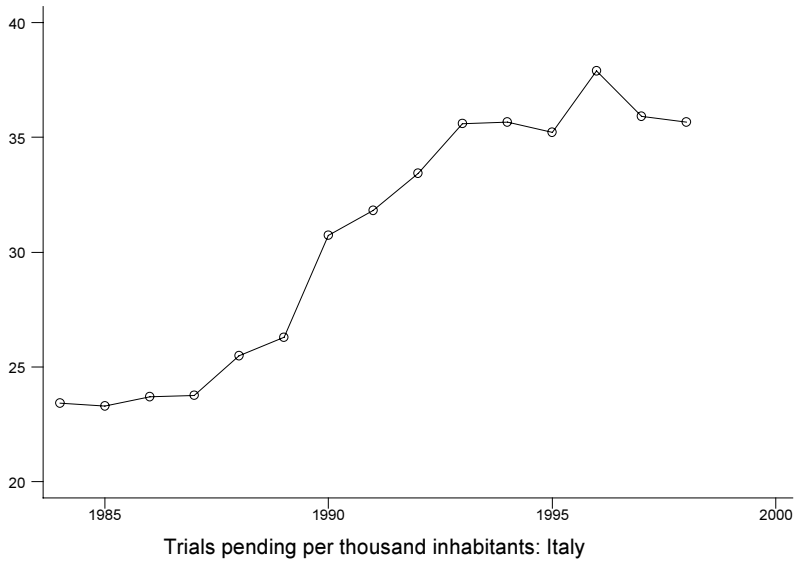
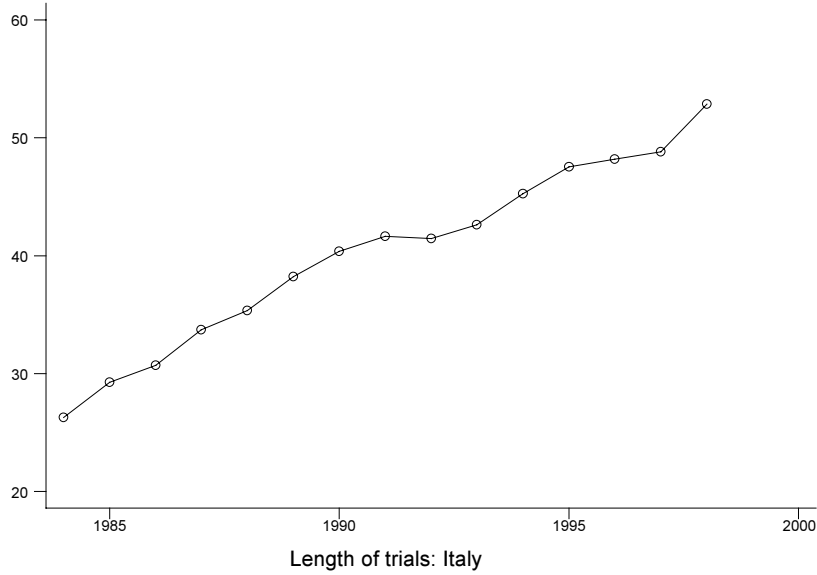


Figure 6

Indicators of Judicial Efficiency, by Region

The graphs display the average length of ordinary civil trials (in months) and the stock of pending civil trials (divided by the population of the district) in four Italian regions from 1984 to 1998.

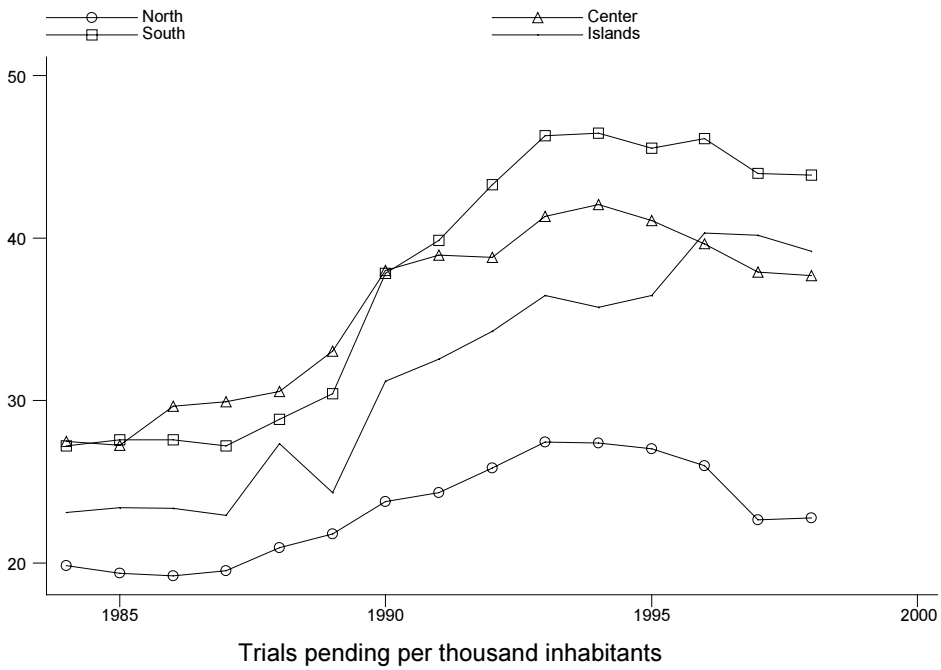
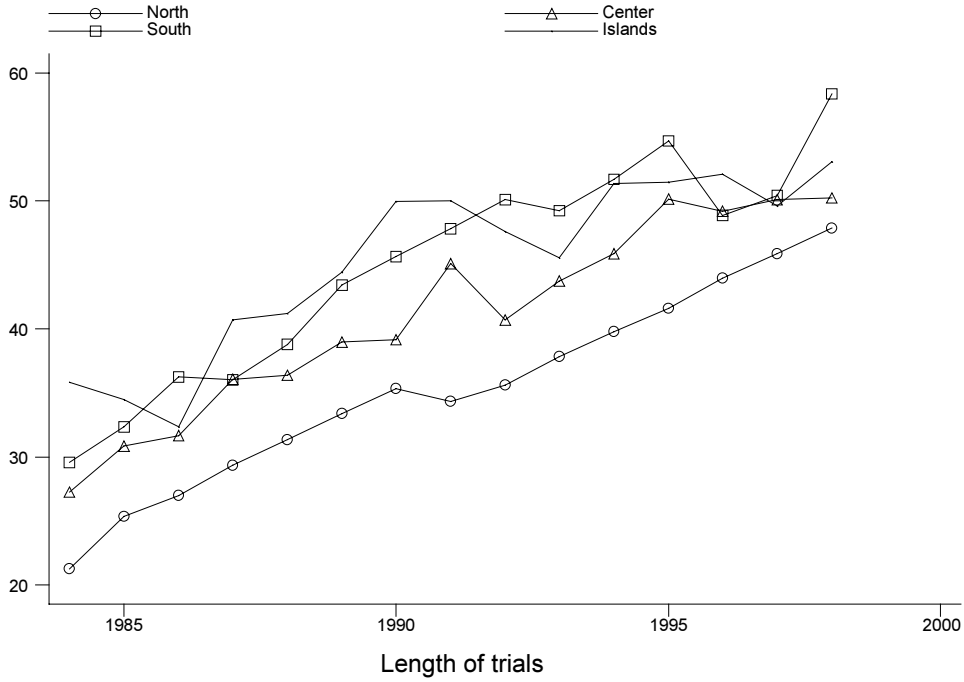


Figure 7

Comparison between ISTAT and Banks' Reported Measures of Judicial Efficiency

The figures plot the self-reported length of trials against the ISTAT measure of the length of trial and of the stock of pending trials, respectively. The self-reported length of trial is drawn from a 1994 survey on 269 Italian banks, representing 90 per cent of total lending. Data are grouped by regions (20 in total).

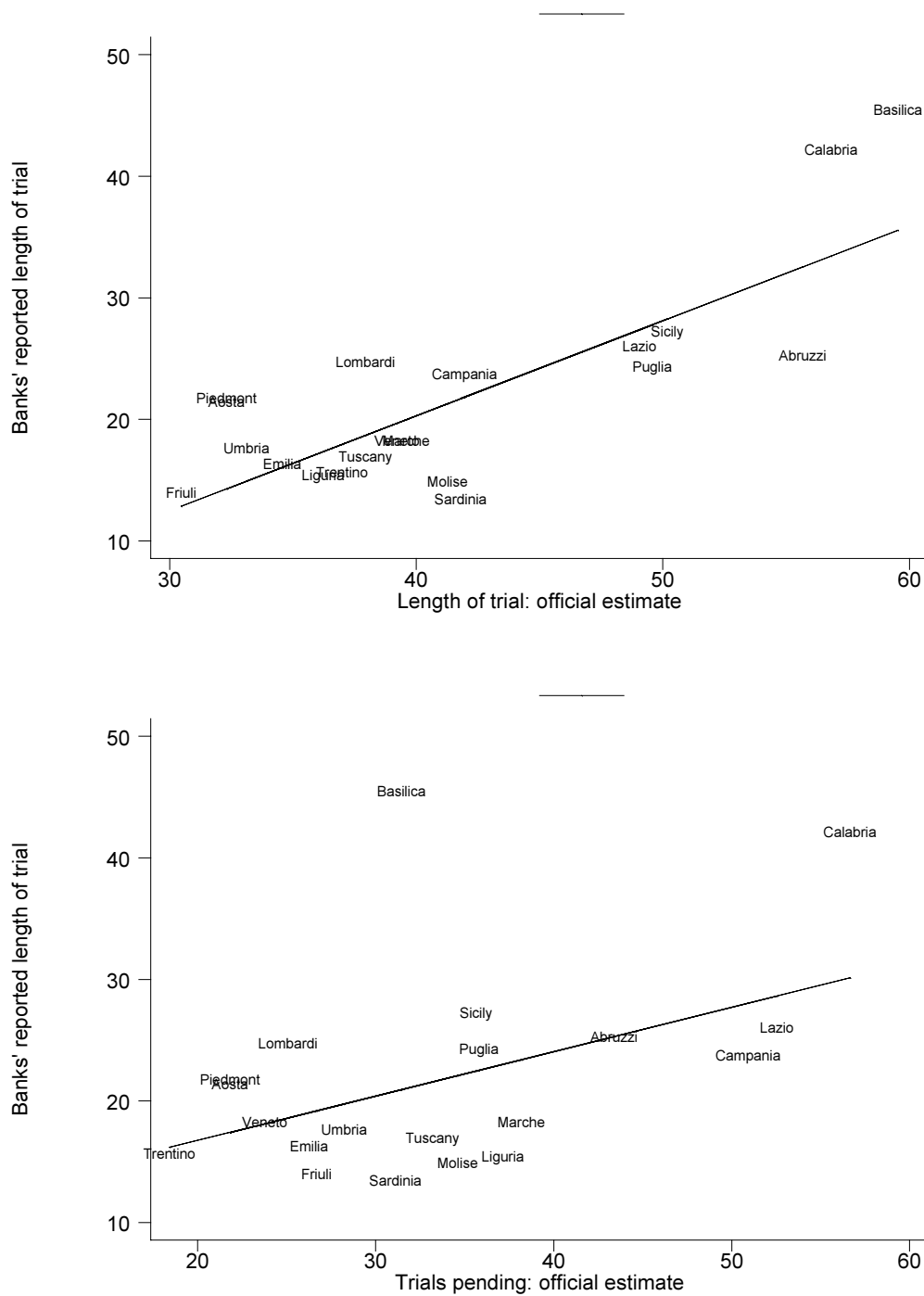


Figure 8

Judicial Efficiency and Lending

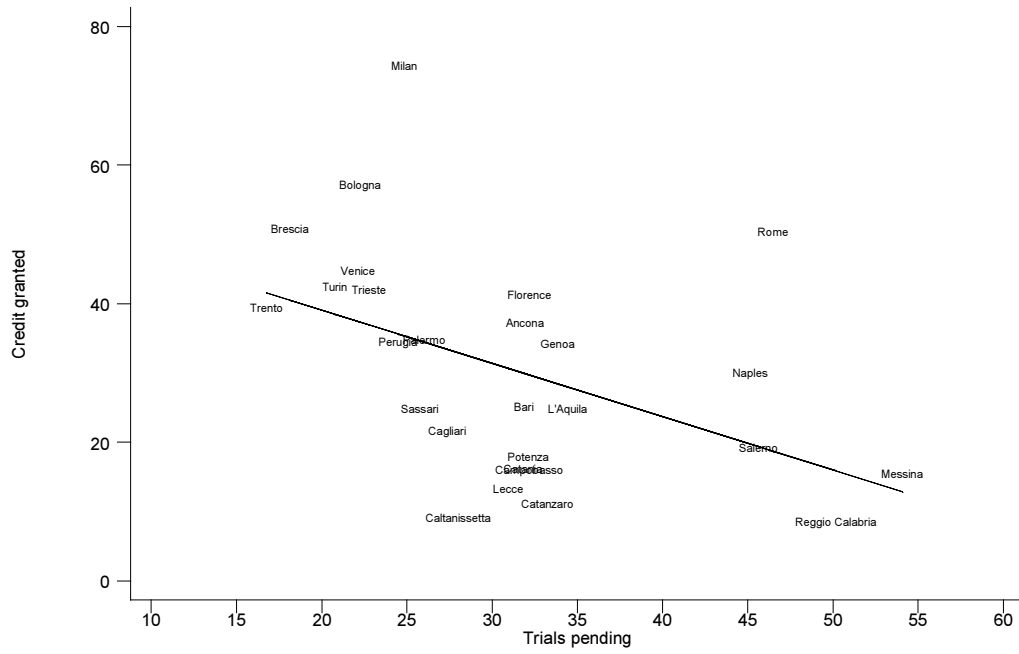
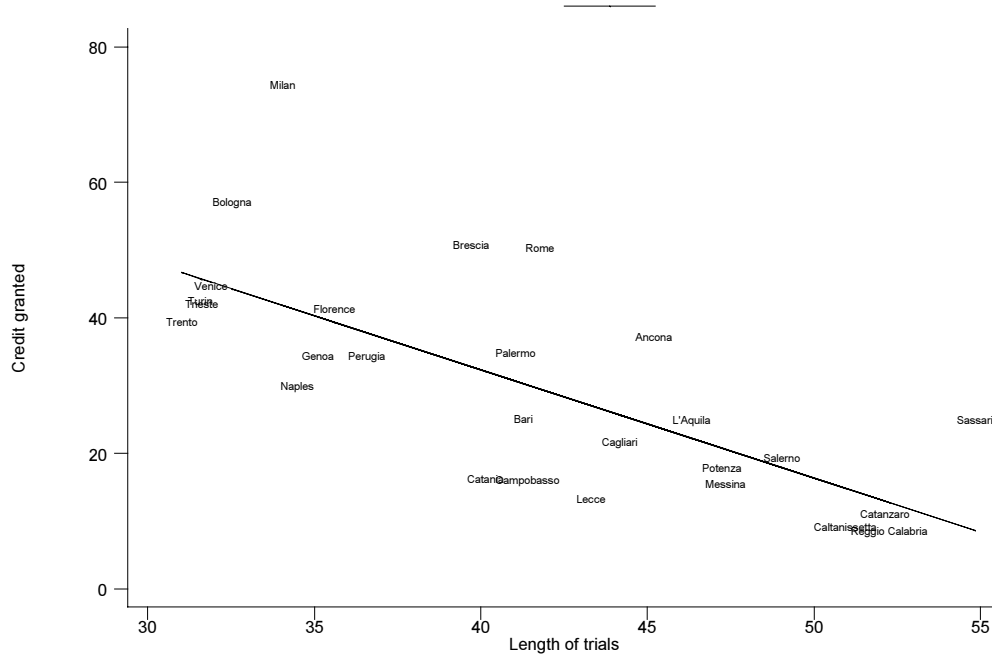


Figure 9

Judicial Efficiency and Overdraft Loans

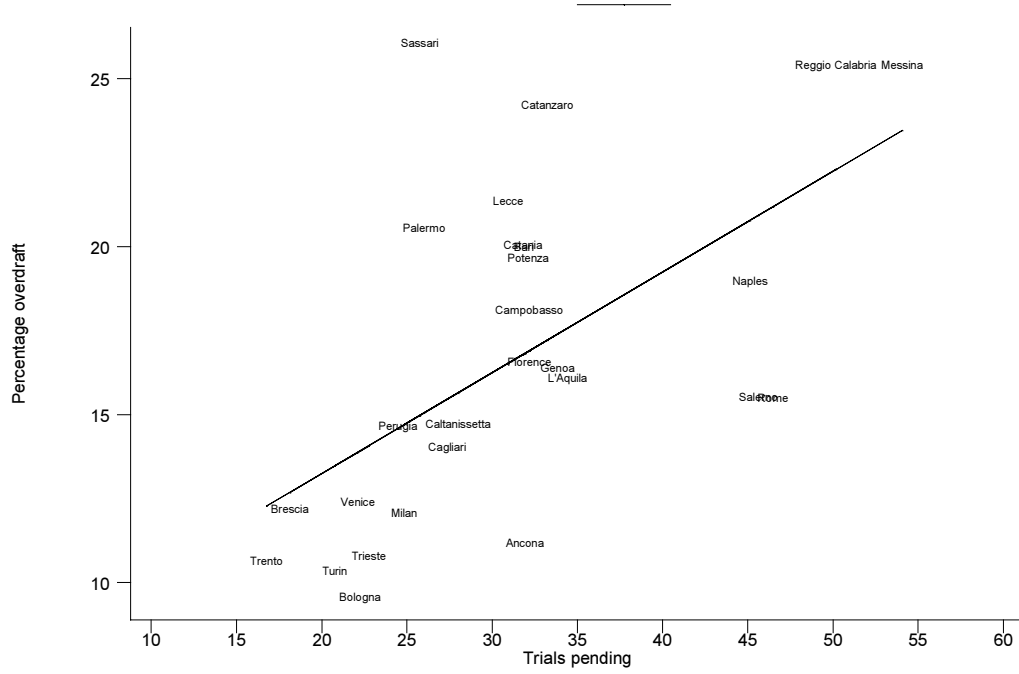
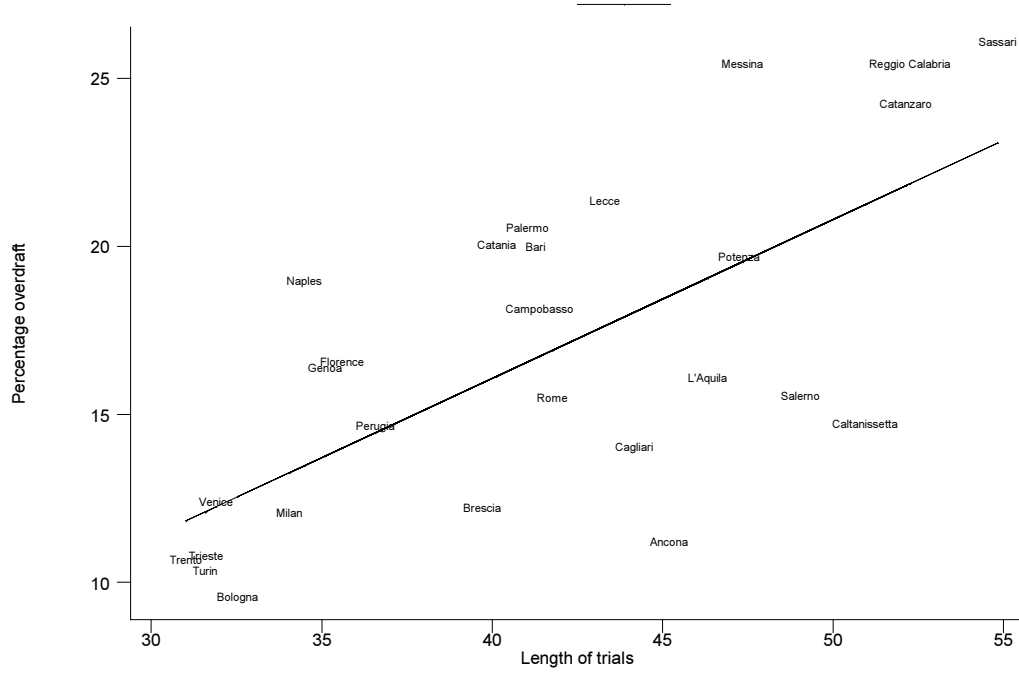


Figure 10

Judicial Efficiency and Interest Rate Spread

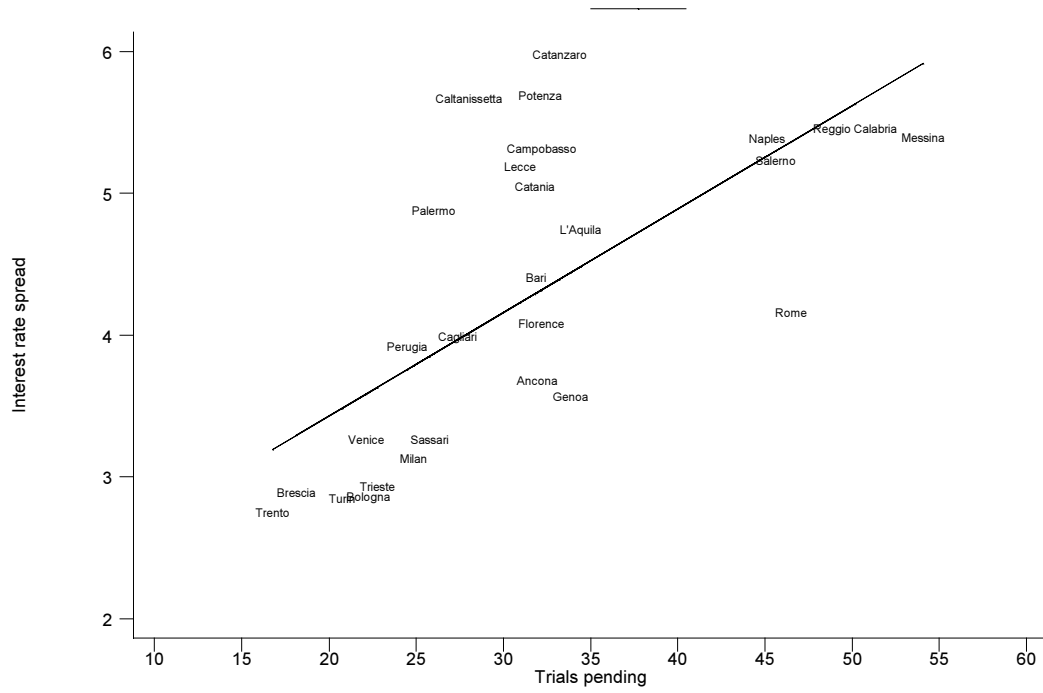
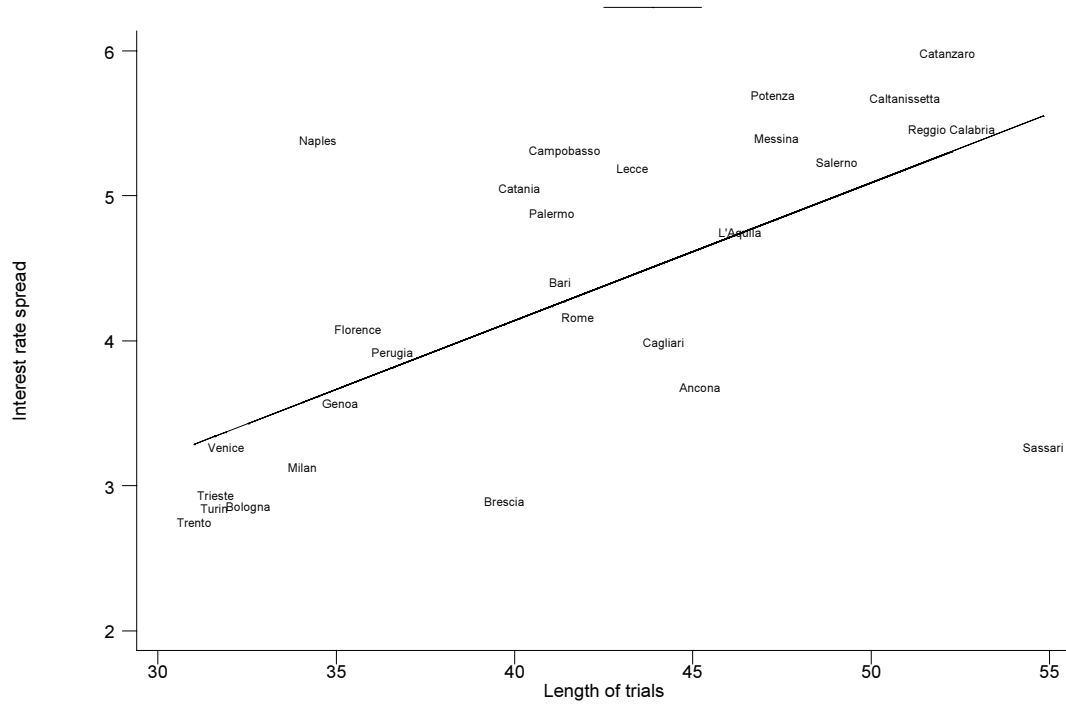


Figure 11

Judicial Efficiency and Non-Performing Loans

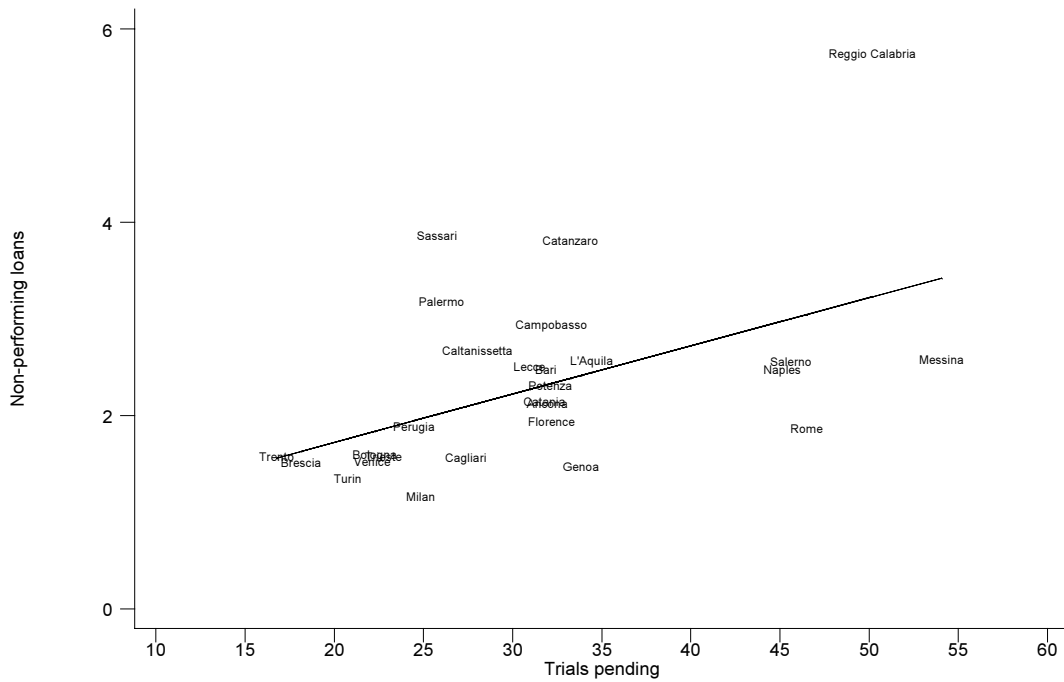
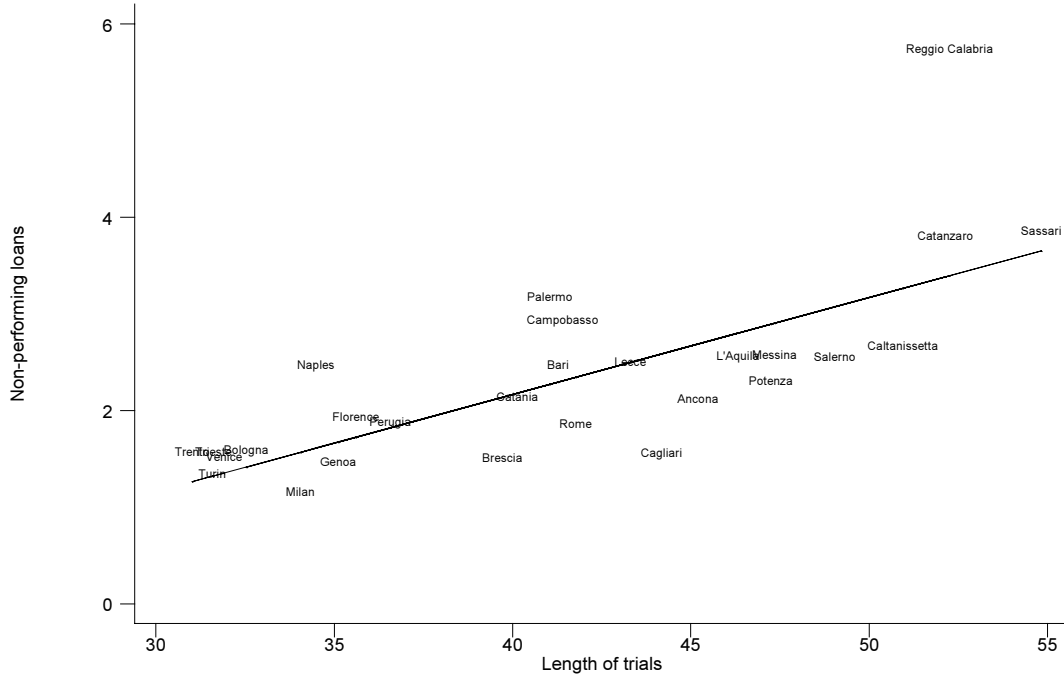


Figure 12

**Duration of Foreclosure Proceedings, Judicial Efficiency and Mortgage Lending:
International Evidence**

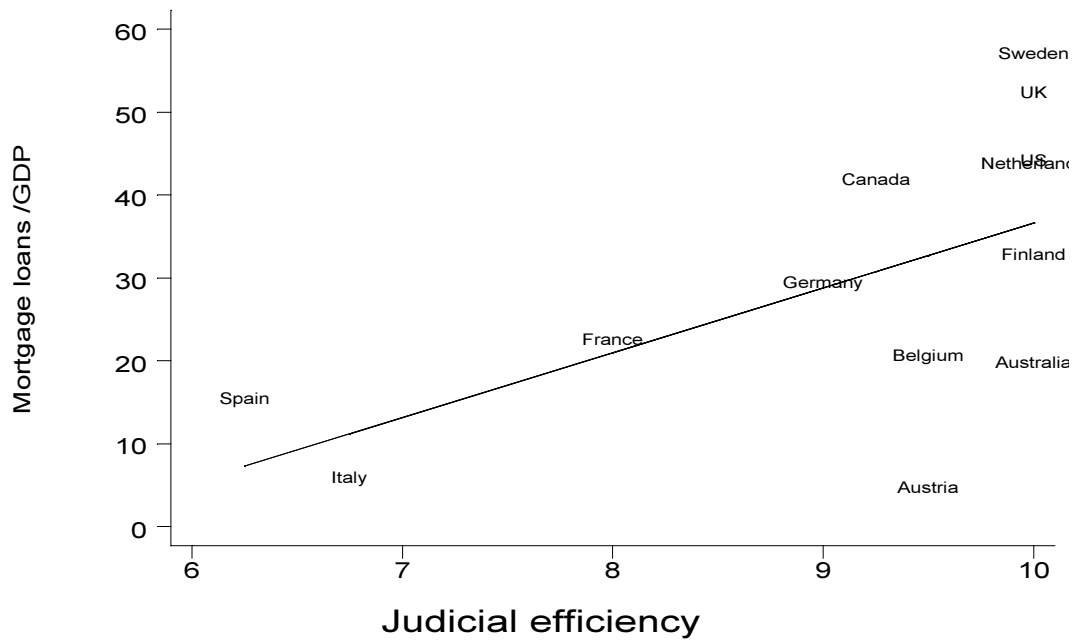
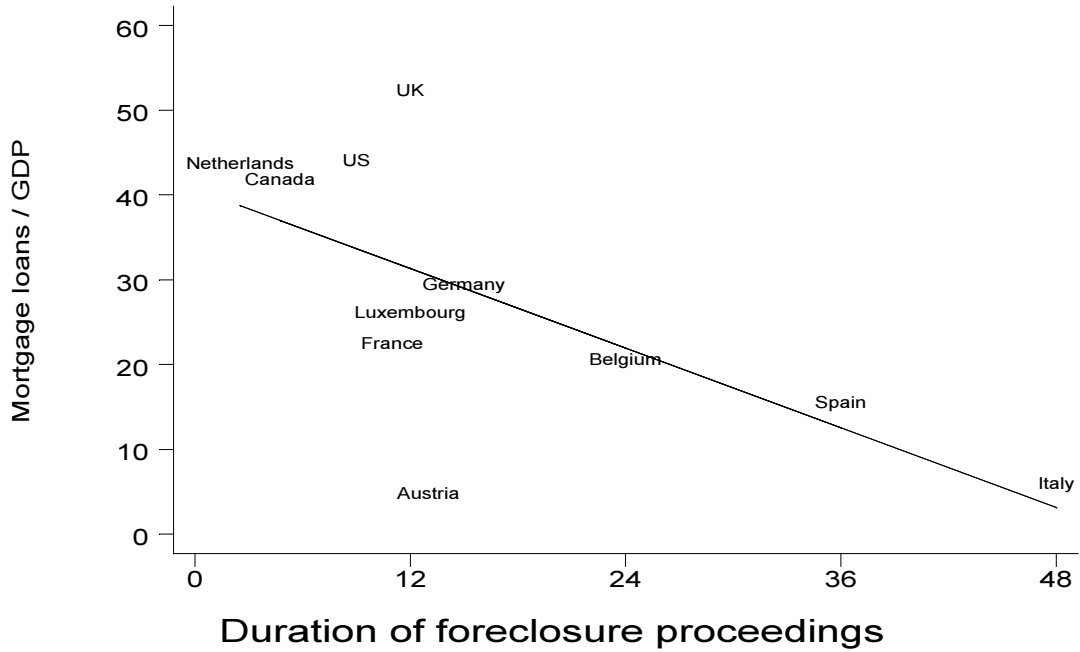


Figure 13

**Duration of Foreclosure Proceedings, Judicial Efficiency and Downpayment Ratios:
International Evidence**

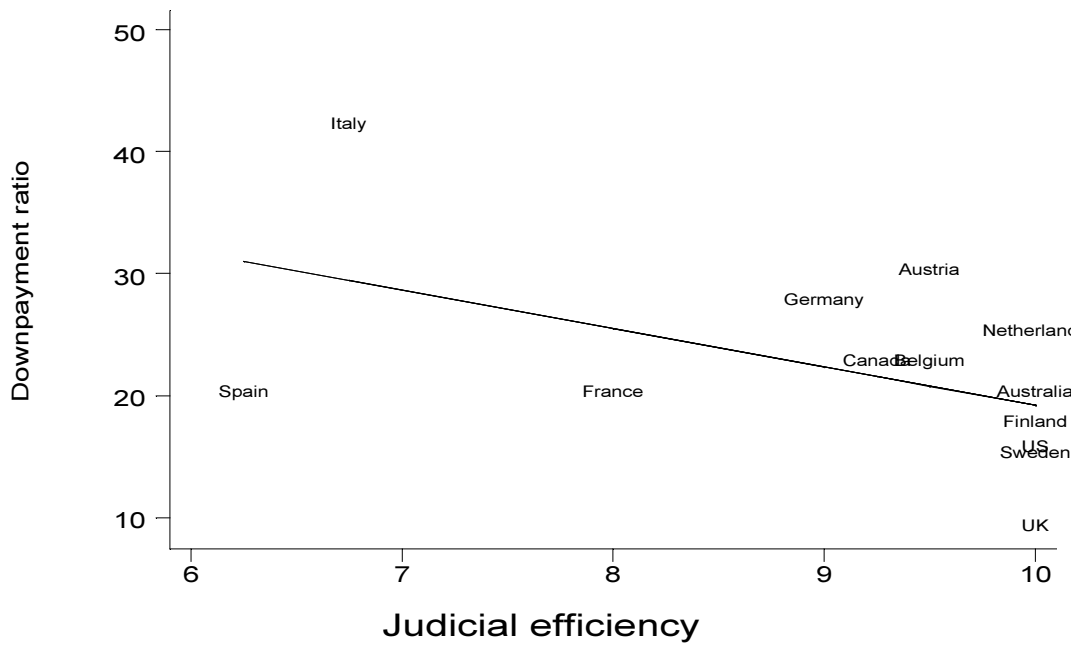
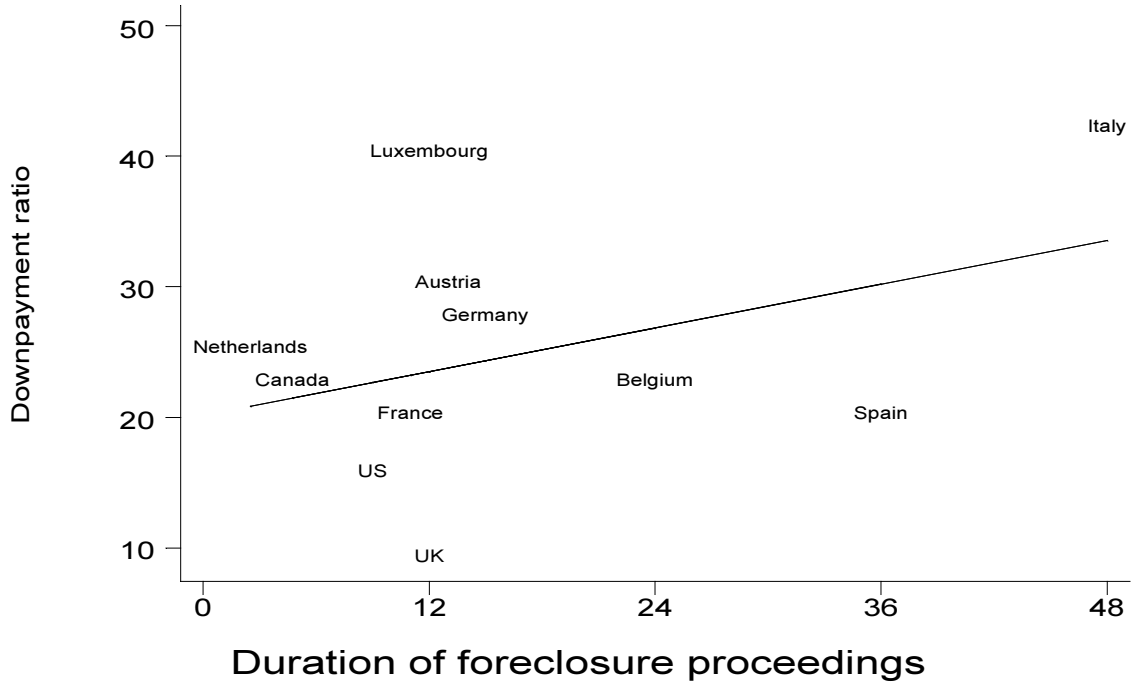


Figure 14

**Duration of Foreclosure Proceedings, Judicial Efficiency and Interest Rate Spread:
International Evidence**

