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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. We start by presenting a model of opportunistic debtors and inefficient courts. According to the model, improvements in judicial efficiency reduce credit rationing and increase lending, while have an ambiguous effect on interest rates, depending 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 than elsewhere. International evidence also shows that the depth of mortgage markets is inversely related to costs of mortgage foreclosure and other proxies for judicial inefficiency.

Keywords: enforcement, judicial efficiency, credit market, lending, interest rates
JEL classification: G2, K4

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"May you have lawsuits - and win them."
Old gypsy curse[1]

1. Introduction

A borrower may default because he is unable to repay (accidental default) or because, though potentially solvent, he is unwilling to repay the loan (strategic default). Besides being intrinsically different, *inability* to repay 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 or low effort in managing the project, or on a combination of these factors.

A solvent borrower may be unwilling to repay if the benefit of defaulting is greater than the perceived cost of sanctions associated with default. The perceived cost of these sanctions does not just depend on the lender's willingness to inflict them, but on the whole set of institutional arrangements that affect the credit market. The legal system and its enforcement by the judiciary are an important part of these arrangements. In the course of history, countries have developed different legal systems, which feature different degrees of protection of creditors' rights. But even countries with similar legal rules may enforce them to a different degree, depending on the efficiency and honesty of their judiciary. And even in the context of the same country, the efficiency of courts can vary a great deal, depending on the allocation of resources across judicial districts and the distribution of the "demand for contract enforcement" across geographic locations.

By affecting the borrower's *ex post* willingness to pay, these features determine the willingness that creditors have to extend loans *ex ante*, as well as the terms at which credit will be forthcoming. By the same token, they determine the effectiveness of credit markets in intermediating and allocating saving among alternative users.

The purpose of this paper will be to assess quantitatively how the quality of judicial enforcement of debt contracts affects the amount of lending and interest rates. We analyze this issue using an Italian panel data set on interest rates, lending volumes, default rates, and indicators of judicial efficiency at the provincial level. We also analyze cross-country data on

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

housing mortgage loans and correlate them with measures of the cost and length of mortgage foreclosure procedures.

Our results highlight the importance of judicial enforcement for the performance of credit markets. They are consistent with the findings of other recent papers. La Porta et al. (1997) consider indicators of creditor protection, origin of the legal system and the respect for the law to explain private debt-GNP ratio, using cross-country data. They find that the respect for the law "has a large and statistically significant effect on the size of the capital market: the move from world mean to a perfect 10 is associated with a 20 percentage point increase in debt to GNP ratio" (p. 1145). Other studies use instead panel data for individual countries and markets. Castelar Pineiro and Cabral (2001) and Cristini, Moya and Powell (2001) analyze how variations in the effectiveness of the legal system across the different provinces of Argentina and Brazilian states have affected the development of credit markets in those countries. They find that loans are lower and non-performing loans higher in provinces or states with poor legal enforcement. Similar results are reported for household credit in the U.S. and Italy. In the United States, 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. In Italy, Fabbri and Padula (2001) find that households located in less efficient judicial districts receive a lower amount of credit, controlling for their characteristics.

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. In Section 4 we present the international evidence concerning 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. By the same token, poor judicial enforcement increases the opportunistic behavior of borrowers: anticipating that creditors will not be able to recover their loans easily and cheaply via courts, borrowers will be more tempted to default. Creditors respond to this strategic behavior of borrowers by reducing the availability of credit.

We illustrate how court 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 if 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 revenue[3] 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 the fraction $(1-\phi_p)(1+\pi)+(1-\phi_c)c_i$ of the loan 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, regardless of whether the project has succeeded or failed.

A second interpretation is that these resources are dissipated in the course of the judicial process (legal fees, mismanagement of the company during the trial, bribes taken by corrupt officials, etc.) rather than retained by the borrower. In this interpretation, judicial costs effectively operate as a tax on credit transactions. In principle, such tax can be avoided by

[2] The model can effectively capture also 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 ϕ_p=0.

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

settling the dispute out of court. The two parties will have to agree on how to split the resources that they would have otherwise wasted in court. 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 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 would be able to retain only a portion of the cost of the trial. Still, he will generally have an incentive to dispute the amount owed and thereby extract such 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:

$$1+r_i \le \phi_p(1+\pi)+\phi_c c_i . \tag{1}$$

All banks know the success probability *p*, the projects' profitability π, the judicial efficiency parameters ϕ_p and ϕ_c, and each individual'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*:

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

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. Equation (2) defines the break-even interest rate r_i charged to each borrower:

[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.

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

where:

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

The minimum level of collateral in equation (4) is obtained by substituting (1) (taken with equality) into equation (3). Banks do not finance entrepreneurs who have collateral-loan ratio below $c_{\min}$, even though their projects would be undertaken with internal financing. 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 have access to credit.[5]

The zero-profit condition (3) defines two lending regions. If $\phi_c c_i > 1 + r_i$, collateral is so large that loans are safe and competition equates the lending rate to the cost of capital. Replacing $r_i = \bar{r}$ 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 losses when the borrower's project fails. To break even, the bank must compensate this expected loss with a higher interest rate in case of success: collateral and lending rates are substitutes from the standpoint of the bank. 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:

[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 $c_{\min}$.

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

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

If instead the individual *i* does not borrow, his utility is just the collateral c_i. Using 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 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 inside 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 CD. The minimum collateral declines to the level corresponding to point C, and the region of credit rationing shrinks: the improvement in judicial efficiency turns some loss-making loans into viable ones. Borrowers with collateral ratio between $c_{\min}$ and $\bar{c}$ already had access to credit, but now pay a lower loan rate. Therefore, for any given borrower *i*, the loan rate either decreases or stays unchanged. However, the *average* loan rate may either increase or decrease depending on how the composition of the borrowers' pool changes as the credit market expands. The effect on the average loan rate is negative when initially there is no credit rationing. It is attenuated and can even switch sign depending on the fraction of borrowers that are initially excluded from credit and gain access to credit when ϕ increases.[6]

Next, consider an increase in ϕ_p. As shown in Figure 2, the downward-sloping portion of the zero-profit locus expands from AB to EB. As a consequence, the region of credit rationing shrinks and lending increases. The interest rates charged to those who were already borrowing are unchanged, in contrast with the previous experiment. 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

[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 will 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 immediate that in this second example the average interest rate increases from its initial level $\bar{r}$.

forces banks to reduce interest 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, and therefore the zero-profit interest rate is unaffected. Borrowers who were previously rationed have now access to credit at a higher interest rate, since raising the interest rate is the only way for the bank to exploit the larger inside collateral.

So far we considered the probability of projects' 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 projects' 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 increase the average default rate, although it leaves the individual default rate unaffected. More specifically, the average default rate increases whenever some entrepreneurs are denied credit prior to the judicial reform. The reason is that a more efficient judiciary reduces the region of credit rationing and therefore opens the credit market to lower-grade borrowers.[7] Of course, the average equilibrium interest rate will increase along with the average default rate.

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

2.2 Monopoly

[7] The judicial reform may increase the default rate also via another channel. When judicial efficiency increases, banks are more protected by collateral in case of default, and therefore have less incentive to screen (collateral and screening being substitutes from their point of view). The lower level of screening will increase the

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:

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

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) in the participation constraint:

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

yielding:

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

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 relationship between the lending rate and the collateral-loan ratio. In the absence of competition, the bank can charge higher rates to those who can pledge more collateral. The positive relation between r_i and c_i is graphed as the line AB in Figure 3. As under competition, no credit is granted if the collateral-loan ratio is less than $c_{\min}$.

Figure 3 illustrates that an increase in ϕ_c shifts the AB locus upward and to the left. The new locus CD features lower $c_{\min}$ and $c_{\max}$. So the credit-rationing region shrinks and lending increases, as in the competitive case. Lending rates increase for all borrowers. An increase in ϕ_c effectively raises the pledgeable portion of collateral and therefore enables the bank to extract a higher surplus via increased 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 and increases both lending activity and interest rates.

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riskiness of their loans and the average default rate, as shown by Manove, Padilla and Pagano (2000).

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 increase or decrease, depending on the competitive structure of the banking sector and on the specific channel through which judicial reforms improve the ability of lenders to repossess collateral. In the rest of the paper, we 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 judicial efficiency for 27 judicial districts with credit market data for 95 Italian provinces.

We rely on two indicators of judicial efficiency, constructed with data provided by the Italian National Institute of Statistics (ISTAT). The first indicator is the length of ordinary civil trials from 1984 to 1998. It measures the interval between the date of initial recording of a trial and the date of the judicial ruling, 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 lengthy 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 pending civil trials divided by the corresponding district's population, expressed in thousands. It refers to all actions requiring adjudication of substantive rights, including appeal trials, from 1984 to 1998. The stock of

[8] A narrower classification of legal actions (e.g., loans only) results in too few observations for each district-year cell to compute reliable indicators of judicial efficiency. Data for the length of appeal civil trials and bankruptcy procedures are not used for the same reason.

pending trial is a key determinant of the expected length of future trials. In practice, the two indicators are strongly correlated.

Our indicators of judicial efficiency exhibit considerable variability across judicial districts and over time. The two graphs in Figure 5 display the national averages of the two indicators. The length of trials doubles from 26.3 months in 1984 to 52.9 in 1998. The number of pending trials increases from 23.4 trials per 1000 inhabitants at the beginning of the sample period to 35.7 in 1998, after peaking in 1996 at 37.9. These increasing time trends may be accounted for by the rising number of judges and resources allocated to criminal rather than to civil 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 by geographical areas. Trials are longer and judicial backlogs are higher in the South and in the Islands than in the North and Center. While the differential in the length of trials across regions is approximately constant, the stock of pending trials shows increasing geographical differences. In 1984 the number of pending trials was 20 in the North and 27 in the South, while in 1998 the two corresponding values were 23 in the North and 44 in the South. Furthermore, the North shows much more marked signs of improvements after 1993, when its stock peaked at 27.4.

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

Both of our indicators may be affected by measurement error. The length of trials includes many disputes on matters other than credit relations. The stock of pending trials refers to the even broader aggregate of all civil trials. Indirect evidence on the reliability of these indicators comes from a 1994 survey on 269 Italian banks, representing 90 per cent of total loans in the country.[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. The survey allows us to compare our measures of judicial efficiency, which are based on ISTAT data, with a self-assessment of the length of the judicial procedures used by banks to recover their credit by region, as reported in the Bank of Italy survey. Since

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

the survey refers to 1994, we aggregate the ISTAT district-level judicial data by regions (20 in total, each including 1 to 9 provinces) and relate the resulting measures to the self-reported indicator.

Figure 7 shows that the length of trials and the stock of pending trials based on ISTAT data are positively correlated with the self-reported length of trials. 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 stock of pending trials (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 reasonably well lenders' perceived credit collection costs.[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 loans to total loans and the Herfindhal index of loan concentration.

Loans granted are the total loans to domestic companies in each province divided by provincial GDP. Credit rationing is proxied by the proportion of overdraft credit lines to non-financial firms in each province, that is, loans 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 draw the credit line above the amount granted. Interest rates are provincial averages weighted by loans. The ratio of non-performing loans to total loans is a proxy of the average default rate in each province. 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 in 12 years). The ratio of outstanding loans to GDP increases from 31 to 41 percent. Credit rationing has also increased over time, possibly a reflection of monetary policy tightening during Italy's run-up to joining the European Monetary Union. Both the lending rate and the T-bill rate

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

decline over the sample period, reflecting the reduction in the inflation rate. The differential between the two also declines from 5 to 3.6 percent. The Herfindhal index declines from 17 to 15 percent, revealing increased competition in the loan market.

3.2. Descriptive Evidence

In Figures 8, 9, 10 and 11 we report judicial district evidence on the relation between credit market performance and judicial efficiency. Averages are taken over the 1984-95 interval. Figure 8 indicates that the district average amount of loans is negatively correlated with the length of trials and with the stock of pending trials. The correlation is statistically different from zero at standard significance levels. For instance, lending is over 40 percent of GDP 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. In contrast, lending is 10 percent of GDP in districts such as Reggio Calabria, where the length of trial exceeds 50 months and there are about 50 pending trials per 1000 inhabitants.

Figure 9 indicates that where trials are longer and the judicial backlog is heavier, our indicator of credit rationing is also higher. For instance, moving from Venice to Reggio Calabria, the indicator 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 rises by over 200 basis points moving from the least to the most efficient districts. Figure 11 shows that, like the interest rate spread, also the fraction of non-performing loans on total loans is higher where courts are less efficient.

This descriptive evidence suggests that judicial efficiency is associated with larger amount of lending, lower credit rationing and lower interest rates, in agreement with the model of Section 1 with banking competition. However, the relations might be spurious, because the analysis so far does not control 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 of the data 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

The regressions in Table 2 include a concentration index of loans, the lagged value of provincial GDP and our two indicators of judicial efficiency. We expect market concentration to reduce lending, increase our indicator of credit rationing and interest rates, insofar as it signals less competition. In a concentrated market, banks may also establish close relations with firms, a further channel for higher interest rates and lower lending, see Petersen and Rajan (1995). Finally, concentration might be associated with a larger share of non-performing loans because higher interest rates may force into default borrowers who might otherwise be solvent.

The regressions also include two lags of real GDP among the explanatory variable. The variable is lagged to reduce endogeneity problems. One would expect GDP to raise the demand for loans to finance production and investment, bringing forth a higher supply of lending by banks. Interest rates should increase, barring a large reduction in default rates. The reduced risk associated with greater economic activity should reduce credit constraints, although the increased borrowing may exhaust the debt capacity of some firms.

In order to control for the impact of unobserved heterogeneity at the province level and for the effect of aggregate variables (including the business cycle), all regressions are estimated with fixed effects and a full set of time effects.

Table 2 reports the regression results. The top panel reports the basic specification, while in the bottom panel we drop variables whose coefficient is not statistically different from zero. The coefficient of the length of trial is very close to zero in all regressions. In contrast, the stock of pending trial affects credit market performance along several dimensions. In the regression for lending, the coefficient is negative and statistically different from zero at the 1 percent level. With respect to the descriptive evidence of Section 3.2, the correlation is much attenuated: increasing the stock from 20 to 50 (per thousand inhabitants) reduces lending by half of a percentage points of GDP.

The impact of the stock of pending trials on credit rationing, however, is significant both statistically and economically, regardless of the indicator used. An increase in the stock from 20 to 50 is associated with an increase in the credit rationing indicator of 4.4 percentage points. This implies that the fraction of loans for which credit used exceeds credit granted increases by 3 percentage points, or 20 percent relative to its average. The stock of trials

correlates negatively with the interest rate spread and with non-performing loans, overturning the descriptive evidence of Figures 10 and 11.

The Herfindhal index affects negatively lending and positively credit rationing, the interest rate spread and non performing loans. In the latter two cases its coefficient is imprecisely estimated, but this is not the case if time effects are not included among the regressors (the corresponding regression is not presented for brevity). So, on the whole the evidence about the effects of concentration appear consistent with the theory.[11]

None of the GDP coefficients is statistically different from zero. The variable is therefore dropped in the regressions reported in the lower panel of Table 2. The results in this panel confirm the previous findings. An improvement in judicial efficiency - as measured by the stock of pending trials - increases lending, reduces credit rationing, increases lending rates, and non-performing loans.

A caveat is that if the cost and length of the judicial process become excessive, private parties may bypass courts and use alternative forms of dispute resolution. The substitution between court and non-court dispute resolution procedures might be particularly relevant in case of bankruptcies. This suggests that the relation between credit conditions and judicial enforcement may be non-linear. At low or moderate length of trials, 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 disappear or be attenuated, we introduce quadratic terms in the indicators of judicial efficiency in the specification of Table 2. However, the quadratic terms turn out to be not statistically different from zero.[12]

To summarize, the econometric estimates obtained controlling for unobserved heterogeneity via province-level fixed effects yield quite different conclusions compared to the descriptive evidence of Figures 7 to 11. According to the estimates, the judicial districts with better legal enforcement feature more lending activity, lower credit rationing, higher average interest rate and higher average default rate. These results are consistent with the model of Section 2, which predicts judicial efficiency to raise lending activity and decrease credit

[11] Also other studies find a positive and significant relation between market concentration and lending interest rates, using data from individual loan contracts, see De Bonis and Ferrando (1997), D'Auria and Foglia (1997) and Sapienza (1997).

[12] Such non-linearity may be visible only for large loans, since for small loans private arbitration procedures are

rationing under perfect competition as well as under monopoly. The model's predictions concerning average interest rates are less clear-cut, as they depend on market structure and on composition effects: under perfect competition higher judicial efficiency can raise the average default rate and interest rate by opening market access to lower-grade borrowers, while under monopolistic banking it tends to raise interest rates by allowing banks to extract greater rents from borrowers. The evidence is potentially consistent with any of these interpretations.

4. International Evidence on Mortgage Markets

The market for housing mortgage loans is a potentially fruitful testing ground to evaluate the effects of differences in the quality of judicial enforcement on the availability and the cost of credit. First, this market is relatively homogeneous across countries, so that international comparison is meaningful. Second, in the mortgage market an indicator of credit rationing is readily available: the down payment ratio between the amount of cash that the borrower needs to have prior to home purchase and the value of the purchase. Finally, the performance of mortgage markets can be related to a set of specific indicators of the effectiveness of mortgage foreclosure procedures that can be collected for several industrialized countries.

The first three columns of Table 3 report the ratio of outstanding mortgage loans to GDP, the down payment ratio, and the spread between the lending and the borrowing rate in fourteen countries. Mortgage markets differ widely from country to country. 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. In itself, a spread is consistent with equilibrium models of the mortgage market. In these models, the spread stems 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 borrowers' opportunistic behavior. In these alternative models there is no necessary relation between the spread and the supply of

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prohibitively expensive.

loans. For instance, in the model developed in Section 2 the spread arises from a particular form of transaction costs (judicial inefficiency), but can either increase or decrease following a judicial reform.

In our sample of fourteen countries, differences in spreads are negligible, while the cross-country variation in mortgage lending is huge. The spread varies 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 (at the other end of the spectrum). In short, there is simply no correlation between the spread and the size of the mortgage market. On the contrary, the down payment ratio exhibits considerable variability. It is lowest in Austria, Belgium, Germany, Italy, Luxembourg and Spain, which unsurprisingly are also those with relatively small mortgage markets.[13] The absence of correlation between the spread and the supply of loans (the correlation coefficient is 0.04) and the strong, negative correlation between the down payment and the stock of outstanding mortgage loans (–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, among which the cost and length of collateral foreclosure procedures, and to demand factors and regulation. Prominent demand factors are household earnings profiles, age structure of the population, ownership preference, tax incentives for owning and debt, and intergenerational transfers. Regulation often sets interest rate controls and minimum down payment (for instance, 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 disposing of collateral can affect the performance of credit markets. Table 4 reports three indicators of judicial efficiency in the different countries. The first is a survey-based overall assessment of the quality of judicial enforcement in the country. The second and third indicators are, respectively, the length and

[13] Chiuri and Jappelli (2001) explore the determinants of the international pattern of home ownership using the Luxembourg Income Study (LIS), a collection of microeconomic data. They merge the microeconomic data 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 calendar time effects, they find strong evidence that the availability of mortgage finance – as measured by outstanding mortgage loans and down payment ratios – affects the age-profile of home ownership, especially at the young end.

average cost of judicial foreclosures of housing mortgage loans.

On the basis of these indicators, Belgium, Germany, Italy and Spain feature more costly procedures, lengthier duration of mortgage foreclosure and less efficient judicial systems in general.[14] The Italian case stands out. Consistent with the data reported in Section 3, debt collection and repossession in case of mortgage foreclosure is very costly and time-consuming. It takes between 3 and 5 years to repossess a house in case of foreclosure and legal expenses for mortgage 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 feature quick mortgage foreclosure processes (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 the three indicators reported in Table 4 (duration of foreclosure and the overall indicator of 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 is negatively associated with down payment ratios, and duration is positively correlated with them: that is, the countries with better judicial systems are also those that feature least credit rationing. Figure 14 shows that the spread between lending and borrowing rates correlates negatively with duration and positively with efficiency: that is, in countries with better judicial systems lending rates are higher.[15] The patterns of Figures 12, 13 and 14 are summarized by the correlation matrix reported in Table 4. The correlations of mortgage loans and down payments with the indicators of judicial efficiency 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.

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

[15] 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. Alston (1984) reports that the farm foreclosure moratorium legislation during the 1930s led both to fewer farm loans and to higher interest rates in states which enacted this legislation. Consistently with these findings, in states that facilitate the foreclosure process the rate of foreclosure is higher (Clauretie, 1987) and the losses incurred by lenders are lower (Clauretie and Herzog, 1990).

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 down payment ratios. It is fully consistent with the predictions of the theoretical model in Section 2 and with our findings for the panel of Italian provinces in Section 3.

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. The first part of the paper presents a model of opportunistic debtors and inefficient courts. The model illustrates that improvements in judicial efficiency reduce credit rationing and increase aggregate lending. Interest rates can either increase or decrease, depending on the competitive structure of the banking sector, on the specific channel through which judicial reforms improves lenders' ability to repossess collateral, and on composition effects. For instance, greater judicial efficiency can open the gates of the credit market to low-grade borrowers who were previously judged not credit-worthy, and thereby raise the average default rate and the average interest rate paid in the market.

These theoretical predictions receive support from panel data on Italian provinces and cross-country data on mortgage markets. We construct a panel of Italian provinces merging data from judicial courts with 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 than elsewhere, and the average interest and default rate are lower than elsewhere.

International data also show that the depth of mortgage markets and the availability of mortgage loans are inversely related to costs of mortgage foreclosure and directly related 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 and Contractible Default

Assume that the utility of entrepreneur *i* is:

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

where the disutility of effort $V_i(p_i)$ is an entrepreneur-specific, increasing and convex function of the success rate p_i. Since p_i and c_i are observable and contractible, 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 a exogenous parameter. The first-order condition of the problem is:

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

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:

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

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_i (for any given p_i)

or, alternatively, reduces the minimum required effort p_i (for any given c_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 average interest rate rises along with the average default rate, following a judicial reform. 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:

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

Since the new entrants in the credit market have lower p_i than pre-existing borrowers, they pay higher interest rates. As a result, the average interest rate rises.

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, and is managed by a department of the Bank of Italy. Between 1984-95 it recorded data on each loan over 80 million Lire (approximately 40,000 euro) 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 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 court district (1984-98). Interval between the date of initial recording of a civil trial and the date of the judicial ruling, 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 court district (1985-98). Number of pending civil trials, based on actions requiring adjudication of substantive rights and scaled by the population of the corresponding court 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 overdraft lines of credit (loans for which credit actually drawn exceeds credit granted) to a set of non-financial companies. The companies are those that also present in the dataset Centrale dei Bilanci (including 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 quarterly provide lending rates on loans exceeding 80 million lire. Data are aggregated by province weighting interest rates by the loan size. Annual data are computed as averages of quarterly data. Source: *Centrale dei Rischi*.

Non-performing loans, by province (1984-95). Ratio between non-performing loans and 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
Fraction of overdraft loans, 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 (thousand of billion 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, three indicators of credit rationing (the fraction of loans for which credit used exceeds 90, 95 or 100 percent of credit granted, the spread between the lending rate and the T-bill rate, and the ratio of non-performing loans to total loans. Each regression is estimated with fixed effects and includes a full set of year dummies. The sample period is 1984-1995. Standard errors are reported in parenthesis.

Variable	**Lending / GDP**	**Rationing** (overdraft loans / total loans)	**Spread** (lending rate minus T-Bill rate)	**Default rate** (non-performing loans / total loans)
Length of trials, months	-0.002 (0.050)	0.011 (0.028)	0.007 (0.004)	-0.012 (0.013)
Stock of pending trials, per thousand inhabitants	-0.147 (0.051)	0.106 (0.029)	-0.005 (0.004)	-0.045 (0.013)
Herfindhal index	-0.209 (0.067)	0.113 (0.037)	0.001 (0.005)	0.054 (0.017)
First lag of real GDP	-0.451 (0.308)	-0.118 (0.171)	0.026 (0.022)	0.011 (0.078)
Second lag of real GDP	-0.238 (0.294)	-0.055 (0.163)	0.000 (0.021)	-0.069 (0.075)
R square (within)	0.278	0.666	0.832	0.178
Number of observations	950	950	950	950

Variable	**Lending / GDP**	**Rationing** (overdraft loans / total loans)	**Spread** (lending rate minus T-Bill rate)	**Default rate** (non-performing loans / total loans)
Length of trials, months			0.008 (0.004)	
Stock of pending trials, per thousand inhabitants	-0.185 (0.050)	0.100 (0.028)	-0.011 (0.004)	-0.022 (0.013)
Herfindhal index	-0.136 (0.061)	0.098 (0.034)	0.005 (0.005)	0.025 (0.015)
R square (within)	0.385	0.600	0.807	0.178
Number of observations	1140	1140	1140	1140

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 mortgage 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 source is 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 minus the reference 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 integrity of the 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 percent 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 housing 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. Given 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 housing 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 housing mortgage foreclosure (in 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
Torino	Piemonte (all provinces), Valle d' Aosta	4,417,412
Milano	Milano, Como, Varese, Pavia, Sondrio	6,196,412
Brescia	Brescia, Bergamo ,Cremona, Mantova	2,704,486
Trento	Trentino-Alto Adige (all provinces)	906,387
Venezia	Veneto (all provinces)	4,418,139
Trieste	Friuli-Venezia Giulia (all provinces)	1,860,380
Genova	Liguria (all provinces) and Massa-Carrara	1,191,768
Bologna	Emilia Romagna (all provinces)	3,922,564
Firenze	Toscana (all provinces excluding Massa Carrara)	3,326,434
Perugia	Umbria (all provinces)	820,529
Ancona	Marche (all provinces)	1,440,435
Roma	Lazio (all provinces)	5,189,728
L'Aquila	Abruzzo (all provinces)	1,262,802
Campobasso	Molise (all provinces)	331,776
Napoli	Napoli, 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
Caltanisetta	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

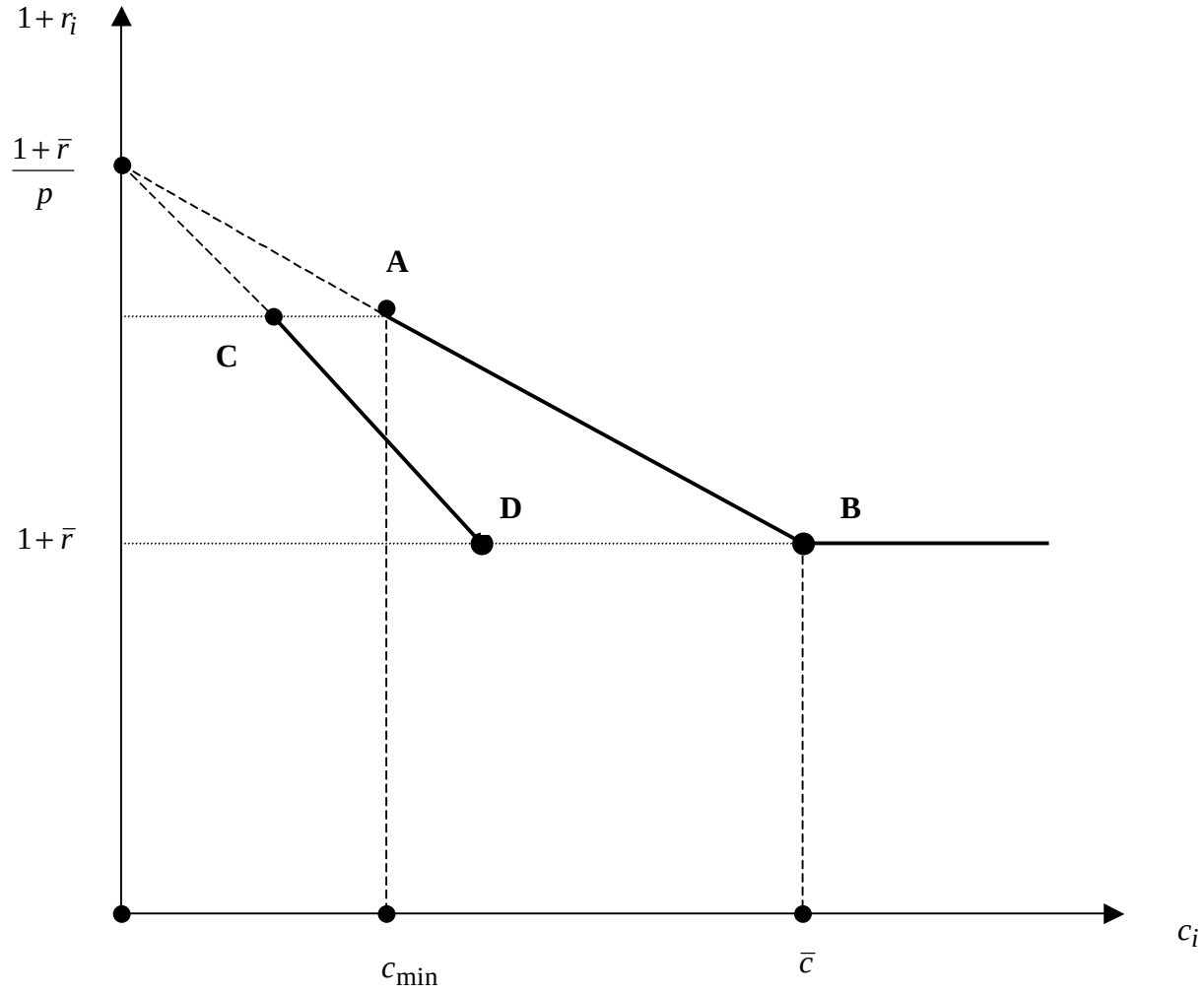


Figure 2

An increase in recoverable inside collateral (ϕ_p) under competition

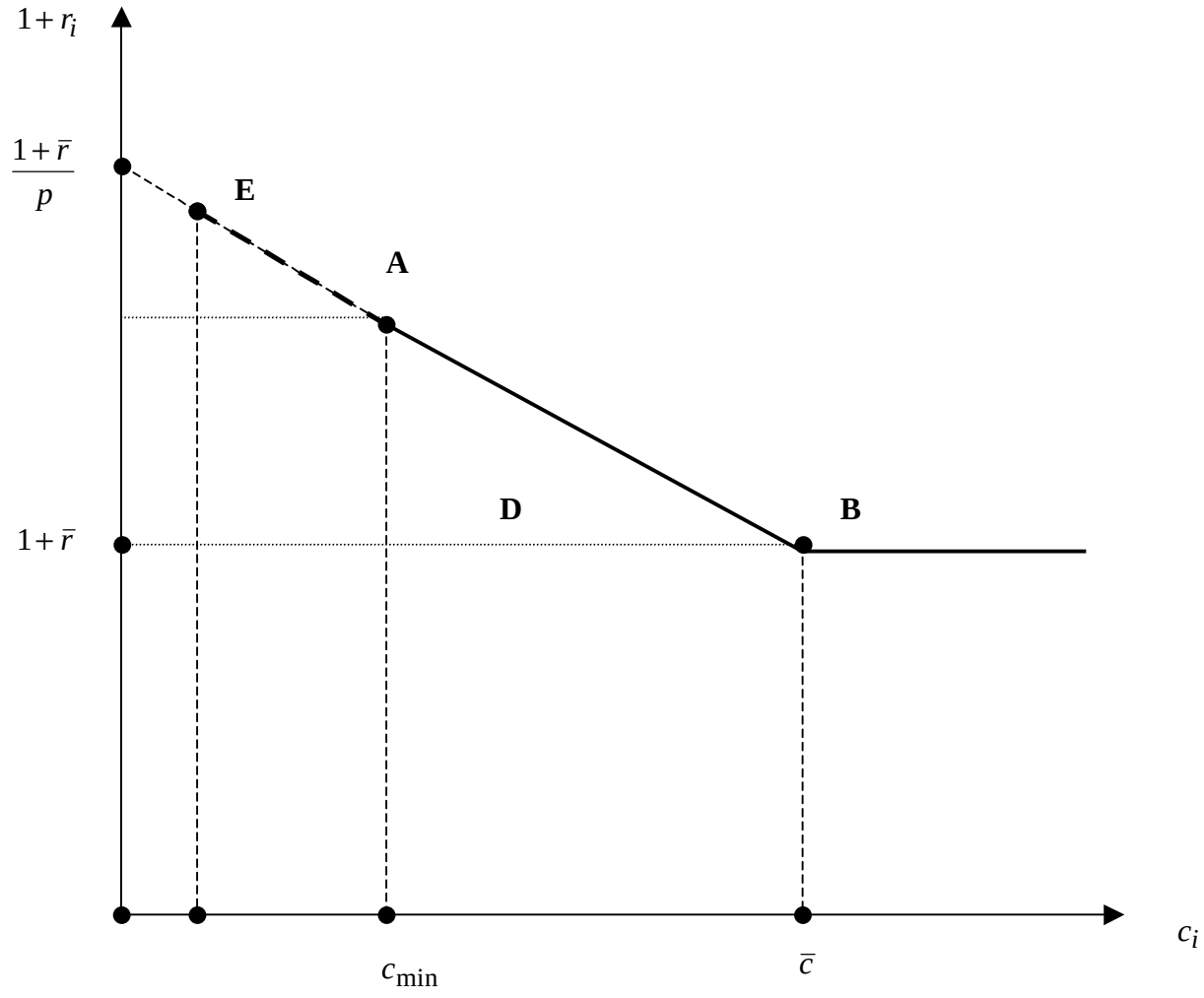


Figure 3

An increase in recoverable outside collateral (ϕ_c) under monopoly

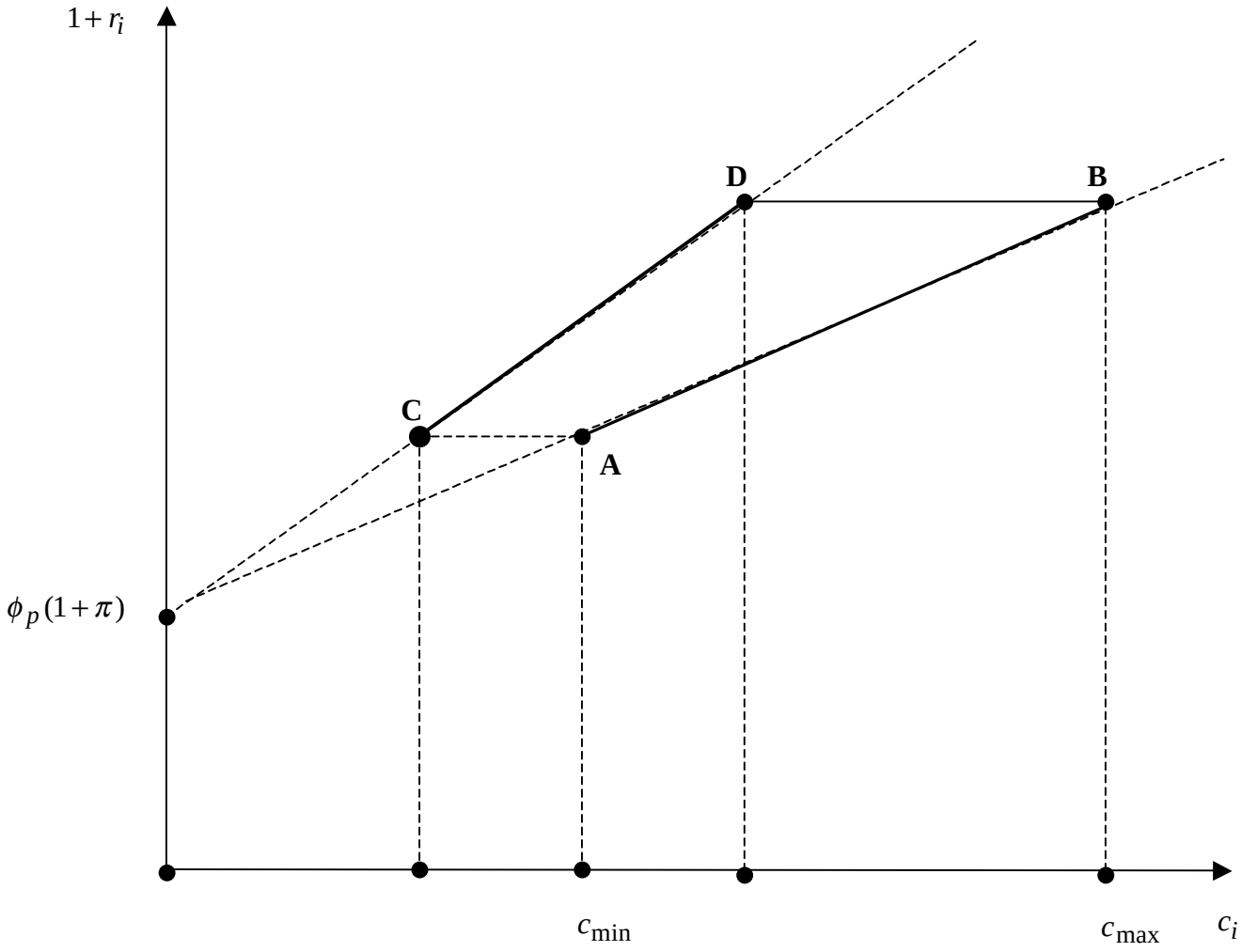


Figure 4

An increase in recoverable inside collateral (ϕ_p) under monopoly

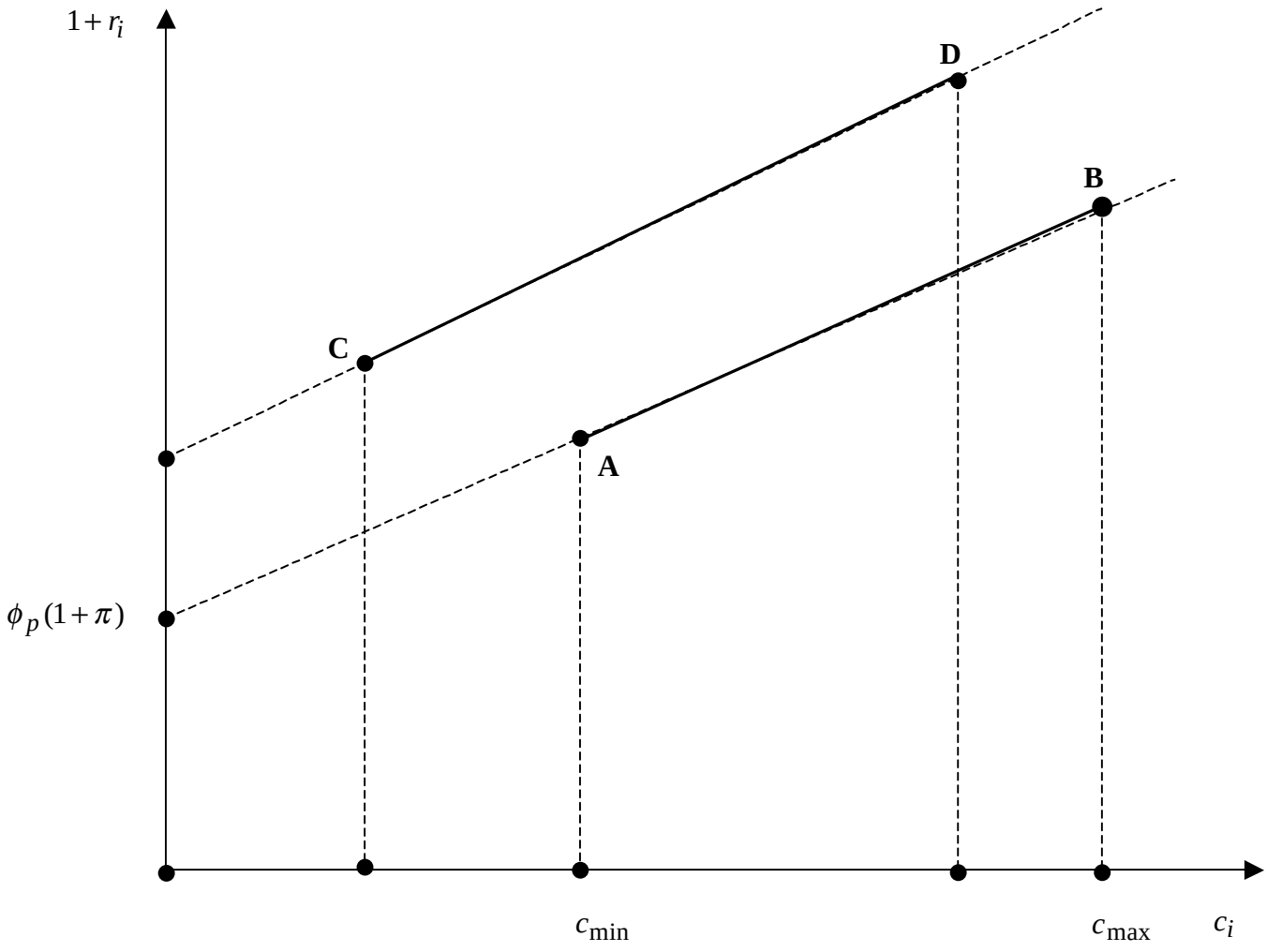
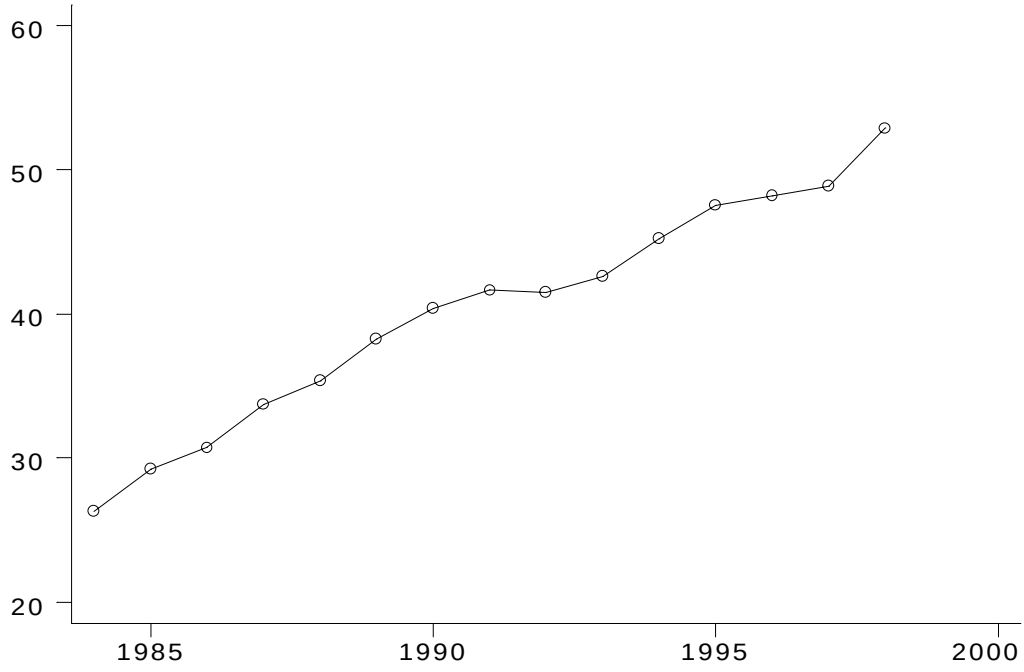
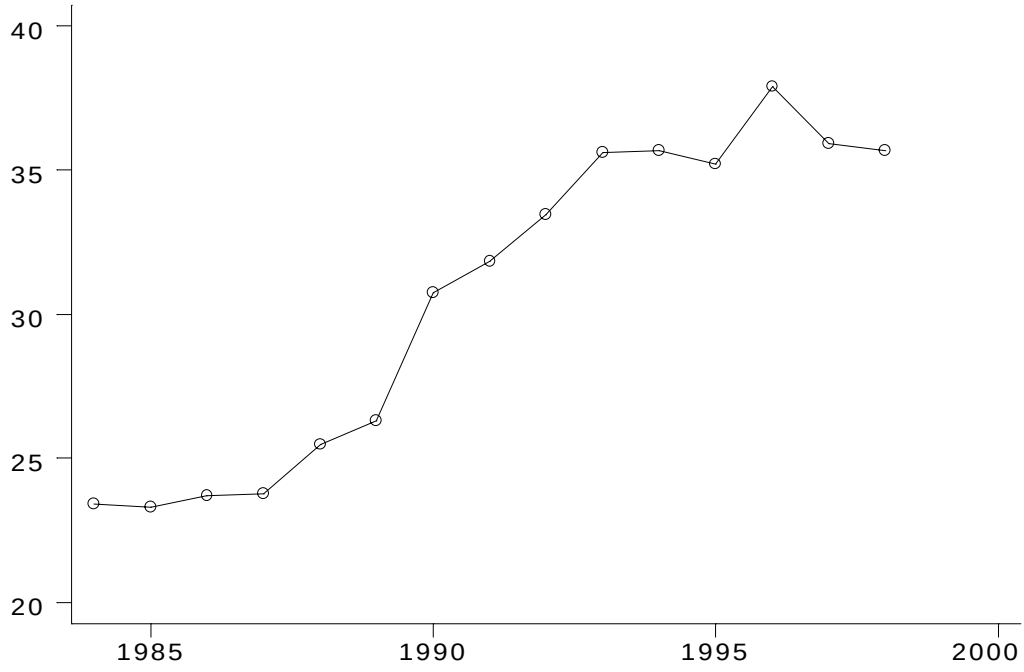


Figure 5
Indicators of Judicial Efficiency

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.



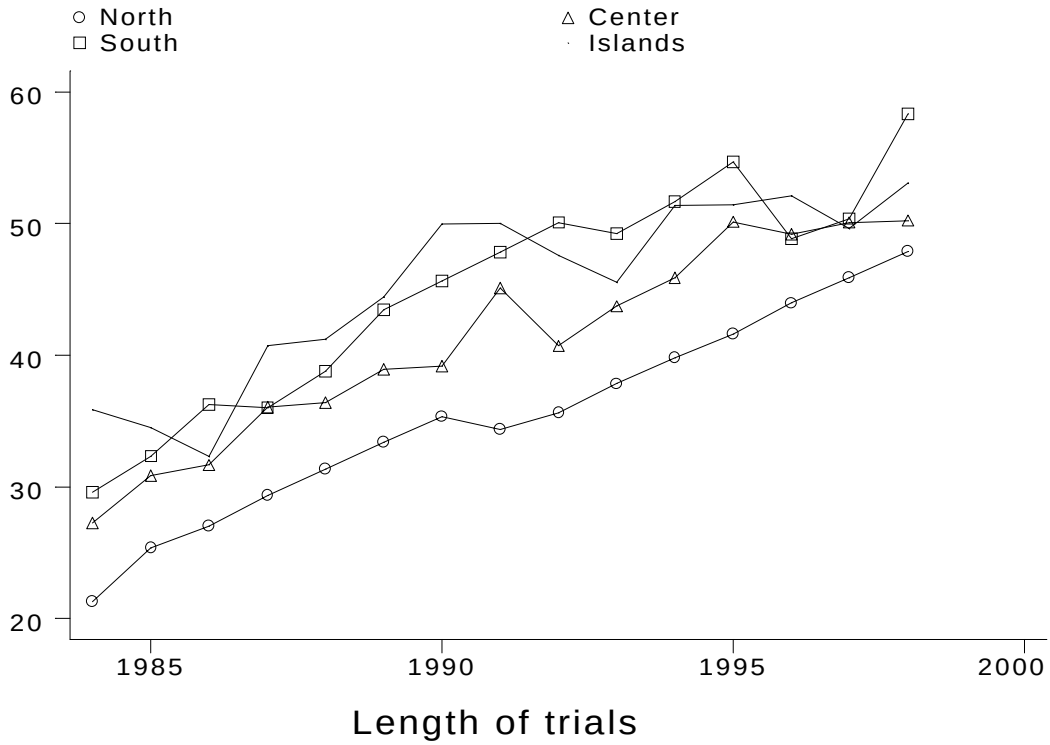
Length of trials: Italy

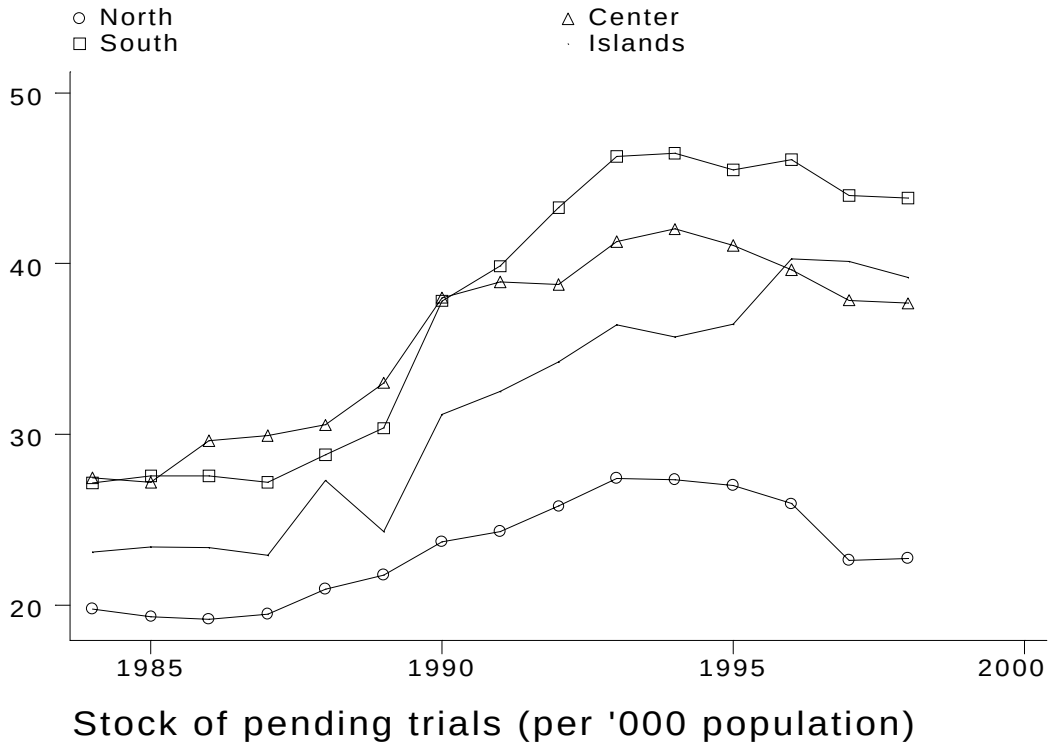


Stock of pending trials (per '000 population): Italy

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.



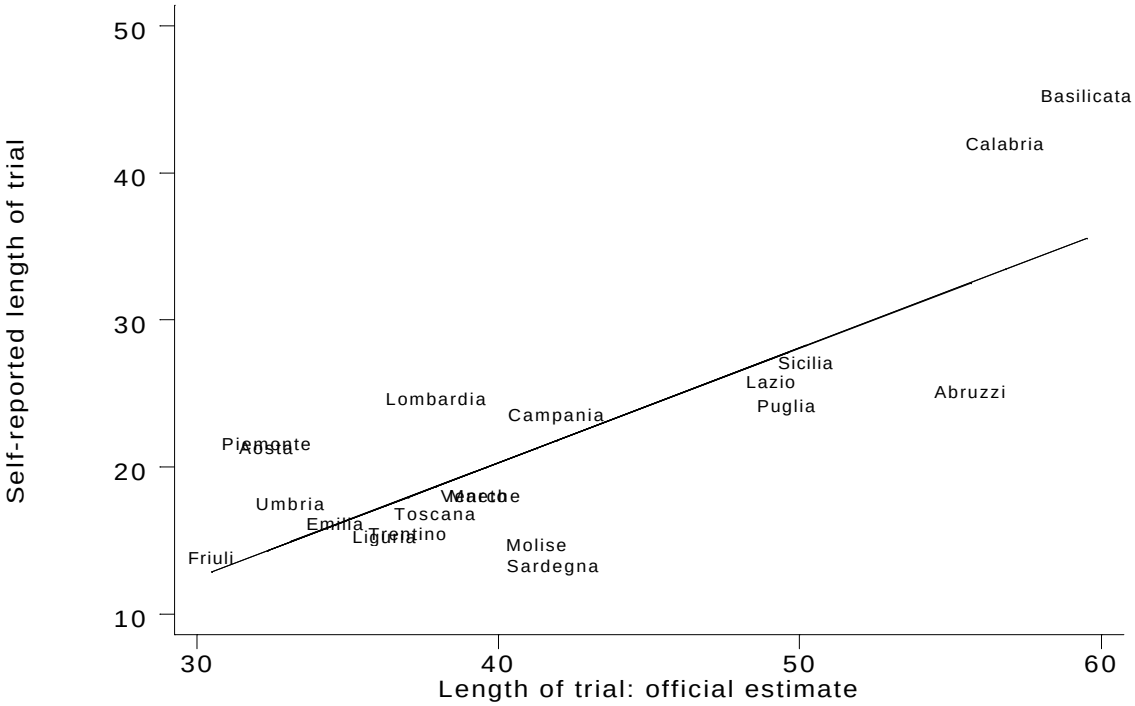


Stock of pending trials (per '000 population)

Figure 7

Comparison between ISTAT and Self-Reported Measures of Judicial Efficiency

The two 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 loans in the country. Data are grouped by regions (20 in total).



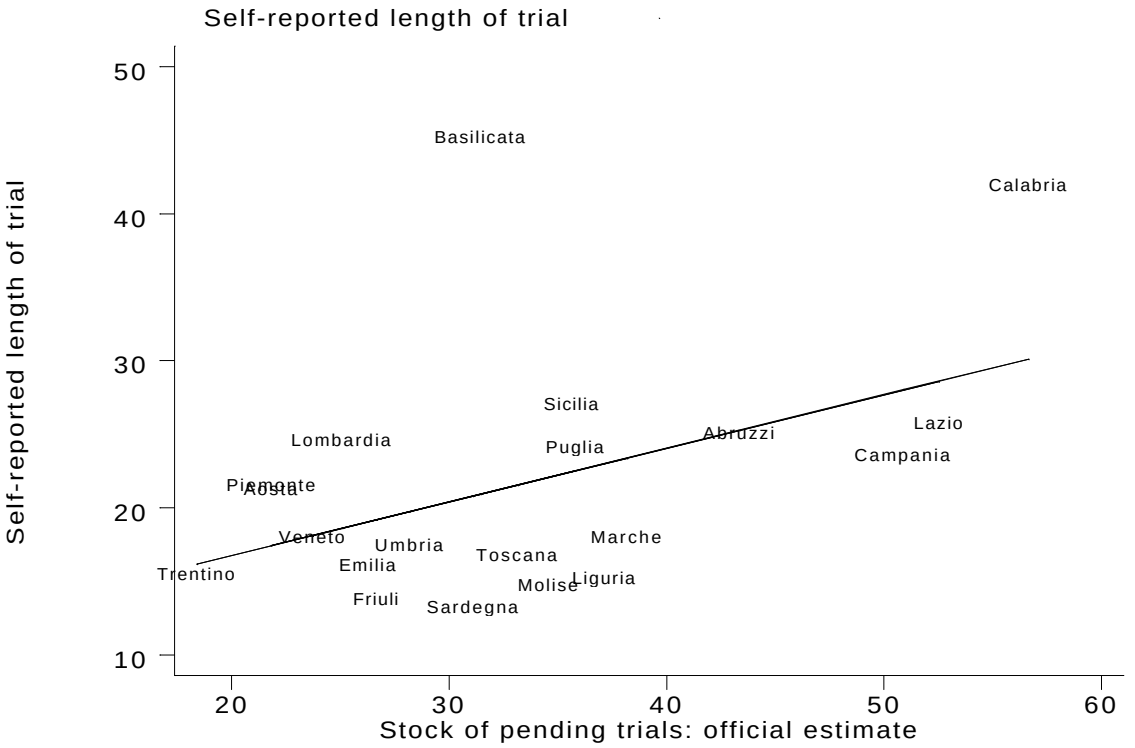
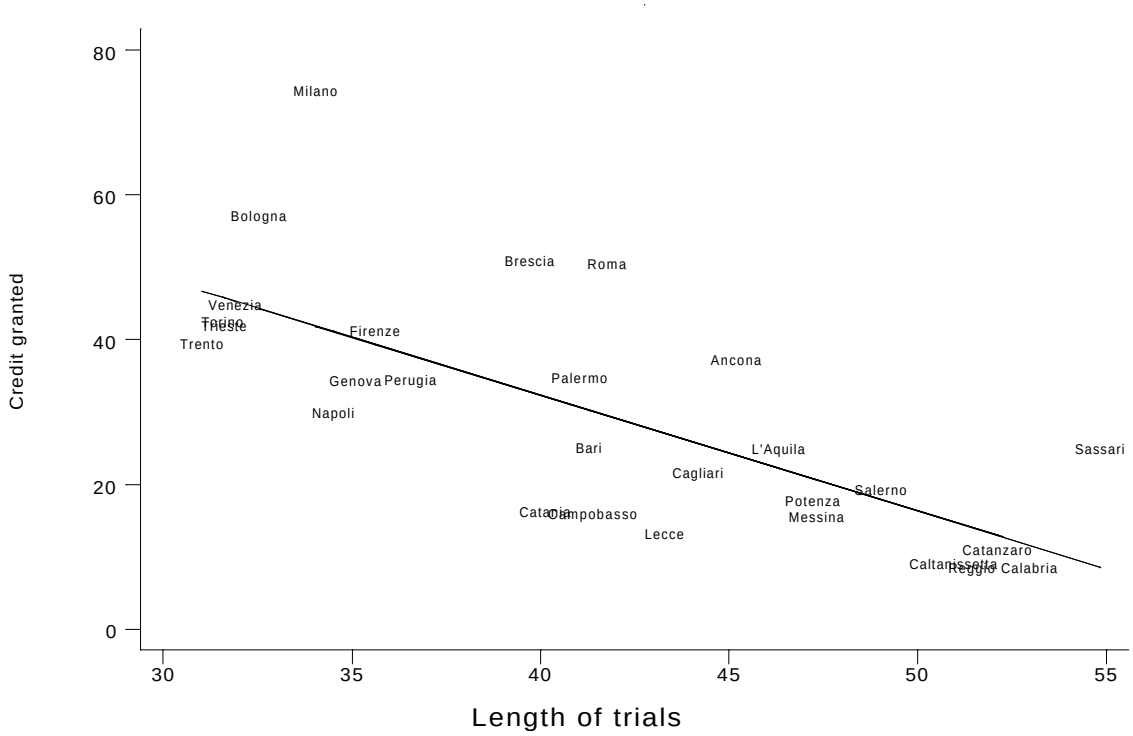


Figure 8
Lending and Judicial Efficiency



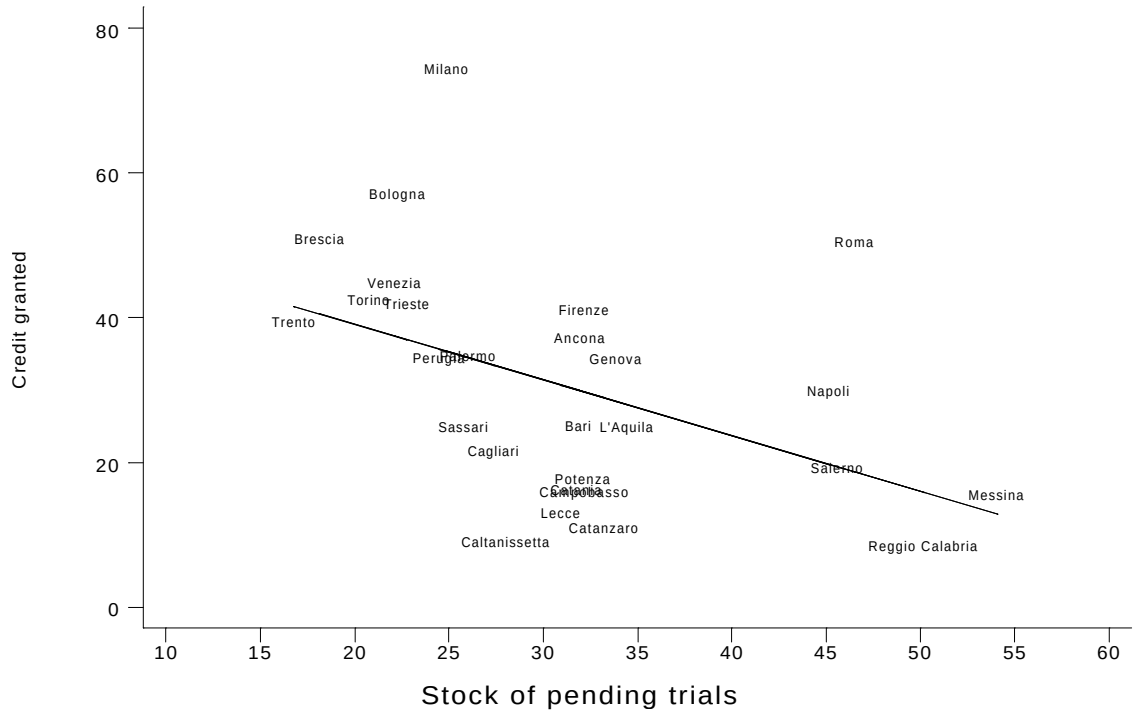
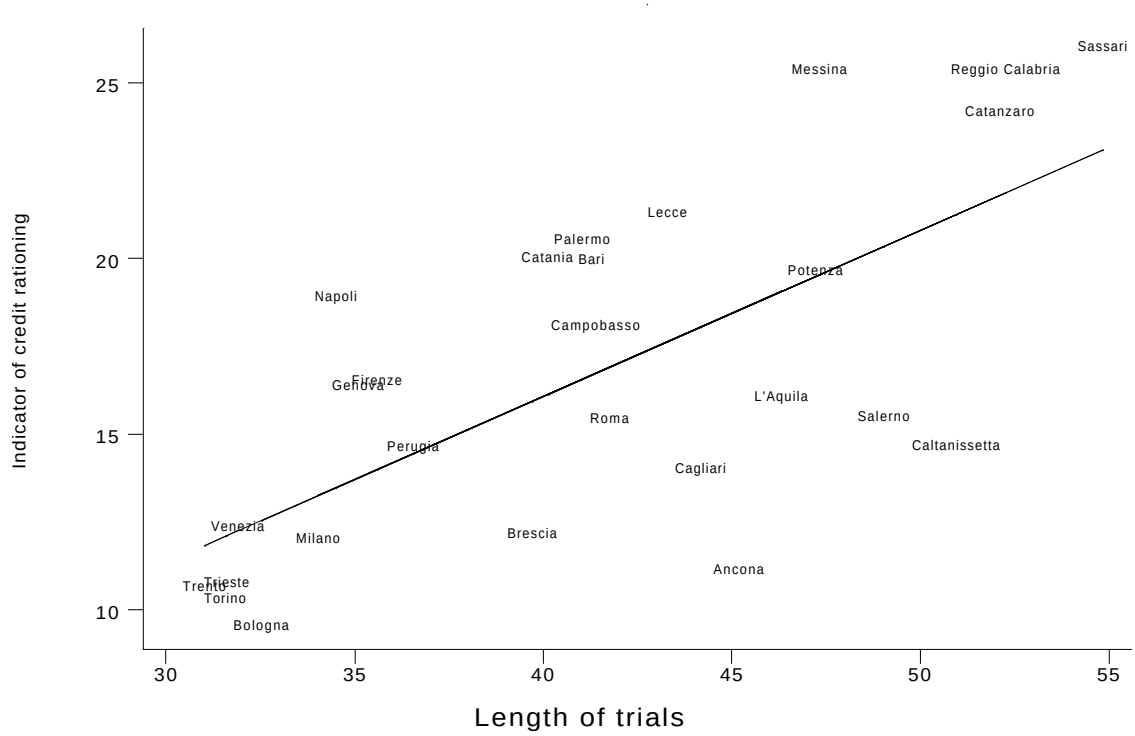


Figure 9

Credit Rationing and Judicial Efficiency



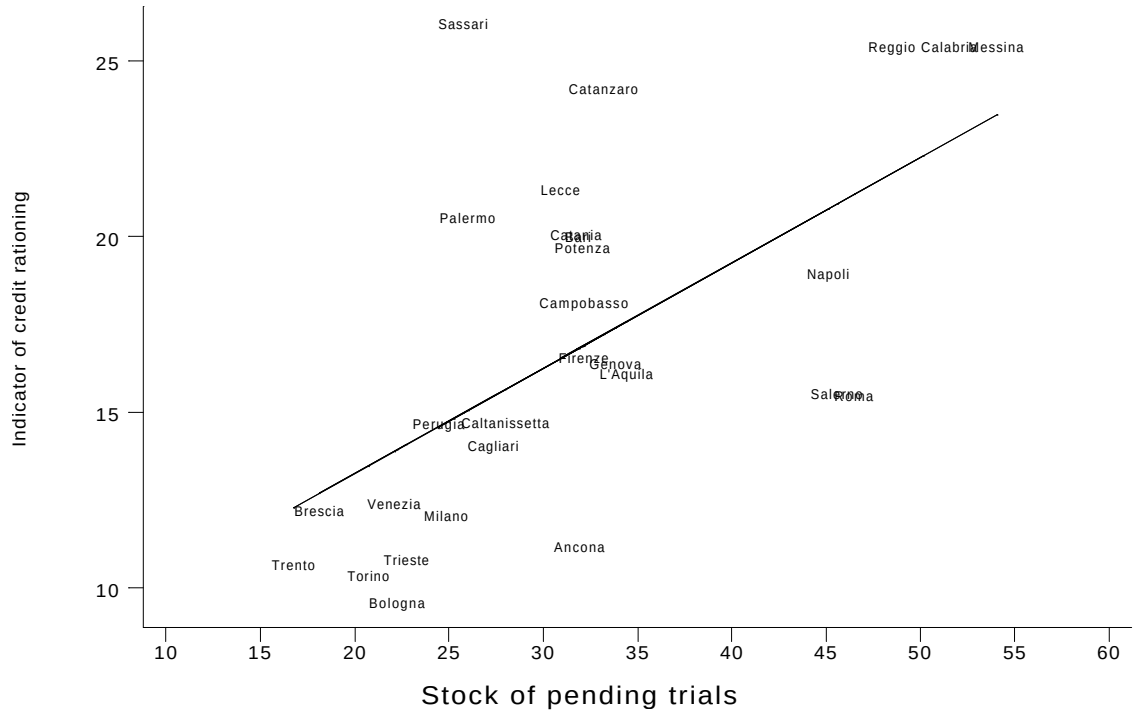
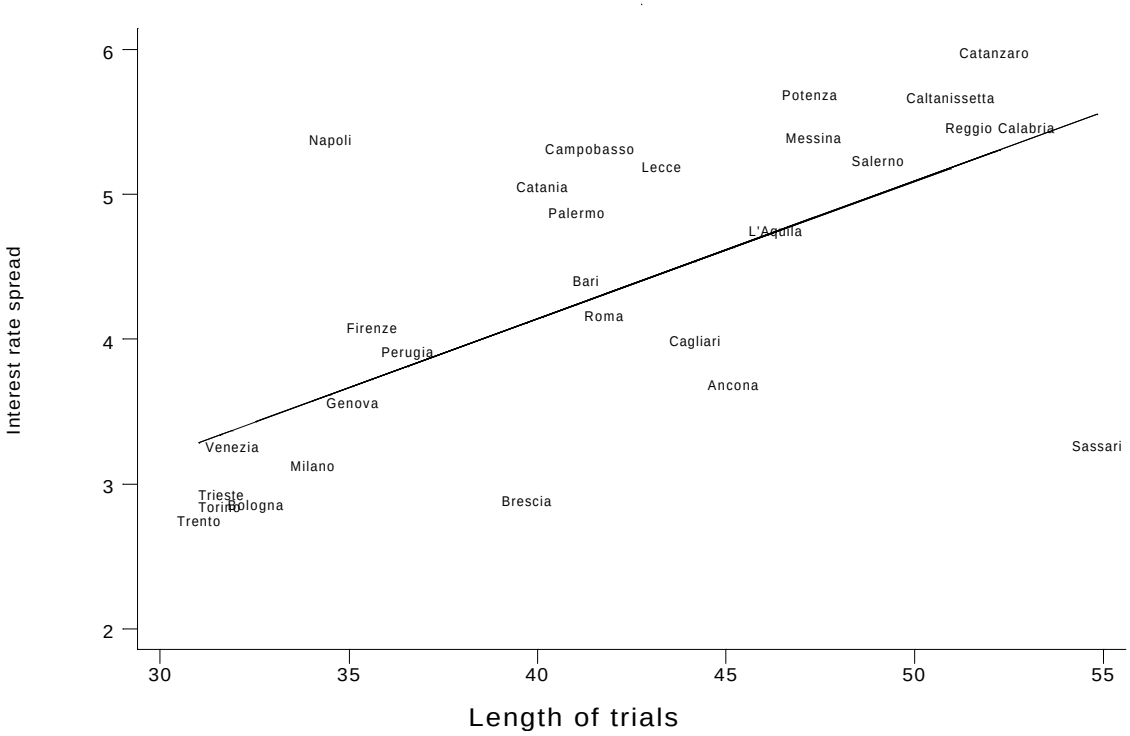


Figure 10

Interest Rate Spread and Judicial Efficiency



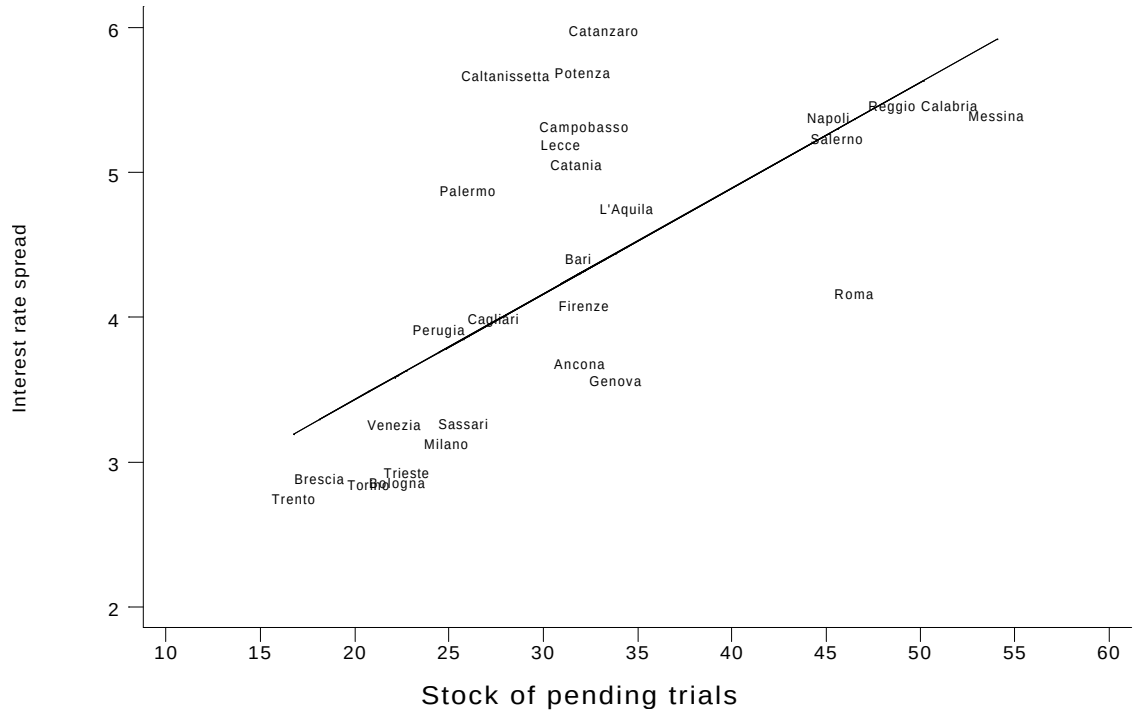
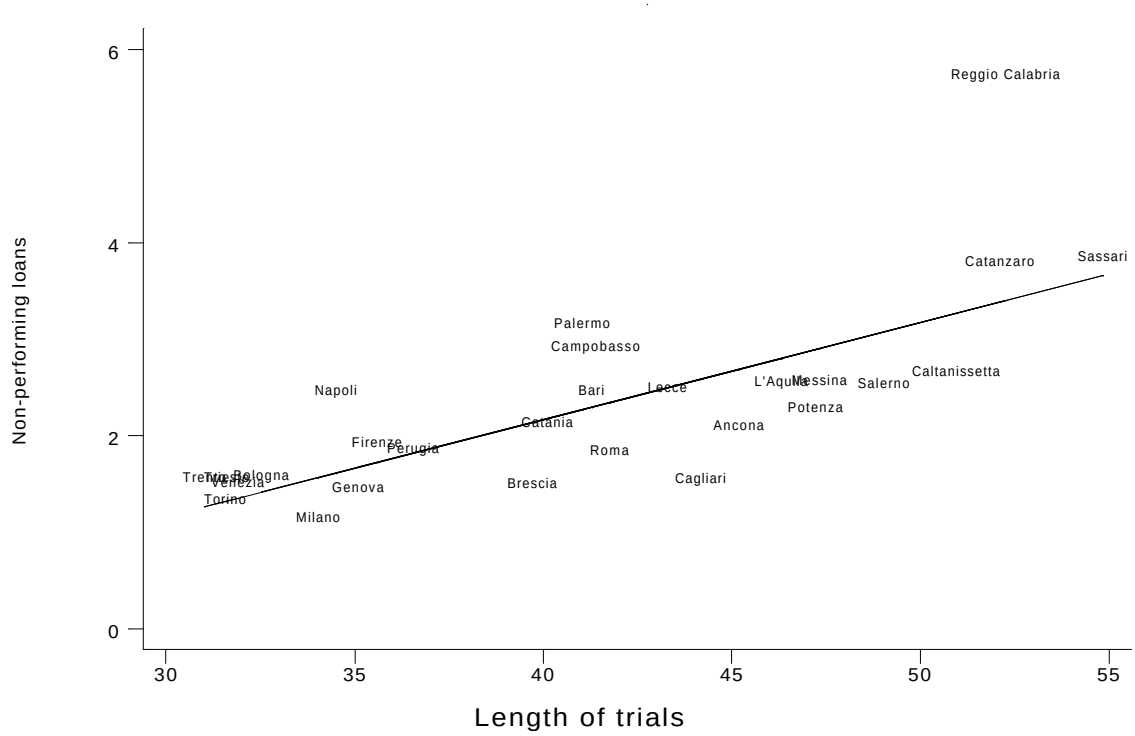


Figure 11

Non-Performing Loans and Judicial Efficiency



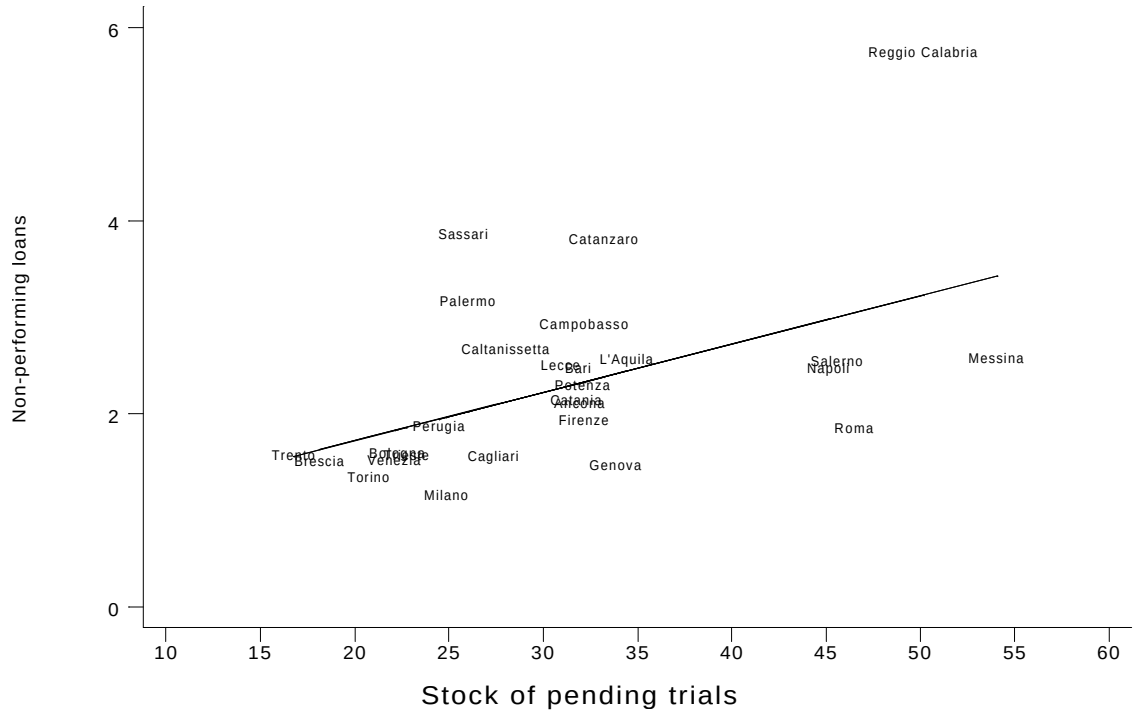


Figure 12

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

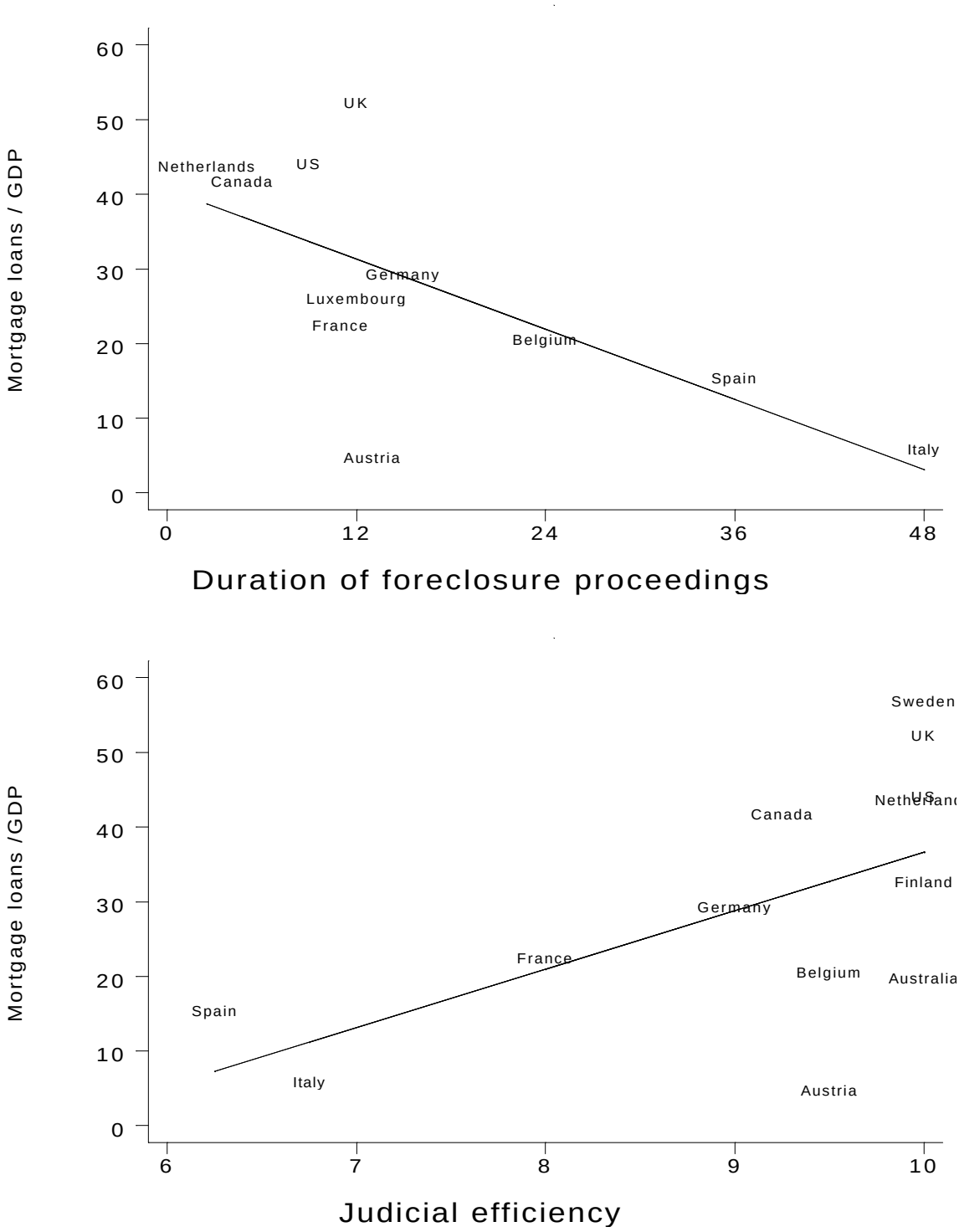
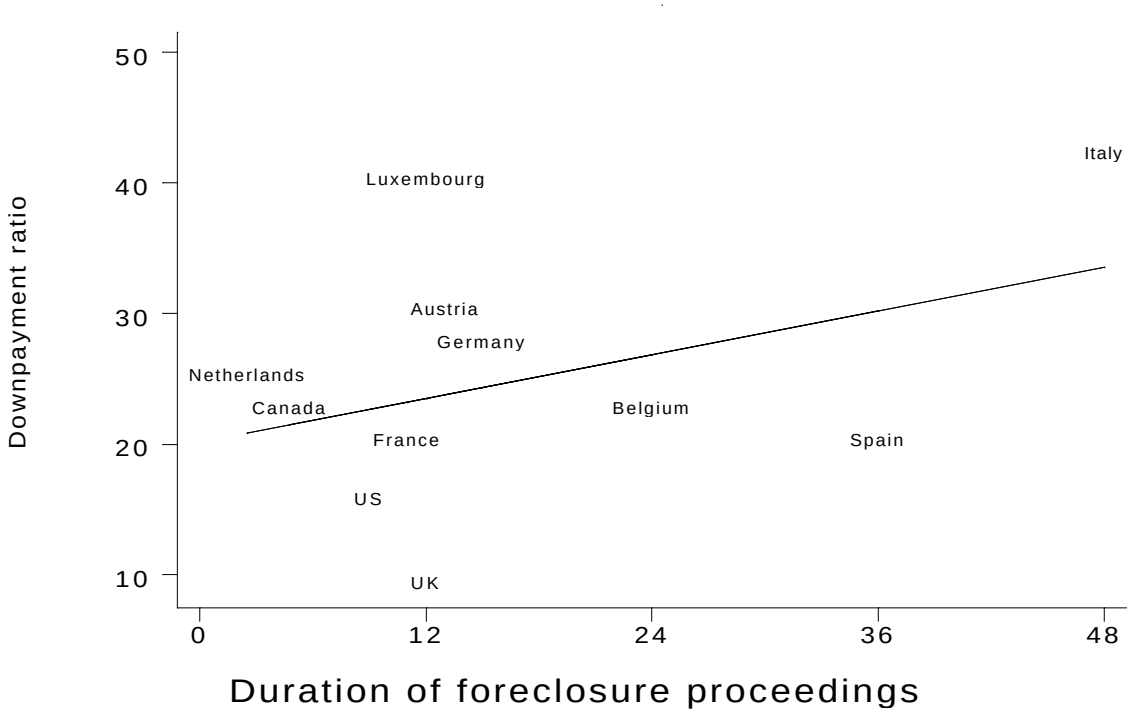


Figure 13

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



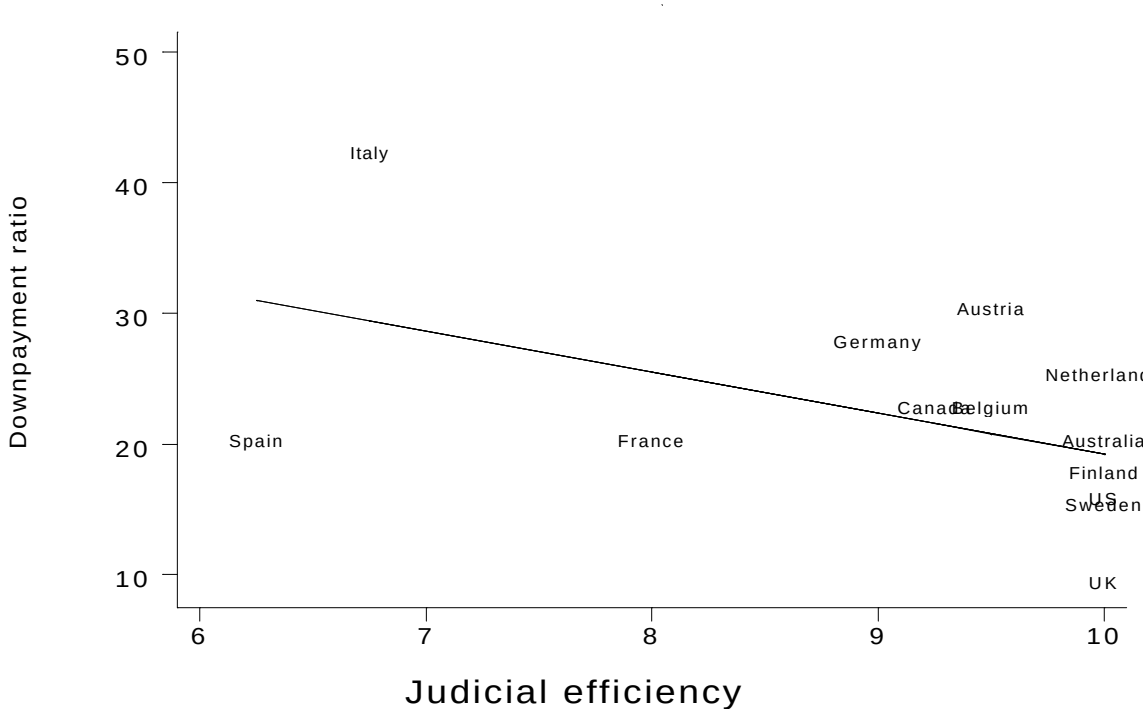


Figure 14

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