The Economics of Legal Uncertainty

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Motivation

- Link between law and economic development recognized since 19th century
- Max Weber attributed emergence of modern industrial capitalist system to rule of law and legal certainty (Trubek, 1972)
- Even under rule of law, legal uncertainty remains due to judicial discretion or changes in law over time
  - Trade off between judicial discretion and legal certainty fundamental to modern legal philosophy
- Despite its ubiquity, few attempts have been made to study link between legal uncertainty and economic activity

This Paper

- Parsimonious model that generates different types of legal uncertainty
- Theory insights
  - Legal uncertainty reduces economic activity
  - Systematic and idiosyncratic sources of legal uncertainty may have different effects depending on agents' ability to diversify
- Exploit institutional setting and data from Korea to test model's predictions in context of credit markets and bankruptcy law
- Empirical findings
  - Filing for restructuring more likely in more debtor-friendly courts with lower legal uncertainty
  - Legal uncertainty reduces size of credit markets
  - Credit supply relatively more sensitive to systematic than to idiosyncratic sources of legal uncertainty relative to credit demand

Theoretical Framework

Model Setup

- Producer requires input from supplier (e.g., labor or capital)
  - Supplier's cost of producing input: $C > 0$
  - Producer's revenue from producing output: $R > C$
  - Endogenous price of input: P
- With probability π, legal dispute between producer and supplier over $D > 0$
  - Today, we assume that $\pi = 1$
- Producer's share of D described by random variable $\Lambda \in [0, 1]$
  - Λ follows probability distribution described by parameter $\theta \in \mathbb{R}^n$
  - θ unknown and agents have homogeneous beliefs regarding its probability distribution
- Producer and supplier guided by mean-variance objectives with risk aversion $\gamma > 0$

$$U(Y) = \mathbb{E}[Y] - \frac{\gamma}{2} \operatorname{Var}[Y]$$

- Producer's payoff
  - Expectation

$$R - (1 - \mathbb{E}\left[\mathbb{E}[\Lambda|\theta]\right]) D - P$$

  - Variance

$$D^2 (\underbrace{\mathbb{E}\left[\mathrm{Var}[\Lambda|\theta]\right]}_{\substack{\text{Realization} \\ \text{uncertainty}}} + \underbrace{\mathrm{Var}\left[\mathbb{E}[\Lambda|\theta]\right]}_{\substack{\text{Parameter} \\ \text{uncertainty}}})$$

- Supplier's payoff
  - Expectation

$$P - C + (1 - \mathbb{E}\left[\mathbb{E}[\Lambda|\theta]\right]) D$$

  - Variance

$$D^2 \left(\mathbb{E}\left[\mathrm{Var}[\Lambda|\theta]\right] + \mathrm{Var}\left[\mathbb{E}[\Lambda|\theta]\right]\right)$$

- Production requires

$$R - C \geqslant \gamma D^2 \left(\mathbb{E}\left[\mathrm{Var}\left[\Lambda|\theta\right]\right] + \mathrm{Var}\left[\mathbb{E}\left[\Lambda|\theta\right]\right]\right)$$

Different Sources of Legal Uncertainty

- Idiosyncratic sources
  - Random assignment to judges
  - Idiosyncratic factors affecting judge decision making
  - *Lawyer performance*
- Systematic sources
  - Appointment of new judges
  - *Change in law*
  - *Change in public officer*

Diversification

- N producers and N suppliers
  - Each supplier supplies fraction $\frac{1}{N}$ of input to each producer
- Legal uncertainty producer specific
  - Supplier's share of supplier in relationship with producer i: $\frac{1-\Lambda_i}{N}$
  - Random variables Λ_i, $i \in N$, independent and identically distributed conditionally on θ
- Variance of supplier's payoff

$$\operatorname{Var}\left[P - C + \sum_{i=1}^{N} \frac{1-\Lambda_i}{N} D\right] = \frac{D^2}{N}\mathbb{E}\left[\operatorname{Var}\left[\Lambda|\theta\right]\right] + D^2 \operatorname{Var}\left[\mathbb{E}\left[\Lambda|\theta\right]\right]$$

- Production requires

$$R - C \geqslant \gamma D^2 \left(\frac{1}{2}\left(1 + \frac{1}{N}\right)\mathbb{E}\left[\operatorname{Var}\left[\Lambda|\theta\right]\right] + \operatorname{Var}\left[\mathbb{E}\left[\Lambda|\theta\right]\right]\right)$$

Learning about Legal Regime

- Consider a signal S
  - Observed by agents in economy
  - Informative about producer's share Λ: $\text{Var}\left[\mathbb{E}\left[\Lambda|S\right]\right] > 0$
- Legal uncertainty decreases in expectation

$$\mathbb{E}\left[\text{Var}\left[\Lambda|S\right]\right] = \text{Var}[\Lambda] - \text{Var}\left[\mathbb{E}\left[\Lambda|S\right]\right] < \text{Var}[\Lambda]$$

- Employ specific Bayesian learning model to motivate measures in empirical analysis

Legal Regime Change

- Introduce possibility of change in legal regime
- "Future" legal regime
  - Occurs with probability q
  - Producer's share Λ_f with unknown parameter θ_f
- "Current" legal regime
  - Occurs with probability $1 - q$
  - Producer's share Λ_c with unknown parameter θ_c
- Production requires

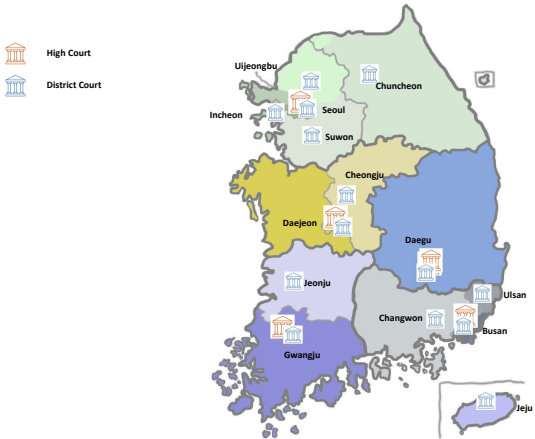
$$R - C \geqslant \gamma D^2 \left(q \operatorname{Var}[\Lambda_f] + (1-q) \operatorname{Var}[\Lambda_c] + q(1-q) \left(\mathbb{E}[\Lambda_c] - \mathbb{E}[\Lambda_f] \right)^2 \right)$$

Institutional Setting

Bankruptcy Courts in Korea

- Bankruptcy cases handled by 14 District Courts
  - Nine District Courts handle only cases in local court district
  - Five District Courts handle cases from several court districts in a region
- Jurisdiction determined by geography
  - Debtor's principal office or place of business
- Some firms have a choice between two courts

Court Zones


High Court
District Court
Uijeongbu
Chuncheon
Incheon
Seoul
Suwon
Cheongju
Daejeon
Daegu
Jeonju
Ulsan
Changwon
Busan
Gwangju
Jeju

Bankruptcy Judges

- No specialized bankruptcy judges in Korea unlike U.S.
  - Judges are considered to be generalists
  - Rotate through different courts and different court divisions throughout career
  - Appointment to bankruptcy court requires no prior exposure to bankruptcy law
- Two-year term in office for most bankruptcy judges
- Bankruptcy cases randomly assigned to judges
  - Exception: debtor related to pending case

Bankruptcy Law

- Debtor Rehabilitation and Bankruptcy Act implemented in 2006
- Liquidation and restructuring procedures similar to Ch. 7 and Ch. 11 in U.S.
- Judges have discretion to accept, terminate, extend deadlines, etc.
  - A lot of power given to judges
- Case duration
  - Mean: 19 months
  - Median: 10 months

Data and Calibration

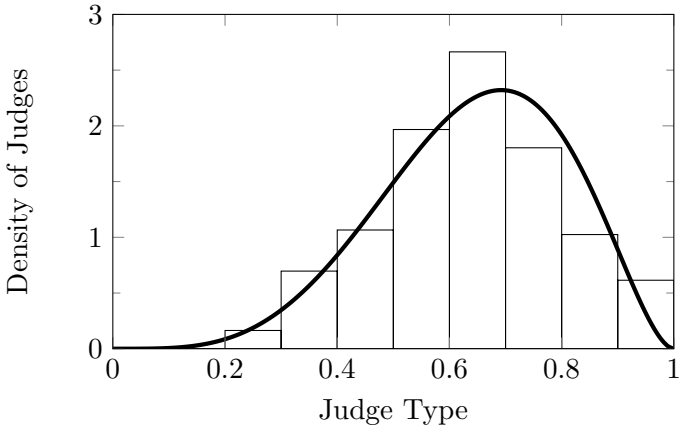
Data

- Sample period: April 2006 to December 2015
- Bankruptcy filing data from Court of Korea registry
- Bankruptcy case data from Court of Korea
  - Detailed information on every step of process with dates
- Accounting and loan data from Korea Information Service (KIS)
  - Annual accounting data
  - Monthly loan data at firm-bank level
  - Information on location of principal office (bankruptcy jurisdiction)
- Annual loan and interest rate data at firm-bank level from firms' annual reports (Moon and Schoenherr, 2022)

Measurement

- Code decisions of judges as debtor-friendly or creditor-friendly
  - 327 judges
  - 23,900 (relevant) decisions
  - Yields a debtor-friendliness measure for a given judge between 0 and 1
- Examples debtor-friendly decisions
  - Approve debtor's restructuring plan
  - Prohibit seizure of assets
  - Successful graduation from procedure
- Examples creditor-friendly decisions
  - Reject debtor's restructuring plan
  - Allow seizure of assets
  - Failed graduation from procedure

Judge Type Distribution



- Mean: 0.643
  - Court mean $\in [0.46, 0.87]$
  - Court standard deviation $\in [0.00, 0.64]$

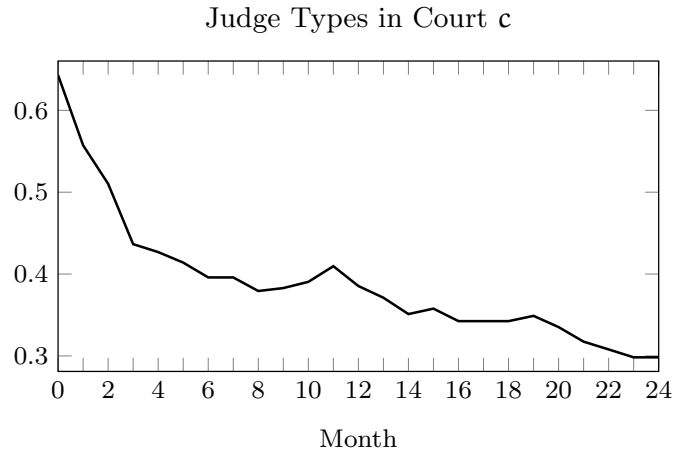
- Debtor's share for judge $j \in J$: λ_j
  - Bernoulli distribution with probability q_j
  - Judge type q_j distributed according to beta distribution with parameters α_j and β_j
  - Common prior α_0 and β_0
- Beliefs updated according to Bayes rule
  - Number of judge decisions: N_j
  - Number of debtor-friendly decisions: F_j
  - Share of debtor-friendly decisions: $\bar{F}_j$

$$\mathbb{E}\left[q_j\right] = \frac{\alpha_j}{\alpha_j + \beta_j} = \frac{\alpha_0 + \beta_0}{\alpha_0 + \beta_0 + N_j} \frac{\alpha_0}{\alpha_0 + \beta_0} + \frac{N_j}{\alpha_0 + \beta_0 + N_j} \bar{F}_j.$$

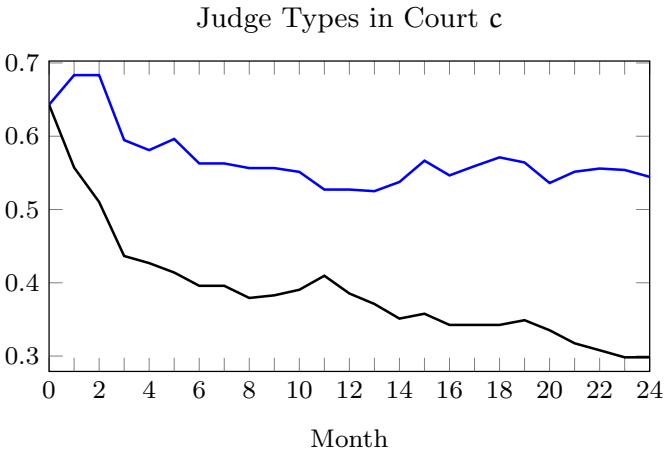
- Calibration of prior: $\alpha_0 + \beta_0 = 7.834$

Persistence of Judge Types

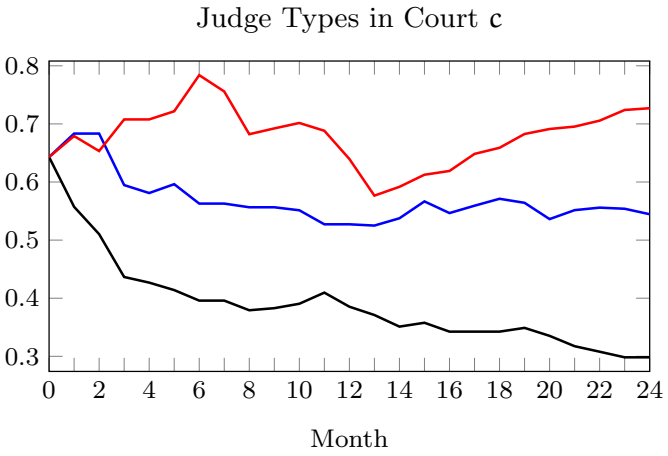
Dep. var.: $\mu_{j,t>T/2}$	I	II	III
$\mu_{j,t\leqslant T/2}$	0.8505***	0.8384***	1.1116***
	[0.1548]	[0.1454]	[0.1916]
Court FE	no	yes	-
Court-Cycle FE	no	no	yes
Observations	327	327	327
R-squared	0.097	0.155	0.458


Judge Types in Court c
0.6
0.5
0.4
0.3
0
2
4
6
8
10
12
14
16
18
20
22
24
Month

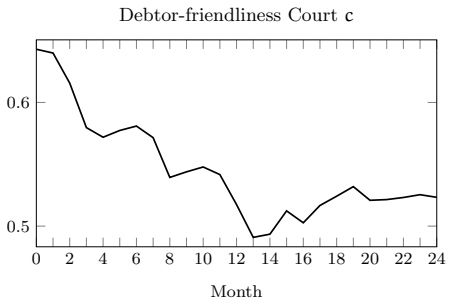
Judge Types and Learning - Example

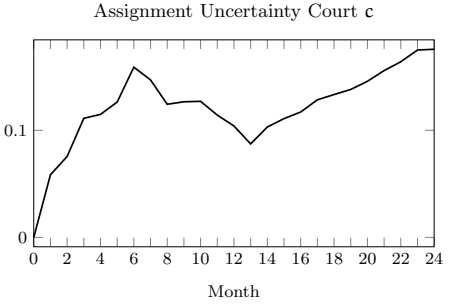


Judge Types and Learning - Example



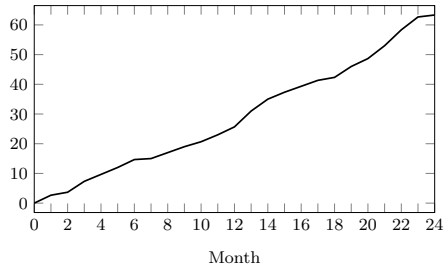
Judge Types and Learning - Example



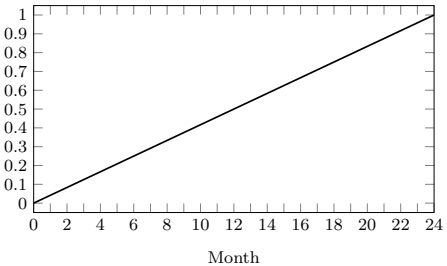


Judge Types and Learning - Example

Average number of judges' decisions in court c ($N_{c,t}$)



Completed fraction of judges' term in court c ($\tau_{c,t}$)



Empirical Analysis

Legal Uncertainty and Restructuring Filings

- Does courts' debtor-friendliness and legal uncertainty affect firm decision making?
- Examine whether debtor-friendliness and legal uncertainty can predict time-series variation in restructuring filings across different courts
- Exploit fact that some firms have a choice between two bankruptcy courts
- Evidence on forum shopping in different institutional contexts

$$F_{c,t} = \alpha_c + \alpha_t + \delta \cdot \mu_{c,t-1} + \theta_1 \cdot \sigma_{c,t-1} + \theta_2 \cdot N_{c,t-1} + \theta_3 \cdot \tau_{c,t-1} + \epsilon_{c,t}$$

Dep. var.: $F_{c,t}$	I	II	III
$\mu_{c,t-1}$	7.0558***	7.9931***	4.0066***
	[1.6511]	[2.2709]	[1.2282]
$\sigma_{c,t-1}$	-8.3979***	-9.5341***	-3.1517***
	[1.6076]	[2.1019]	[1.1368]
$N_{c,t-1}$	0.5700	1.0130	0.4431
	[0.4661]	[0.6541]	[0.3538]
$\tau_{c,t-1}$	1.4742***	1.5392***	0.2486
	[0.4346]	[0.5682]	[0.3073]
Court FE	yes	yes	yes
Month FE	yes	-	-
Court Zone-Month FE	no	yes	yes
Observations	1,183	1,183	1,183
R-squared	0.752	0.828	0.706

- Assess whether equilibrium levels of credit associated with debtor-friendliness and legal uncertainty
- Exploit monthly frequency of measures and loan data
- Estimation at firm-bank level (intensive plus extensive margin)
- Estimation at firm level

$$\log(L_{ij,t}) = \alpha_i + \alpha_j + \alpha_{z,t} + \delta \cdot \mu_{c,t-1} + \theta_1 \cdot \sigma_{c,t-1} + \theta_2 \cdot N_{c,t-1} + \theta_3 \cdot \tau_{c,t-1} + \epsilon_{ij,t}$$

Dep. var.: $\log(L_{ib,t})$	I	II	III	IV
Sample	all	high risk	med risk	low risk
$\mu_{c,t-1}$	0.1611***	0.5927***	0.0206	0.0587
	[0.0298]	[0.0653]	[0.0474]	[0.0452]
$\sigma_{c,t-1}$	-0.0697***	-0.1563***	-0.0291**	-0.0216
	[0.0087]	[0.0194]	[0.0139]	[0.0132]
$N_{c,t-1}$	0.0127***	0.0322***	0.0128***	0.0048
	[0.0028]	[0.0061]	[0.0044]	[0.0041]
$\tau_{c,t-1}$	-0.0088***	-0.0344***	-0.0042	0.0016
	[0.0025]	[0.0055]	[0.0040]	[0.0037]
Firm FE	yes	yes	yes	yes
Bank FE	yes	yes	yes	yes
Court Zone-Month FE	yes	yes	yes	yes
Clustered SE	firm	firm	firm	firm
Observations	37,333,079	6,331,954	13,098,991	17,902,134
R-squared	0.540	0.578	0.563	0.518

Credit: Firm Level

$$\log(L_{i,t}) = \alpha_i + \alpha_{z,t} + \delta \cdot \mu_{c,t-1} + \theta_1 \cdot \sigma_{c,t-1} + \theta_2 \cdot N_{c,t-1} + \theta_3 \cdot \tau_{c,t-1} + \epsilon_{i,t}$$

Dep. var.: $\log(L_{i,t})$	I	II	III	IV
Sample	all	high risk	med risk	low risk
$\mu_{c,t-1}$	0.2014***	0.9135***	0.0245	0.1017
	[0.0435]	[0.0793]	[0.0664]	[0.0681]
$\sigma_{c,t-1}$	-0.0632***	-0.2065***	0.0069	-0.0245
	[0.0128]	[0.0226]	[0.0191]	[0.0203]
$N_{c,t-1}$	0.0079*	0.0432***	-0.0010	0.0049
	[0.0042]	[0.0077]	[0.0064]	[0.0066]
$\tau_{c,t-1}$	-0.0263***	-0.0611***	-0.0125**	-0.0208***
	[0.0041]	[0.0080]	[0.0062]	[0.0064]
Firm FE	yes	yes	yes	yes
Court Zone-Month FE	yes	yes	yes	yes
Clustered SE	firm	firm	firm	firm
Observations	4,784,434	662,338	1,600,905	2,518,222
R-squared	0.827	0.879	0.841	0.791

Credit: Demand and Supply

- Thus far, examined equilibrium quantities
- Not possible to disentangle demand and supply from quantities
- Exploit data on prices (interest rates) from annual loan data
- Aggregate court-level measures at annual level

Credit: Demand and Supply

$$R_{i,t} = \alpha_i + \alpha_j + \alpha_{z,t} + \delta \cdot \overline{\mu}_{c,t} + \theta_1 \cdot \overline{\sigma}_{c,t} + \theta_2 \cdot \overline{N}_{c,t} + \theta_3 \cdot \overline{\tau}_{c,t} + \epsilon_{i,t}$$

Dep. var.: $R_{i,t}$	I	II	III	IV
Sample	all	high risk	med risk	low risk
$\overline{\mu}_{c,t}$	0.0114***	0.0212***	0.0038	-0.0016
	[0.0040]	[0.0057]	[0.0085]	[0.0074]
$\overline{\sigma}_{c,t}$	-0.0016	-0.0028*	0.00002	-0.0006
	[0.0011]	[0.0016]	[0.0022]	[0.0021]
$\overline{N}_{c,t}$	-0.0016	-0.0028*	0.0027	-0.0014
	[0.0011]	[0.0015]	[0.0024]	[0.0021]
$\overline{\tau}_{c,t}$	0.0022**	0.0026**	0.0010	0.0024
	[0.0009]	[0.0012]	[0.0020]	[0.0018]
Firm FE	yes	yes	yes	yes
Court Zone-Month FE	yes	yes	yes	yes
Clustered SE	firm	firm	firm	firm
Observations	41,076	22,143	7,223	11,710
R-squared	0.694	0.707	0.664	0.660

Legal Uncertainty and Firm Investment

- Finally, examine whether legal uncertainty affects real outcomes
- Exploit data on firm investment
- Aggregate court-level measures at annual level

$$I_{i,t} = \alpha_i + \alpha_j + \alpha_{z,t} + \delta \cdot \overline{\mu}_{c,t-1} + \theta_1 \cdot \overline{\sigma}_{c,t-1} + \theta_2 \cdot \overline{N}_{c,t-1} + \theta_3 \cdot \overline{\tau}_{c,t-1} + \epsilon_{i,t}$$

Dep. var.: $I_{i,t}$	I	II	III	IV
Sample	all	high risk	med risk	low risk
$\overline{\mu}_{c,t}$	-0.0030	0.0613***	-0.0225	-0.0092
	[0.0071]	[0.0162]	[0.0161]	[0.0089]
$\overline{\sigma}_{c,t}$	-0.0075***	-0.0218***	-0.0033	0.0029
	[0.0020]	[0.0046]	[0.0045]	[0.0025]
$\overline{N}_{c,t}$	0.0049**	0.0243***	0.0048	0.0037
	[0.0022]	[0.0050]	[0.0051]	[0.0028]
$\overline{\tau}_{c,t}$	-0.0004	-0.0071*	-0.0031	0.0028
	[0.0020]	[0.0043]	[0.0048]	[0.0025]
Firm FE	yes	yes	yes	yes
Court Zone-Month FE	yes	yes	yes	yes
Clustered SE	firm	firm	firm	firm
Observations	720,239	158,209	144,487	417,543
R-squared	0.279	0.250	0.295	0.295

Robustness Tests

- Agents' prior and learning
  - Different priors
  - Fully informed types
- Court choice
  - Only firms without court choice
- Macro-economic conditions and legal uncertainty
  - GDP growth and courts' debtor-friendliness and assignment uncertainty uncorrelated
  - Control for industry-time fixed effects
- Differences in bank quality
  - Control for bank-month fixed effects exploiting variation across courts
- Differences in judge quality
  - Measures uncorrelated with case length
- Large firms
  - Exclude large firms

Discussion and Implications

- Judicial system
  - Random judge assignment generates idiosyncratic legal uncertainty
  - Regular judge rotations generate systematic legal uncertainty
- Legal system
  - Limited judicial discretion reduces both assignment and decision uncertainty
  - Legal precedent may reduce uncertainty
  - Reliance on precedent may make legal uncertainty more systematic
- Legislation
  - Fewer and less drastic changes in legislation reduce uncertainty about legal regime
- Transparency
  - Establishing predictable patterns that govern judicial process reduces legal uncertainty
- Boundary of firm
  - Size and boundary of firm may affect legal uncertainty
- Intermediation
  - Large institutions such as insurance companies and banks can diversify legal uncertainty

Conclusion

- Legal uncertainty reduces economic activity
- Idiosyncratic and systematic sources of legal uncertainty
  - Idiosyncratic sources of legal uncertainty less relevant when diversified
- Credit markets
  - Demand (firms) relatively more sensitive to idiosyncratic sources of legal uncertainty
  - Supply (banks) relatively more sensitive to systematic sources of legal uncertainty