

# When do Laws and Institutions Affect the Recovery Rate of Collateral?

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Using Microdata for MacroPrudential Policy

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# Motivation

- Laws and institutions determine financial development and economic growth (La Porta, Lopez-de-Silanes, Shleifer and Vishny (JF1997, JPE1998, JFE2000), Levine (JFI1999))
- Legal mechanisms allow lenders to enforce debt contracts in a predictable way
- Collateral is central to secured debt contracts. Efficiency of secured lending depends on
  - Ability of debtors to pledge collateral
  - Value of collateral to creditors upon enforcement of the debt contract
- Using a cross-country loan level data set, we study whether
  - laws and institutions affect the bank's expected **recovery rate on collateral**
  - greater recovery rates on collateral impact on **loan terms**

# Debt Enforcement Around the World

- Djankov, Hart, McLiesh and Shleifer (JPE2008) (DHMS) study enforcement of collateralized debt with respect to a *similar hypothetical* insolvent firm in 88 countries.
  - Case developed to be representative of an insolvency mid-size firm, *Mirage*, a domestically owned hotel business.
  - Using questionnaires to lawyers, DHMS gather data to construct a measure of the **efficiency** of debt enforcement in each country.
  - Inefficiency comes from time to enforcement, direct enforcement costs, and the way of disposing the asset – they exclude tunnelling
  - 48 percent of the hotel's value is lost in enforcement
- **Our contribution:** Take DHMS to the “real world” by “Asking the Bank”:
  - Explore the impact that creditor rights have on expected recovery rates of collateral.
  - Explore different types of collateral: important as not all collateral types are equally prone to inefficiencies weak laws and legal institutions may induce

# Data Description

- We employ an extended version of the dataset employed by Liberti and Mian (JF2010)
- Contains loan level information of SME division in 16 countries, including information about the collateral pledged
- Collateral information contains two values
  - Fair Market Value (FMV): the gross price that a willing and informed buyer would be expected to pay to a willing and informed seller when neither is under pressure to conclude the transaction
  - Orderly Liquidation Value (OLV): FMV minus the bank's expected costs of repossessing and liquidating the pledged assets given the country's institutional framework and efficiency of enforcement
- Expected recovery rate on collateral:  $\frac{OLV}{FMV}$
- 'Recovery rate on collateral' differs from 'recovery rate on loan'
  - The latter also determined by loan-to-value ratio and expected default probability

# Identification Strategy

- Follow Liberti and Mian (JF2010):
  - Consider two economies: High Creditor Rights (*HCR*) and Low Creditor Rights (*LCR*)
  - Two types of collateral: those whose values are susceptible to borrower agency problems (*Divertible*) and those that are not (*Non-Divertible*)
  - Spread in Recovery Rates =  $\text{Recovery Rate}_{\text{Divertible}} - \text{Recovery Rate}_{\text{Non-Divertible}}$
  - Spread in Recovery Rates is expected to be negative (Hypothesis 1)
  - In LCR where it typically takes a long-time before security interest can be enforced, the recovery spread should be more negative than in HCR where successful and timely seizure of collateral is possible (Hypothesis 2)
  - We will compare the *within-country* recovery spread of HCR and LCR countries
    - Allows us to difference out level differences that may be driven by spurious country-specific factors
    - In more conservative specifications, we include country-industry-time or borrower fixed effects, implying that confounding factors within a country are eliminated.

# Empirical Strategy : Hypothesis 1

**Hypothesis 1:** The “recovery spread” between divertible and non-divertible collateral is **negative**

$$RecoveryRate_{k,i,c,t} = \alpha_c + \beta_1 Divertible_k + \gamma_1 Firm_{i,c,t} + \varepsilon_{k,i,c,t}. \quad (2)$$

with  $k$  = collateral type,  $i$ =borrower,  $c$ =country,  $t$ =time

$Divertible = 1$  when collateral type  $k$  is divertible, 0 otherwise

H1:  $\beta_1 < 0$ ; a negative spread in recovery rates between divertible and non-divertible types of collateral

Concern that country specific factors are correlated with the type of collateral pledged -> include country fixed effects  $\alpha_c$  (and in more conservative specifications, country-industry-time, or borrower fixed effects)

## Empirical Strategy: Hypothesis 2

**Hypothesis 2:** The “recovery spread” should be more negative in low creditor rights countries

$$RecoveryRate_{k,i,c,t} = \alpha_c + \beta_1 Divertible_k + \beta_2 (Divertible_k * CR_c) + \gamma_1 Firm_{i,c,t} + \varepsilon_{k,i,c,t} \quad (3)$$

Recovery spread in LCR:  $\beta_1$

Recovery spread in HCR:  $\beta_1 + \beta_2$

H2:  $\beta_2 > 0$

By focusing on the spread in recovery rates instead of the levels, we difference out level differences between high creditor rights and low creditor rights countries that may be driven by spurious country-specific factors

# Data: Descriptives

Country	Sample		Rules in the books					Collateral Law Index
	# Obs	# Firms	DMS				DB	
			LLSV Index	Reorganization Restrictions	No Automatic Stay	Secured Creditors First	Management doesn't Stay	
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	
1 Brazil	201	201	1	0	1	0	0	2
2 Chile	1,140	348	2	0	1	1	0	3
3 Czech	2,100	631	3	0	1	1	1	5
4 Hong Kong	5,263	1,277	4	1	1	1	1	8
5 Hungary	342	227	1	1	0	0	0	6
6 India	4,259	602	2	1	0	1	0	5
7 Korea	5,329	1,213	3	0	1	1	1	6
8 Malaysia	2,573	627	3	1	1	1	0	8
9 Pakistan	581	96	1	0	0	1	0	5
10 Romania	459	134	2	0	1	1	0	6
11 Singapore	888	241	3	0	1	1	1	8
12 Slovakia	806	157	2	0	1	1	0	8
13 South Africa	749	395	3	1	0	1	1	8
14 Sri Lanka	122	86	2	1	0	0	1	2
15 Taiwan	775	373	2	0	0	1	1	3
16 Turkey	3,789	814	2	1	1	0	0	3
Total/Average								
Our sample	29,376	7,422	2.19	0.44	0.56	0.75	0.44	5.375
DHMS sample			2.01	0.33	0.42	0.71	0.57	4.49



## Data: Classification

	Divertible Collateral (1)	All Countries			HCR			LCR			Diff.	
		mean (2)	st. dev. (3)	obs (4)	mean (5)	st. dev. (6)	obs (7)	mean (8)	st. dev. (9)	obs (10)	High - Low (11)	(12)
All Collateral Classes		0.852	0.324	29,376	0.959	0.162	16,902	0.707	0.418	12,474	0.253	0.000
Economic Characteristic												
<i>Divertible</i>	1	0.732	0.407	15,139	0.936	0.214	7,922	0.508	0.449	7,217	0.429	0.000
<i>Non-Divertible</i>	0	0.980	0.093	14,237	0.980	0.090	8,980	0.979	0.097	5,257	0.000	0.875
Asset Class												
<i>Accounts Receivables</i>	1	0.198	0.397	2,192	0.548	0.498	367	0.128	0.332	1,825	0.420	0.000
<i>Equipment &amp; Vehicles</i>	1	0.975	0.125	8,479	0.990	0.057	5,510	0.948	0.194	2,969	0.042	0.000
<i>Firm-Specific Assets</i>	1	0.533	0.404	4,468	0.863	0.290	2,045	0.255	0.247	2,423	0.608	0.000
<i>Real Estate</i>	0	0.976	0.093	10,355	0.976	0.097	7,271	0.977	0.083	3,084	-0.001	0.493
<i>Financial Instruments</i>	0	0.986	0.097	3,397	0.994	0.052	1,419	0.980	0.118	1,978	0.013	0.000
<i>Bank Letters of Credit</i>	0	1.000	0.002	485	1.000	0.000	290	1.000	0.004	195	0.000	0.252

- **Classification of Divertible and Non-Divertible Assets: Employ Universal Commercial Code 9 (UCC9) as principle:**
  - *Divertible* assets: Equipment & Vehicles, Firm-Specific Assets, Accounts Receivables
  - *Non-Divertible* Assets: Real Estate, Financial Instruments, Bank LOC

# Data: Descriptives

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		mean (2)	st. dev. (3)	obs (4)	mean (5)	st. dev. (6)	obs (7)	mean (8)	st. dev. (9)	obs (10)	High - Low (11)	(12)
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- Expected Recovery rate on collateral is about 85%
  - 73% for divertible collateral and 98% for non-divertible
  - Recovery spread is about -47 percentage points in LCR and -4.4 pp in HCR
  - Substantial variation in recovery rates of divertible assets, except for Equipment & Vehicles
  - Almost no variation in recovery rates for non-divertible assets across creditor rights and types

# Results: H1

	Recovery Rate				
	(1)	(2)	(3)	(4)	(5)
<i>Divertible</i>	-0.271** (0.103)	-0.453*** (0.130)	-0.450*** (0.135)	-0.552*** (0.117)	-0.421*** (0.094)
<i>Divertible × LLSV</i>		0.364** (0.133)	0.367** (0.138)	0.493*** (0.122)	0.303* (0.154)
Firm Composition					
<i>Firm Ratings</i>	Included	Included	Included	Included	
<i>Loan Size</i>	Included	Included	Included	Included	
<i>Firm Size</i>	Included	Included	Included	Included	
<i>Balance Sheet Data (4 Ratios)</i>	Included	Included	Included	Included	
Fixed Effects					
<i>Country</i>	Included	Included			
<i>Country-Industry-Time</i>			Included		
<i>Borrower</i>				Included	
Observations	29,376	29,376	29,376	29,376	16
R-squared	0.47	0.52	0.61	0.82	0.22

- Recovery spread equals -27 percentage points, i.e. divertible collateral has a 27 percentage points lower recovery rate than non-divertible collateral

# Results: H2

	Recovery Rate				
	(1)	(2)	(3)	(4)	(5)
<i>Divertible</i>	-0.271** (0.103)	-0.453*** (0.130)	-0.450*** (0.135)	-0.552*** (0.117)	-0.421*** (0.094)
<i>Divertible × LLSV</i>		0.364** (0.133)	0.367** (0.138)	0.493*** (0.122)	0.303* (0.154)
Firm Composition					
<i>Firm Ratings</i>	Included	Included	Included	Included	
<i>Loan Size</i>	Included	Included	Included	Included	
<i>Firm Size</i>	Included	Included	Included	Included	
<i>Balance Sheet Data (4 Ratios)</i>	Included	Included	Included	Included	
Fixed Effects					
<i>Country</i>	Included	Included			
<i>Country-Industry-Time</i>			Included		
<i>Borrower</i>				Included	
Observations	29,376	29,376	29,376	29,376	16
R-squared	0.47	0.52	0.61	0.82	0.22

- Recovery spread in LCR countries is -45 to -55 percentage points
- Recovery spread in HCR countries is -6 to -9 percentage points only

## Results H2: Opening up LLSV index

	Recovery Rate				
	(1)	(2)	(3)	(4)	(5)
<i>Divertible</i>	-0.498*** (0.165)	-0.596*** (0.122)	-0.333*** (0.056)	-0.505*** (0.136)	-0.720*** (0.193)
<i>Divertible × Reorg. Restrictions</i>	0.288 (0.187)				0.168 (0.127)
<i>Divertible × No Automatic Stay</i>		0.392** (0.156)			0.248 (0.156)
<i>Divertible × Secured Creditors First</i>			-0.085 (0.176)		0.089 (0.172)
<i>Divertible × Management Doesn't Stay</i>				0.411** (0.147)	0.265* (0.130)
Firm Composition					
<i>Firm Ratings</i>	Included	Included	Included	Included	Included
<i>Loan Size</i>	Included	Included	Included	Included	Included
<i>Firm Size</i>	Included	Included	Included	Included	Included
<i>Balance Sheet Data (4 Ratios)</i>	Included	Included	Included	Included	Included
Fixed Effects					
<i>Borrower</i>	Included	Included	Included	Included	Included
Observations	29,376	29,376	29,376	29,376	29,376
R-squared	0.81	0.82	0.80	0.81	0.82

- Management Doesn't Stay and No Automatic Stay seem most important creditor right

# Results H2: Opening up Divertible Collateral

	Recovery Rates			
	(1)	(2)	(3)	(4)
<b>Divertible Collateral Types</b>				
<i>Accounts Receivables</i>	-0.693*** (0.123)	-0.778*** (0.128)	-0.836*** (0.110)	-0.832*** (0.123)
<i>Equipment &amp; Vehicles</i>	0.026 (0.040)	-0.045 (0.047)	-0.039 (0.051)	-0.102 (0.065)
<i>Firm-Specific Assets</i>	-0.357** (0.157)	-0.512*** (0.115)	-0.649*** (0.060)	-0.622*** (0.053)
<i>Accounts Receivables</i> × LLSV			0.377* (0.178)	0.266* (0.146)
<i>Equipment &amp; Vehicles</i> × LLSV			0.043 (0.051)	0.104 (0.065)
<i>Firm-Specific Assets</i> × LLSV			0.565*** (0.062)	0.538*** (0.055)
<b>Firm Composition</b>				
<i>Firm Ratings</i>	Included	Included	Included	Included
<i>Loan Size</i>	Included	Included	Included	Included
<i>Firm Size</i>	Included	Included	Included	Included
<i>Balance Sheet Data (4 Ratios)</i>	Included	Included	Included	Included
<b>Fixed Effects</b>				
<i>Country-Industry-Time</i>	Included		Included	
<i>Borrower</i>		Included		Included
Observations	29,376	29,376	29,376	29,376
R-squared	0.76	0.88	0.82	0.90

- Recovery spread less negative in HCR for various types of divertible assets, except *Equipment & Vehicles*

# What about other creditor rights indicators?

	Recovery Rates					
	Other Creditor Rights				Information Sharing	
	Collateral Law	Rule of Law	Contract Days	Enforcement Procedure	Public Registry	Private Bureau
	(1)	(2)	(3)	(4)	(5)	(6)
<i>Divertible</i>	-0.564*** (0.118)	-0.582*** (0.118)	-0.328*** (0.062)	-0.536*** (0.113)	-0.656*** (0.029)	-0.588*** (0.040)
<i>Divertible</i> × <i>LLSV</i>	0.267** (0.107)	0.343** (0.151)	0.268*** (0.072)	0.352*** (0.084)	0.517*** (0.035)	0.083 (0.055)
<i>Divertible</i> × <i>Collateral Law</i>	0.256** (0.116)					
<i>Divertible</i> × <i>Rule of Law</i>		0.199 (0.182)				
<i>Divertible</i> × <i>Contract Days</i>			-0.295** (0.120)			
<i>Divertible</i> × <i>Foreclosure</i>				0.273 (0.158)		
<i>Divertible</i> × <i>Reorganization</i>				0.168 (0.099)		
<i>Divertible</i> × <i>Public Registry</i>					0.257*** (0.040)	
<i>Divertible</i> × <i>Private Bureau</i>						0.448*** (0.066)

- Results suggest strength collateral law, time, and information play important role -> point to borrower agency problems

# Channels driving variation in recovery rates and recovery spread: agency

Channel ----->	Recovery Rates				
	Agency				Asset Specificit
	Collateral Law	Information Sharing		Firm Risk	
	(1)	Public Registry (2)	Private Bureau (3)	(4)	(5)
<i>Divertible</i>	-0.569*** (0.118)	-0.689*** (0.045)	-0.588*** (0.109)	-0.460*** (0.135)	-0.443*** (0.151)
<i>Divertible</i> × <i>LLSV</i>	0.449*** (0.117)	0.619*** (0.068)	0.489*** (0.104)	0.383** (0.137)	0.392** (0.155)
<i>Channel</i>				-0.092** (0.040)	
<i>Channel</i> × <i>LLSV</i>				0.078* (0.042)	
<i>Divertible</i> × <i>Channel</i>	0.333** (0.142)	0.345*** (0.113)	0.478*** (0.155)	0.138*** (0.021)	-0.140** (0.060)
<i>Divertible</i> × <i>Channel</i> × <i>LLSV</i>	-0.268* (0.146)	-0.312** (0.127)	-0.439** (0.151)	-0.138*** (0.032)	0.126* (0.061)
Fixed Effects					
<i>Country-Industry-Time</i>				Included	
<i>Borrower</i>	Included	Included	Included		Included

- In LCR, having a strong collateral law or information sharing reduces the recovery spread, this effect is not present in HCR.
- Firm risk: high risk firms have lower recovery rates but not in HCR; banks accept only better quality divertible collateral from high risk firms in LCR



# Channels driving variation in recovery rates and recovery spread: asset specificity

Channel ----->	Recovery Rates				Asset Specificity
	Agency			Firm Risk	
	Collateral Law	Information Sharing	Public Registry		
	(1)	(2)	(3)		
<i>Divertible</i>	-0.569*** (0.118)	-0.689*** (0.045)	-0.588*** (0.109)	-0.460*** (0.135)	-0.443** (0.151)
<i>Divertible</i> × <i>LLSV</i>	0.449*** (0.117)	0.619*** (0.068)	0.489*** (0.104)	0.383** (0.137)	0.392** (0.155)
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Fixed Effects					
<i>Country-Industry-Time</i>				Included	
<i>Borrower</i>	Included	Included	Included		Included

- Firms in high-asset specific industries have more negative recovery spreads in LCR. This effect is muted in HCR

# Loan interest rates and expected recovery rates

	Loan Interest Rate				
	(1)	(2)	(3)	(4)	(5)
<i>Divertible</i>	0.042* (0.025)	0.177*** (0.034)	0.060*** (0.020)		
<i>Divertible × LLSV</i>		-0.278*** (0.050)	-0.119*** (0.045)		
<i>Recovery Rate</i>				-0.095** (0.039)	
<i>PV(Recovery Rate)</i>					-0.502*** (0.129)
Firm Composition					
<i>Loan Size</i>	Included	Included	Included	Included	Included
<i>Firm Ratings</i>	Included	Included	Included	Included	Included
<i>Firm Size</i>	Included	Included	Included	Included	Included
<i>Balance Sheet Data (4 Ratios)</i>	Included	Included	Included	Included	Included
Fixed Effects					
<i>Country-Industry-Time</i>	Included	Included			
<i>Borrower</i>			Included	Included	Included
Observations	29,376	29,376	29,376	29,376	24,536
R-squared	0.84	0.84	0.95	0.95	0.95

- Firms pledging divertible collateral pay a 4.2 basispoints higher loan rate. This effect is only present in LCR
- Firms that pledge collateral with a higher expected recovery rate pay lower loan interest rate

## Preliminary Conclusions

- Collateral is important contract feature but we know little about expected recovery rates on collateral
- When do laws and institutions affect recovery rates of collateral?
  - when collateral is divertible
- We find that
  - Expected recovery rate is about 85% (96% in HCR and 70% in LCR)
  - Recovery rate is about 98% for non-divertible assets and 73% for divertible assets
  - Recovery spread (i.e, difference between divertible and non-divertible assets) is more negative in low creditor rights countries and close to zero in high creditor right countries
  - Borrower agency problems and asset specificity are channels driving recovery rates and recovery spreads

# Data: Descriptives

Country	Sample		Rules in the books					DB	Quality of Enforcement in Practice					Information Sharing		
	# Obs	# Firms	DMS						Collateral Law Index	LLSV	DLLS	DHMS			DMS	
			LLSV Index	Reorgan ization Restricti ons	No Automatic Stay	Secured Creditor s First	Manage ment doesn't Stay			Rule of Law	Contract Enforce ment Days	Enforcement Procedure			Public Registry	Private Bureau
												Forecl osure	Reorgan ization	Liquid ation		
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)		
1 Brazil	201	201	1	0	1	0	0	2	6.32	566	0	0	1	1	1	
2 Chile	1,140	348	2	0	1	1	0	3	7.02	305	1	0	0	1	1	
3 Czech	2,100	631	3	0	1	1	1	5	8.33	300	0	0	1	1	1	
4 Hong Kong	5,263	1,277	4	1	1	1	1	8	8.22	211	1	0	0	0	0	
5 Hungary	342	227	1	1	0	0	0	6	6.67	365	1	0	0	0	1	
6 India	4,259	602	2	1	0	1	0	5	4.17	425				0	0	
7 Korea	5,329	1,213	3	0	1	1	1	6	6.67	75	0	1	0	0	1	
8 Malaysia	2,573	627	3	1	1	1	0	8	6.78	300	0	0	1	1	1	
9 Pakistan	581	96	1	0	0	1	0	5	3.03	395				1	0	
10 Romania	459	134	2	0	1	1	0	6	6.67	335	0	1	0	0	0	
11 Singapore	888	241	3	0	1	1	1	8	8.57	69	1	0	0	0	0	
12 Slovakia	806	157	2	0	1	1	0	8	6.67	565	0	0	1	1	0	
13 South Africa	749	395	3	1	0	1	1	8	4.42	277	0	0	1	0	1	
14 Sri Lanka	122	86	2	1	0	0	1	2	5.00	440	1	0	0	0	1	
15 Taiwan	775	373	2	0	0	1	1	3	8.52	210	0	1	0	1	1	
16 Turkey	3,789	814	2	1	1	0	0	3	5.18	330	0	1	0	1	0	
Total/Average																
Our sample	29,376	7,422	2.19	0.44	0.56	0.75	0.44	5.375	6.39	323	0.36	0.29	0.36	0.44	0.50	
DHMS sample			2.01	0.33	0.42	0.71	0.57	4.49	6.85	381	0.28	0.42	0.30	0.49	0.59	