The interbank market after August 2007: what has changed and why?

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Outline

1 Motivation of this paper and existing literature

2 The data

3 Regression

4 Estimation results

5 Conclusions

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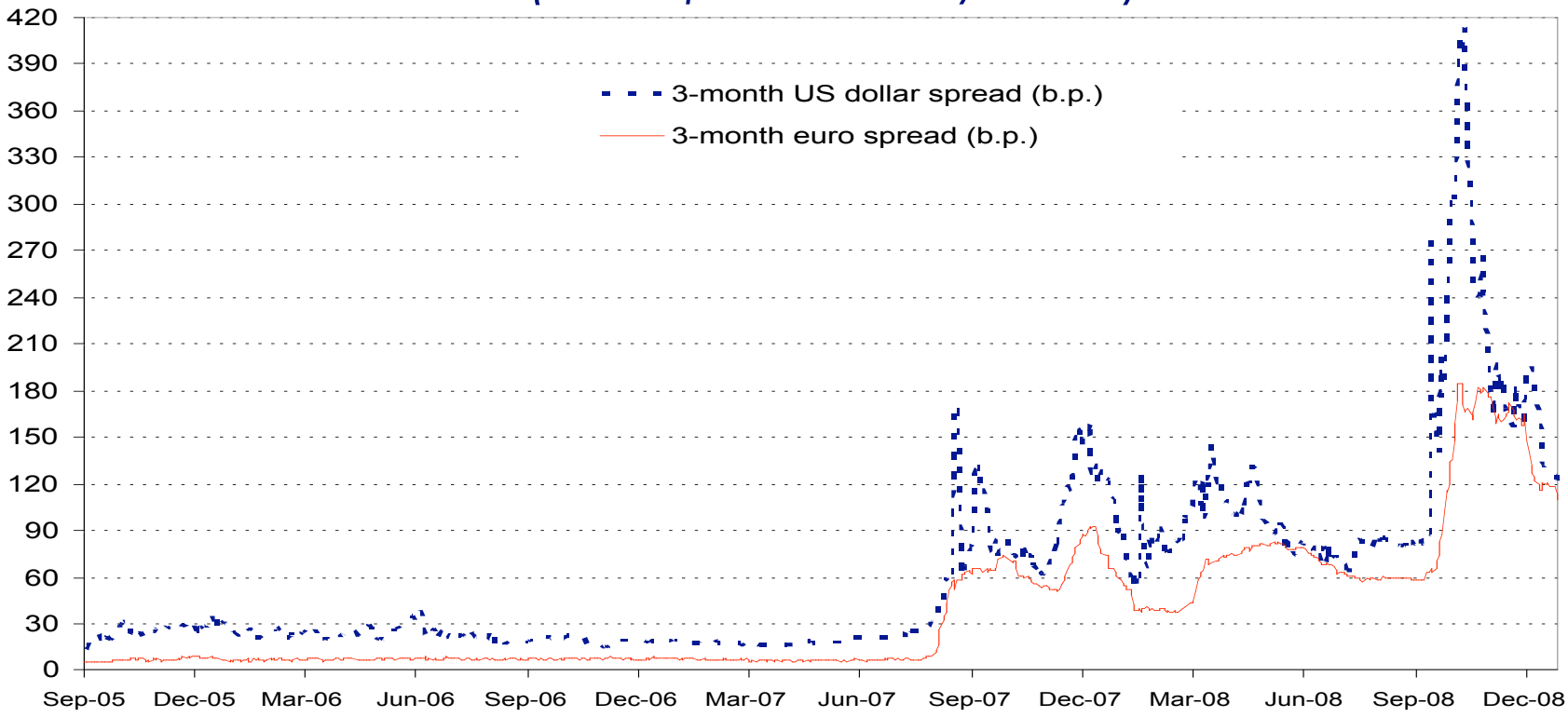
Motivation: strains in interbank markets

Spreads between uncollateralized and collateralized rates

(basis points; daily data)



Which are the determinants of the spreads?

Which role for:

- Deterioration of measures of counterparty creditworthiness
- Increase in perception of default risk
- Generalized increase in lender's risk aversion
- Window-dressing/accounting practices
- Reduction in market and/or funding liquidity
- Lender's characteristics

The literature on spreads' decomposition

- Taylor and Williams (2008): increased counterparty risk
- Wu – McAndrews et al. (2008): increased counterparty risk but also reactivity to central banks interventions
- Michaud and Upper (2008): cointegrating relationship between counterparty risk and spreads
- Cassola et al. (forthcoming): asymmetric information

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The data

Dependent variable

- Sample period: January, 24th 2005 - December, 31st 2008. Main focus: up to Lehman's collapse
- Individual daily transactions on e-MID
- Dependent variable in long-term spread regression: e-MID individual rate minus Eurepo rate of the same maturity
- Maturity:1 week, 2 weeks, 3 weeks, 1 month, 2 months, 3 months, …, 6 months,…, 12 months
- Pooling of maturities: average transaction of 37 days

The data

Independent variables

- Bank-specific variables:

  - ratings (Fitch, Moody's, S&P's; daily)

  - balance sheet data (Banca d'Italia's supervisory reports; quarterly)

- Market-wide variables:

  - maturity dummies ("term structure" pattern)

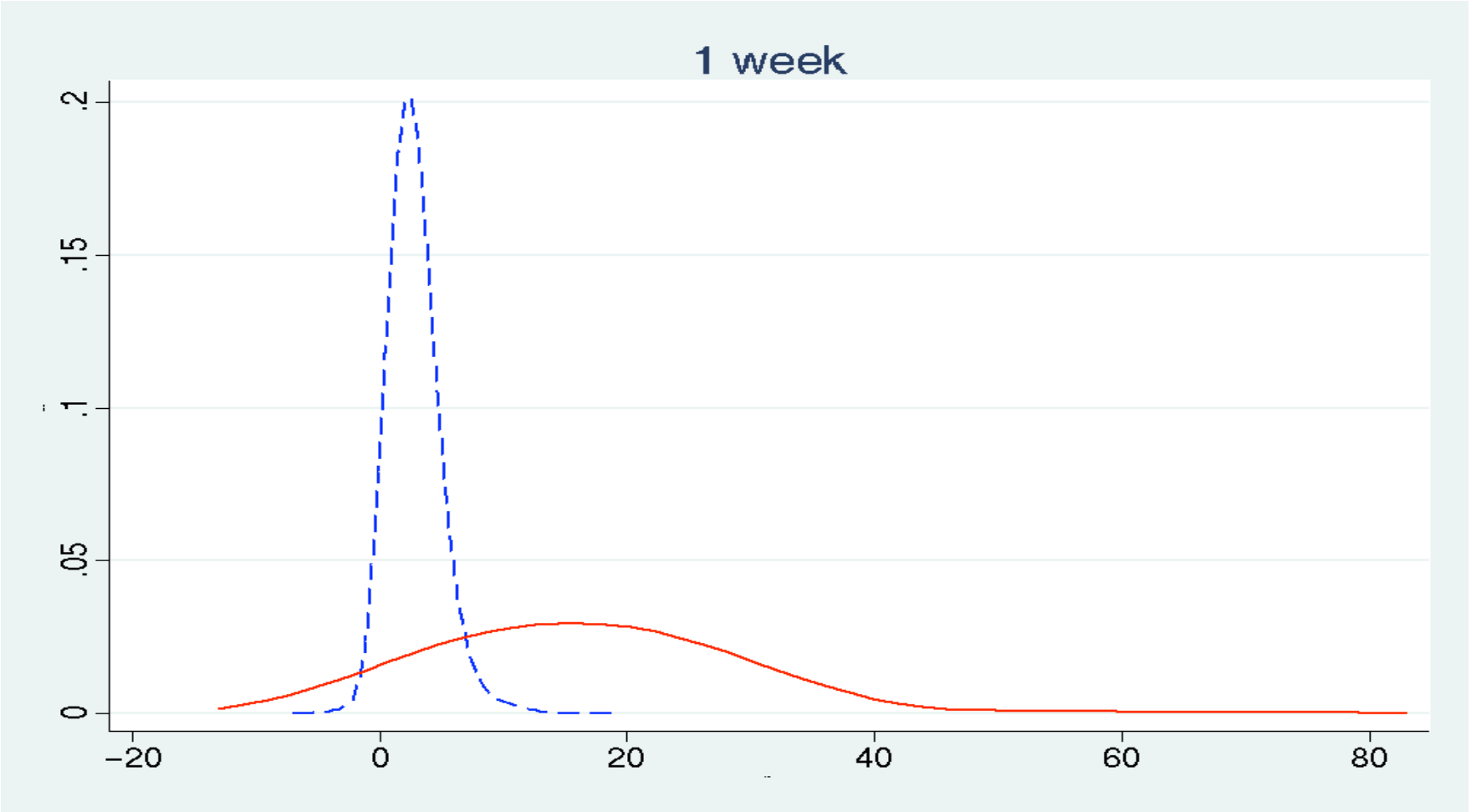
  - window-dressing dummies (seasonal patterns)

  - bid/ask dummy

  - overall risk aversion measure (from the stock market; Jackwerth 2000).

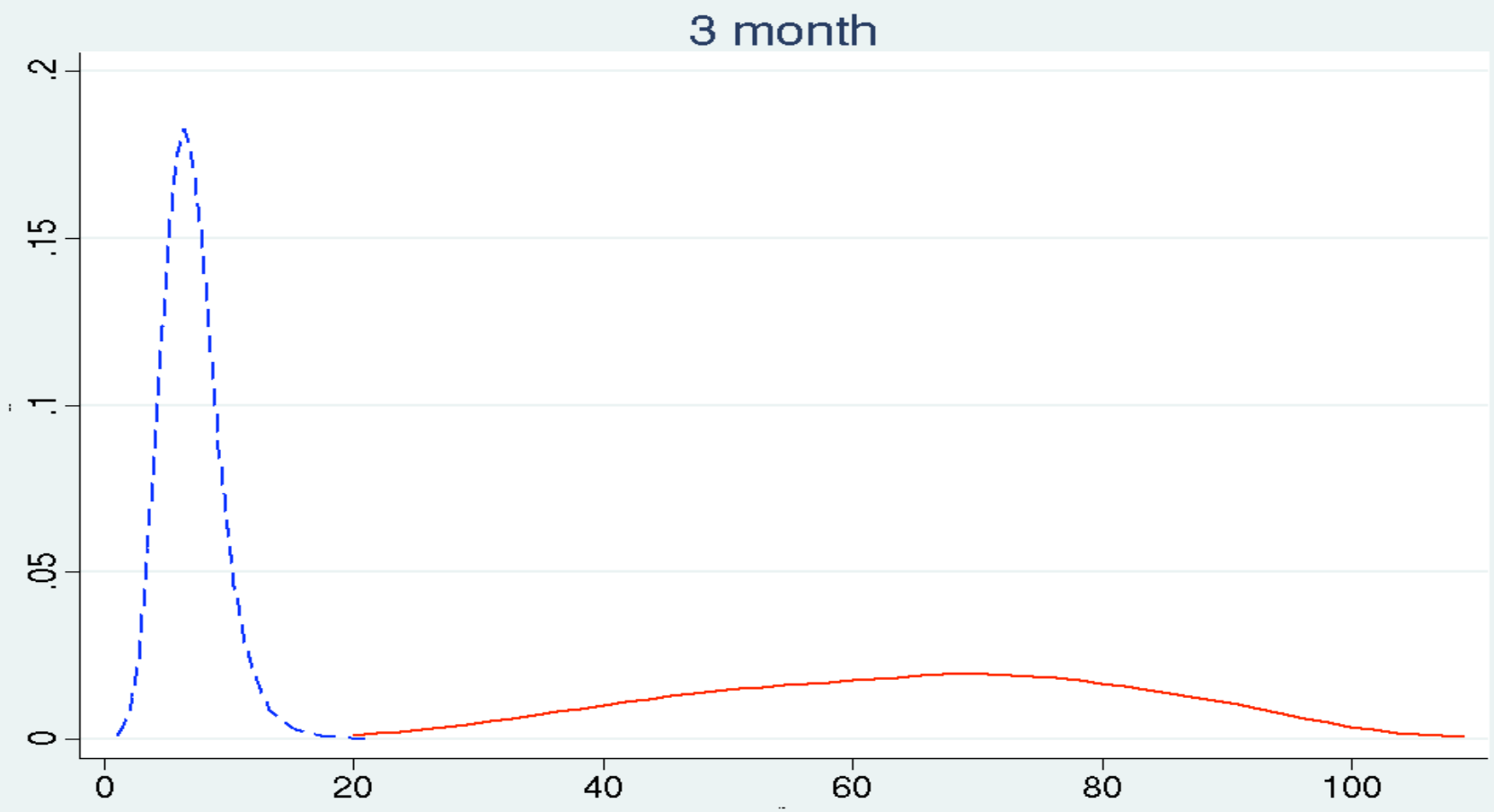
The data

e-MID spreads: empirical distribution



The data

e-MID spreads: empirical distribution



The data

Deterioration of counterparty creditworthiness?

		Overall sample	Before crisis	Crisis Excluding Lehman	Crisis Including Lehman
Rating (Fitch long-term issuer default rating)	**mean**	**6.9**	**7.0**	**7.0**	**6.9**
	st dev	1.9	1.8	2.1	2.1
	min	3	3	3	3
	max	12	12	12	12
Bank size (ln of total assets in billions of euro)	**mean**	**9.14**	**9.12**	**9.10**	**9.18**
	st dev	1.38	1.35	1.34	1.43
	min	4.88	4.88	5.82	5.41
	max	12.99	12.96	12.98	12.99
Capital ratio (percentage points)	**mean**	**15.0**	**14.7**	**15.9**	**15.7**
	st dev	13.9	12.9	16.7	15.8
	min	5.6	5.6	6.3	6.2
	max	251.6	251.6	143.8	143.8

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The regression

Up to September 13th 2008

Bank-specific variables

Market-wide variables

Spread

$$r_{it} = c + \beta_1 \bar{x}_{it} + \beta_2 (\bar{x}_{it} D_{turm,t}) + \beta_3 \bar{z}_t + \beta_4 \bar{z}_t D_{turm,t} + \varepsilon_{it}$$

Structural break

,

Including Lehman's failure

(up tp December 31st 2008)

2. Structural break

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Estimation results

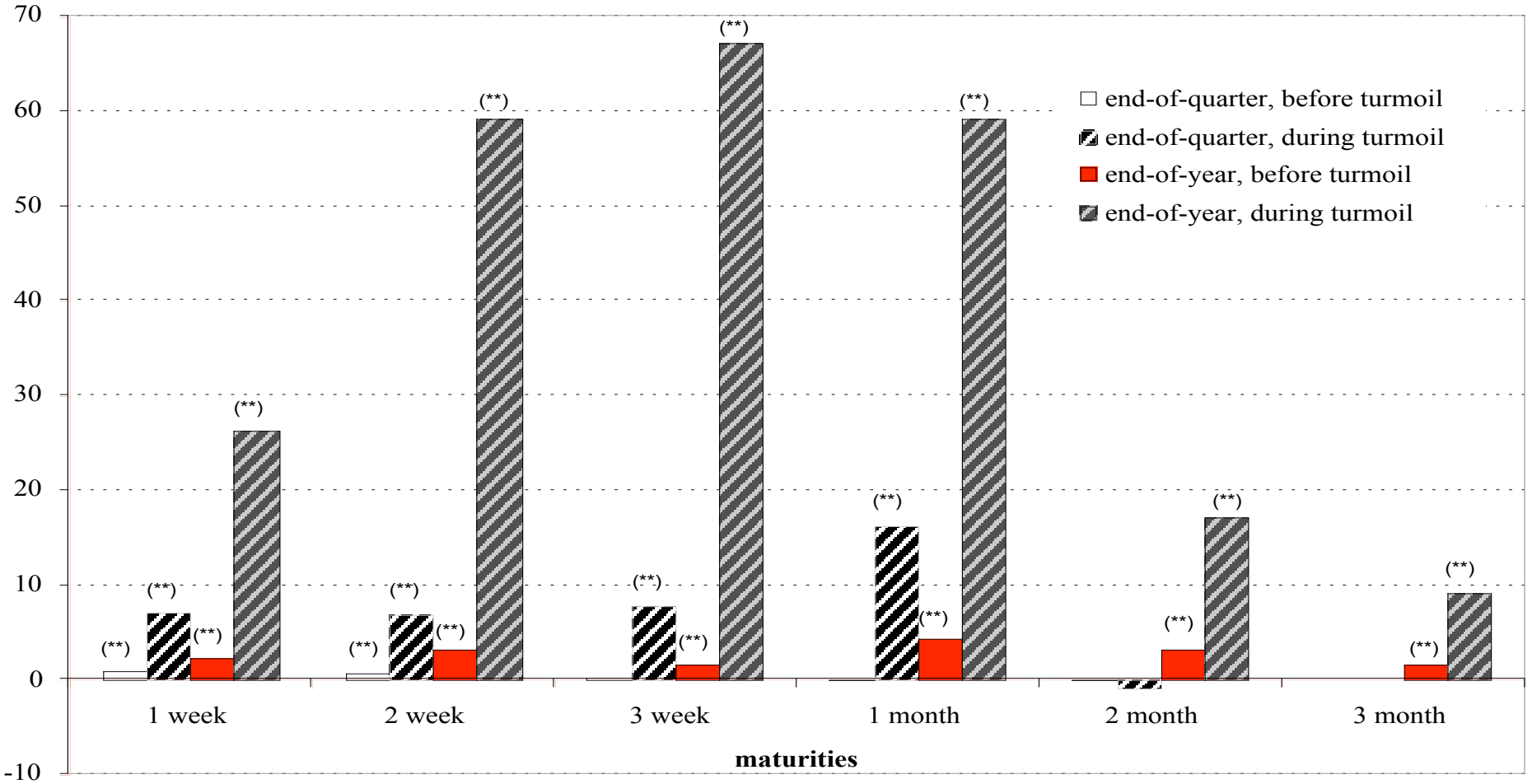
	Before turmoil	During turmoil excluding Lehman
Bank-specific characteristics	Coef. β_i	Coef. β_i
Rating	0.26**	0.42**
Bank has no rating (0-1)	-1.76**	-3.44**
Ln(total assets)	-0.38**	-1.06**
Capital ratio	-0.45**	-23.63**
Capital ratio seller	-2.51**	-3.62**
Risk aversion	3.05**	27.07**
No. obs	20,553	15,179
R2	0.92	

Window-dressing effects

Use "jump" dummies for annual and quarterly effects.

- E.g. for 1 week rate:
  - Annual dummy set to 1 between Dec 24&Dec31
  - Quarterly dummy set to 1 between March 24&31, June23&30, …
- E.g. for 1 month rate:
  - Annual dummy set to 1 between Dec1&Dec31
  - Quarterly dummy set to 1 between March 1&31, June1&30, …

Estimated window-dressing effects



Robustness checks

- Replicating analysis on overnight spread
- Changing the rating variable
- Separate regressions for rated and not rated banks
- Consolidated balance sheet data
- Allowing interaction between bank-specific variables and maturity dummies
- Separate regression for bid/ask contracts
- Individual regressions for each maturity
- Omitting overall risk-aversion

Simulating spreads

- (i) Set rating to 3 (best rating) for all banks
- (ii) Obtain fitted values
- (iii) Take averages of fitted values over pre- and turmoil periods

- Set size to largest size (top decile) for all banks
- (ii) Obtain fitted values
- (iii) ……

Simulated long-term spreads (basis points)

	24Jan05–8Aug07	*9Aug07-13Sep08*
Average cost of funds	**5**	**37**
Estimated cost of funds		
net of effect of risk aversion	3	12
net of window dressing/accounting effects	4	32
for		
banks with best rating	4	34
banks with no rating	5	37
large banks	4	34
highly capitalized banks	5	34
best rated, large, highly capitalized banks (a)	**3**	**27**
banks with worst rating	6	40
small banks	6	40
poorly capitalized banks	5	38
worst rated, small, poorly capitalized banks (b)	**7**	**44**

Determinants of the spread

In order of importance:

(1) generalized increase in risk-aversion (70%)

(2) heightened reactivity to borrowers' characteristics (25%)

- Discount to larger banks much larger than before

(3) window-dressing accounting practices (remaining)

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Conclusions

- Risk aversion is the main determinant of the increase in the spreads
- Banks have become more discerning in their lending, a welcome change
- Large increase in the discount obtained by large borrowers suggests risk of moral hazard has considerably increased. Reason of concern for central banks.

Thank you for your attention!

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Estimation results

	excluding Lehman OLS	including Lehman OLS	including Lehman Random effects
Bank-specific characteristics	Coef. _i	Coef. _i	Coef. _i
Rating	0.42**	0.74**	0.72**
Bank has no rating (0-1)	-3.44**	-5.15**	-5.03**
Ln(total assets)	-1.06**	-0.84**	-0.63**
Capital ratio	-23.63**	-18.37**	-18.13**
Capital ratio lender	-3.62**	6.37	-11.81**
Risk aversion	27.07**	30.40**	29.33**
No. obs	15,179	16,015	
R2	0.92	0.92	0.91

Simulated long-term spreads (basis points)

	24Jan05–8Aug 07	*9Aug07-13Sep08*
Average cost of funds	5	37
Estimated cost of funds		
net of effect of risk aversion	3	12
net of window dressing/accounting effects	4	32
Estimated premium paid by		
worst vs. best rated banks	2	6
small vs. large banks	2	6
poorly vs. highly capitalized banks	0	4
"worst" vs. "best" banks (a)-(b)	**4**	**17**

The data:

		e-MID transactions			
		overall sample	before crisis	during crisis: no Lehman	during crisis: with Lehman
Daily volumes (millions of euros)	mean	646	686	580	572
	st dev	416	405	418	425
	min	3	3	20	10
	max	3,067	2,495	3,067	3,067
Spread (basis points)	mean	16.5	4	33.7	43.3
	st dev	28	3	25.5	38.1
	min	-12	-6	-12	-12
	max	226	32	128.3	225.9
Daily average number of active participants	mean	24	25	23	22
	st dev	8	8	8	8
	min	2	2	2	2
	max	49	49	44	44
Duration (days)	mean	36.6	35.6	38.9	39.0
	weig avg	32.4	32.4	33.2	32.6
Number of contracts		20,750	14,279	5,314	6,480