The Flight from Maturity

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Preview

- During the crisis short-term lending became shorter and shorter.
- BearingPoint: “Borrowing money from other banks or even between different departments of the same bank for more than a day has become very difficult.”
- BP interviews: “…liquidity in the unsecured market is currently concentrated in ‘Overnight’ transactions.”

Preview continued

- We study three short-term unsecured markets: CP, FF, Eurodollars, and the secured market—repo.
- Show that in normal times these markets are the same, i.e., all are 'near' riskless. i.e., borrowers are riskless.
- In the crisis, there are no riskless borrowers. There is a flight from maturity.

Four Money Markets

- Secured market: repo lenders get collateral.
- Unsecured markets appear to screen borrowers to maintain high quality.
  - CP issuers require minimum ratings—orderly exit.
  - FF-must be a regulated bank.
  - Eurodollars-largely regulated entities.

Spreads and the Slope of the Term Structure of Spreads

- r_{ti}^{τ} is the annualized rate of return at time t for money market instrument i with maturity τ.
- Define: $\theta_{t,i}^{\tau} \equiv r_{t,i}^{\tau} - r_{t,OIS}^{\tau}$ as the <u>spread</u> between the rate on money market instrument i and the overnight index swap (OIS) rate at date t for maturity τ.
- $\Phi_{t,i}^{\tau 2,1} \equiv \theta_{t,i}^{\tau 2} - \theta_{t,i}^{\tau 1}$, where τ2> τ1, is the <u>slope</u> of the term structure of spreads (various maturities).

Preliminary Hypotheses about Money Markets

1. $\Theta_{t,i}^{\tau} \approx 0$, for i=CP, FF, Euro$, and for all τ. I.e., borrowers in unsecured markets are screened. Only high quality firms can borrow. Money markets are near riskless.

2. $\Phi_{t,i}^{\tau 2,1} \approx 0$, i.e., term structure flat; no term premium. (It could be that $\theta_{t,i}^{\tau} > 0$, but term structure flat.)

Crisis Hypotheses

- Crisis: An event in which there are no high quality firms in the money markets.
- One possible outcome: no trade at all. For the CP market we have issuance data, and there was (short) issuance during the crisis.
- In the unsecured market, screening during the crisis might take the form of "time tranching," i.e., lenders are only willing to lend at very short horizons. Borrowers want long.

3. Hypothesis: $\Phi_{t,i}^{\tau 2,1} > 0$, i.e., the slope becomes positive – the flight from maturity.

- In repo, haircuts rise. In addition, it may be that $\Phi_{t,i}^{\tau 21} > 0$.

Crisis Hypotheses continued

- $\Phi_{t,i}^{\tau 2,1} > 0$, i.e., the slope becomes positive.
- The slope becomes positive if there are no safe borrowers….

  …and no one wants to lend long.
- So, Hypothesis 4: $\Delta\Phi_{t,i}^{\tau 2,1} > 0$ → counterparty risk is higher in the future. L3

Slide 8

L3 Should we express the hypothesis as delat_Φt,iт2,1 > 0 (if slope increases) then counterparty risk is higher in the future?
Lei, 9/29/2010

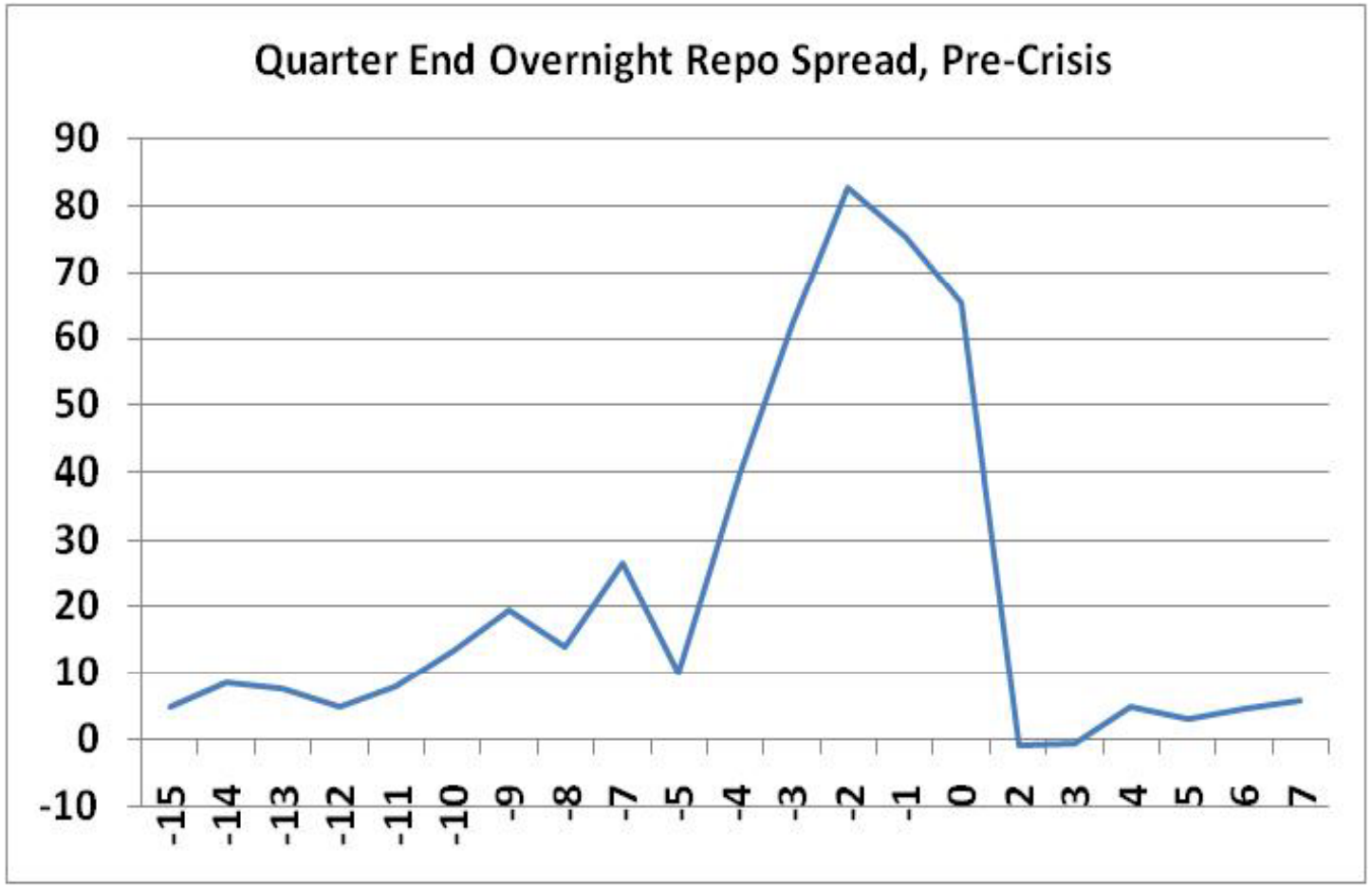
Data

L2

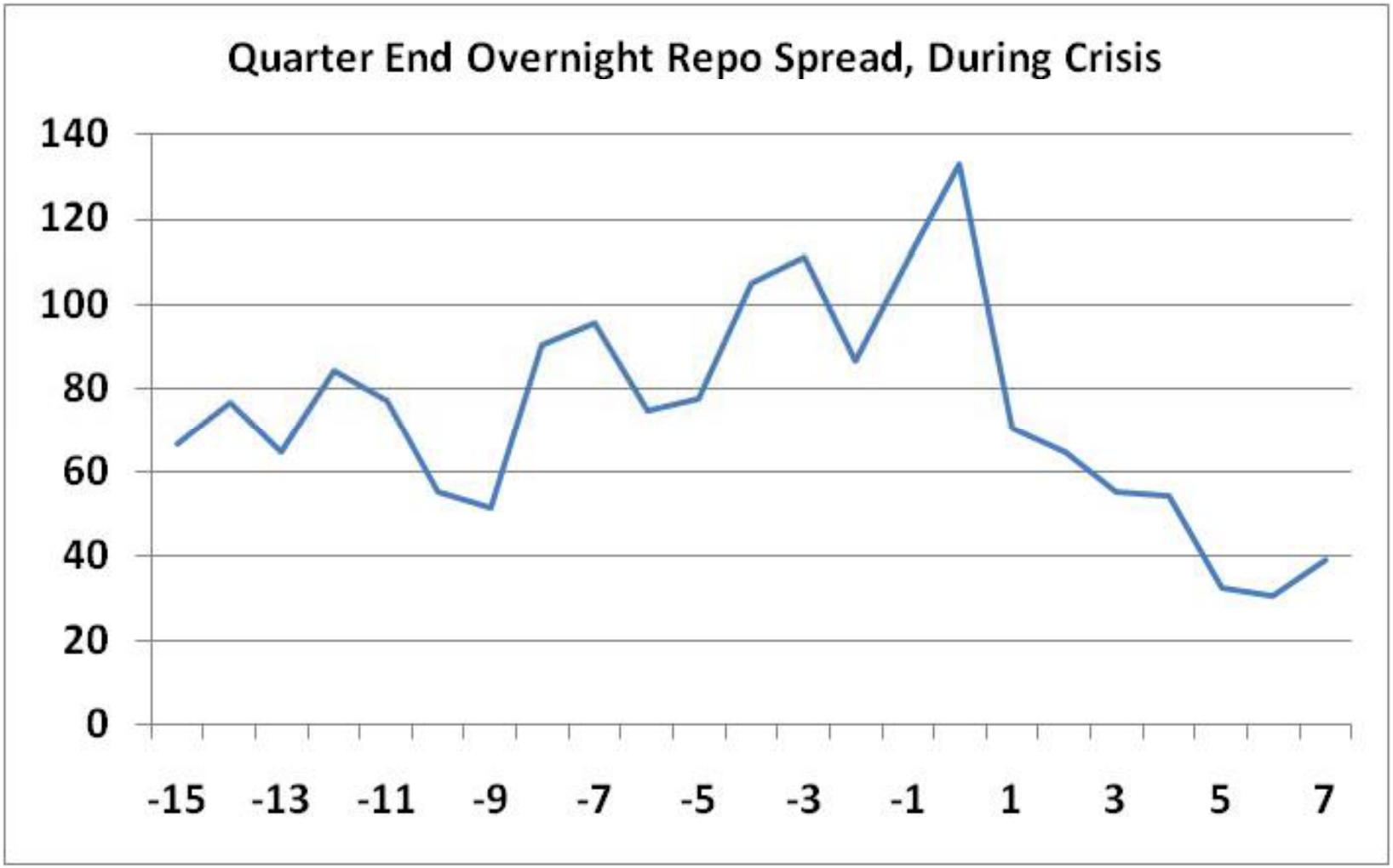
- Daily data Jan 2006- Apr 2009 on repo rates for:
  - Various terms: Overnight, 1 month, 3 month.
  - Various asset classes: different ABS classes, CLOs, CDOs, corporate bonds (by rating category).
- Daily data on FF, CP, Eurodollars for various terms.
- Issuance data for CP, by category of issuer.

L2 the period should be 2006 to 2009.
Lei, 9/29/2010

Preliminaries: Window-Dressing

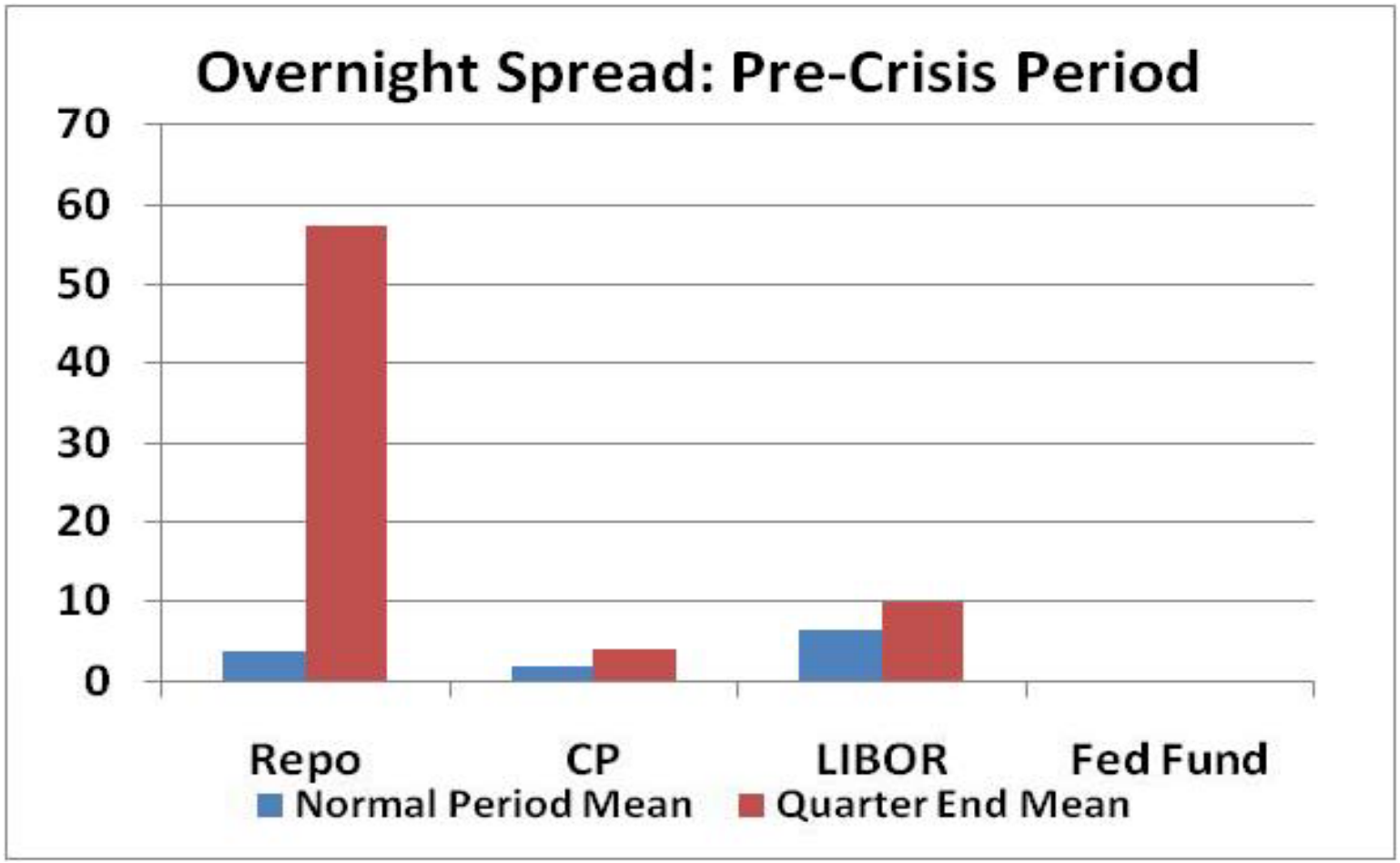


Preliminaries continued



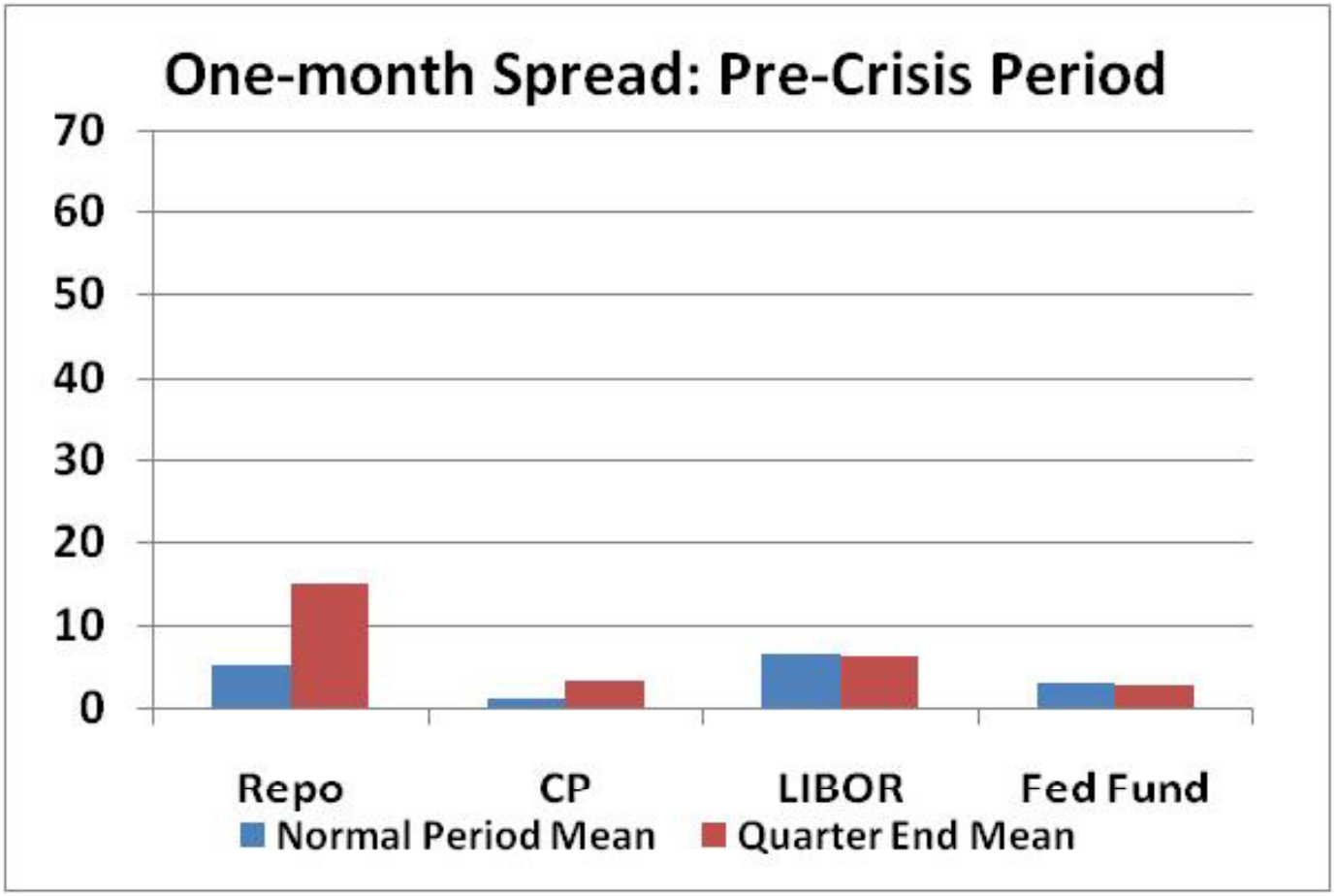
L1

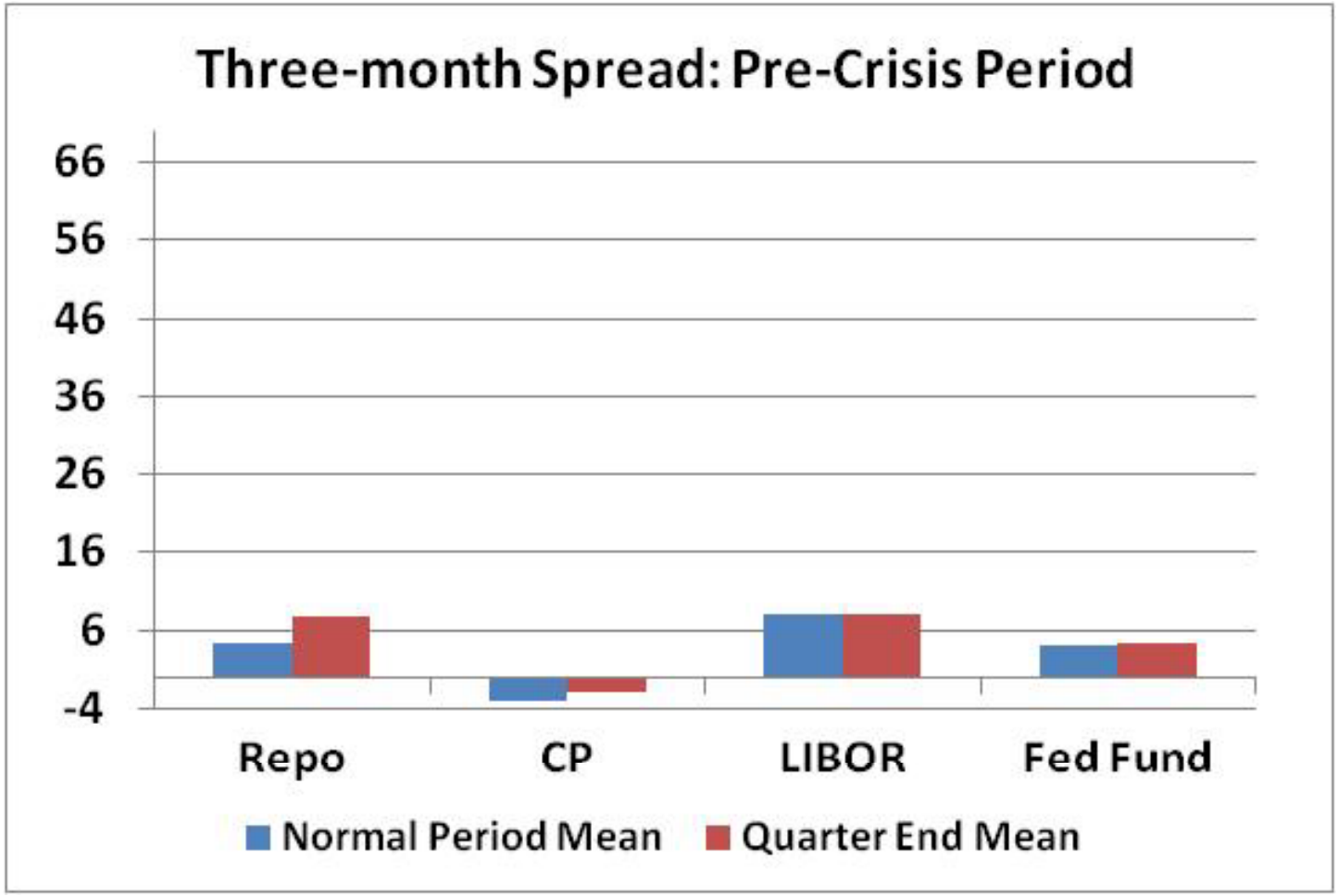
$$\theta^{T}_{t,repo} = \alpha + \beta Quarter - end\ Dummy + \epsilon_t$$

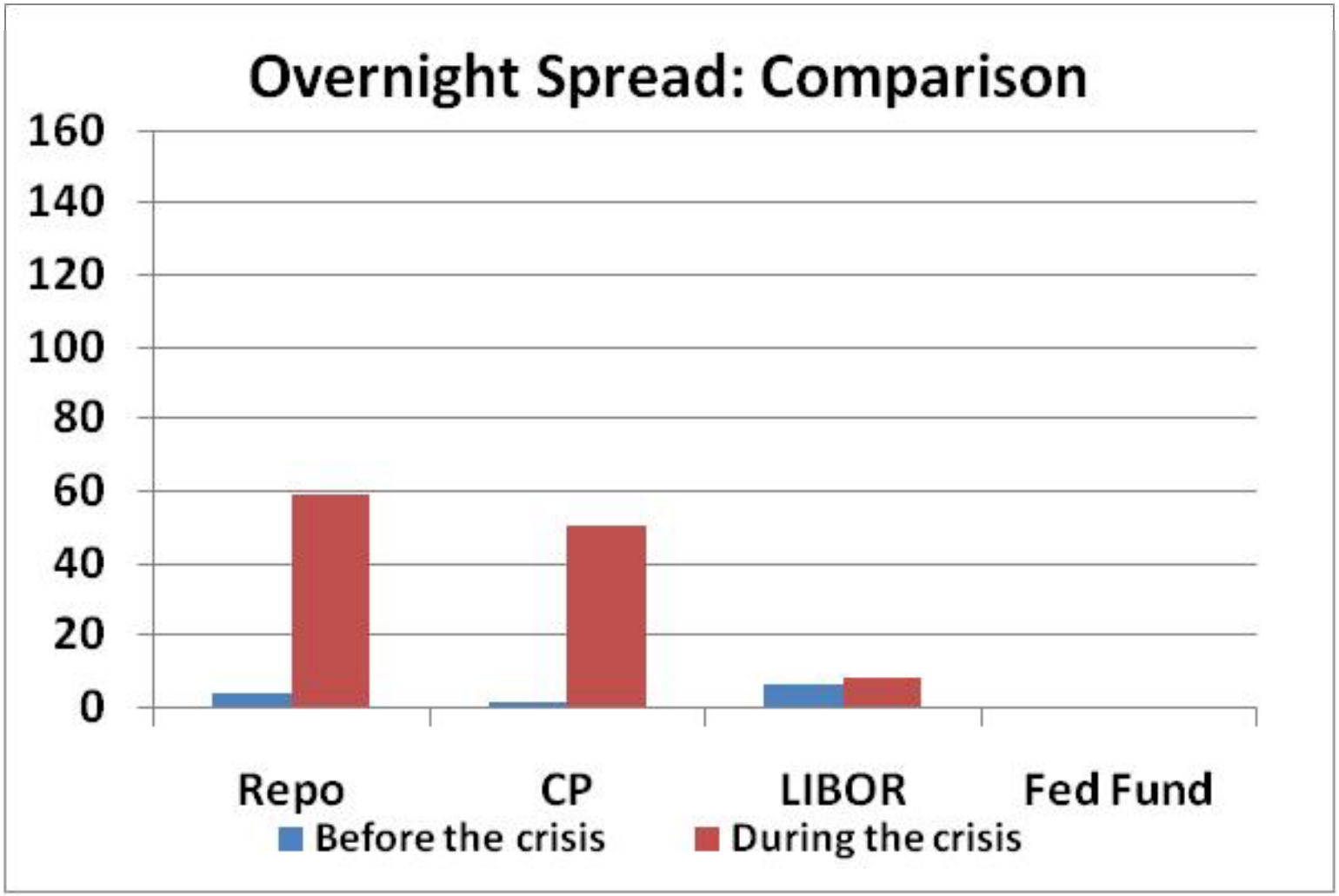


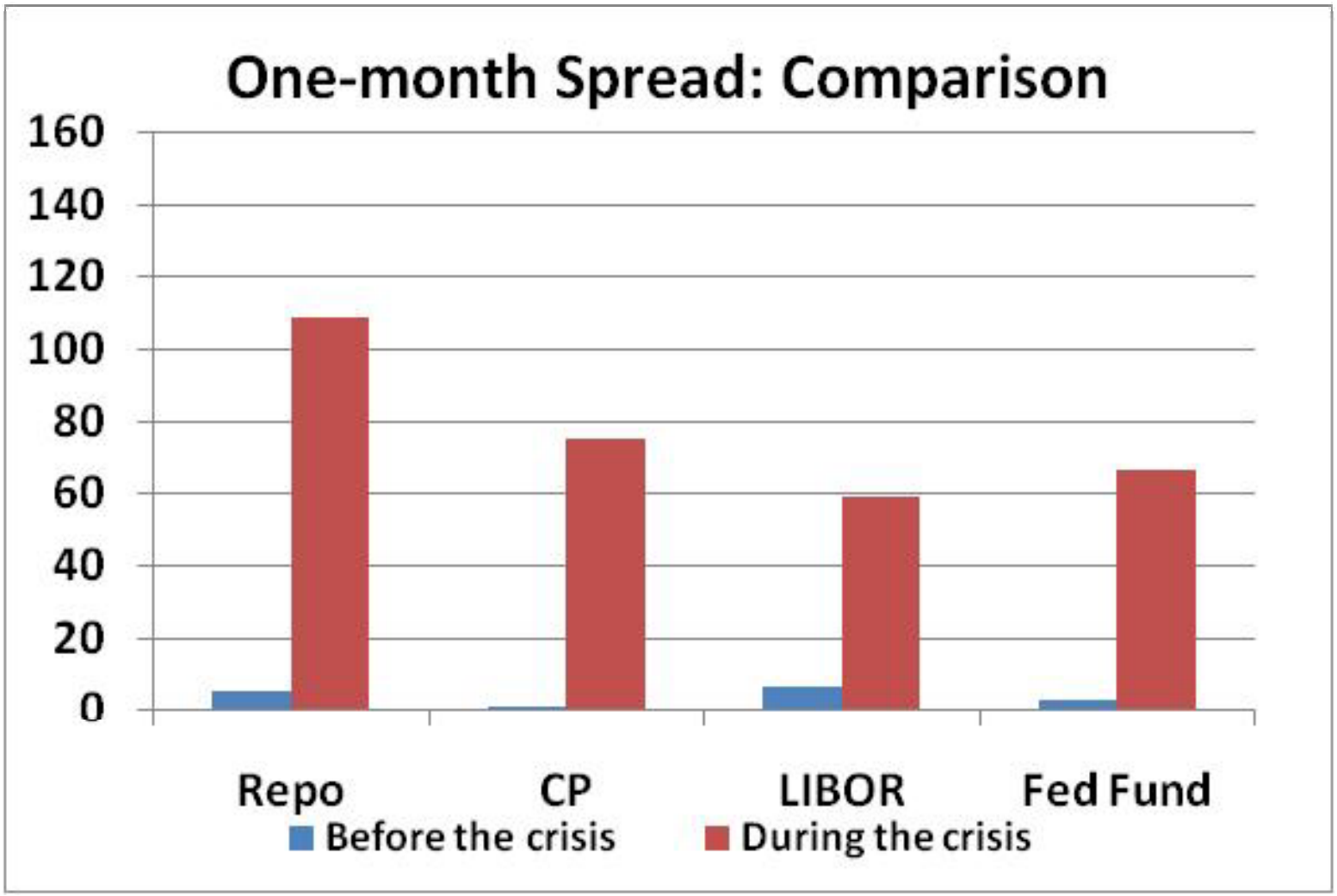
Slide 12

L1 Here the dependent variable should be overnight spread?
Lei, 9/29/2010


One-month Spread: Pre-Crisis Period
70
60
50
40
30
20
10
0
Repo
CP
LIBOR
Fed Fund
Normal Period Mean
Quarter End Mean


Three-month Spread: Pre-Crisis Period
66
56
46
36
26
16
6
-4
Repo
CP
LIBOR
Fed Fund
Normal Period Mean
Quarter End Mean


Overnight Spread: Comparison
160
140
120
100
80
60
40
20
0
Repo
CP
LIBOR
Fed Fund
Before the crisis
During the crisis


One-month Spread: Comparison
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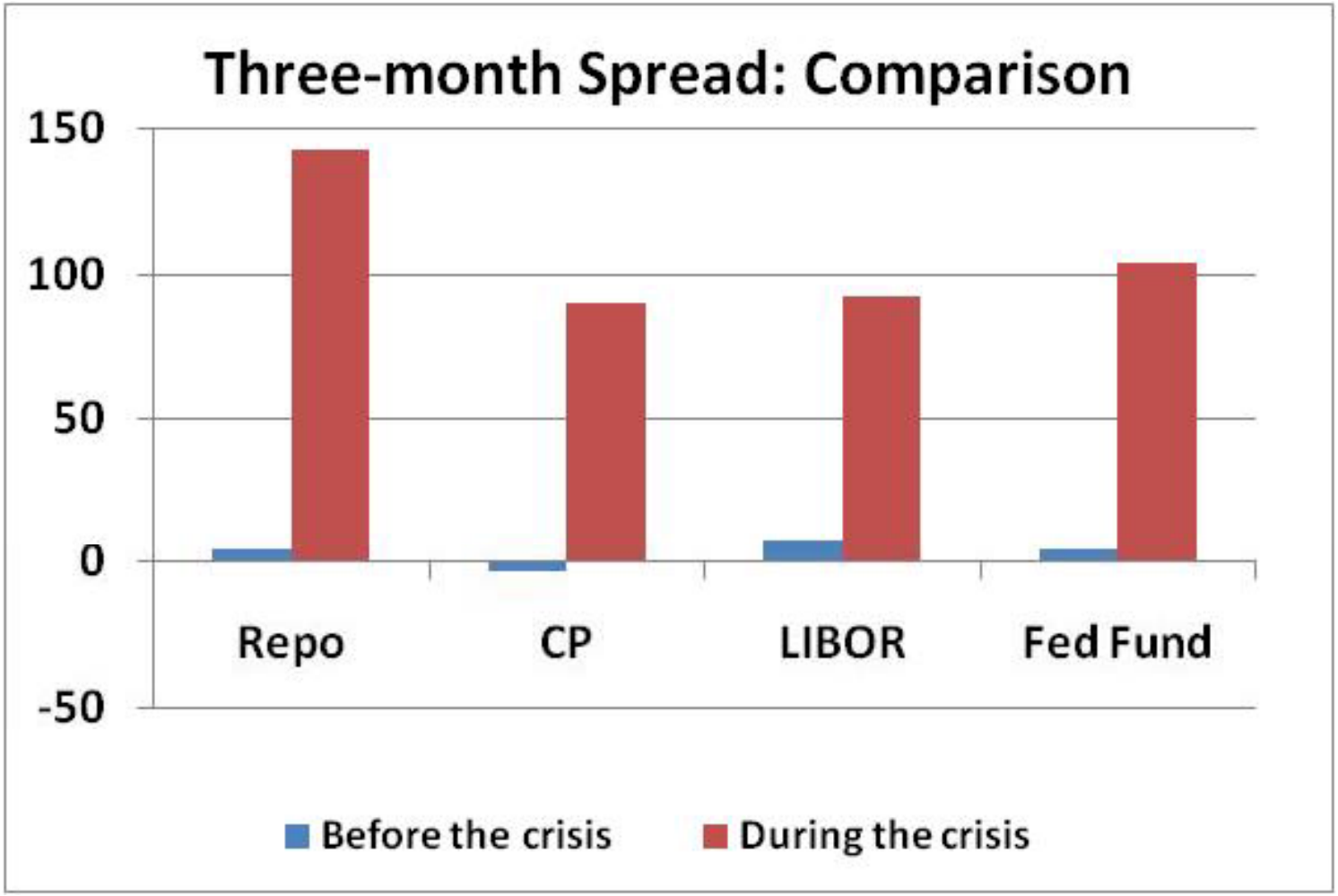
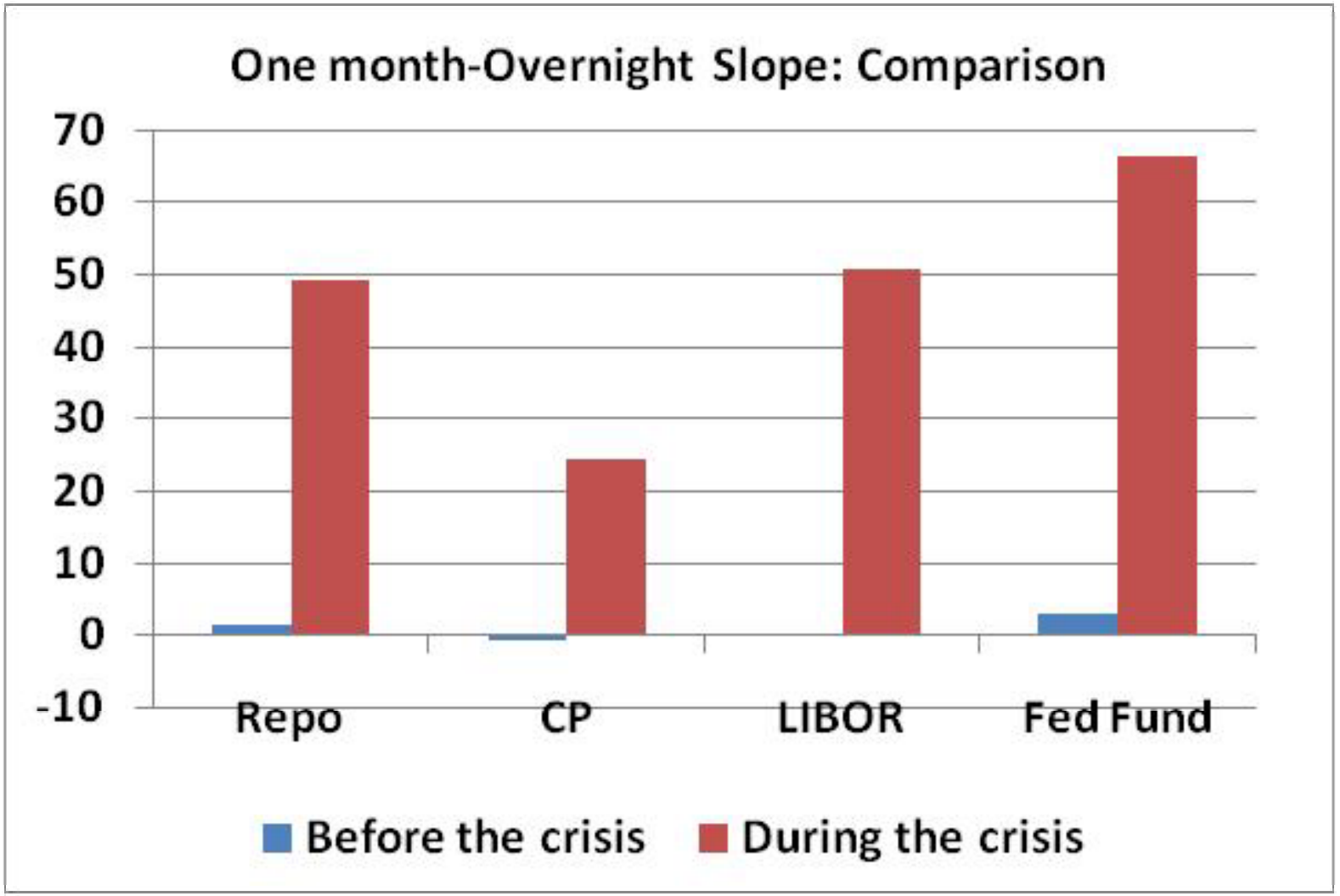
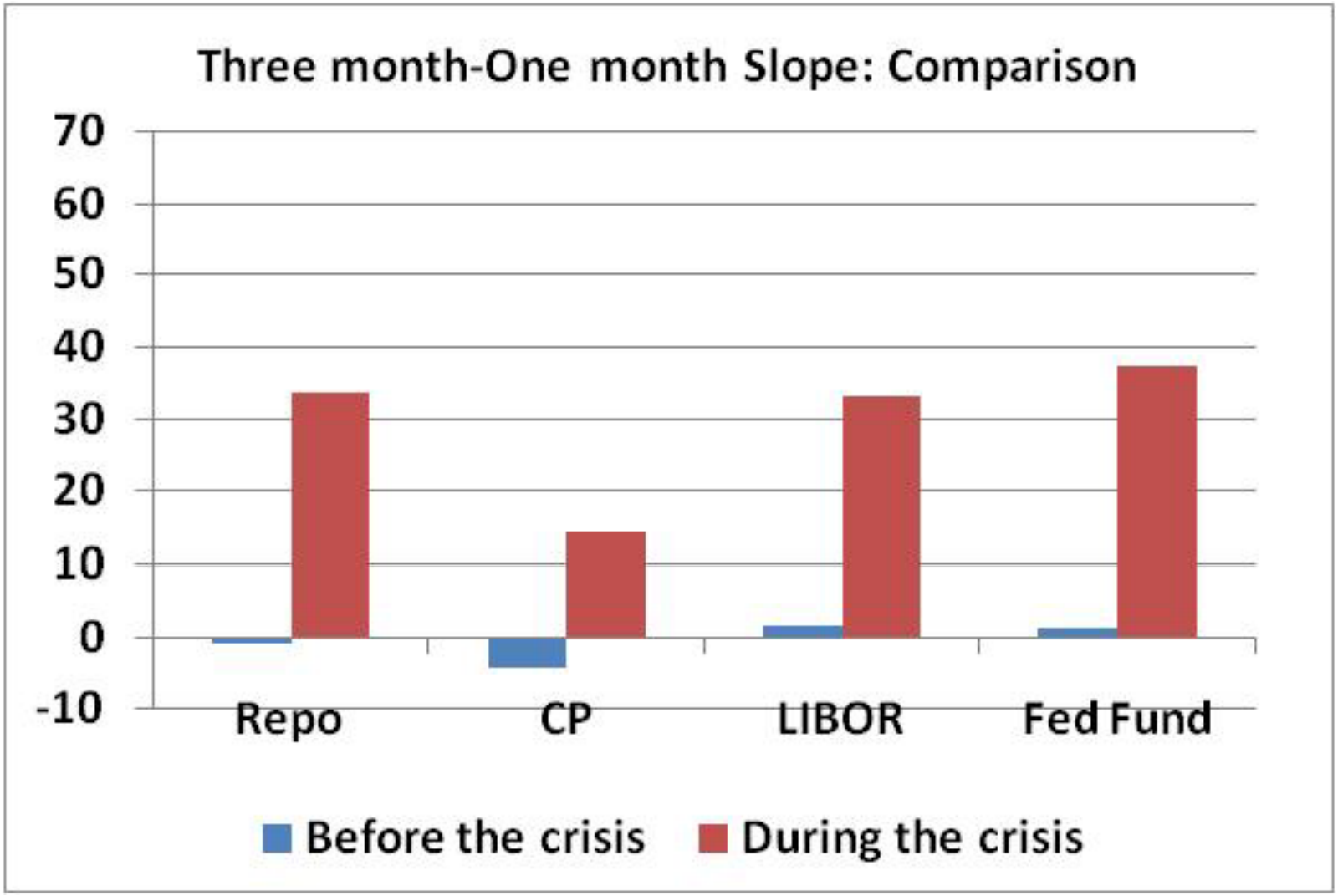
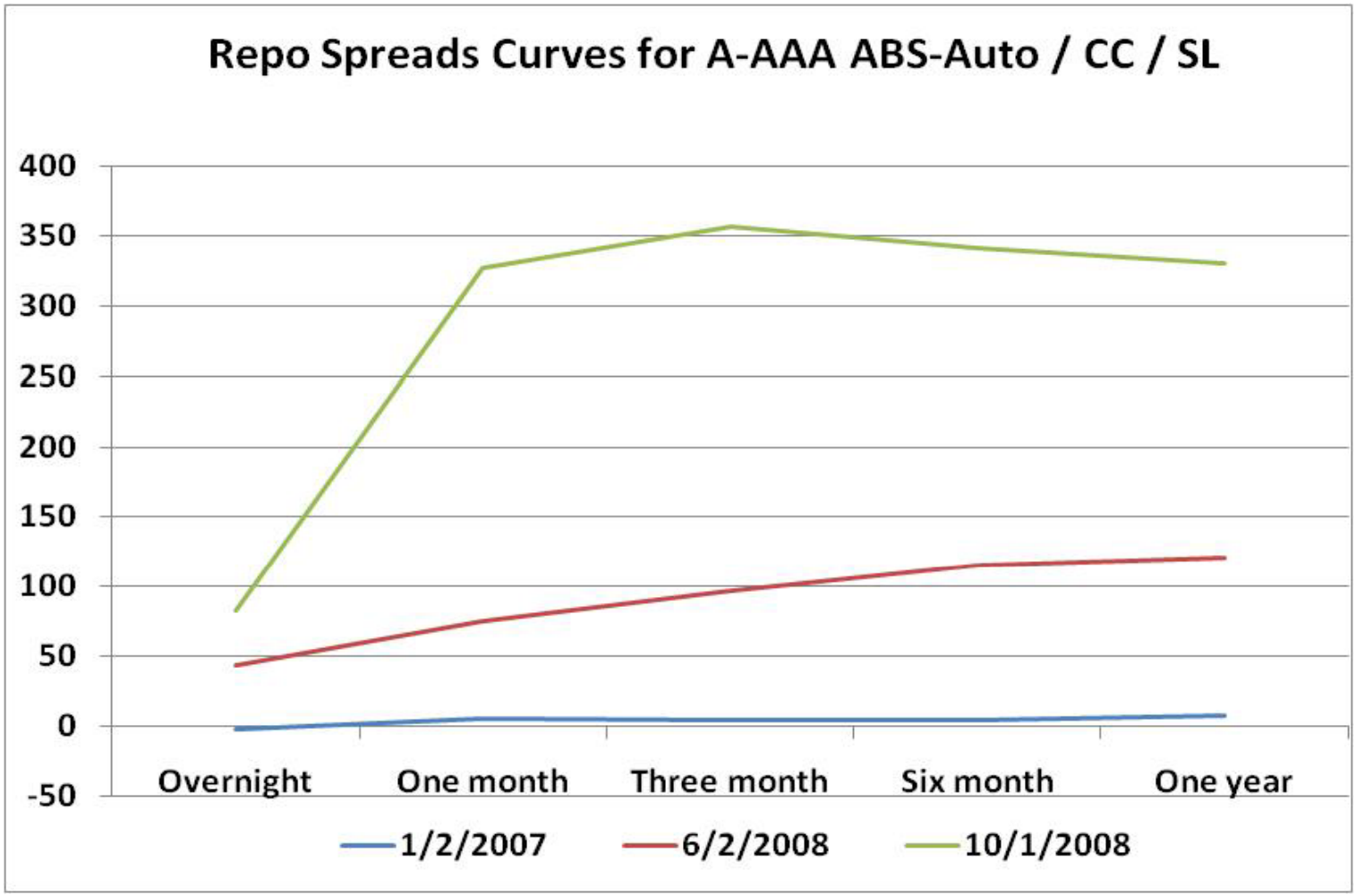
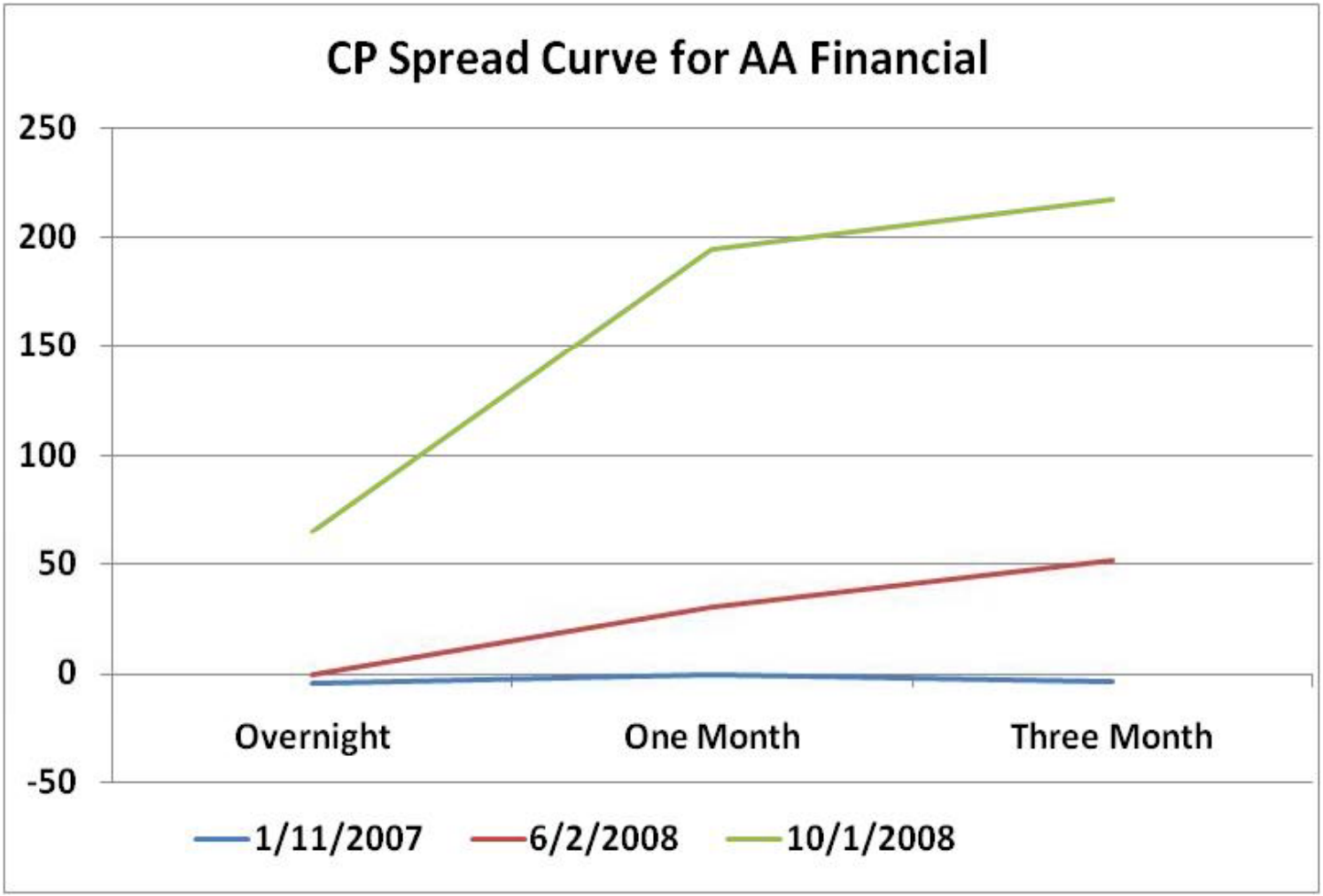
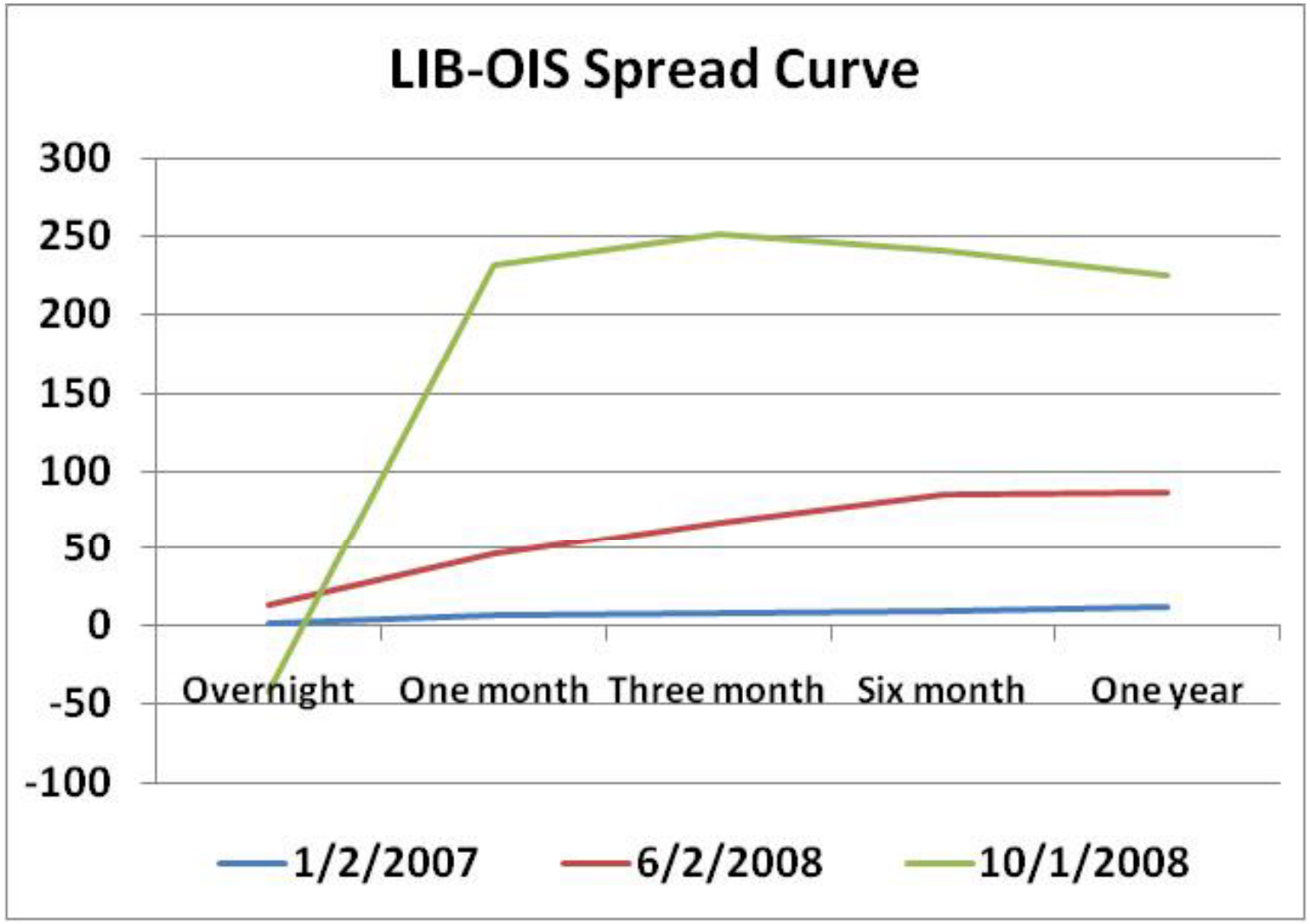

Three-month Spread: Comparison
150
100
50
0
-50
Repo
CP
LIBOR
Fed Fund
Before the crisis
During the crisis

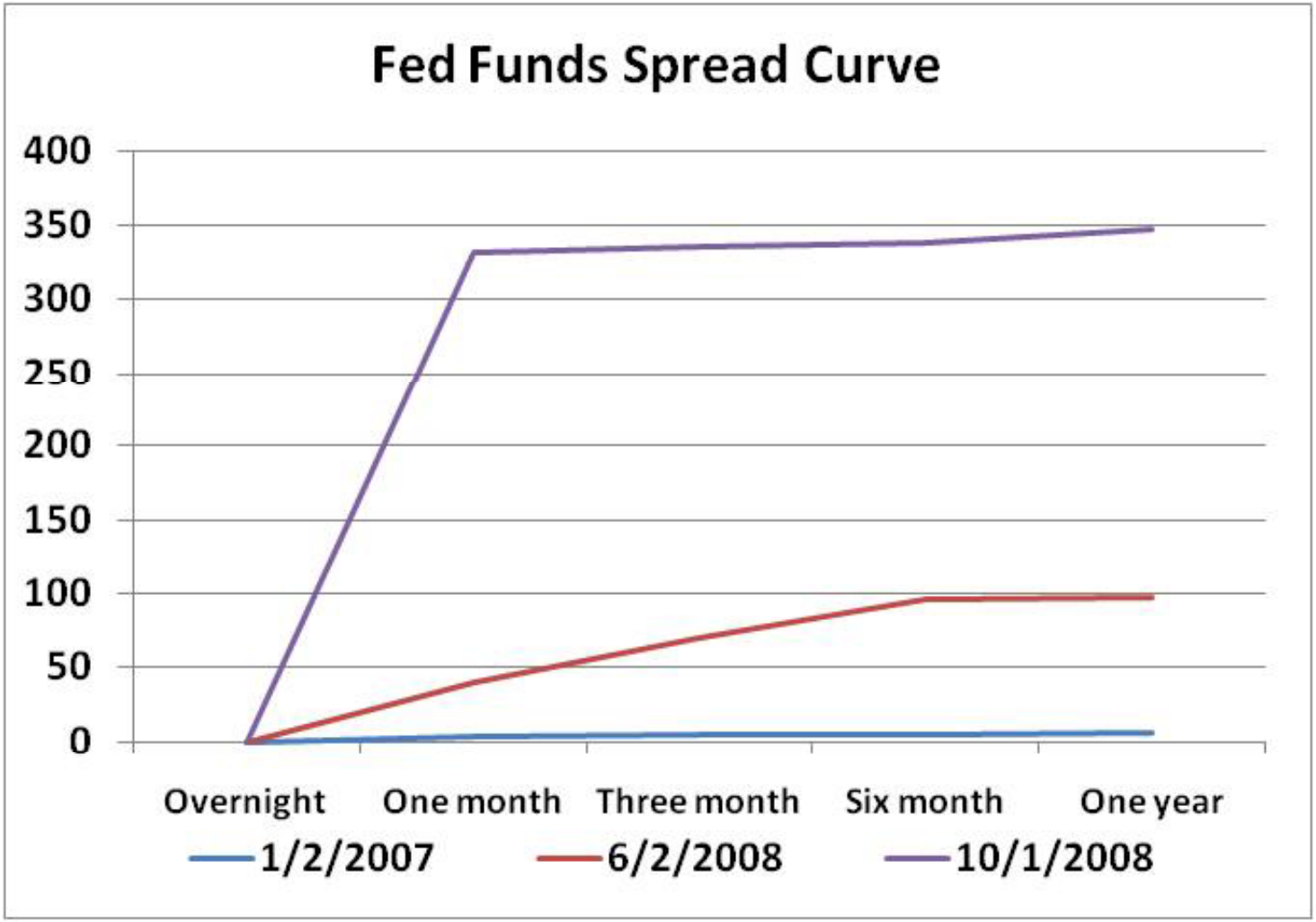

One month-Overnight Slope: Comparison
70
60
50
40
30
20
10
0
-10
Repo
CP
LIBOR
Fed Fund
Before the crisis
During the crisis


Three month-One month Slope: Comparison
70
60
50
40
30
20
10
0
-10
Repo
CP
LIBOR
Fed Fund
Before the crisis
During the crisis


Repo Spreads Curves for A-AAA ABS-Auto / CC / SL
400
350
300
250
200
150
100
50
0
-50
Overnight
One month
Three month
Six month
One year
1/2/2007
6/2/2008
10/1/2008


CP Spread Curve for AA Financial
250
200
150
100
50
0
-50
Overnight
One Month
Three Month
1/11/2007
6/2/2008
10/1/2008


LIB-OIS Spread Curve
300
250
200
150
100
50
0
-50
-100
Overnight
One month
Three month
Six month
One year
1/2/2007
6/2/2008
10/1/2008


Fed Funds Spread Curve
400
350
300
250
200
150
100
50
0
Overnight
One month
Three month
Six month
One year
1/2/2007
6/2/2008
10/1/2008

Hypothesis 4: $\Delta\Phi_{ti}^{\tau 21} > 0 \rightarrow$ counterparty risk is higher in the future.

$$\Delta\theta_{t,repo}^{3m} = \alpha + \sum_{j=1}^{4} \beta_{j\Delta} \Phi_{t-j,repo}^{1m1d} + \sum_{j=1}^{4} \Delta\theta_{t-j,repo}^{3m} + Q\,end\ dummy + \Delta 10Yr\ Treasury + \Delta(10Yr Treasury)^2 + \Delta VIX + \Delta S\&P + \Delta(10Yr - 2Yr) + \varepsilon_t$$

Repo: Pre-Crisis

$$\Delta\theta^{3m}_{t,repo} = \alpha + \sum_{j=1}^{4} \beta_{j\Delta}\Phi^{1m1d}_{t-j,repo} + \sum_{j=1}^{4} \Delta\theta^{3m}_{t-j,repo} + Qend\ dummy + \Delta 10Yr\ Treasury + \Delta(10YrTreasury)^2 + \Delta VIX + \Delta S\&P + \Delta(10Yr - 2Yr) + \varepsilon_t$$

	<AA ABS-RMBS / CMBS	A-AAA ABS-Auto / CC / SL	AA-AAA ABS-RMBS / CMBS	AA-AAA CDO	AA-AAA CLO	AA-AAA Corporates	BBB+ / A Corporates	General Collateral	Unpriced ABS / MBS / All Sub-Prime	Unpriced CLO / CDO
Slope F-test	0.07	6.87	4.65	4.59	0.07	4.00	3.72	5.42	0.08	0.07
ProbF	0.80	0.01	0.03	0.03	0.80	0.05	0.05	0.02	0.77	0.80
Lags F-test	52.30	0.17	0.35	0.15	52.30	0.51	2.40	82.22	50.79	52.30
ProbF	0.00	0.68	0.55	0.70	0.00	0.48	0.12	0.00	0.00	0.00

Repo: During Crisis

$$\Delta\theta^{3m}_{t,repo} = \alpha + \sum_{j=1}^{4} \beta_{j\Delta}\Phi^{1m1d}_{t-j,repo} + \sum_{j=1}^{4} \Delta\theta^{3m}_{t-j,repo} + Qend\ dummy + \Delta 10Yr\ Treasury + \Delta(10YrTreasury)^2 + \Delta VIX + \Delta S\&P + \Delta(10Yr - 2Yr) + \varepsilon_t$$

	<AA ABS-RMBS / CMBS	A-AAA ABS-Auto / CC / SL	AA-AAA ABS-RMBS / CMBS	AA-AAA CDO	AA-AAA CLO	AA-AAA Corporates	BBB+ / A Corporates	General Collateral	Unpriced ABS / MBS / All Sub-Prime	Unpriced CLO / CDO
Slope F-test	8.86	24.40	8.54	2.61	11.11	11.49	13.69	8.84	2.87	2.18
ProbF	0.00	0.00	0.00	0.11	0.00	0.00	0.00	0.00	0.09	0.14
Lags F-test	18.41	11.85	16.94	0.01	12.11	21.46	24.61	41.24	0.32	0.02
ProbF	0.00	0.00	0.00	0.92	0.00	0.00	0.00	0.00	0.57	0.88

CP, FF, Euro$: Pre-Crisis

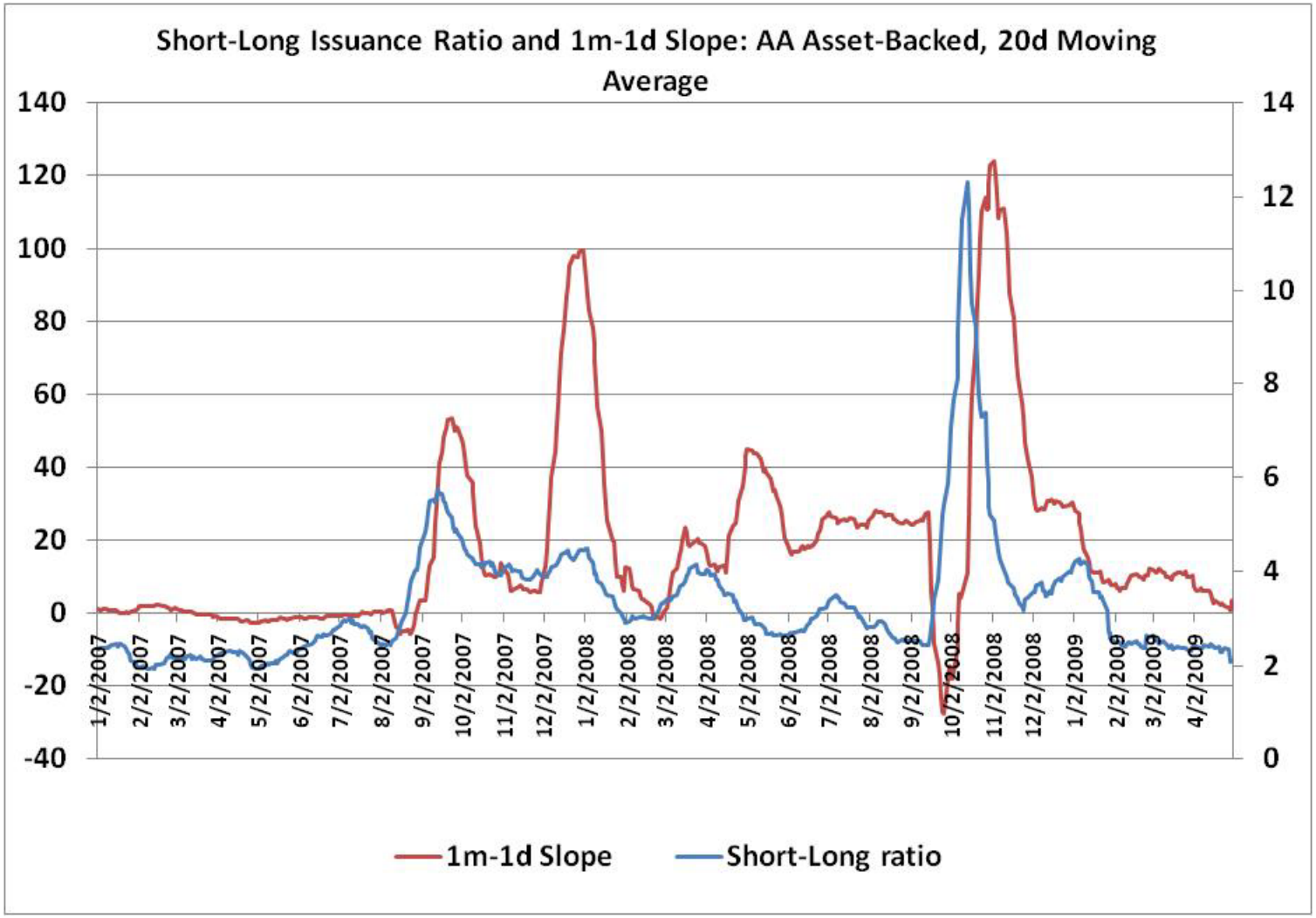
$$\Delta\theta_{t,i}^{3m} = \alpha + \sum_{j=1}^{4} \beta_j \Delta \Phi_{t-j,i}^{1m1d} + \sum_{j=1}^{4} \Delta\theta_{t-j,i}^{3m} + Qend\ dummy + \Delta 10Yr\ Treasury + \Delta(10YrTreasury)^2 + \Delta VIX + \Delta S\&P + \Delta(10Yr - 2Yr) + \varepsilon_t$$

	A2/P2 Nonfinancial	AA Asset-backed	AA Financial	AA Nonfinancial	LIB	Fed
Slope F-test	0.09	1.08	1.40	0.81	1.22	0.85
ProbF	0.76	0.30	0.24	0.37	0.27	0.36
Lags F-test	92.40	0.42	0.02	0.17	2.99	95.68
ProbF	0.00	0.51	0.90	0.68	0.08	0.00

CP, FF, Euro$: During-Crisis

$$\Delta\theta_{t,i}^{3m} = \alpha + \sum_{j=1}^{4} \beta_j \Delta\Phi_{t-j,i}^{1m1d} + \sum_{j=1}^{4} \Delta\theta_{t-j,i}^{3m} + Qend\ dummy + \Delta 10Yr\ Treasury + \Delta(10Yr Treasury)^2 + \Delta VIX + \Delta S\&P + \Delta(10Yr - 2Yr) + \varepsilon_t$$

	A2/P2 Nonfinancial	AA Asset-backed	AA Financial	AA Nonfinancial	LIB	Fed
Slope F-test	40.80	3.99	1.92	0.48	6.17	29.63
Prob F	0.00	0.05	0.17	0.49	0.01	0.00
Lags F-test	14.44	34.81	22.82	9.17	27.11	15.80
Prob F	0.00	0.00	0.00	0.00	0.00	0.00


Short-Long Issuance Ratio and 1m-1d Slope: AA Asset-Backed, 20d Moving Average
140
120
100
80
60
40
20
0
-20
-40
14
12
10
8
6
4
2
0
1/2/2007
2/2/2007
3/2/2007
4/2/2007
5/2/2007
6/2/2007
7/2/2007
8/2/2007
9/2/2007
10/2/2007
11/2/2007
12/2/2007
1/2/2008
2/2/2008
3/2/2008
4/2/2008
5/2/2008
6/2/2008
7/2/2008
8/2/2008
9/2/2008
10/2/2008
11/2/2008
12/2/2008
1/2/2009
2/2/2009
3/2/2009
4/2/2009
1m-1d Slope
Short-Long ratio

Final Thoughts

- Money markets normally consist of riskless borrowers (who window dress).
- In the crisis, there are no riskless borrowers.
- Lenders generally flee to very short maturity in response; spread term structures positive.
- Positive slopes forecast counterparty risk – lenders right to flee longer maturities.
- Suggests role of slope as indicator for policy.