Asset Fire Sale or Cherry Picking: Evidence from Commercial REO Sales

Yongqiang Chu

University of South Carolina

Oct 2012-FDIC Conference

Fire sale and cherry-picking

- Firms in financial distress selling assets
  - Fire sale-liquidate assets at discounted price (Shleifer and Vishny, 1992, Brown et al, 1994, Pulvino, 1998, etc)
  - Cherry picking-pick high quality assets to sell (Boyson et al, 2012, Ellul et al, 2012)
- Test the theories using commercial REO sales

Why real estate, why REO sales

- Price information on individual sales is available-no need to rely on stock market reactions.
- Large amount of sales comparables -easier to estimate fundamental value.
- Asking price and time on the market-testing the selling strategies.
- Commercial real estate-illiquid, high leverage.

Bank REOs

- Bank owned foreclosed properties.
- Recorded on bank's balance sheets as Other Real Estate Owned.
- Valued as fair value less cost to sell the asset-higher than market value.
- To be sold in five years.
- REO sale-recognize loss, reduce bank capital.

Literature-Fire sale

- Theory-Shleifer and Vishny (1992)
- Empirical evidence
  - Pulvino (1998)-Aircraft sale by airlines.
  - Brown (2000)-Mortgage REITs dispose foreclosed real estate.
  - Office (2007)-Liquidity constrained seller in merges.
  - Eckbo and Thorburn (2008)-Bankruptcy auctions.
  - Ellul et al (2011)-Bond sale by insurance companies.
  - Boyson et al (2012)-No evidence of fire sale

Fire sale hypotheses

- Banks with low liquidity will post lower asking price for REO properties.
- Banks with lower liquidity will sell REO properties at lower prices.
- Banks with lower liquidity will sell REO properties with shorter time on the market.
- The effects of bank liquidity on REO sales are stronger when bank liquidity is low.

Literature-Cherry picking

- Ellul et al (2012)-Bond sale by insurance companies-sell assets with unrealized gains
- Boyson et al (2012)-Financial institutions sell high quality assets during financial crises.

Cherry picking hypotheses

- Banks with lower capital will post higher asking prices for REO properties.
- Banks with lower capital will sell REO properties at higher prices.
- Banks with lower capital will sell REO properties with longer time on the market.
- The effects of bank capital on REO sales are stronger when bank capital is low.

The interaction between fire sale and cherry picking

- The effects of bank capital on REO sales are stronger if bank liquidity is high, and the effects of liquidity on REO sales are stronger if bank capital is high.

REO sales data

- Data from CoStar commercial real estate database.
- Sales of bank owned multi-family and commercial properties 2008-2010.
- Sale price, asking price, and time on the market, property characteristics, buyer, and seller.

Summary statistics of REO sales

Variable	Mean	Std. Dev.	Min	Max	Obs
Sale price	1058604	1772407	0	1.15E+07	3302
Asking price	985762.1	1465825	29000	8900000	1838
Time on the market	253.353	255.3652	1	1272	1986
Seller financing	0.290407	0.454068	0	1	1918
Cash deal	0.430737	0.495309	0	1	1913
Square footage	18655.39	33913.52	900	220090	2633
Age	34.97859	31.03959	0	128	2242
Vacancy	5.361177	18.17707	0	100	2463
Recently Renovated	0.049061	0.216029	0	1	3302
Land square footage	327790.7	1039236	2178	7676578	3165

Selling banks

- Call report data.
- Seller names matched to bank names.
- Liquidity measures-Cash, Liquid assets, On-Balance sheet net liquidity, Off-balance sheet net liquidity, and Illiquidity measure of Berger and Bouwman (2009) .
- Capital measures-Tier 1 leverage ratio, Tier 1 capital ratio, and Total capital ratio.

Summary statistics of banks

Variable	Mean	Std. Dev.	Min	Max	Obs
Cash	0.065	0.061	0.002	0.625	3298
Cash and liquid assets	0.153	0.103	0.005	0.777	2341
Balance sheet net liquidity	-0.183	0.172	-0.637	0.780	2341
Off-Balance sheet net liquidity	-0.332	0.204	-1.158	0.587	2341
Tier 1 leverage ratio	0.085	0.030	0.001	0.183	2341
Tier 1 capital ratio	0.118	0.046	0.001	0.276	2341
Total capital ratio	0.131	0.047	0.001	0.288	2341
Bank size	14.448	2.409	10.821	20.227	3298
Profitability	-0.003	0.015	-0.068	0.022	3298
Deposits	0.806	0.077	0.610	0.948	3298
Real estate exposure	0.529	0.137	0.150	0.840	3298
Loan loss allowance	0.025	0.012	0.008	0.073	3290
Risk weighted assets ratio	0.750	0.116	0.419	1.061	3298

Asking prices

	(1)	(2)	(3)	(4)
	All	Multi-Family	Office	Industrial
Bank Size	0.004	-0.021	-0.001	-0.020
	(0.012)	(0.040)	(0.022)	(0.030)
Tier 1 Leverage Ratio	-1.930**	-2.272	-2.384	-5.671***
	(0.926)	(2.464)	(1.967)	(2.148)
Cash	1.369***	1.411	1.565**	2.079**
	(0.378)	(1.476)	(0.699)	(0.950)
Profitability	-0.363	0.931	7.156***	1.861
	(1.492)	(4.676)	(2.745)	(4.401)
Deposit	-0.396	1.037	-0.331	-1.033
	(0.341)	(0.920)	(0.639)	(0.873)
Real Estate Exposure	-0.095	0.034	0.021	-0.040
	(0.172)	(0.526)	(0.334)	(0.394)
Loan Loss Allowance	0.052	10.963	5.667	-0.767
	(2.268)	(8.391)	(3.957)	(5.119)
Risk Weighted Assets	0.645***	0.699	0.351	0.774*
	(0.205)	(0.607)	(0.416)	(0.414)
Observations	1,261	199	279	257
R-squared	0.691	0.825	0.799	0.713

Sale prices

	(1)	(2)	(3)	(4)
	All	Multi-Family	Office	Industrial
Bank Size	-0.024**	-0.004	-0.016	-0.033
	(0.010)	(0.025)	(0.019)	(0.027)
Tier 1 Leverage Ratio	-0.513	0.329	1.259	-1.399
	(0.720)	(1.464)	(1.599)	(1.875)
Cash	1.315***	2.868***	1.859***	0.772
	(0.325)	(0.818)	(0.576)	(0.824)
Profitability	1.365	-3.374	5.015**	-2.398
	(1.286)	(3.205)	(2.487)	(3.003)
Deposit	-0.497*	0.067	-0.551	0.125
	(0.282)	(0.531)	(0.548)	(0.781)
Real Estate Exposure	0.188	0.331	0.342	-0.061
	(0.148)	(0.335)	(0.288)	(0.374)
Loan Loss Allowance	3.888**	2.631	7.115**	-0.236
	(1.804)	(4.477)	(3.417)	(4.021)
Risk Weighted Assets	0.403**	0.897**	0.193	0.134
	(0.179)	(0.408)	(0.368)	(0.398)
Observations	2,006	402	390	369
R-squared	0.682	0.808	0.788	0.649

Time on the market

	(1)	(2)	(3)	(4)
	All	Multi-Family	Office	Industrial
Bank Size	-0.007	0.002	-0.025	0.013
	(0.020)	(0.071)	(0.042)	(0.052)
Tier 1 Leverage Ratio	-4.272***	-2.096	-7.649**	-6.184*
	(1.509)	(4.798)	(3.593)	(3.683)
Cash	0.872	-1.386	3.399**	1.991
	(0.605)	(2.025)	(1.383)	(1.685)
Profitability	3.202	7.472	6.751	2.241
	(2.416)	(8.620)	(5.019)	(7.849)
Deposit	-0.322	1.579	-3.025**	-0.395
	(0.557)	(1.612)	(1.235)	(1.513)
Real Estate Exposure	-0.185	-1.274	0.486	0.025
	(0.282)	(0.927)	(0.680)	(0.708)
Loan Loss Allowance	0.418	5.686	3.069	-6.629
	(3.539)	(14.652)	(7.229)	(8.856)
Risk Weighted Assets	-0.744**	0.068	-0.994	-0.002
	(0.333)	(1.101)	(0.790)	(0.723)
Observations	1,383	239	296	269
R-squared	0.172	0.197	0.242	0.323

Nonlinearity and Interactive Effects-Asking prices

	(1)	(2)	(3)	(4)
	High Capital	Low Capital	High Liquidity	Low Liquidity
Bank Size	-0.014	0.018	-0.007	0.011
	(0.019)	(0.018)	(0.018)	(0.018)
Tier 1 Leverage Ratio	-2.590	-5.227**	-4.785***	-2.693
	(1.936)	(2.301)	(1.223)	(1.743)
Cash	1.811***	0.950*	0.796	1.721***
	(0.661)	(0.543)	(0.533)	(0.629)
Profitability	-2.291	3.444	0.279	0.309
	(2.141)	(2.360)	(1.734)	(3.645)
Deposit	-0.502	-0.208	-0.717	-0.184
	(0.517)	(0.490)	(0.525)	(0.493)
Real Estate Exposure	-0.504**	0.078	-0.275	0.031
	(0.246)	(0.288)	(0.255)	(0.259)
Loan Loss Allowance	3.440	-4.305	-0.289	2.404
	(3.365)	(3.630)	(2.828)	(4.235)
Risk Weighted Assets	0.631**	1.146***	1.047***	0.314
	(0.274)	(0.379)	(0.295)	(0.314)
Observations	655	606	629	632
R-squared	0.710	0.714	0.706	0.721

Nonlinearity and Interactive Effects-Sale prices

	(1)	(2)	(3)	(4)
	High Capital	Low Capital	High Liquidity	Low Liquidity
Bank Size	-0.011	-0.031**	-0.010	-0.033**
	(0.016)	(0.015)	(0.015)	(0.015)
Tier 1 Leverage Ratio	-0.658	-3.325*	-0.89	-0.214
	(1.167)	(1.918)	(1.014)	(1.114)
Cash	1.880***	1.149	0.966**	1.940***
	(0.480)	(0.807)	(0.455)	(0.599)
Profitability	0.273	3.286	1.617	1.177
	(1.773)	(2.067)	(1.554)	(2.401)
Deposit	-0.509	-0.328	-0.119	-0.827**
	(0.429)	(0.403)	(0.427)	(0.393)
Real Estate Exposure	0.060	0.110	0.213	0.141
	(0.207)	(0.240)	(0.214)	(0.220)
Loan Loss Allowance	6.006**	-0.338	3.801*	2.696
	(2.545)	(2.969)	(2.183)	(3.478)
Risk Weighted Assets	0.182	1.006***	0.729***	0.136
	(0.240)	(0.309)	(0.248)	(0.269)
Observations	1,023	983	976	1,030
R-squared	0.689	0.699	0.702	0.694

Nonlinearity and Interactive Effects-Time on the market

	(1)	(2)	(3)	(4)
	High Capital	Low Capital	High Liquidity	Low Liquidity
Bank Size	-0.019	0.022	0.009	-0.012
	(0.033)	(0.029)	(0.028)	(0.029)
Tier 1 Leverage Ratio	-2.473	-6.162**	-4.786**	-2.629
	(3.073)	(2.766)	(1.920)	(2.841)
Cash	1.375***	-0.261	0.293	1.405*
	(0.450)	(1.062)	(4.238)	(0.834)
Profitability	1.941	5.546	3.159	5.143
	(3.409)	(3.932)	(2.764)	(5.423)
Deposit	-1.296	0.506	-0.672	0.101
	(0.864)	(0.795)	(0.828)	(0.801)
Real Estate Exposure	-0.346	0.415	0.173	-0.609
	(0.410)	(0.462)	(0.405)	(0.423)
Loan Loss Allowance	-2.514	1.003	2.625	-6.700
	(5.291)	(5.753)	(4.270)	(6.728)
Risk Weighted Assets	-0.811*	-0.884	-0.980**	0.037
	(0.448)	(0.613)	(0.455)	(0.526)
Observations	710	673	678	705
R-squared	0.217	0.196	0.225	0.256

Bank deposits and fire sale

	(1)	(2)	(3)
VARIABLES	Asking Price	Sale Price	Time on the Market
Bank size	0.003	-0.024**	-0.005
	(0.012)	(0.010)	(0.020)
Tier 1 leverage ratio	-2.479**	-0.798	-3.381**
	(1.005)	(0.749)	(1.610)
Cash	5.483*	4.304**	9.483
	(2.952)	(2.167)	(6.006)
Cash X Deposits	-5.024***	-3.693***	-6.903
	(2.575)	(1.647)	(4.961)
Profitability	-0.131	1.533	2.797
	(1.500)	(1.291)	(2.428)
Deposits	-0.093	-0.262	-0.888
	(0.403)	(0.328)	(0.662)
Real estate exposure	-0.084	0.205	-0.201
	(0.172)	(0.148)	(0.282)
Loan loss allowance	0.169	4.040**	0.140
	(2.268)	(1.807)	(3.541)
Risk weighted assets	0.651***	0.403**	-0.750**
	(0.205)	(0.179)	(0.333)
Observations	1,261	2,006	1,383
(Pseudo) R-squared	0.691	0.682	0.173

The matching method

- A two-step Procedure
  - Run hedonic regressions on REOs sales and matched property sales
  - Calculate excess price as the residual difference between REO sale and its sales comparables
  - Regress excess price on bank characteristics
- More accurate estimation of fundamental values.
- Solves selections on observables, unobserved location effects.

The repeated sales method

- Also a two-step Procedure
  - Run hedonic regressions on REOs sales and also repeated sales
  - Calculate excess price as the residual difference between REO sale and its repeated sales
  - Regress excess price on bank characteristics
- Solves selections on time-invariant unobservable property characteristics.

Matching and repeated sales results

	(1)	(2)	(3)	(4)	(5)	(6)
	Matching Sample			Repeated Sales Sample		
VARIABLES	Asking Price	Sale Price	Time on Market	Asking Price	Sale Price	Time on Market
Bank Size	0.004	-0.024**	-0.007	0.003	-0.024**	-0.004
	(0.012)	(0.010)	(0.020)	(0.013)	(0.010)	(0.020)
Tier 1 Leverage Ratio	-1.947**	-0.518	-4.261***	-1.688*	-0.432	-4.224***
	(0.921)	(0.718)	(1.501)	(0.937)	(0.724)	(1.506)
Cash	1.360***	1.307***	0.861	1.346***	1.332***	0.793
	(0.375)	(0.324)	(0.600)	(0.381)	(0.327)	(0.602)
Profitability	-0.361	1.374	3.237	-0.615	0.949	3.290
	(1.485)	(1.280)	(2.402)	(1.510)	(1.290)	(2.410)
Deposit	-0.396	-0.493*	-0.313	-0.401	-0.486*	-0.325
	(0.339)	(0.281)	(0.554)	(0.345)	(0.283)	(0.556)
Real Estate Exposure	-0.093	0.189	-0.186	-0.154	0.161	-0.183
	(0.171)	(0.147)	(0.280)	(0.174)	(0.148)	(0.281)
Loan Loss Allowance	0.048	3.887**	0.509	0.284	3.494*	0.923
	(2.254)	(1.797)	(3.522)	(2.292)	(1.812)	(3.534)
Risk Weighted Assets	0.642***	0.402**	-0.729**	0.633***	0.364**	-0.707**
	(0.203)	(0.178)	(0.330)	(0.207)	(0.180)	(0.332)
Observations	1,261	2,006	1,383	865	1235	954
R-squared	0.294	0.315	0.114	0.317	0.338	0.147

Robustness checks

- Enforcement actions.
- Other liquidity and capital measures.
- Duration models for time on the market.
- Additional controls.

Conclusion

- Lower bank capital leads to
  - Higher asking price
  - Longer time on the market
  - Not high sale price
- Lower bank liquidity leads to
  - Lower asking price
  - Lower sale price
  - Not shorter time on the market