

Differences Across Originators in CMBS Loan Underwriting

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Introduction

- CRE: “second wave” of financial crisis
 - High delinquency rates (9.5% of loans originated since 2005 now delinquent)
 - CMBS market shutdown & future refinancing waves
- Like RMBS, observers cite distorted incentives for quality underwriting standards as a primary cause
- At the same time, CMBS portfolios contain fewer loans, and individual loan characteristics much more transparent.
- To what extent does CMBS underwriting quality vary across originator types?
 - 6 key types characterized by capital and corporate structure
- Evidence on incentive distortions? (adverse selection, moral hazard)

Types of originators

- Commercial banks
- Insurance
- Investment banks
- Finance companies
- Foreign conduits
- Domestic conduits

Preview of findings

- Conduits and foreign entities perform worst.
- Insurance companies and commercial banks perform best.
- Results hold both before and after controlling for observed loan characteristics.
- Possible interpretation: originator types differ in their sources of warehouse funding, involvement in balance-sheet lending, capitalization, and investment in CMBS.

Data

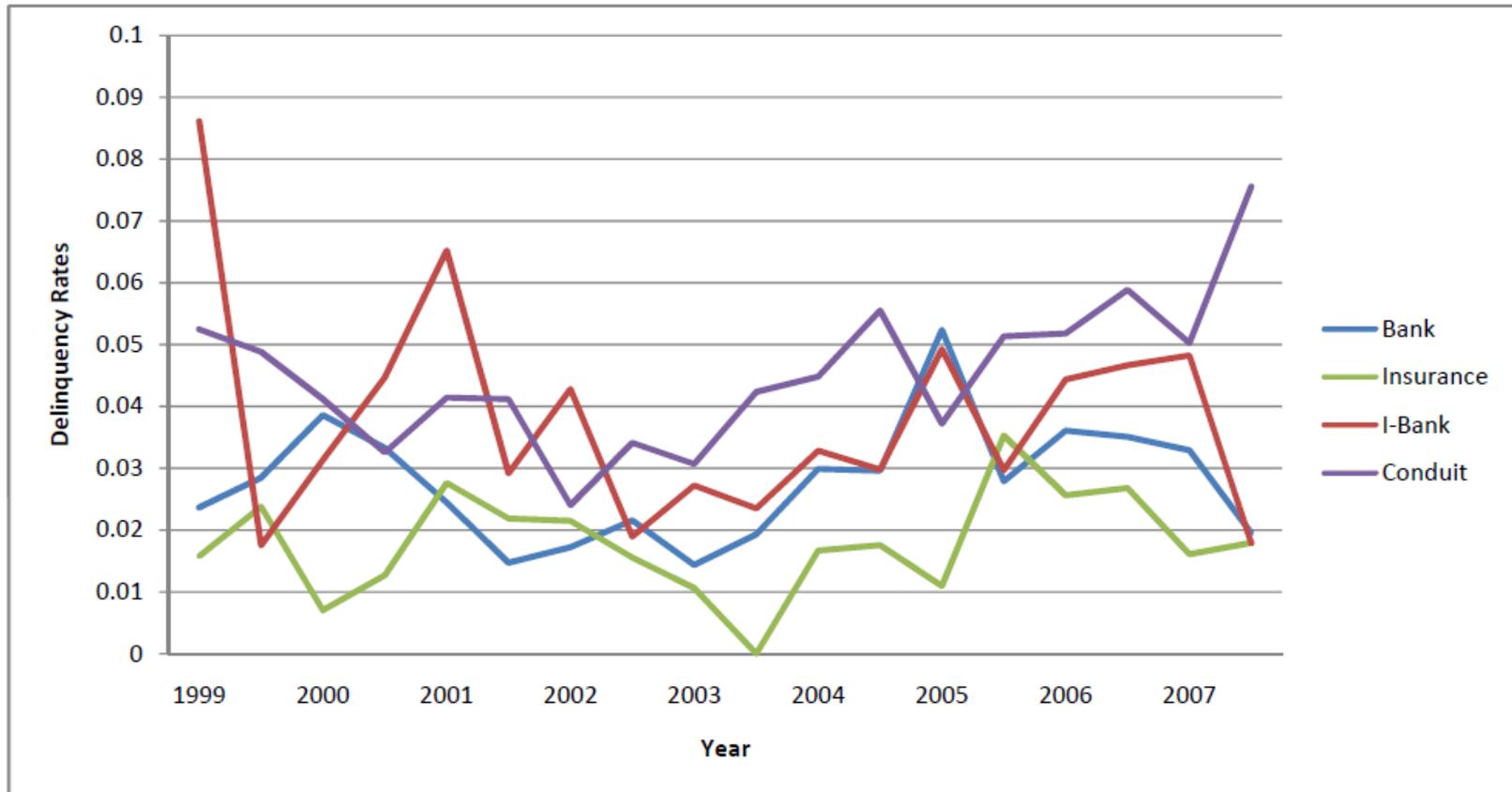
- Sample of 31,657 fixed-rate loans sold into any CMBS from 1999 to 2007
- Loan characteristics at origination
- Matched originators to top holders (using NIC) and classified into 1 of the 6 types
- Payment history through July 2010

Cumulative Delinquency Rates

- Delinquency = 60+ days delinquent or in special servicing

Originator Type	Comm. Bank	Insur. Co.	Inv. Bank	Fin. Co.	Foreign Entity	Domestic Conduit
% ever delinquent	7.38%	4.68%	8.93%	8.76%	10.10%	12.89%

Cumulative Delinquency Rate by Originator Type



- Delinquent = ever 60 days late
- Year = year of origination

Differences in loans across originator types

- Loan characteristics
 - DSCR, LTV, coupon
- Delinquency rates conditioning on loan characteristics

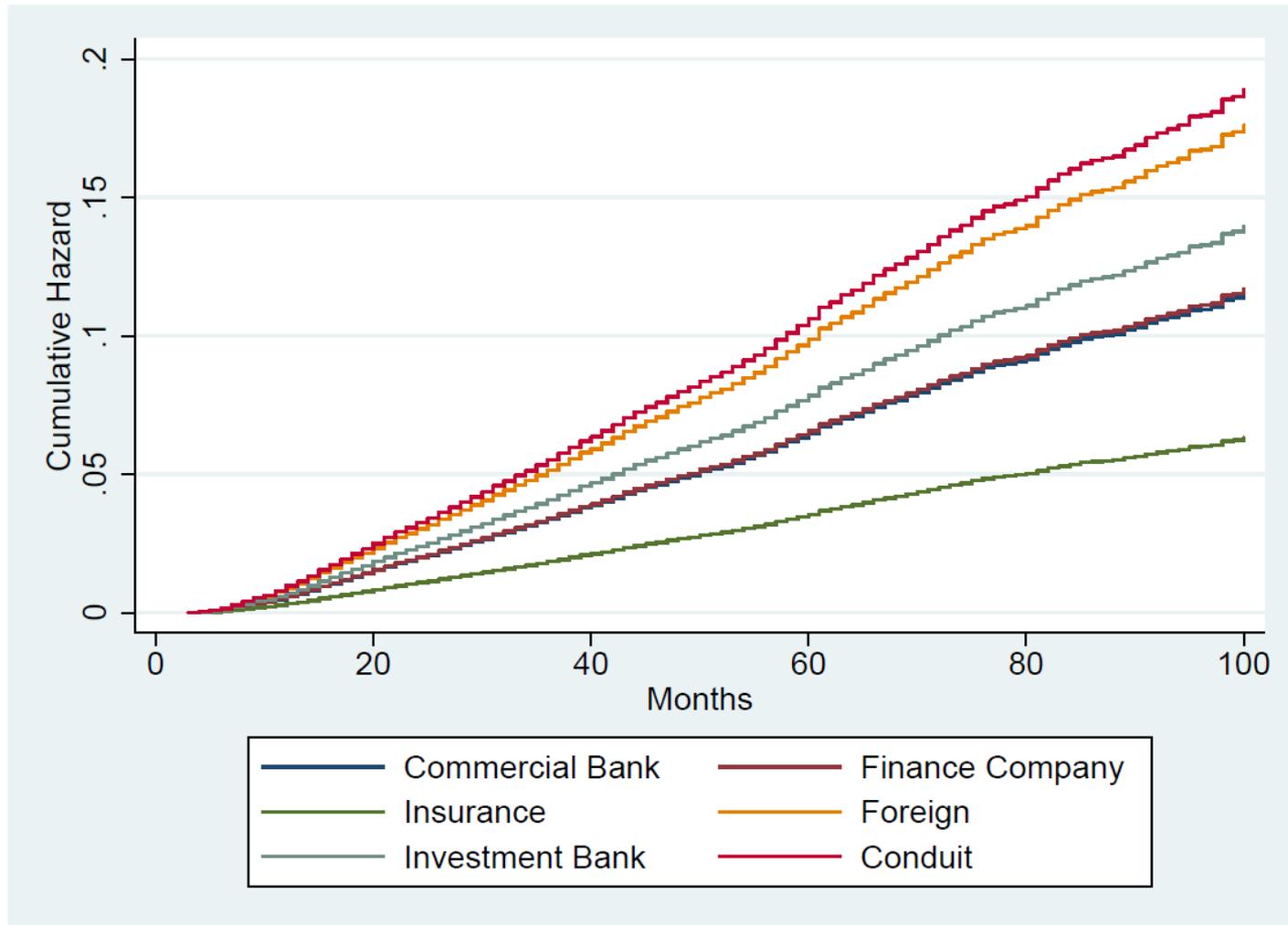
Loan Characteristics at Origination

Mean (Std. Dev.)	DSCR	Occupancy	Coupon Spread	Loan Amount	LTV Ratio	Cumul. Default
Commercial Bank	1.49 (0.46)	94.59 (7.37)	1.47 (0.65)	9.71 (14.87)	68.15 (12.46)	7.38%
Insurance	1.49 (0.39)	96.02 (6.32)	1.55 (0.7)	8.15 (11.34)	64.45 (11.92)	4.68%
Investment Bank	1.5 (0.4)	94.73 (7.54)	1.46 (0.65)	10.87 (16.93)	69.02 (10.37)	8.93%
Finance Company	1.45 (0.34)	93.33 (7.37)	1.57 (0.7)	8.68 (11.01)	70.16 (10.08)	8.76%
Foreign Entity	1.41 (0.26)	94.86 (6.98)	1.55 (0.76)	8.58 (12.99)	70.82 (9.19)	10.10%
Domestic Conduit	1.39 (0.3)	94.13 (7.53)	1.63 (0.71)	10.36 (15.75)	70.56 (9.45)	12.89%
Total	1.47 (0.4)	94.69 (7.28)	1.5 (0.68)	9.59 (14.63)	68.73 (11.33)	8.30%

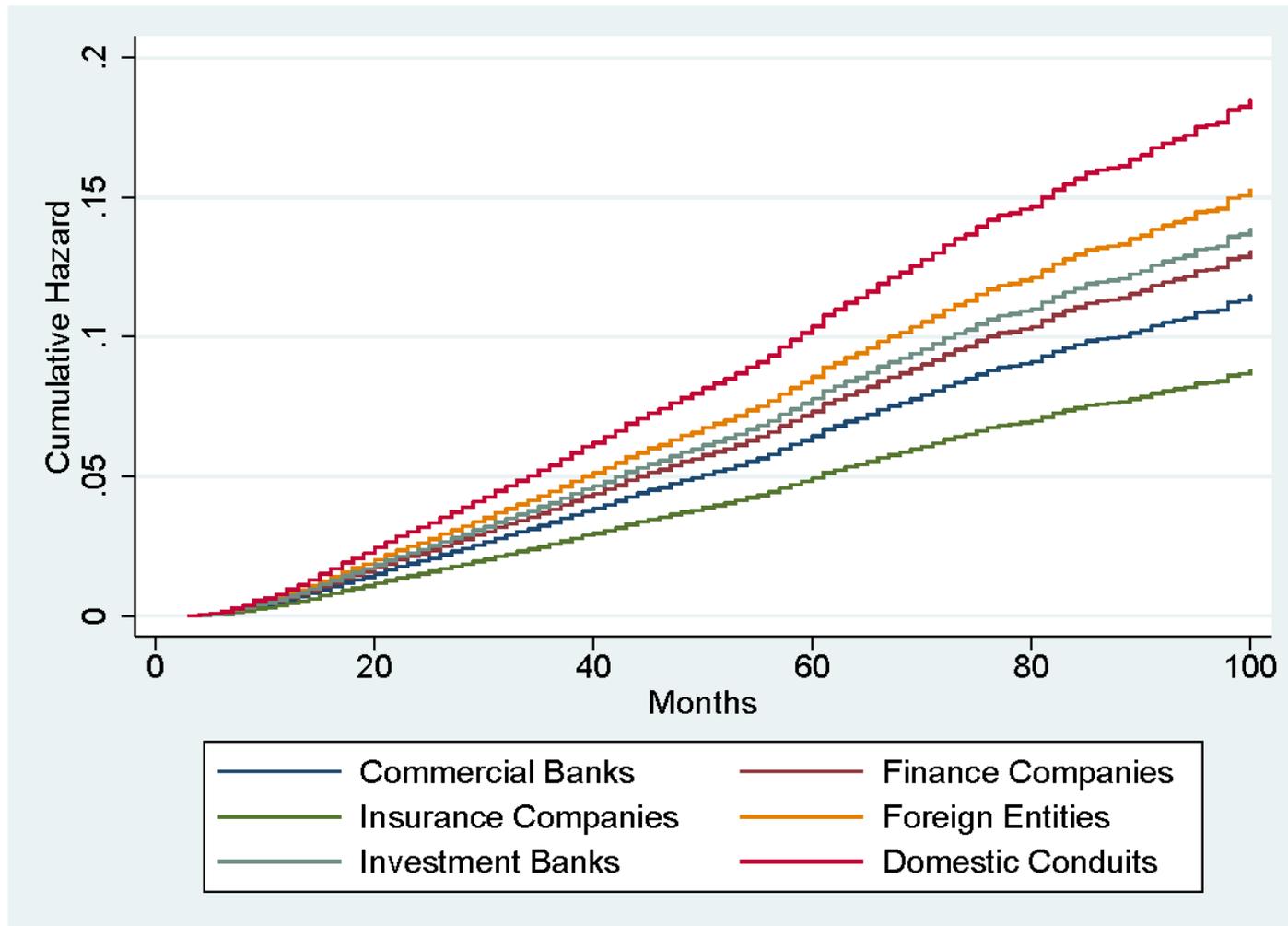
Cox Proportional Hazards Model

- Outcome: how long before a loan first became delinquent?
- Hazards differ across originator types.
- Controls for vintage, region, and property type.
- Differences remain, even after controlling for underwriting characteristics.
- Also find evidence of deterioration from early to later vintages, even after controlling for observable underwriting characteristics.

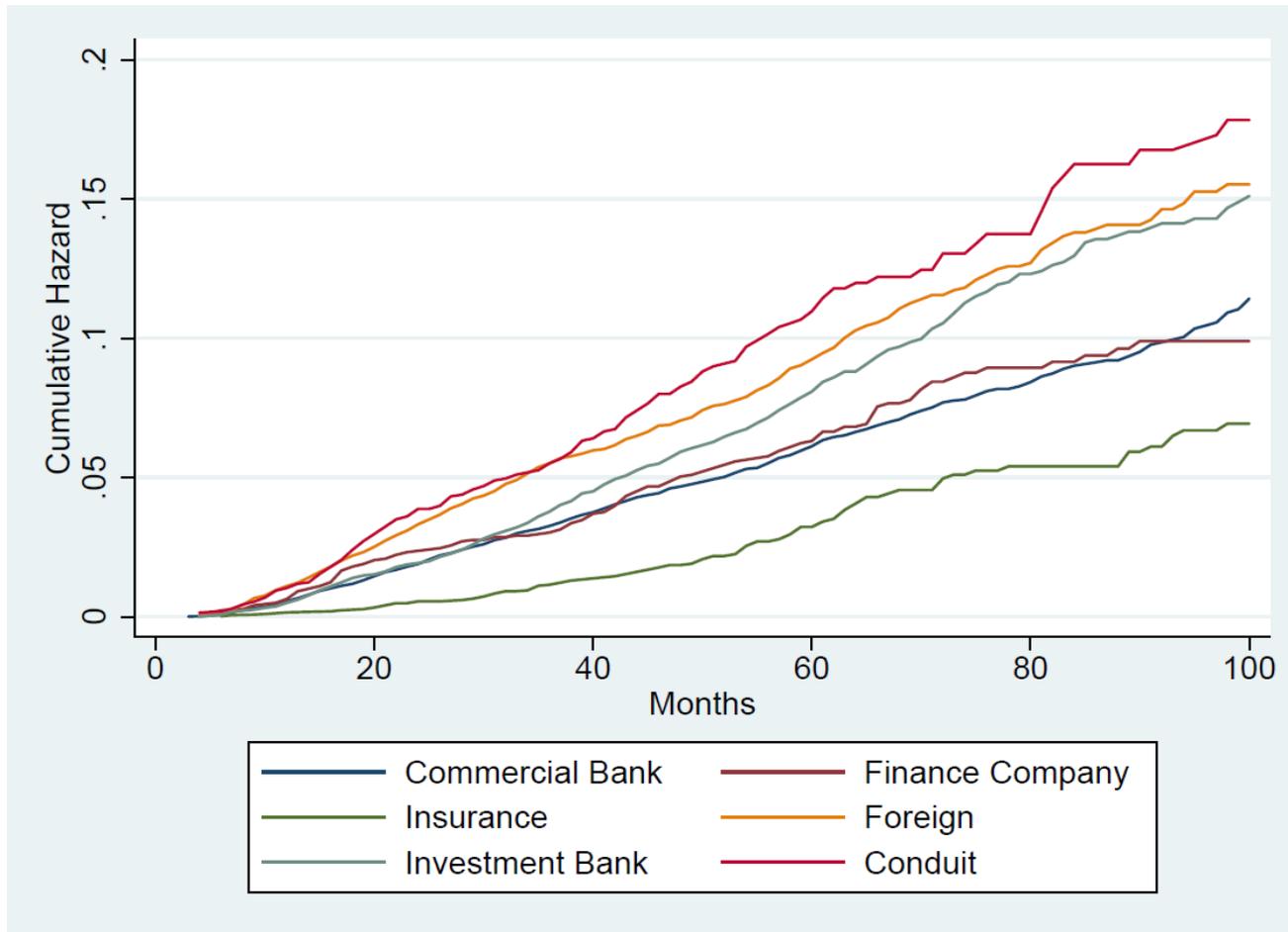
Cumulative Hazards Evaluated at Means Conditional on Originator Type



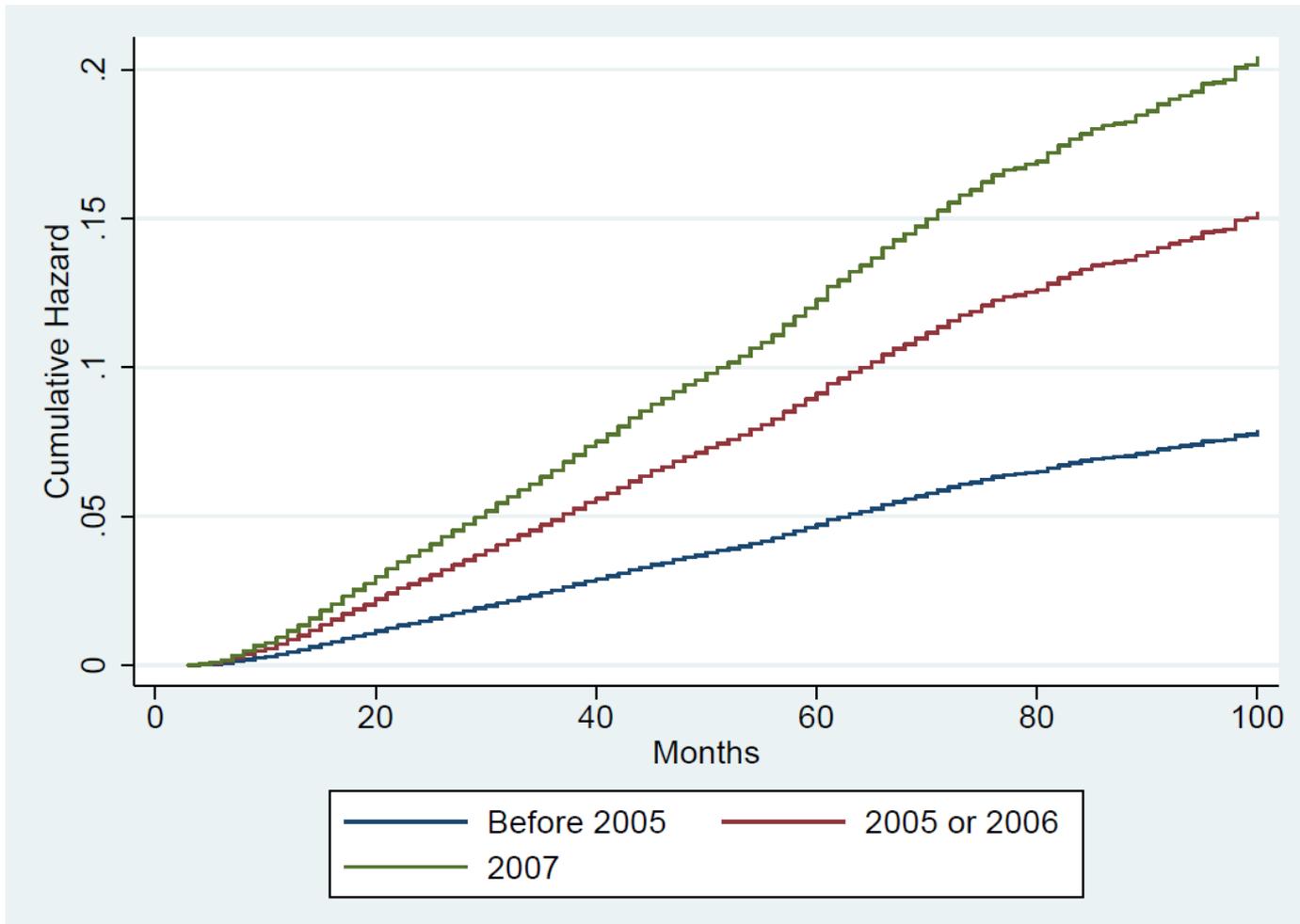
Cumulative Hazards Evaluated at Entire-Sample Means



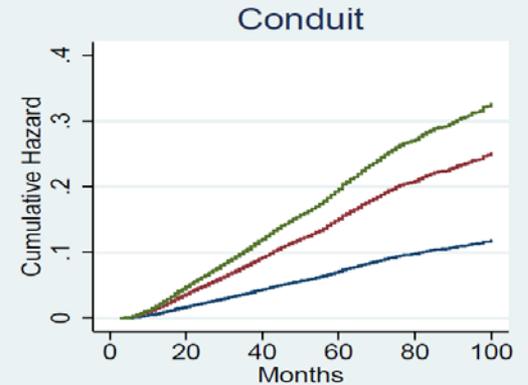
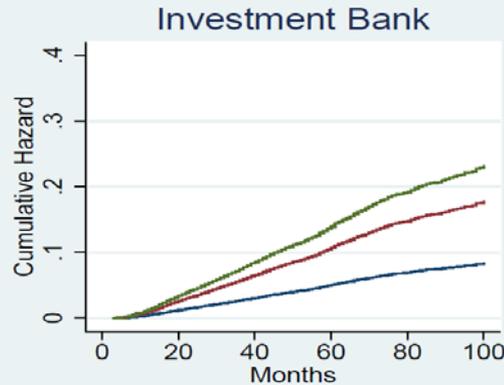
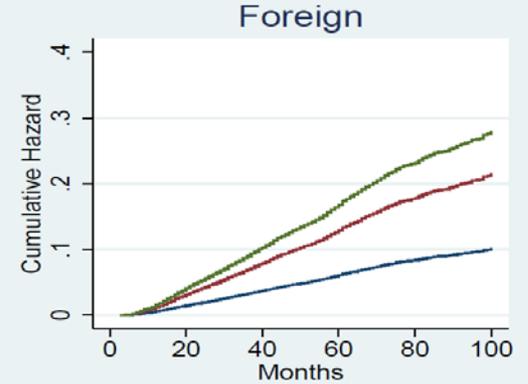
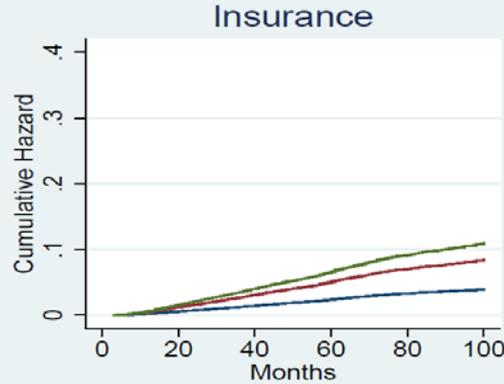
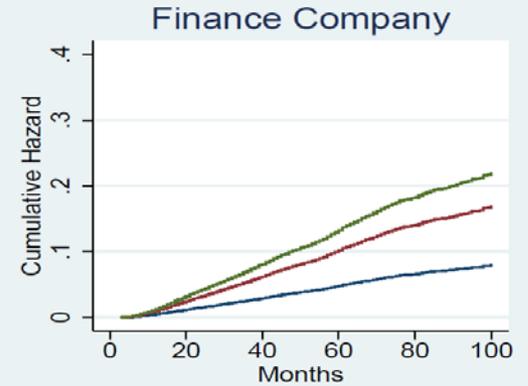
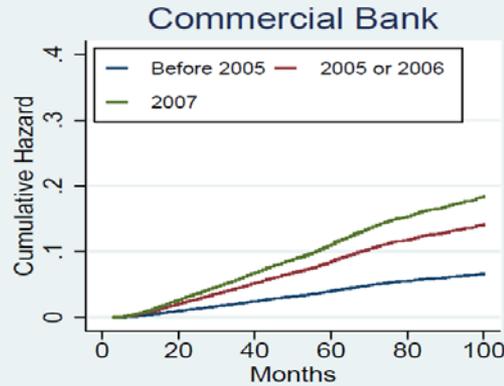
Cumulative Hazards Estimated Separately by Originator Type



Cumulative Hazards by Vintage



Cumulative Hazards by Originator Type and Vintage



Institutional Features Affecting Underwriting (1)

	Warehouse loans	Balance-sheet lenders
Commercial bank	X	X
Insurance company	X	X
Investment bank	X	
Finance company	X	X
Foreign entity	Depends	
Domestic conduit		

Institutional Features Affecting Underwriting (2)

- Warehouse Funding: Internal vs. External
 - Moral hazard: does originator hold mortgage for appreciable period of time prior to securitization?
 - External funding may be more costly → product differentiation toward riskier loans
- Balance sheet lending
 - Adverse selection: Does originator choose which loans to securitize?
 - Possible spillovers in lending technology (origination cost for given level of quality)
 - Capitalization: Correlated with risk preferences.

Institutional Features Affecting Underwriting (3)

- Possible reason for difference between commercial banks vs. insurance companies:
 - Insurance companies have proportionally more balance-sheet CRE lending (10% vs. 5 to 8%)
 - Anecdotally, we know that insurance companies invested heavily in CMBS – maybe some of them collateralized by their own originations.

Discussion

- Standard underwriting characteristics only partly explain loan performance. Despite reputation for transparency, CRE loan performance affected by originator type.
- Adverse selection an often-cited cause of poor performance, but evidence suggests presence of mitigating factors among balance sheet lenders (e.g., better overall pools, higher K)
- Must interpret conservatively: some sources of unobserved heterogeneity may be observed by investors.

Extensions

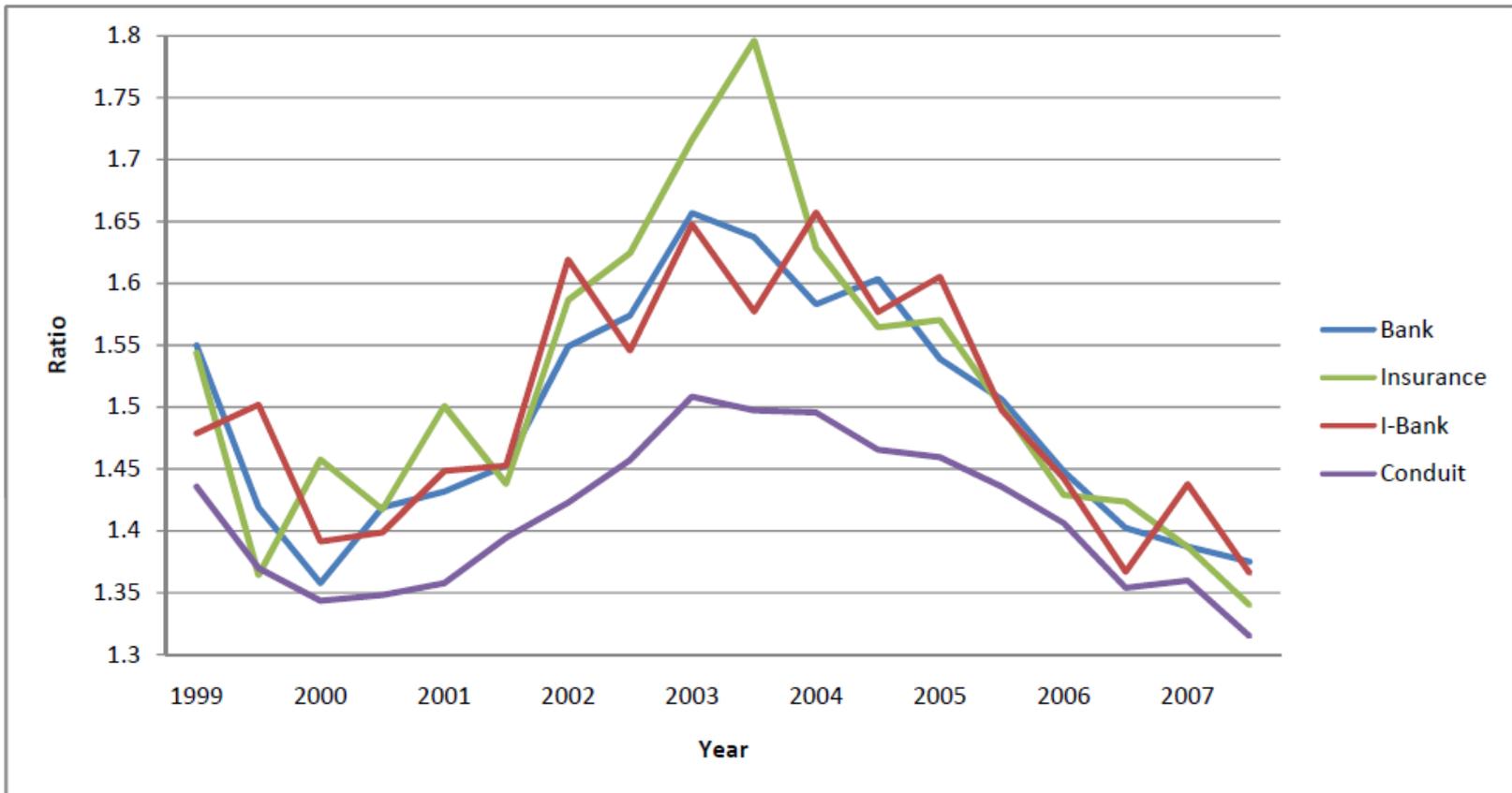
- Can we test underwriting differences more directly?
 - Compare underwritten NOI to realized NOI by originator type.
 - For 6 percent of loans, rating agencies impose a haircut on DSCR (15 percent on average) or LTV (36 percent on average).
- Are differences across originators reflected in pricing of CMBS securities?

Conclusion

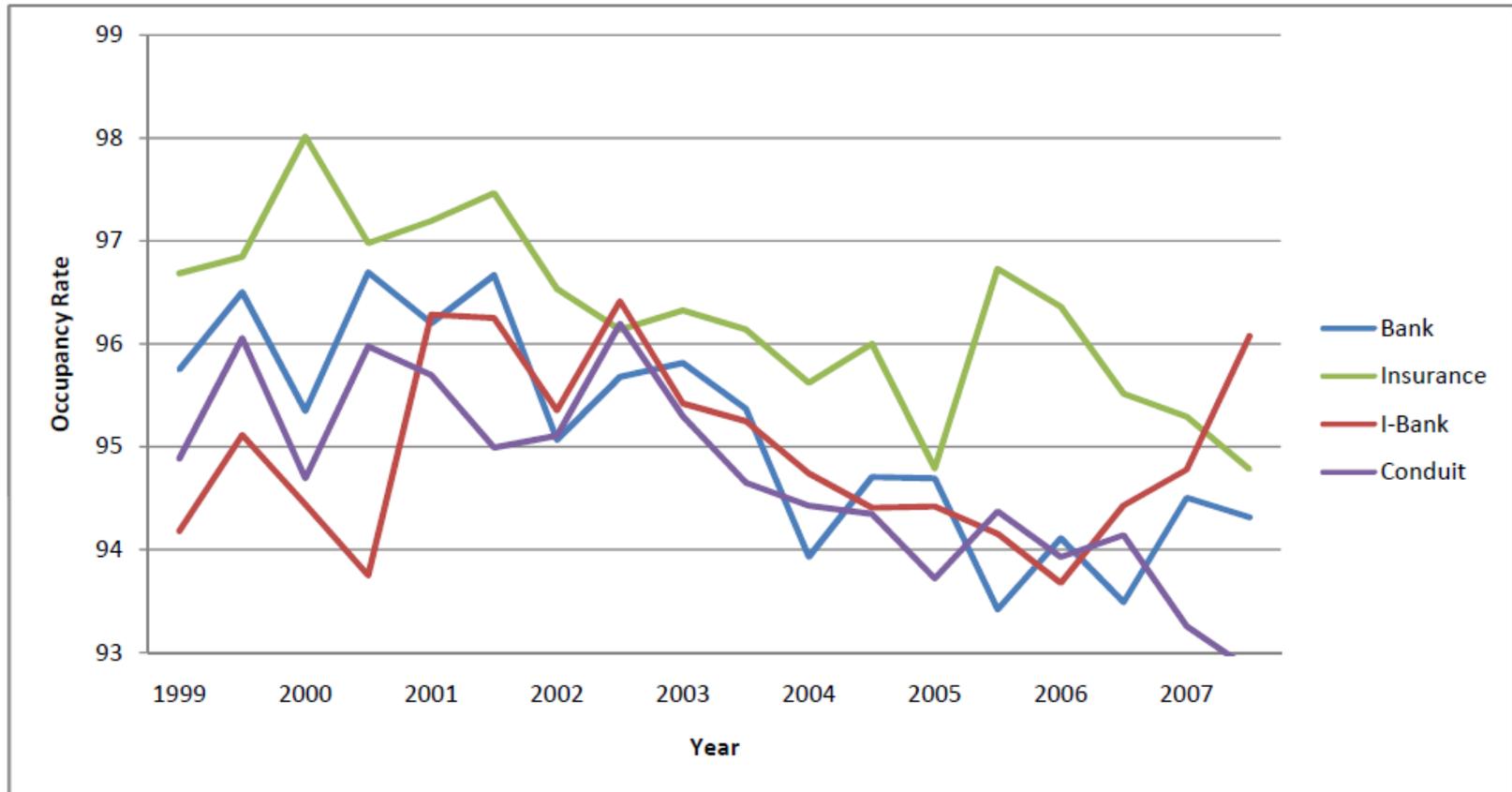
- Differences in loan performance across originator types, before and after controlling for underwriting characteristics.
- Insurance companies and commercial banks best.
- Foreign entities and conduits worst.
- Underlying drivers behind these differences merits further study.

Extra slides

Average Debt-Service Coverage Ratio by Originator Type

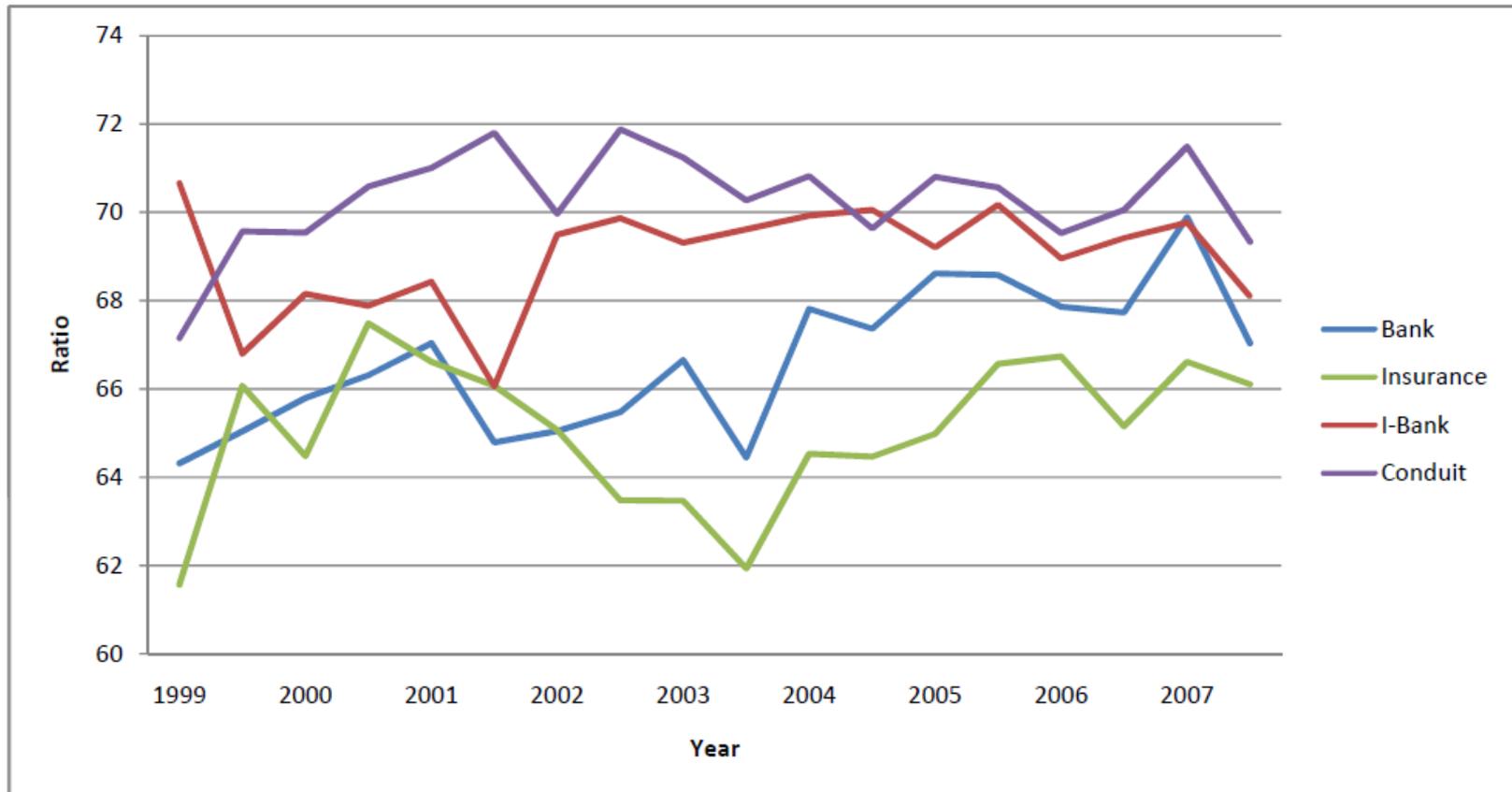


Average Occupancy by Originator Type



- Insurance companies have higher occupancy over nearly all years, especially in the late 2000's.

Average Loan-to-Value by Originator Type



Logit Model

- Outcome: whether a loan ever becomes delinquent.
- Variation: distinguish between regular on-time payment and prepayment.
- Older loans have had more time over which to become delinquent. Control for this using vintage.
- Regress on underwriting variables, originator type, vintage (originator type)*(vintage).
- Are there differences across types and vintages after controlling for underwriting variables?

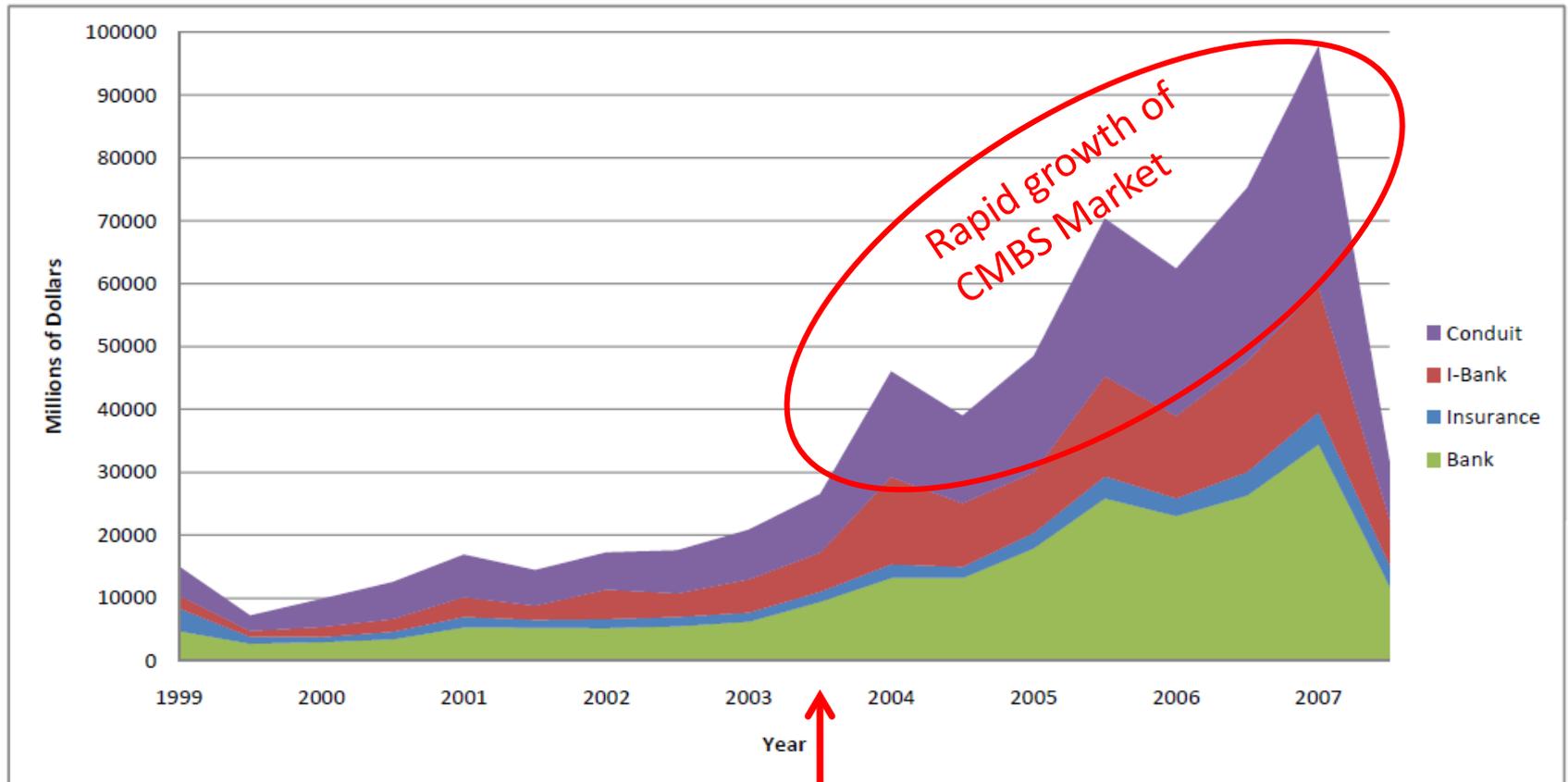
Logit Model Results

Loan Characteristics at Origination	Coefficients (Standard Error)	Originator Type and Vintage Effects	Coefficient (Standard Error)
Debt-to-Service Coverage Ratio	0.044 (0.104)	Commercial Bank	
Occupancy	-0.025*** (0.003)	Insurance	-0.287** (0.144)
Coupon Spread	0.324*** (0.039)	Investment Bank	0.202** (0.082)
Loan Amount	0.011*** (0.0012)	Finance Company	0.077 (0.123)
Loan-to-Value Ratio	0.052*** (0.0033)	Foreign	0.163* (0.086)
		Conduit	0.230* (0.131)
		Vintage <= 2004	
		Vintage = 2005	0.153* (0.091)
		Vintage = 2006	0.225** (0.09)
		Vintage = 2007	-0.534*** (0.124)

Multinomial Logit Results

- 19 percent of loans prepay, less than for RMBS.
- Compared with simple logit, effects of various explanatory variables on delinquency is essentially unchanged.

Total Volume of Originations by Originator Type



- Growth of CMBS market began in mid 2003 and 2004

Sources

- Cox, D.R. 1972. Regression Models and Life-Tables. *Journal of the Royal Statistical Society, Series B* 34:187-220.

Hazard Model: Explanation of Coefficients

- Coefficients of variables are in Hazard Ratio form.
 - For example, consider a continuous random variable x_i . The hazard rate given x_1, \dots, x_n is:

$$h(t \mid x_1, \dots, x_i, \dots, x_n) = h_0(t) \exp(x_1 \beta_1 + \dots + x_i \beta_i + \dots + x_n \beta_n)$$

- Now consider the hazard rate given a unit increase in x_i :

$$h(t \mid x_1, \dots, x_i + 1, \dots, x_n) = h_0(t) \exp(x_1 \beta_1 + \dots + (x_i + 1) \beta_i + \dots + x_n \beta_n)$$

- Thus the ratio of the two hazard rates is:

$$\frac{h(t \mid x_1, \dots, x_i + 1, \dots, x_n)}{h(t \mid x_1, \dots, x_i, \dots, x_n)} = \exp(\beta_i)$$

Hazard Model: Explanation of Coefficients

- Interpretation of Results:
 - The coefficient we report in the tables is $\exp(\beta_i)$, or the hazard ratio.
 - If $\beta_x > 1$, then an increase in x implies a higher hazard ratio (and thus a higher probability of delinquency)
 - If $\beta_x < 1$, then an increase in x implies a lower hazard ratio (and thus a lower probability of delinquency)