SUBPRIME MORTGAGE INSTITUTION

AN ALTERNATIVE DEFINITION

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Objective:

- Using a newly crafted Subprime Definition; evaluate differences between *standard* definitions used in the from the financial crisis. Lastly, using two of the definitions assess the number of Subprime originations between 2008 and 2016.

- The Subprime Definitions
  - *HMDA Higher Priced*
    - Uses the interest rate given to the borrower in terms of the treasury standards
    - Higher sensitivity to the economic environment, especially the Federal Funds Rate
    - Higher interest rates reflects more risk, which is why the loan is priced higher
  - *HUD Subprime*
    - Evaluated lending institutions by calling and asking if they were heavy in subprime lending
    - Ceased to produce this definition after 2005
  - *Subprime Institution*
    - Uses a list of institutions that failed/went bankrupt during the financial crisis

Why Is This Research Important???

- The ability to identify riskier loans is critical for the health of housing market
  - *A healthy housing market provides stability to the economy*
  - *Policy/Oversight/Government Regulation need be evaluated to ensure lending standards are not diluted*
- This work is intended to compare subprime definitions and offer a new vantage point
  - *There is no universal defined definition for subprime that can be used at the macro level*
  - *Subprime definitions are hard to define (buy outs, sold loans)*
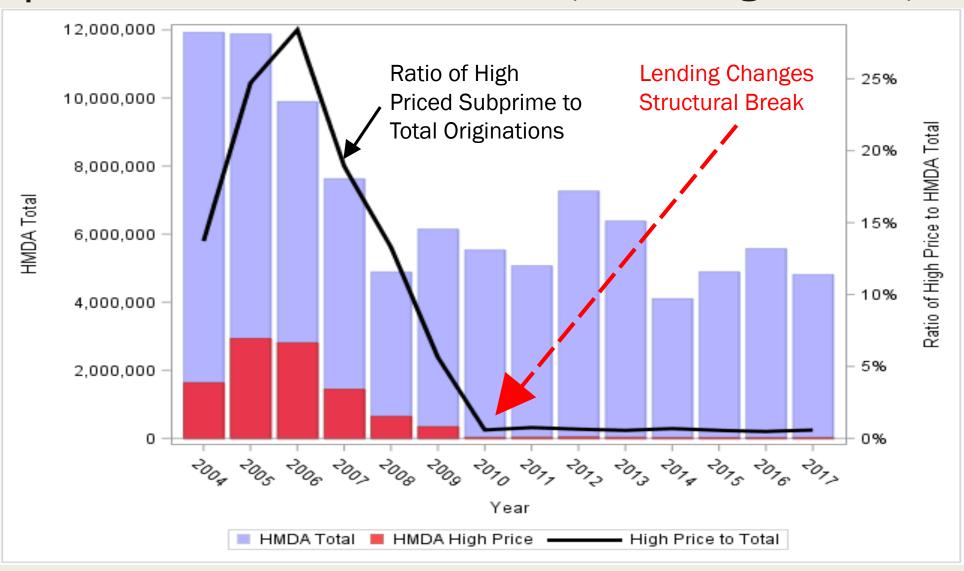
Subprime Unit Counts Cross Tabulation

■ Data is between 2004 and 2007 with total units evaluated was 55 million

■ The table below reflects a cross tabulation between subprime definitions.

■ "All" represents when all three definitions categorize as subprime, with the <u>row totals</u> being actual number of Subprime units.

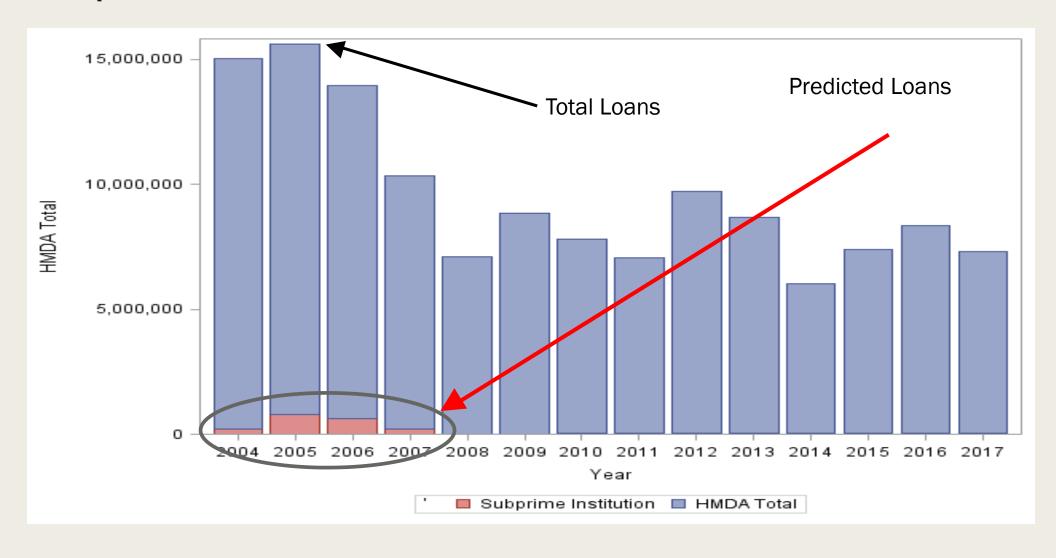|	Subprime Institution	HUD Subprime	High Priced Subprime	All	*Total*
Subprime Institution	4,841,426	9,275	895,954	32,473	*5,779,128*
HUD Subprime	9,275	1,678,722	3,652,797	32,473	*5,373,267*
High Priced Subprime	895,954	3,652,797	7,670,582	32,473	*12,251,806*
Total	*5,746,655*	*5,340,794*	*12,219,333*	*32,473*	

Predictors for the Subprime Institution Model

Variable	Definition
Sold To	Lending institutions originated and sold to another investor, such as a Commercial Bank, Government Sponsored Entity (GSE), Private Security
Purpose	Refinance Mortgage versus Home Purchase Mortgage
Race	Borrower's Race
Sex	Borrower's Sex
Pre-Approval	Pre-Approval was requested for the loan at origination
Lien Position	First Lien or Not First Lien
Income Quintile	Borrowers stated income differenced from the State median stated income. Quintile 5 indicates low income to the State median.

Population Characteristics (HMDA High Priced)

Population Characteristics (Subprime Institution)

Main Results

- **2004 to 2007:**
  - *Subprime Institution definition is half that of Higher Priced*
  - *The predictive accuracy using the Subprime Institution definition is questionable*
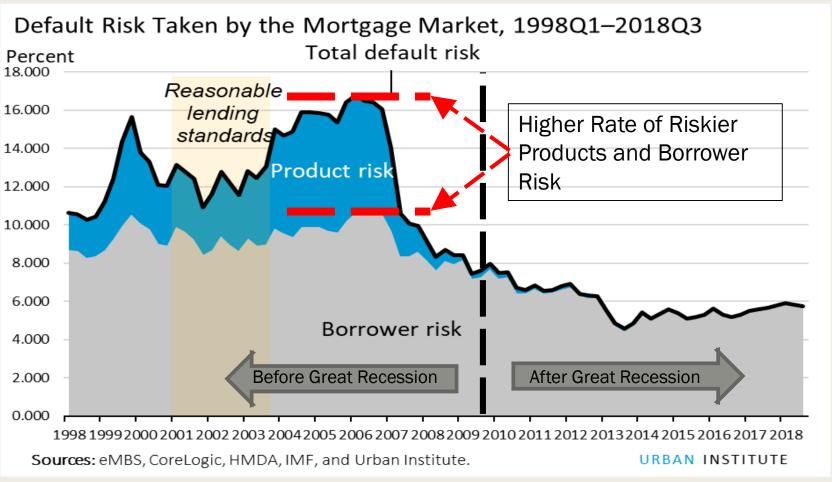
- **2008 Forward:**
  - *Both, Subprime Institution and Higher Priced show a dramatic reduction in Subprime loans*
  - *The Loan Application Registrar (LARs) data shows tightening of lending standards*
  - *Shift of originations being sold to Government Sponsored Entities*

Main Results

■ Originations being sold to Private Securities disappeared after 2007. This is likely due to the cease in mortgage backed securities post the financial crisis.

■ A considerable shift between pre/post financial crisis to the GSE's.

Variable	Total (2004-2007)	Subprime Institution	Subprime Ratio	Percent Total Sub Prime	Category Ratio	Total (2008-2016)	Category Ratio
Sold To							
COMMERCIAL BANK	2,707,686	410,658	15.2%	0.7%	4.9%	7,608,016	10.7%
GSE	11,647,720	2,361,836	20.3%	4.3%	21.2%	31,593,954	44.3%
HELD FOR INVESTMENT	23,643,348	1,676,922	7.1%	3.0%	43.0%	21,223,935	29.8%
INSURANCE/MORTGAGE BANK	4,986,139	111,570	2.2%	0.2%	9.1%	5,029,303	7.1%
OTHER	9,598,879	101,720	1.1%	0.2%	17.5%	5,106,580	7.2%
PRIVATE SECURITY	2,400,674	1,116,422	46.5%	2.0%	4.4%	775,719	1.1%

Where Did the Subprime Loans Go???

Default Risk Taken by the Mortgage Market, 1998Q1–2018Q3

Higher Rate of Riskier Products and Borrower Risk

Conclusion

- **2004 to 2007:**
  - Lending standards were loose
  - Second lien loans consumed a higher percentage of the population
  - More loans were sold to securities

- **2008 Forward:**
  - *Lending standards tightened*
  - *Refinance boom occurred due to lower rate environment*
  - *Considerable amount of originations shifted to GSE*

Appendix (Simple Stats)

Variable	Total (2004-2007)	Subprime Institution	Subprime Ratio	Percent Total Sub Prime	Category Ratio	Total (2008-2016)	Category Ratio
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Loan Purpose							
PURCHASE	25,230,318	2,414,088	9.6%	4.4%	45.9%	27,686,924	38.8%
REFI	29,754,128	3,365,040	11.3%	6.1%	54.1%	43,650,583	61.2%
Race							
Asian	2,146,978	334,400	15.6%	0.6%	3.9%	3,704,027	5.2%
Black	4,389,934	416,430	9.5%	0.8%	8.0%	3,325,423	4.7%
Hispanic	6,279,411	861,311	13.7%	1.6%	11.4%	5,084,331	7.1%
Other	6,815,339	899,562	13.2%	1.6%	12.4%	8,013,021	11.2%
White	35,352,784	3,267,425	9.2%	5.9%	64.3%	51,210,705	71.8%

Appendix (Simple Stats)

Variable	Total (2004-2007)	Subprime Institution	Subprime Ratio	Percent Total Sub Prime	Category Ratio	Total (2008-2016)	Category Ratio
Sex							
Female	16,141,463	1,752,171	10.9%	3.2%	29.4%	18,503,065	25.9%
Male	35,753,040	3,652,254	10.2%	6.6%	65.0%	47,895,470	67.1%
Other	3,089,943	374,703	12.1%	0.7%	5.6%	4,938,972	6.9%
Preapproval							
Preapproval Requested (1)	2,091,205	66,323	3.2%	0.1%	3.8%	2,020,434	2.8%
Not Requested (2)	10,397,259	1,252,232	12.0%	2.3%	18.9%	9,804,718	13.7%
Not Applicable (3)	42,495,982	4,460,573	10.5%	8.1%	77.3%	59,512,355	83.4%

Appendix (Simple Stats)

Variable	Total (2004-2007)	Subprime Institution	Subprime Ratio	Percent Total Sub Prime	Category Ratio	Total (2008-2016)	Category Ratio
Lien							
First Lien	45,297,701	5,412,968	11.9%	9.8%	82.4%	67,900,490	95.2%
Second Lien	9,686,745	366,160	3.8%	0.7%	17.6%	3,437,017	4.8%
Income Spread							
Not Reported (0)	3,090,403	374,094	12.1%	0.7%	5.6%	5,316,387	7.5%
Higher Income 1	10,933,417	1,034,223	9.5%	1.9%	19.9%	13,539,749	19.0%
2	10,321,743	1,082,102	10.5%	2.0%	18.8%	13,171,111	18.5%
3	10,242,169	1,061,211	10.4%	1.9%	18.6%	13,113,830	18.4%
4	10,198,674	1,067,126	10.5%	1.9%	18.5%	13,078,373	18.3%
Lower Income 5	10,198,040	1,160,372	11.4%	2.1%	18.5%	13,118,057	18.4%

Appendix (Model Results)

Variable	Estimate	Standard Error	Exponentiate	Odds
Intercept	-0.769	0.0031	0.4630	
Sold To				
COMMERCIAL BANK	0.6367	0.0029	1.8900	0.2090
GSE	0.9244	0.0018	2.5200	0.2790
HELD FOR INVESTMENT	(0.2044)	0.0017	0.8150	0.0900
INSURANCE/MORTGAGE BANK	(1.3889)	0.0037	0.2490	0.0280
OTHER	(2.1702)	0.0037	0.1140	0.0130
PRIVATE SECURITY				Reference

Appendix (Model Results)

Variable	Estimate	Standard Error	Exponentiate	Odds
Loan Purpose				
REFI				*Reference*
PURCHASE	(0.1415)	0.0011	0.8680	0.7540
Race				
Asian	0.3091	0.0033	1.3620	2.0180
Black	(0.2821)	0.0028	0.7540	1.1170
Hispanic	0.2630	0.0023	1.3010	1.9270
Other	0.1030	0.0027	1.1090	1.6420
White				*Reference*

Appendix (Model Results)

Variable	Estimate	Standard Error	Exponentiate	Odds
Sex				
Female	0.0834	0.0019	1.0870	1.1260
Male	(0.0483)	0.0017	0.9530	0.9870
Other				*Reference*
Preapproval				
Preapproval Requested (1)	(0.6970)	0.0041	0.4980	0.3960
Not Requested (2)	0.4683	0.0025	1.5970	1.2710
Not Applicable (3)				*Reference*
Lien				
First Lien	0.4604	0.0015	1.5850	2.5110
Second Lien				*Reference*

Appendix (Model Results)

Variable	Estimate	Standard Error	Exponentiate	Odds
Income Spread				
Not Reported (0)	0.0546	0.0030	1.0560	0.8880
1	(0.2181)	0.0019	0.8040	0.6760
2	(0.0323)	0.0019	0.9680	0.8140
3	(0.0116)	0.0019	0.9880	0.8310
4	0.0341	0.0019	1.0350	0.8700
5				*Reference*