

Could the Housing Crisis be Worsened by a Major Earthquake?

Steven Jakubowski, President,

Impact Forecasting

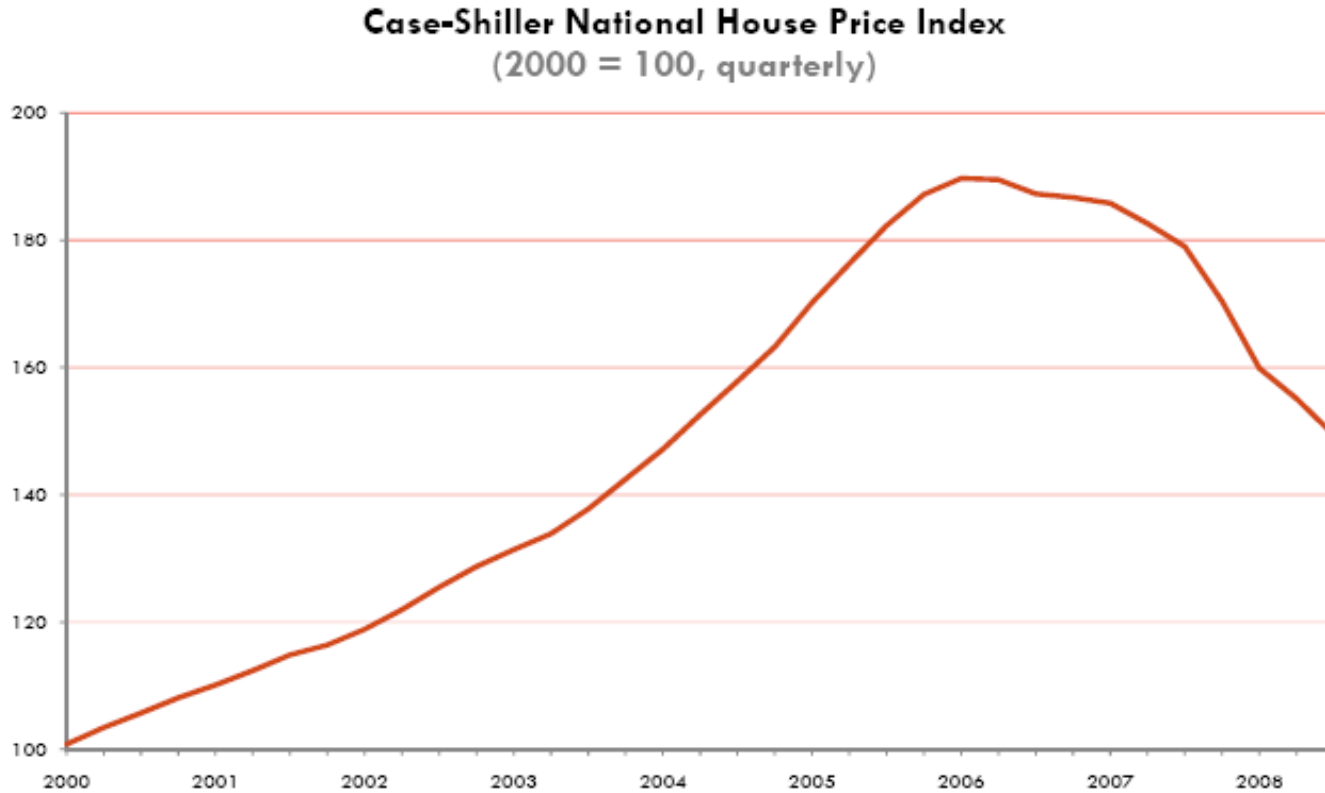
May 2009

Agenda

- Section 1 Housing Crisis Background
- Section 2 Earthquake Scenario: M7.8
- Appendix Modeling Disclaimers

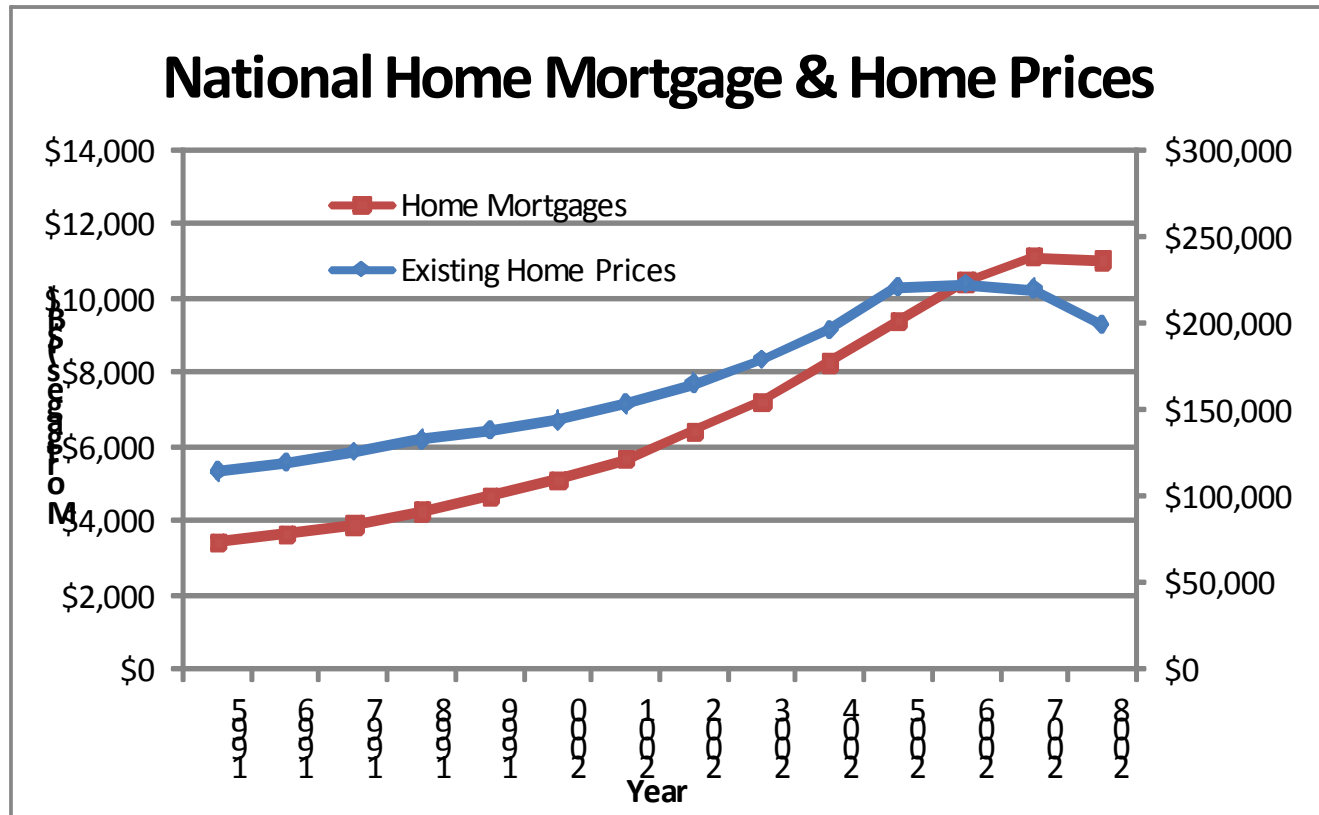
Section 1: Housing Crisis Background

Housing: Annual Housing Price Index



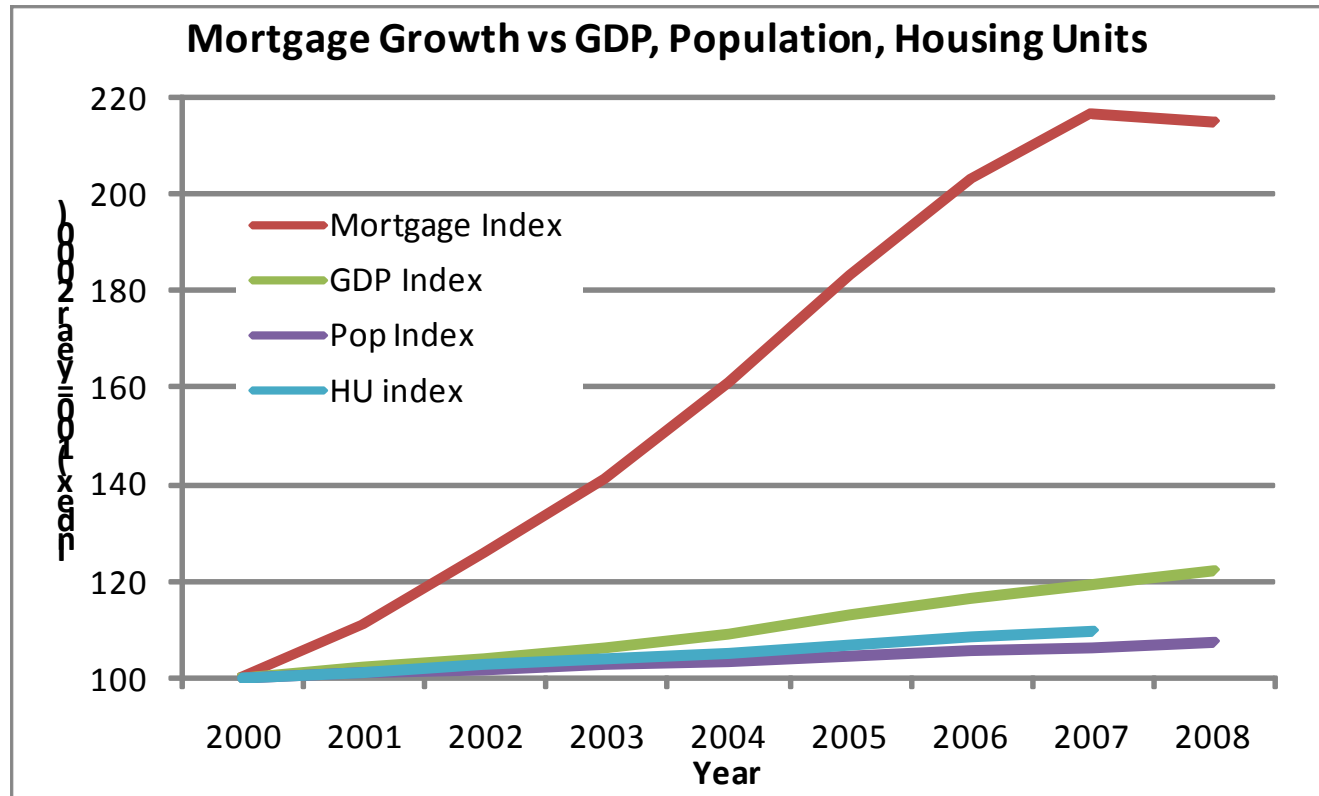
Source: SF Federal Reserve, Trends in Delinquencies and Foreclosures in Southern California

Home Price vs. Mortgage Growth



Source: HUD Market Conditions

Mortgage Grows Faster than Population, GDP



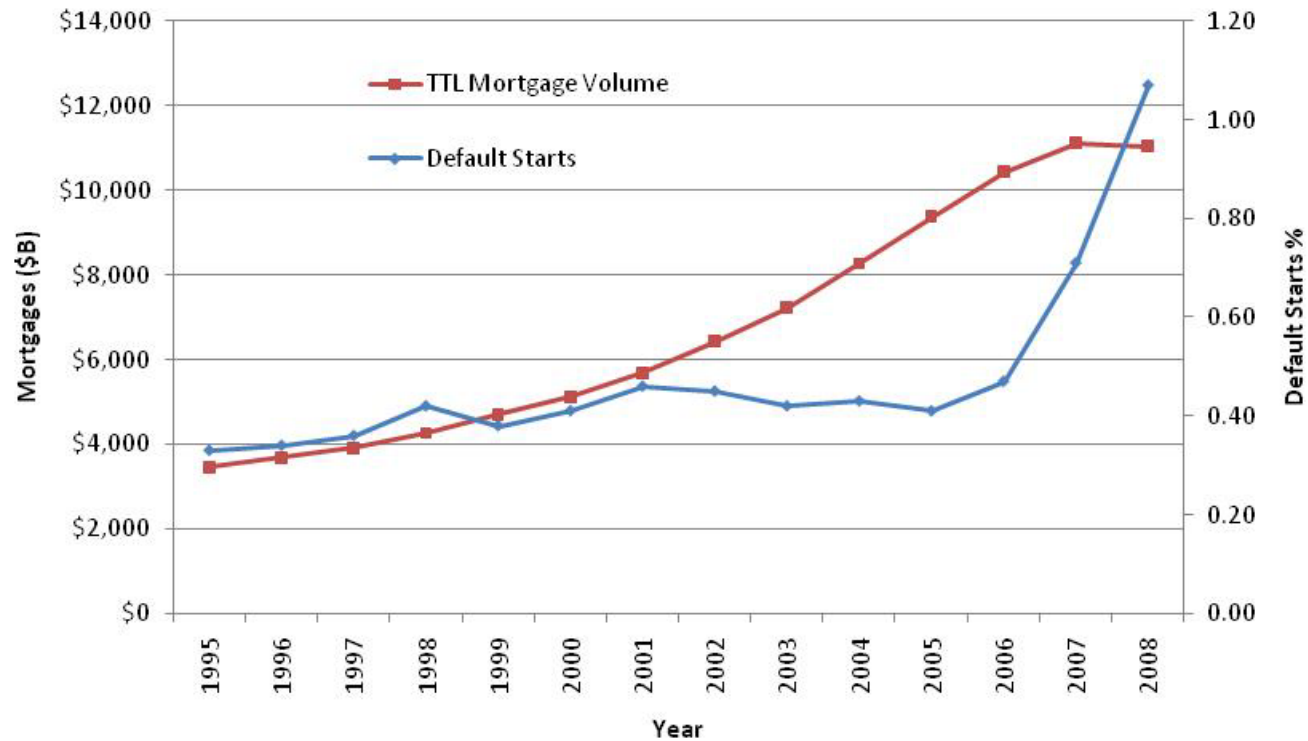
➤ Indexes based on year 2000 values as 100

➤ NOTE: Mortgage Index based on absolute dollars (not adjusted for inflation, etc.)

Source: HUD Market Conditions and US Census housing data

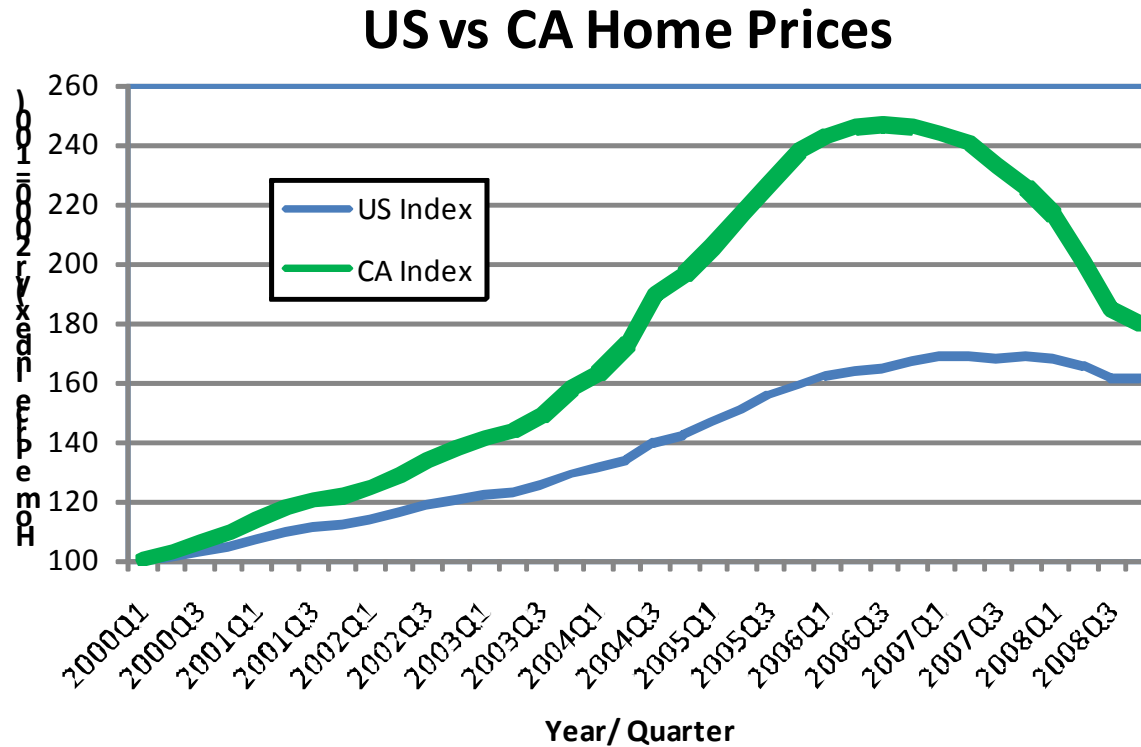
Housing Defaults vs. Mortgage Growth

National Home Mortgage & Defaults



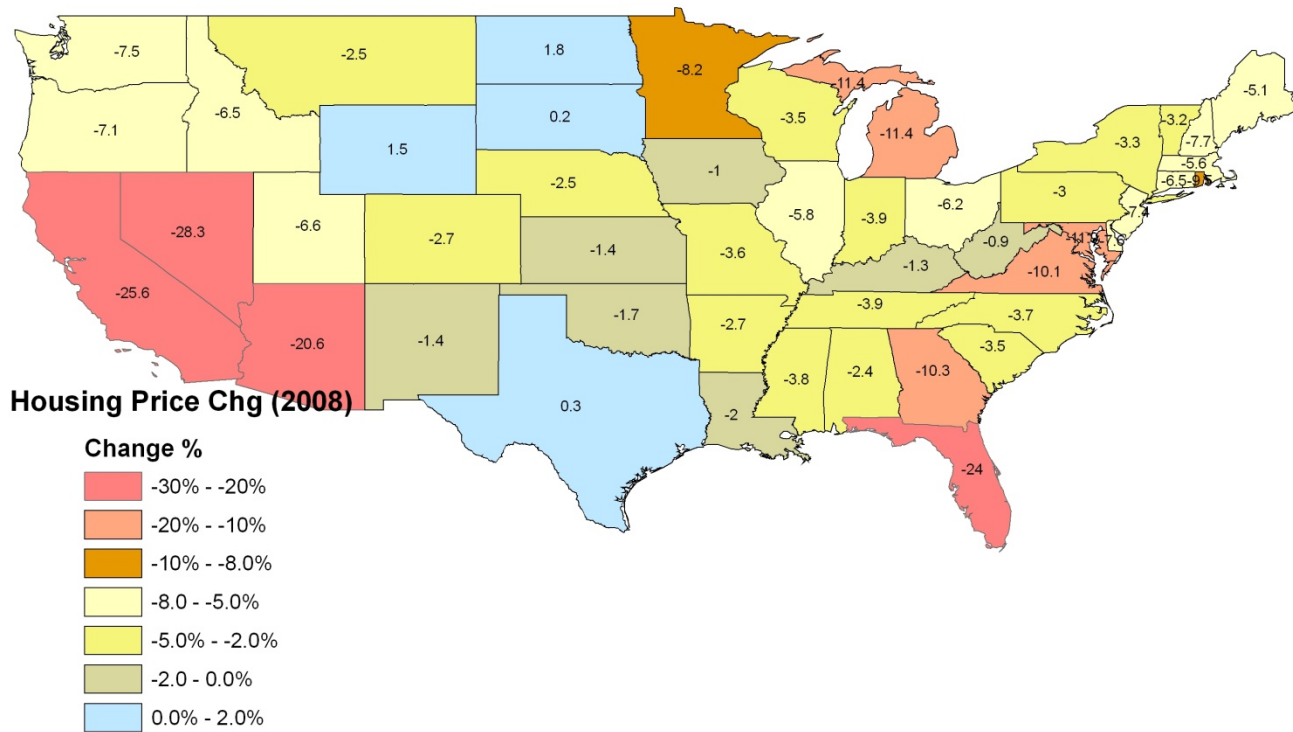
Source: HUD Market Conditions

US Home Prices vs California Home Prices



Source: OFHEO, Federal Housing Finance Agency House Price Index

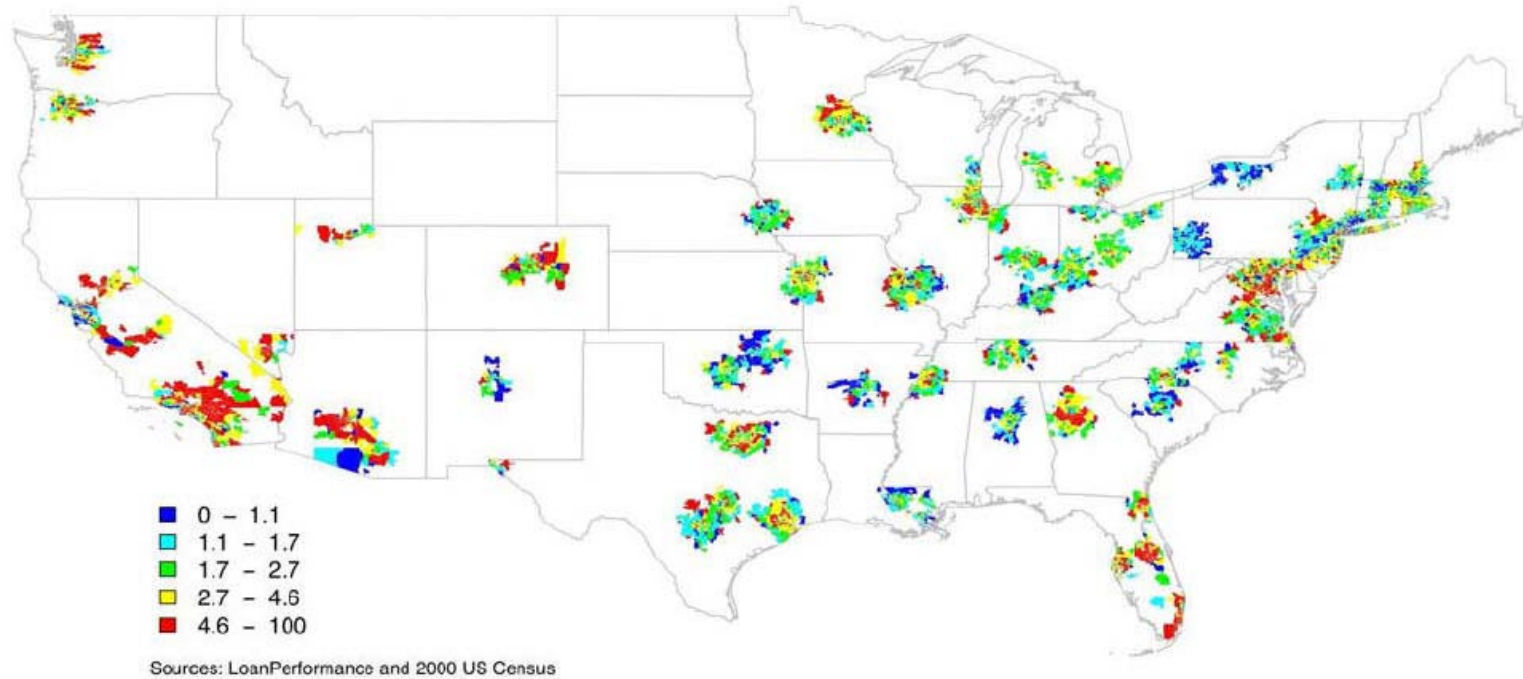
Change in Housing Prices in 2008



Source: Federal Housing Finance Agency House Price Index

Percentage of Subprime Housing (National)

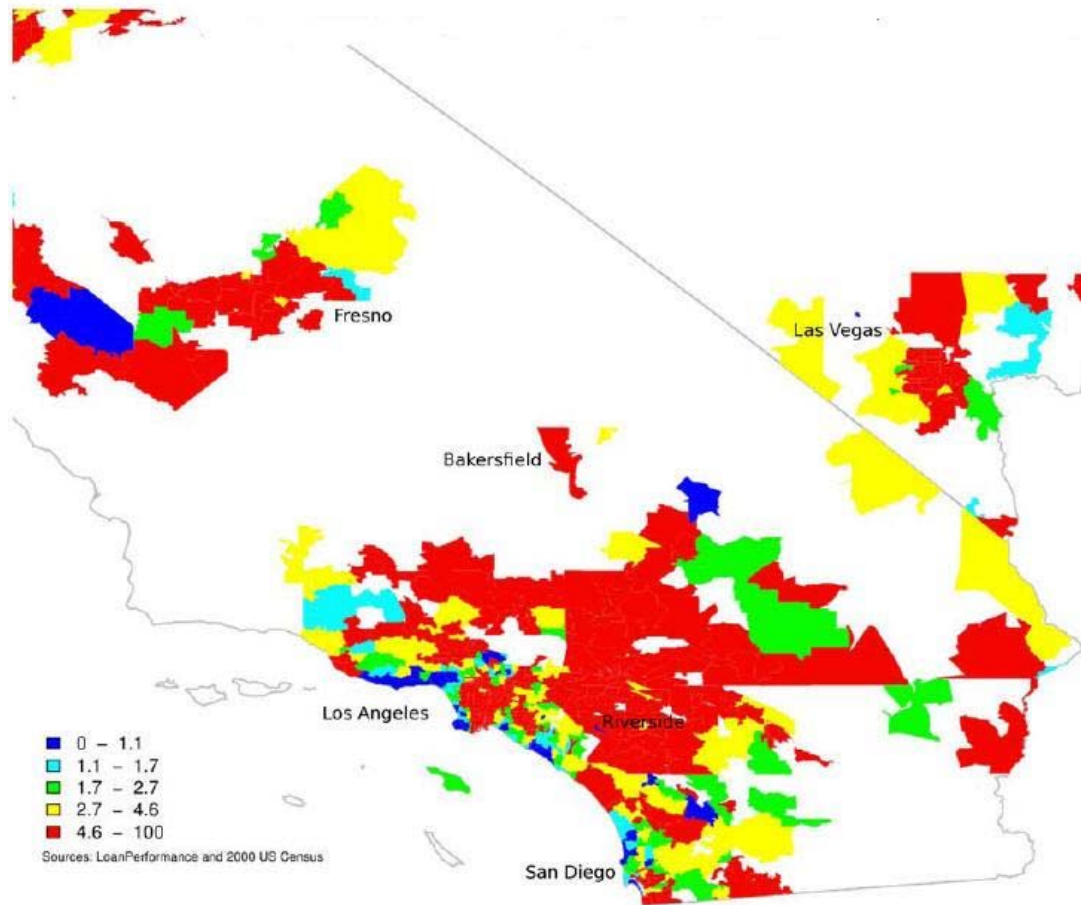
Percentage of Housing Units with Subprime Loan Originations in 2005, Loan Performance



Source: Chris Mayer, and Karen Pence, Subprime Mortgages: What, Where, and to Whom? (Federal Reserve)

Percentage of Subprime Housing (Southern CA)

Percentage of Housing Units with Subprime Loan Originations in 2005, Loan Performance



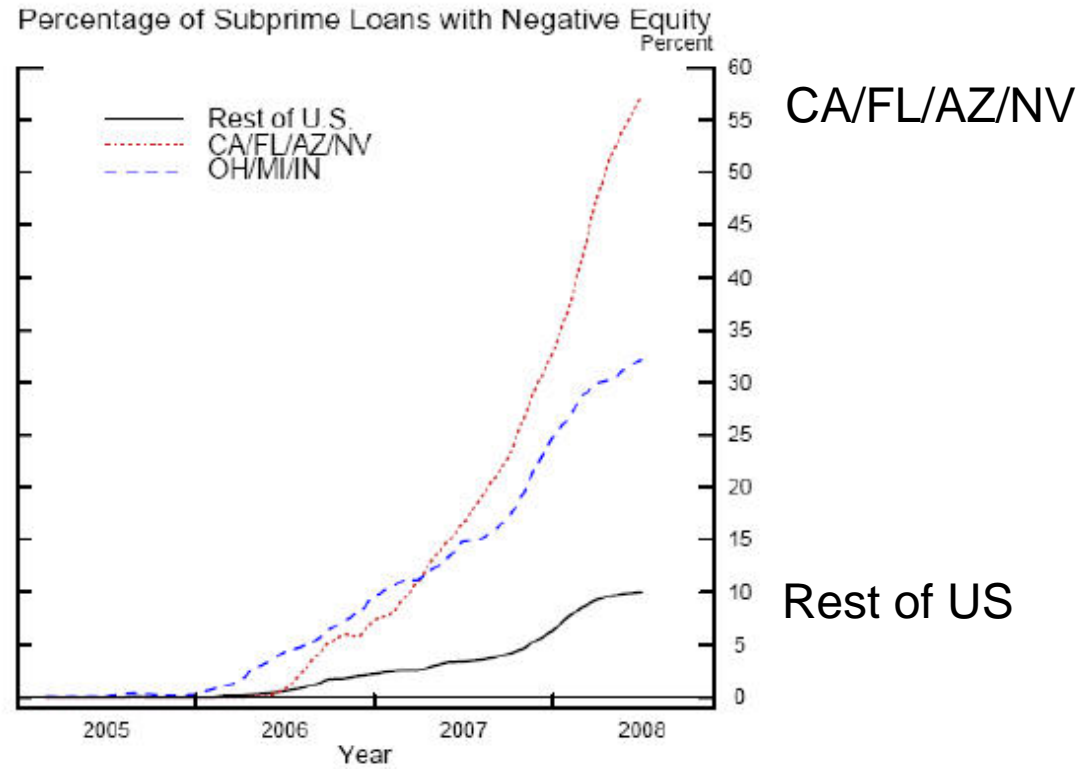
Source: Chris Mayer, and Karen Pence, Subprime Mortgages: What, Where, and to Whom? (Federal Reserve)

Subprime Percentage by MSA

LP Subprime Originations as a Share of All Originations by MSA, 2005		
	MSA	# Subprime Loans/# Loans
1	Memphis, TN-MS-AR	0.34
2	Bakersfield, CA	0.34
3	Visalia, CA	0.32
4	Fresno, CA	0.31
5	Detroit, MI	0.29
6	Miami, FL	0.29
7	Houston, TX	0.28
8	Riverside, CA	0.28
9	Jackson, MS	0.27
10	Las Vegas, NV	0.27
11	McAllen, TX	0.27
12	Cleveland, OH	0.27
13	San Antonio, TX	0.26
14	Stockton, CA	0.26
15	Orlando, FL	0.25
16	Cape Coral, FL	0.24
17	Jacksonville, FL	0.24
18	Milwaukee, WI	0.24
19	Dayton, OH	0.23
20	Tampa, FL	0.23
21	Lakeland, FL	0.23
22	Akron, OH	0.23
23	Chicago, IL-IN-WI	0.23
24	Dallas, TX	0.23
25	New Haven, CT	0.22

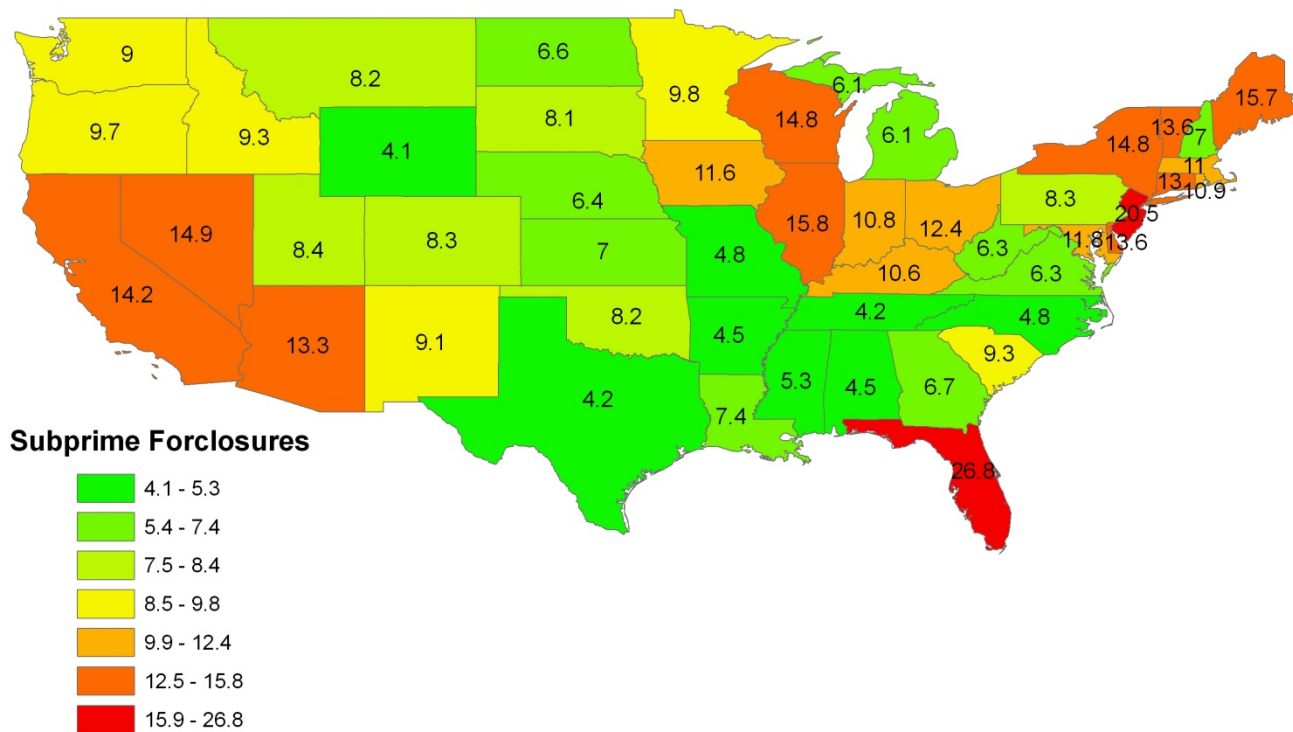
Source: Chris Mayer, and Karen Pence, Subprime Mortgages: What, Where, and to Whom? (Federal Reserve)

Negative Equity Percentage for Subprime Mortgages



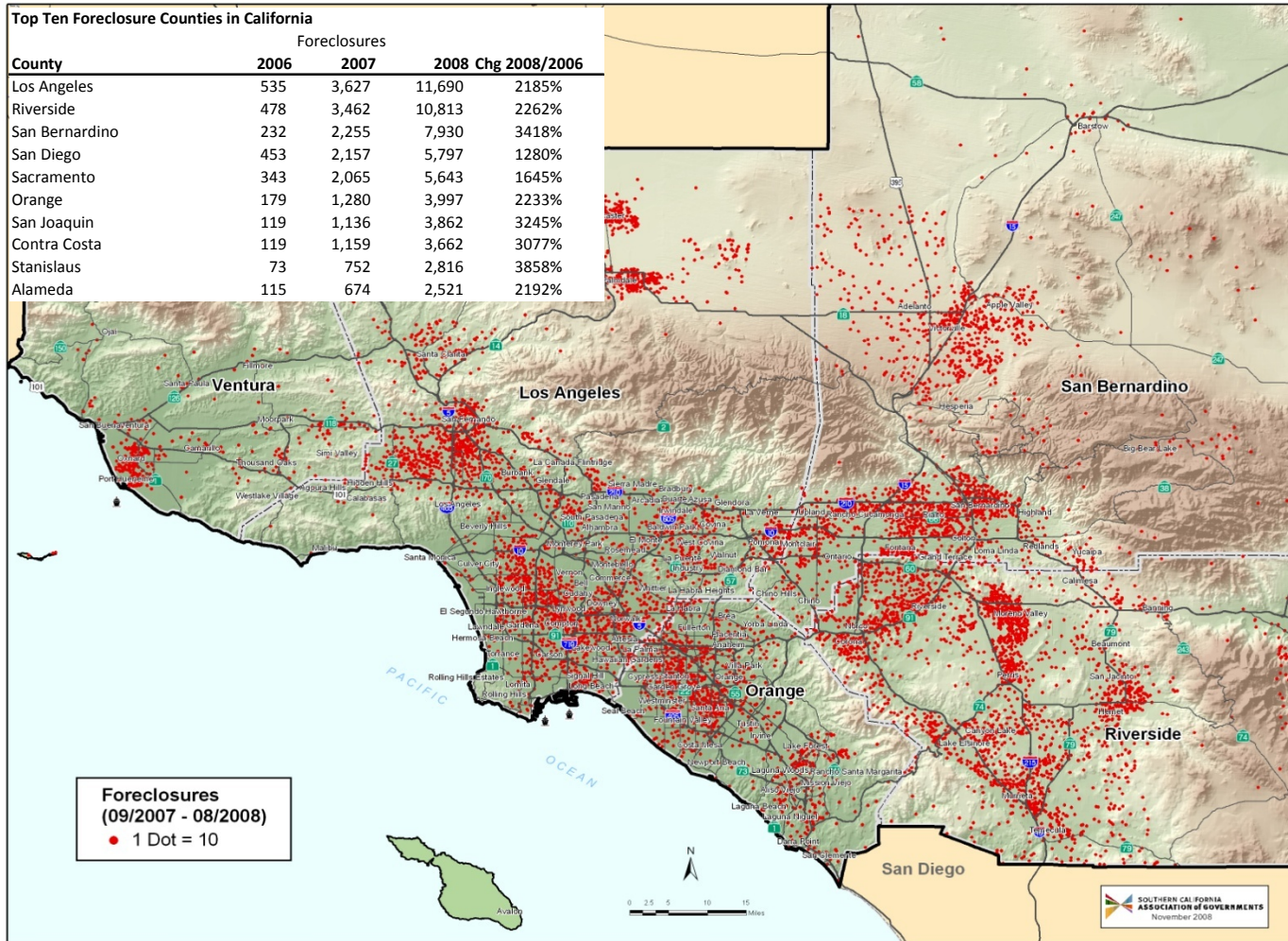
Source: Christopher J. Mayer, Karen M. Pence, and Shane M. Sherlund, *The Rise in Mortgage Defaults* (Federal Reserve)

Foreclosure of Subprime Mortgages (2008)



Source: Federal Reserve, <http://www.newyorkfed.org/mortgagemaps/>

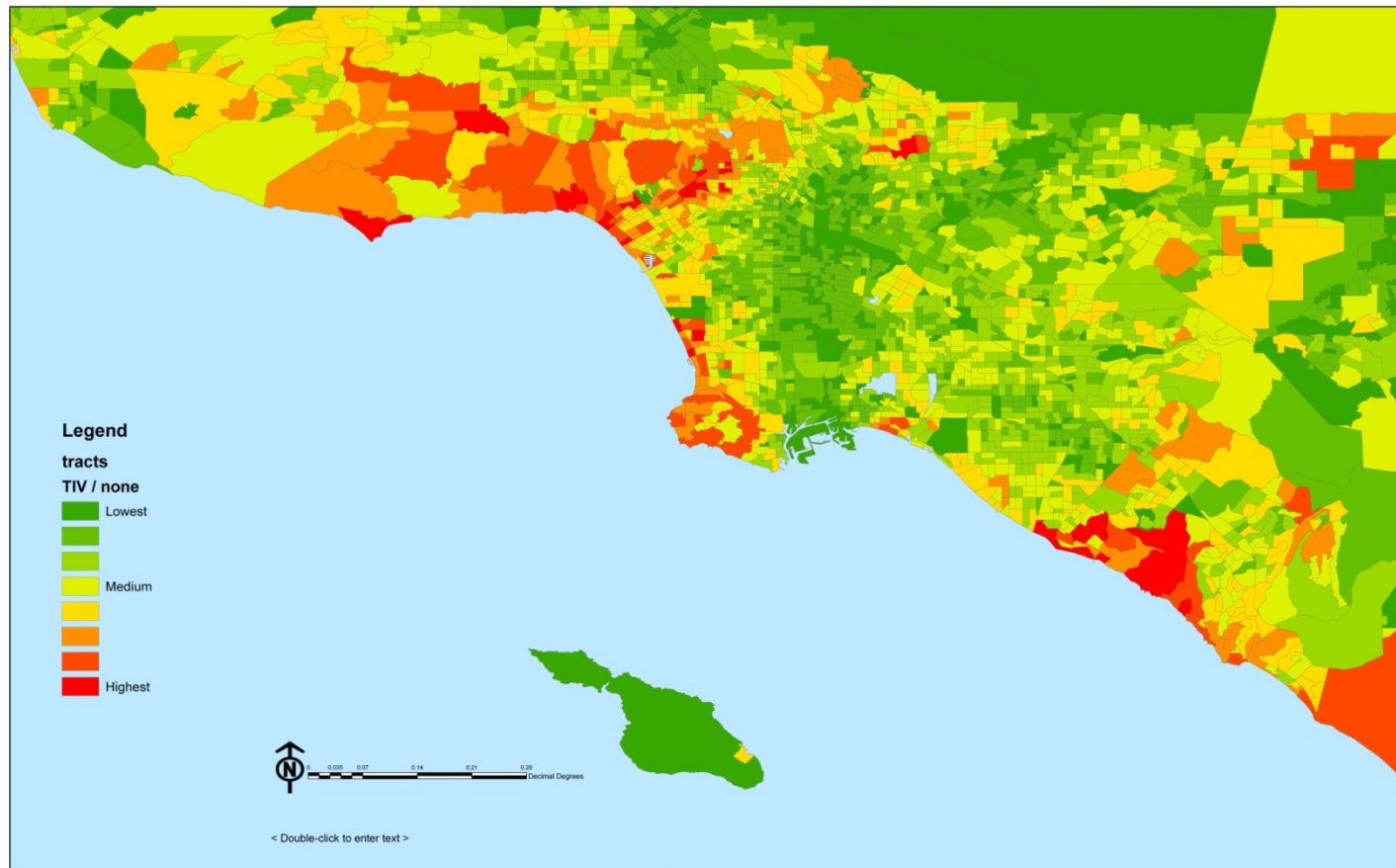
Foreclosures in Southern California



Source: SCAG, Southern California Association of Governments

Section 2: Earthquake Shake Scenario

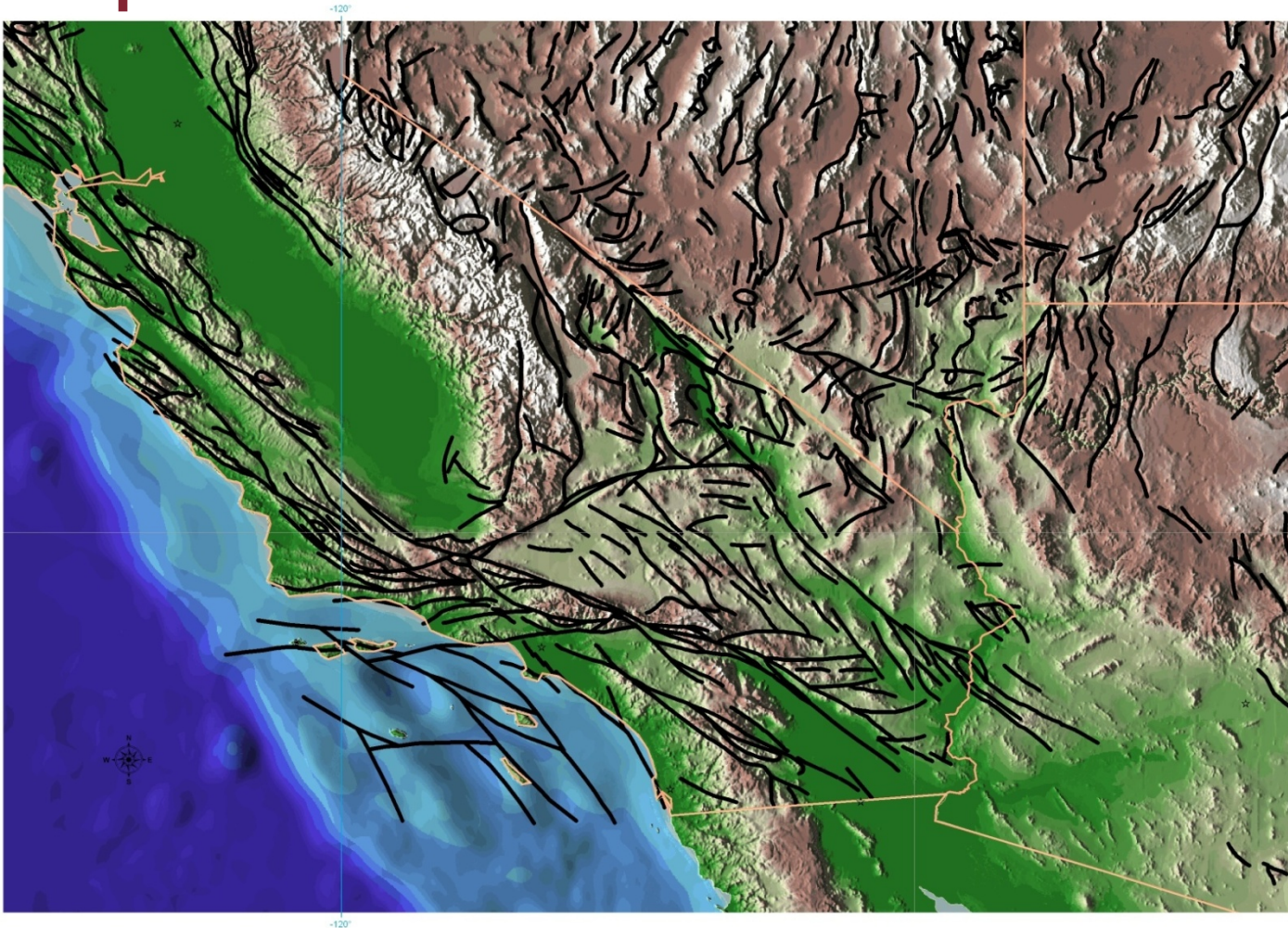
Exposure Value in Southern California



- Exposure values represent Total Insured Values (TIVs) as replacement cost. These include structure, contents, and time element coverages. No deductibles are included.
- Exposure represents housing stock only (commercial lines not modeled).

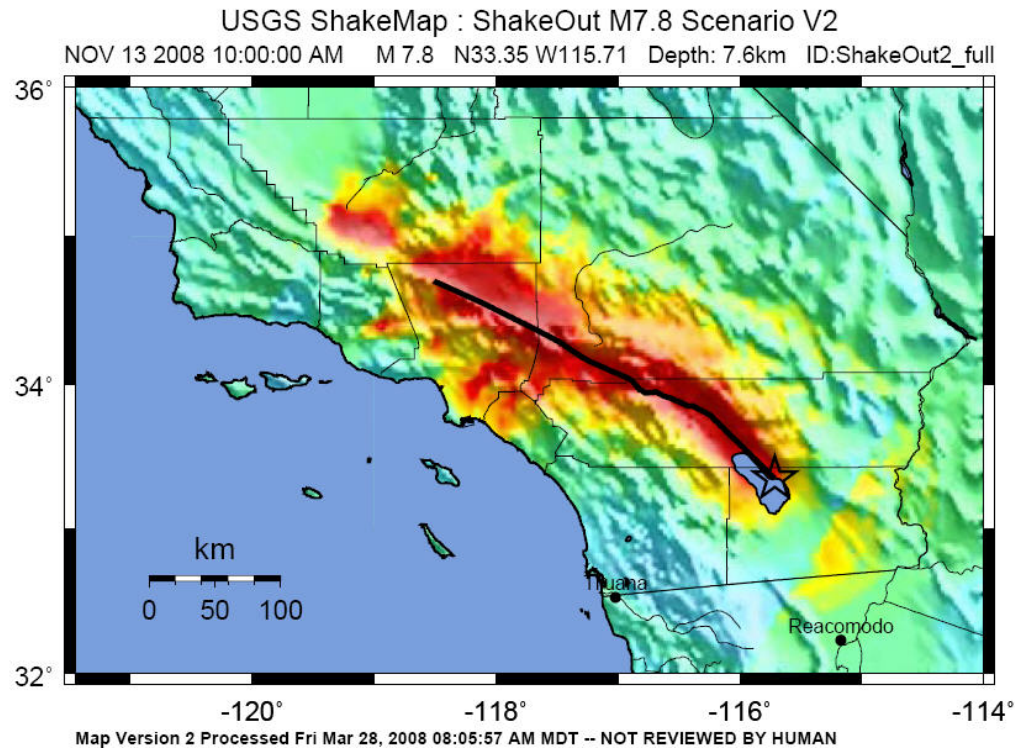
Source: Impact Forecasting, US Census

Earthquake Faults around Southern California



Source: Impact Forecasting, USGS

USGS Great ShakeOut Earthquake Scenario (M7.8)



PERCEIVED SHAKING	Not felt	Weak	Light	Moderate	Strong	Very strong	Severe	Violent	Extreme
POTENTIAL DAMAGE	none	none	none	Very light	Light	Moderate	Moderate/Heavy	Heavy	Very Heavy
PEAK ACC.(%g)	<.17	.17-1.4	1.4-3.9	3.9-9.2	9.2-18	18-34	34-65	65-124	>124
PEAK VEL.(cm/s)	<0.1	0.1-1.1	1.1-3.4	3.4-8.1	8.1-16	16-31	31-60	60-116	>116
INSTRUMENTAL INTENSITY	I	II-III	IV	V	VI	VII	VIII	IX	X+

Source: USGS

Scenario Loss Results (Impact Forecasting)

MMI	Damage State					All (\$M)
	Slight (\$M)	Light (\$M)	Moderate (\$M)	Heavy (\$M)	Complete (\$M)	
6.00	8.1	84.9	157.8	137.7	8.4	396.8
6.25	13.7	151.6	314.4	353.7	16.7	850.3
6.50	21.4	256.0	487.9	601.2	79.6	1,446.2
6.75	57.5	660.0	1,284.9	1,623.8	285.9	3,912.1
7.00	91.4	1,067.1	2,172.9	2,845.3	818.6	6,995.3
7.25	82.3	1,156.2	2,604.1	3,831.8	1,126.6	8,800.9
7.50	66.6	1,170.4	3,112.1	4,812.8	1,969.1	11,131.1
7.75	39.9	919.7	2,965.1	4,638.0	3,400.1	11,962.7
8.00	20.4	567.4	2,574.7	3,532.5	3,918.2	10,613.2
8.25	8.8	337.4	2,001.6	3,220.2	2,718.0	8,285.9
8.50	2.6	145.6	1,290.5	2,866.5	226.0	4,531.2
8.75	0.7	53.7	762.9	2,339.0	125.3	3,281.6
9.00	0.2	14.7	369.7	1,667.3	110.7	2,162.6
9.25	0.0	2.7	121.1	849.4	78.8	1,052.0
9.50	0.0	0.4	23.2	327.3	49.2	400.2
9.75	0.0	0.0	3.4	77.0	12.3	92.8
10.00	0.0	0.0	0.7	9.5	0.3	10.5
Total	413.6	6,587.7	20,247.0	33,733.2	14,943.9	75,925.4

| Note: only "Heavy or better" would exceed most earthquake deductible clauses.

➤ Commentary

- Only heavy or better damage homes would exceed CEA quake deductibles. Typically CEA take up rates are around 9% and CA has only a 12% take up rate for quake insurance overall.
- Due to leverage (LTV ratios of 70% to 90%) the impact of direct losses could be magnified.

Source: Impact Forecasting (Aon Benfield)

Conclusions

➤ Current Economic State of Housing

- Overall housing mortgage volume increased greatly during the past 6-8 years.
- Housing prices peaked in 2006 and subsequently declined precipitously, especially in California, Florida, Arizona, and Nevada.
- Relaxation of underwriting guidelines greatly influenced the housing bubble. This was especially true in subprime and Alt-A mortgages.
- The regions with the highest subprime mortgage volume experienced the highest delinquencies and foreclosures. Southern California (and especially Riverside/ San Bernardino regions) experienced above average foreclosure rates.

➤ Scenario: A Magnitude 7.8 earthquake along the San Andres in Southern California

- A scenario M7.8 earthquake suggested by the United States Geologic Survey was analyzed for the impact on Southern California.
- The likely outcome generates housing losses of \$75.9 Billion (commercial excluded).
- Nationally >12% of the total mortgage volume is subprime, with likely higher percentages in Southern California.
- While California overall currently has ~30% of its homes “underwater”, the rates are higher for Riverside/ San Bernardino (approx. 45%)
- A large natural catastrophe would greatly impact homes already under stress.

Appendix

Limitations Regarding Use of Catastrophe Models

This report includes information that is output from catastrophe models of Impact Forecasting, LLC (IF). The information from the models is provided by Aon Benfield Analytics. (Aon Benfield) under the terms of its license agreements with IF.

The results in this report from IF are the products of the exposures modeled, the financial assumptions made concerning deductibles and limits, and the risk models that project the dollars of damage that may be caused by defined catastrophe perils. Aon Benfield recommends that the results from these models in this report *not be relied upon in isolation* when making decisions that may affect the underwriting appetite, rate adequacy or solvency of the company.

The IF models are based on scientific data, mathematical and empirical models, and the experience of engineering, geological and meteorological experts. Calibration of the models using actual loss experience is based on very sparse data, and material inaccuracies in these models are possible. The loss probabilities generated by the models are not predictive of future hurricanes, other windstorms, or earthquakes or other natural catastrophes, but provide estimates of the magnitude of losses that may occur in the event of such natural catastrophes.

Aon Benfield makes no warranty about the accuracy of the IF models and has made no attempt to independently verify them. Aon Benfield will not be liable for any special, indirect or consequential damages, including, without limitation, losses or damages arising from or related to any use of or decisions based upon data developed using the models of IF.

Additional Limitation of Impact Forecasting, LLC

The results listed in this report are based on engineering / scientific analysis and data, information provided by the client, and mathematical and empirical models. The accuracy of the results depends on the uncertainty associated with each of these areas. In particular, as with any model, actual losses may differ from the results of simulations. It is only possible to provide plausible results based on complete and accurate information provided by the client and other reputable data sources. Furthermore, this information may only be used for the business application specified by Impact Forecasting, LLC and for no other purpose. It may not be used to support development of or calibration of a product or service offering that competes with Impact Forecasting, LLC. The information in this report may not be used as a part of or as a source for any insurance rate filing documentation.

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