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INSURING A WAY OUT: MODERNIZING THE CALIFORNIA EARTHQUAKE AUTHORITY

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EXECUTIVE SUMMARY

California faces severe earthquake risk, yet consumers routinely choose not to purchase insurance products to cover this risk. Low earthquake insurance take-up rates create a scenario in which a major event could result in significant personal, societal, governmental and financial disruptions. The problem is real and serious, although understanding its precise magnitude will require more research.

More than one-third of California's earthquake risk is held by the California Earthquake Authority. The CEA is a publicly managed but privately funded state instrumentality founded to stabilize the state's homeowners insurance market in the midst of an availability crisis following 1994's Northridge quake. The crisis resulted directly from California law insisting that homeowners insurers must offer earthquake insurance, a law that still stands. However, the mission of the CEA has changed over the past 20 years. It is now the CEA's goal to increase the state's earthquake insurance take-up rate.

Increasing the take-up rate is an important objective. Risk that is not maintained in private hands will become a public burden. But to achieve higher take-up rates with a repurposed CEA, the organization's structure needs to evolve. Disincentives to marketing earthquake insurance need to be removed and replaced with sales incentives. Mitigation incentives need to be linked with policy sales in a financially attractive way. Finally, tax incentives, coupled with regulatory updates, are needed to address a current perverse incentive to self-insure.

In addition to the affirmative steps California must take to increase the earthquake insurance take-up rate, it also must avoid potential missteps. Increasing the take-up rate by relying on post-event funding mechanisms will lead to actuarially unsound pricing practices that will burden all Californians, regardless of their relationship to earthquake risk. To grow the number of insureds prudentially, California should instead look to introduce an insurance requirement

for mortgages that are backed by taxpayers. Such a system would preserve individual decisional autonomy while simultaneously reducing the seismic risk currently shouldered by taxpayers. Fortunately for California, should the will exist to avail itself of the opportunity, there is substantial risk-transfer capacity available to facilitate a mortgage requirement of that type.

INTRODUCTION

Californians are overexposed and underinsured with regard to earthquake risk. The desire to live in a beautiful environment outweighs the certainty of earthquake loss, as the state's population continues to concentrate itself along the coast in two of the most seismically active areas of the world. The likelihood of significant impact from an earthquake increases apace.

The California Earthquake Authority – a publicly managed and privately funded earthquake insurance instrumentality, born of a homeowners insurance availability crisis – has a policy take-up rate of around 10 percent. Yet the CEA's seemingly counter-intuitive unattractiveness to such a large proportion of Californians should surprise nobody. One problem is affordability, an inevitable consequence of a high risk concentrated in a small pool of insureds. For those willing to move into the jaws of disaster, insurance to cover such risks is costly.

The animating rationale undergirding the CEA has changed since its genesis. Just what was "the problem" that policymakers were seeking to address? Viewed through the lens of the present, it is often assumed that the CEA was created to increase the number of homeowners who obtain earthquake coverage. This is a reasonable assumption, given that the Northridge quake preceded the CEA's creation. However, the assumption is incorrect. The CEA's legislative history makes clear that it was created with the more elemental goal to ensure that homeowners insurance remained available.

Had the CEA's original goal been to encourage high earthquake insurance take-up rates, it certainly would not have countenanced deductibles of 15 to 20 percent. The CEA's primary function is not to be a guarantor against earthquakes. It remains a stabilization mechanism in the homeowners insurance market. How this scenario evolved is an interesting story that will be discussed later in this paper.

Nonetheless, unless reforms are undertaken to fundamentally realign how the CEA does business, expanding the number of Californians with earthquake coverage will remain but an ancillary benefit of its existence. This paper seeks to discuss what those reforms could entail.

HOW EARTHQUAKE INSURANCE WORKS

A consumer who purchases a homeowners, renters or condominium policy might be surprised to learn that structural damage caused by earth movement is not a covered peril (some renters policies do cover contents).[1] Damage caused by earth movement, like damage caused by flooding, is excluded from standard homeowners coverage. To gain coverage for damage associated with the ground shake trigged by earthquakes, it is necessary either to purchase a separate policy, or a policy endorsement.

California's earthquake market is dominated by the CEA. By far, the largest share of the market – 35 percent overall, including 75 percent of the residential policies – is held by the CEA. At the end of 2013, the CEA had 841,836 policies in force and collected $574 million in direct premiums.

TABLE I: LARGEST WRITERS OF EARTHQUAKE INSURANCE IN CALIFORNIA (2013)

Company	Market Share (%)	Direct Premiums Written ($1M)
CEA	35.1	574.0
Zurich	9.8	160.0
GeoVera	6.0	97.6
AIG	3.6	58.9
ACE	3.5	56.9
Swiss Re	3.2	51.5
ICW	2.6	43.1
Arch Capital	2.4	39.8
Chubb	2.3	37.9
Endurance	2.3	37.7
Everest Re	2.3	37.2
Golden Bear	2.1	34.3
Markel	2.1	34.2
Liberty Mutual	1.9	30.2
AXIS Capital	1.8	29.3
Allianz	1.7	27.4
Travelers	1.6	25.7
XL Group	1.3	21.6
State Farm	1.3	21.4
RLI	1.3	21.1
Argo Group	1.0	16.6
Nationwide	0.9	15.3
Hartford	0.9	14.0
HCC	0.8	13.5
Amica Mutual	0.8	13.3

SOURCE: SNL Financial

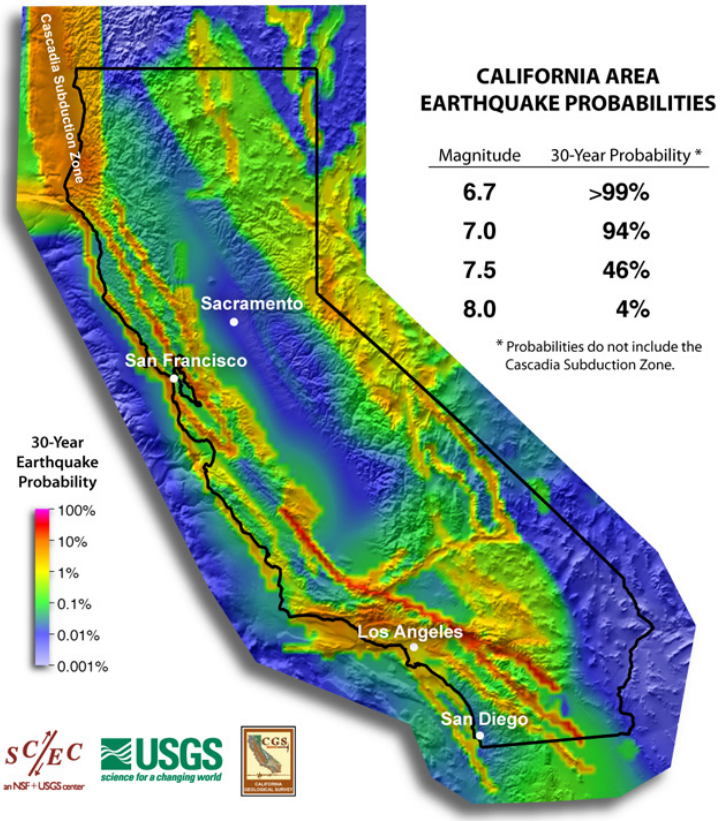
1. United States Automobile Association. "Renters Insurance: 5 Reasons You Can't Afford to Skip It." 6/17/2013. https://www.usaa.com/inet/pages/advice-home-renters-donotskip

With few exceptions, earthquake policies in California are designed to constrain the scope of coverage to structural losses. For instance, a base-limits policy offered by the CEA provides basic protection against earthquake damage. The policy will pay to repair or replace a dwelling – subject to a deductible – but it excludes coverage for such items as pools, patios, fences, driveways and detached garages. Only covered structural damage counts toward meeting the deductible. The base-limits policy pays up to $5,000 to repair or replace personal property and provides $1,500 for any additional living expenses incurred if the home is rendered uninhabitable during repairs. Contents coverage must be purchased separately.

Like other lines of insurance, earthquake insurance carries a deductible. A deductible is the amount that must be paid by the policyholder before insurance coverage kicks in. The purpose of a deductible is to forestall claims for damages that a policyholder can be expected to sustain. In the case of earthquake insurance, because events happen less frequently but are of greater severity, policy deductibles tend to be higher as a means of keeping premiums down and discouraging comparatively minor claims in the wake of an event.

While expensive, earthquake coverage is a sensible purchase in California, where a major earthquake is not a question of "if," but is rather a question of "when."

FIGURE I: CALIFORNIA EARTHQUAKE PROBABILITIES



SOURCE: Southern California Earthquake Center

EARTHQUAKE PERIL, PAST AND PRESENT

Geological likelihood: California's very early European settlers had only a dim awareness of earth movement, largely from stories passed along to them or from feeling small tremors. The first recorded earthquake by California settlers occurred in 1769.[2]

Our contemporary cultural awareness of California's vulnerability to earthquake risk predates modern seismic science, thanks to the state's more recent and calamitous history with earth movement. The infamous San Francisco earthquake of 1906 measured 7.9 on the Richter scale and had a ruinous impact on the city. More than 3,000 people were killed and about $400 million of damage was sustained (an inflation adjusted total of roughly $10 billion).[3] Since 1906, empirical data about the extent of California's seismic vulnerability has been brought into much clearer focus.[4]

It is now known that the state has thousands of fault lines and that further analysis, commissioned in the most recent legislative session, will likely reveal more.[5] The consequence of such a high concentration of fault lines is the virtual inevitability of a significant event. Unique among natural disasters, earthquakes are, in the long run, inevitable along any fault line. Plate tectonics dictate that pressure caused by plate movement will be released eventually. Today, it is estimated by the Southern California Earthquake Center that California has a 99.7 percent chance of experiencing an earthquake of magnitude 6.7 or greater within the next 23 years.[6]

The state's major fault system, the San Andreas, runs the length of California. A study conducted in 2006 concluded that stress along the fault has built to a point that a magnitude 7.0 or greater earthquake can now occur at any time.[7]

2. United States Geological Survey, "Earthquake Facts," June 3, 2014. http://earthquake.usgs.gov/learn/facts.php.

3. United States Geological Survey. "Casualties and Damages After the 1906 Earthquake," July 23, 2014. http://earthquake.usgs.gov/regional/nca/1906/18april/casualties.php.

4. United States Geological Survey, "1906 Marked the Dawn of the Scientific Revolution," July 18, 2014. http://earthquake.usgs.gov/regional/nca/1906/18april/revolution.php.

5. Rosanna Xia, "California acts to speed up quake fault mapping," *Los Angeles Times*, July 1, 2014. http://www.latimes.com/local/la-me-quake-faults-20140702-story.html.

6. Southern California Earthquake Center, "Uniform California Earthquake Rupture Forecast," http://www.scec.org/ucerf2/.

7. Yuri Fialko, "Interseismic strain accumulation and the earthquake potential on the southern San Andreas fault system," Nature, March 2006. http://sioviz.ucsd.edu/~fialko/papers/fialkoNature06.pdf.

However, not all of the state's earthquake risk arises from the San Andreas. One of California's most active faults, the Hayward-Rodgers Creek fault line, runs parallel to the San Andreas. The inevitability of a "big one" is practically California lore, but an underappreciated element of California's earthquake risk is its geographic diversity. While the likelihood of a 6.7 magnitude earthquake occurring in San Francisco (67 percent) is slightly greater than it is in Los Angeles (63 percent), a magnitude 7.5 earthquake is more than twice as likely to occur in Southern California (37 percent) as it is in Northern California (15 percent).[8] Neither prospect is appetizing.

The relative dangers posed by earthquakes is a function not only of their severity, but also where Californians situate themselves. Amazingly, 80 percent of Californians live on, or near, a fault line.[9] More than 70 percent of Californians live within 30 miles of a fault line that has a high likelihood of triggering ground shake within the next 50 years.[10] It is a great historical irony that the bays and coastline that have brought California so much prosperity in the form of commerce and population owe their existence to the surface expression of the world's most diverse and active geological area.

Since 1900, California's population has swollen from 1.5 million to more than 38 million.[11] In the most densely packed population center in the state, the San Francisco Bay Area, population has grown from 655,000 to more than 7 million.[12] Because of this tremendous growth, modeling done in contemplation of the 100th anniversary of the 1906 San Francisco earthquake estimated that, were an identical event to occur today, the total economic loss to the region could reach $260 billion.[13] Such a loss would represent nearly 12 percent of California's gross state product of $2.2 trillion.[14]

Mortgage default risk: Should the "big one" hit somewhere, the big issues are who will pay for it, and how will it be financed. Unsurprisingly, taxpayers bear a significant portion of the risk from earthquakes. In California, the current earthquake policy take-up rate is only about 10 percent, even though the majority of the state's homeowners live in areas with significant earthquake exposure and may have personally experienced earth movement, slight or great.

Absent the existence of an indemnification mechanism like insurance, property damage sustained by individuals as a result of the quake could go unaddressed. While the federal Small Business Association does make low-cost loans available to those who suffer extensive damage and meet certain underwriting conditions, most of the afflicted will lack the financial resources to repair or rebuild their home without insurance. Without a major asset such as an intact house to act as collateral, lenders may be unwilling to lend money to rebuild, particularly for properties that already are heavily mortgaged. These economic disruptions would be significant for property owners, but they pale in comparison to the risk posed by widespread mortgage default.

In instances in which a home is destroyed, the collateral securing mortgage loans is significantly diminished (some value will be retained in the land). This makes the shift of risk from uninsured property owners and lending institutions onto the taxpayers virtually inevitable, following an earthquake. Taxpayers will pick up the tab, either by bailing out government-backed mortgage-related entities or by writing checks to homeowners.

Throughout most of Northern California, taxpayers back almost all mortgages under $625,000 through Fannie Mae, Freddie Mac, the Federal Housing Administration and the Veterans Administration.[15] Previously considered quasi-private "government-sponsored enterprises," Fannie and Freddie have been under the conservatorship of the Federal Housing Finance Agency since September 2008, during which period taxpayers have contributed $187.5 billion to bailing out the GSEs.[16] Given the chances that an earthquake could seriously damage thousands of homes uninsured for that peril, there's a good chance that future support would be needed to backstop the GSEs.

Problems with the structure of the mortgage-securitization system similar to those that caused the 2007-2008 financial crisis mean that price signals may not alert market players to their degree of exposure to earthquake risk. Once bundled and sold in securities by Fannie, Freddie and private parties, mortgages are not "tagged" as being for properties that are earthquake prone. Further, banking regulators, while interested, do not have data about the likely impact of massive

8. Edward Field, et al, "Forecasting California's Earthquakes—What Can We Expect in the Next 30 Years?," United State Geological Survey, 2008. http://pubs.usgs.gov/fs/2008/3027/fs2008-3027.pdf.

9. California Earthquake Authority, "The Earthquake Insurance Affordability Act (EIAA)," http://www.earthquakeauthority.com/UserFiles/File/Release/EIAAFactSheetold.pdf.

10. Department of Conservation, "A whole Lotta Shakin' Goin' On." http://www.conservation.ca.gov/index/earthquakes/Pages/qh_earthquakes.aspx.

11. Public Policy Institute of California, "Just the facts," July 2014. http://www.ppic.org/main/publication_show.asp?i=259.

12. Bay Area Census, http://www.bayareacensus.ca.gov/bayarea.htm.

13. Patricia Grossi, "The 1906 San Francisco Earthquake and Fire: Perspectives on a Modern Super Cat," *Risk Management Solutions*, 2006. http://www.rms.com/resources/publications/natural-catastrophes.

14. Center for Continuing Studies of the California Economy, "California Once Again the World's 8th Largest Economy," July 2014. http://www.ccsce.com/PDF/Numbers-July-2014-CA-Economy-Rankings-2013.pdf.

15. Marc Joffe, et al. "Restoring Trust in Mortgage-Backed Securities." *Reason Foundation*. Page 7. 5/2012. http://reason.org/files/study_restoring_trust_in_mbs_final.pdf.

16. Steve Linick. Testimony to Committee on Banking, Housing, and Urban Affairs. April 18, 2013. http://fhfaoig.gov/Content/Files/Linick%20testimony%20Senate%20Banking.pdf.

mortgage defaults on uninsured properties following a catastrophic earthquake. As a result, default risk on those mortgages is not fully reflected in the securities' basis risk.

Taxpayers might also have to pay directly. While this has not been typical, Congress made an exception following Hurricane Katrina, when it appropriated money to the State of Louisiana which then used it to compensate homeowners who did not have insurance. Unfortunately, this type of government-induced moral hazard creates a disincentive for individuals to finance their own risk transfers. This is not the end of it, however, since in another sort of loss, it is empirically verifiable that every dollar of federal disaster aid forestalls six dollars worth of investment in private insurance coverage.

In short, taxpayers may end up on the hook following a major earthquake, even if Congress never appropriates emergency funds to help uninsured property owners.

Associated risks to the insurance industry: Currently, U.S. insurance companies sell earthquake coverage for residential properties and many commercial properties as a separate policy or as a policy rider. This practice is a legacy of difficult lessons learned by insurers in the wake of disasters like the 1906 San Francisco earthquake.[17]

Prior to the 1906 earthquake, companies sold "all-risk" policies that specifically articulated excluded perils. At the time, most fire policies maintained a "fallen buildings" clause that specifically excluded losses associated with a structure's collapse unless the collapse was the result of a fire. Because of this, insurers believed that they would not be liable for fire losses associated with earthquakes. After the 1906 earthquake, as claims were filed, controversy developed about whether or not losses resulted from ground shake or fire damage. Many insurers interpreted their policies in a manner that precluded recovery for ground shake losses and refused to pay claims made against policies. Courts responded by interpreting the insurance contracts more broadly, to include losses caused by ground shake. As a result, insured losses were much higher than anticipated.[18]

To prevent future confusion and the inevitability of suit, the California Legislature later adopted a change to compel the coverage of fire following an earthquake or any other covered peril.[19] So-called "coverage expansion" resulting from judicial decisions is not merely a thing of the distant past. Many properties affected by the Northridge earthquake suffered serious damage as a result of burst water systems. Since residential policies typically cover non-flood related water loss, and have a far lower deductible than earthquake policies, they were implicated, even though the cause of the water system failures were shake related. Should an event occur today, further policy coverage creep is to be anticipated. Although it is destabilizing and disappointing, courts and the Legislature have much to lose if they fail to act to extend coverage.

When courts do expand coverage, or rule policy exclusions void, there usually are undesirable consequences for the California insurance market. If insurers are made to pay claims for specifically excluded perils that are proximately caused by an earthquake, it could trigger a general homeowners insurance availability crisis, as carriers are prompted to withdraw from the state. In an extreme case, some insurers could face insolvency, adding burdens to the state guaranty fund.

CALIFORNIA EARTHQUAKE AUTHORITY

Progenitors: The California Earthquake Authority was established in the wake of the 1994 Northridge earthquake. But the CEA was not California's first state-driven attempt at providing coverage for earthquake peril.

Founded in 1980 as a temporary organization to study the seismic vulnerability of Southern California counties, the Southern California Earthquake Project, under the control of the California Seismic Safety Commission, commissioned a series of studies to document the prospective resilience of the region to earthquake. Their efforts uncovered that only 5 to 7 percent of Californians held earthquake insurance in the early 1980s.[20] In spite of the low take-up rate for residential earthquake insurance, prior to 1984, the state elected to forego involvement.

In 1984, the California Legislature decided to link homeowners insurance to an offer for earthquake insurance.[21] The Legislature's decision to act was predicated on a court ruling that expanded the scope of causation, so that specifically excluded perils could trigger coverage if a proximate cause of loss resulted from a covered peril. In other words, the court allowed for the realization of losses from consciously and purposely excluded contractual risks. This dramatically expanded the scope of insurers' liability. The burden of demonstrating there was no proximate cause fell

17. James Goltz. "Earthquake Insurance: A Public Policy Dilemma." Federal Emergency Management Service. 5/1985. http://www.fema.gov/media-library-data/20130726-1600-20490-8046/fema_68.pdf.

18. Patricia Grossi, et al, "The 1906 San Francisco Earthquake and Fire: Perspectives on a Modern Super Cat," *Risk Management Solutions*, 2006. http://www.rms.com/resources/publications/natural-catastrophes.

19. California Insurance Code §10088.5.

20. Henry Lambright, "The Southern California Earthquake Preparedness Project: Evolution of an Earthquake Entrepreneur," *International Journal of Mass Emergencies and Disasters*, 1985. http://www.ijmed.org/articles/108/download/.

21. California Insurance Code §10081.

upon the companies, thus dramatically increasing the prospect of punitive damages as a result of a finding of bad faith against the insurer.[22]

Instead of sensibly reigning in an ex post expansion of coverage, the Legislature recklessly chose to compel insurers to entangle two distinct lines of business. By doing so, they tipped over the first domino in a line of unintended consequences, as insurers' past earned premiums proved inadequate to cover existing liabilities. Aware of the dangers of this shortfall, insurers actively sought legislative solutions that would ease this burden. Insurers had been stymied in their efforts for nearly five years when, in 1989, the Loma Prieta earthquake struck the Bay Area.

The losses caused by Loma Prieta sparked legislative action. A special session was convened in Sacramento to address the short-term $1 billion impact of the quake on state government. The result was that the Legislature approved a 13-month, quarter-cent tax increase to fund repairs. Additionally, to address long-term earthquake exposure, the Legislature began investigating ways to expand coverage.

In 1990, the state Legislature enacted the first major effort to address earthquake risk by passing the California Residential Earthquake Recovery program. This program was designed to provide all Californians with the ability to purchase a low-cost earthquake insurance option. The plan called for $15,000 of earthquake coverage, and a $1,000 to $3,000 deductible, at a cost of $12 to $60 annually. Funding for the program was to come first from an initial round of revenue bonds; subsequently, from collected premiums; and finally, if necessary, policy surcharges. The problem with CRER, which led to its repeal in 1992, was that revenue never could match annualized expected loss projections.

It is interesting to note that revenue bonds, the initial means selected to finance the program, were believed to be unworkable.[23] The cost of issuing the bonds, as well as the uncertainty associated with debt service after an event, led to concern on the part of the state treasurer's office. [24] Uncertainty about the viability of an early bond issuance meant the program would have begun without the capital necessary to absorb a loss for its first few years. In fact, if an earthquake were to have hit as the program was being ramped up in the early years, it likely would have been the case that payouts would have been prorated to 20 or 30 percent of expected claims.[25]

Northridge: The state Legislature was forced to reexamine the problem when, on Jan. 17, 1994, an earthquake centered in Northridge that measured 6.7 on the Richter scale killed 60 people and destroyed thousands of homes, businesses and apartment complexes. To date, according to Swiss Re, the Northridge quake, at $22.9 billion in inflation-adjusted dollars, remains the costliest seismic event measured by insured losses in U.S. history.[26]

The insured loss in Northridge was more than four times the $3.5 billion in earthquake premiums collected by all earthquake insurers in California from 1969 through 1994.[27] To put this into perspective, the 25 years of the industry's premiums that were wiped out in an instant paid for just 20 percent of the earthquake's cost. Following the event, insurers were cynically alleged to have dramatically underestimated their exposure to a Northridge-like earthquake. While part of the problem was a lack of awareness of the specific fault that caused the earthquake, the true genesis of the shortfall was shortsightedness by policymakers about the impact of expanding the scope of insured exposure.

Is it any wonder that, bound by the link between earthquake insurance and homeowners insurance,[28] insurance companies responded to Northridge by attempting to reduce their earthquake exposure through the only means available? This was, of course, by restricting the sale of new homeowners policies. Insurers representing more than 93 percent of the homeowners market either reduced their sales of new policies or stopped writing entirely. Without a meaningful homeowners insurance market, lenders, builders and realtors started to howl in economic pain.

The first post-Northridge attempt to right the homeowners insurance market was the introduction of so-called "mini-policies." These policies were introduced to allow insurers to continue selling homeowners insurance without "de-linking" that coverage from earthquake coverage. To accomplish this goal, a mini-policy offers consumers a minimum level of coverage intended only to return structures to habitability. The policies proved ineffective at correcting the real estate market. Insurers continued to fear the financial uncertainty that another serious earthquake could bring. Faced with the intractability of the problem they had created, and seemingly

22. Jeffrey Hare, "Earthquake Insurance: A Proposal for Compulsory Coverage," *Santa Clara Law Review*, January 1984. http://digitalcommons.law.scu.edu/cgi/viewcontent.cgi?article=1938&context=lawreview

23. Assembly Committee on Insurance, "AB 2613 (Areias) – Analysis as amended: April 26, 1994," http://leginfo.ca.gov/pub/93-94/bill/asm/ab_2601-2650/ab_2613_cfa_940510_114210_asm_comm

24. Senate Subcommittee on Earthquake Insurance, "Oversight Hearing on Implementation of SB 2902," p. 47, Nov. 25, 1991. http://digitalcommons.law.ggu.edu/cgi/viewcontent.cgi?article=1099&context=caldocs_senate

25. ibid at 11.

26. James Nash, "California Sells $350 Million of Quake Bonds: Muni Deals," *Bloomberg*, Oct. 19, 2014. http://www.bloomberg.com/news/2014-10-20/california-sells-350-million-of-quake-bonds-muni-deals.html.

27. Chuck Quackenbush, "Help for Homeowners in Next Quake," *Los Angeles Times*, Aug. 12, 1996. http://articles.latimes.com/1996-08-12/local/me-33451_1_homeowners-insurance-market.

28. California Insurance Code §10081.

unwilling to de-link the coverages, legislators determined that a state "instrumentality,"[29] though controversial, was necessary.

The CEA is the result of a legislative conference committee convened to resolve the homeowners insurance availability crisis. Separate but interdependent legislative vehicles were crafted whose implementation was contingent upon each others' passage. The final product of the conference committee bills was a public instrumentality of the State of California that would offer earthquake insurance through "participating insurers" and would, initially, rely on private funding from companies that chose to participate. This was the California Earthquake Authority, or CEA. Since December 1996, Californians have been able to purchase CEA policies.

Statutory structure: The CEA's participating insurers are deemed to have satisfied their legal obligation to offer earthquake insurance if they distribute statutorily delineated offer language to their insureds. That language was recently updated to remove provisions deemed "insurance jargon," in the hope that greater clarity might encourage more offerees to purchase earthquake coverage.[30]

Though publicly managed, the CEA is designed to be privately funded. To get the authority up and running, its participating insurers, representing about 70 percent of the state's earthquake policies, were required to make an initial infusion of capital. The amount of each company's liability was based on their share of the residential earthquake insurance market as of Jan. 1, 1994.[31] Thus, the CEA was seeded with $700 million in capital.

Because the CEA is a government instrumentality, it is not subject to federal income taxes, though its bond issuances are,[32] and is thus free of some of the encumbrances on capital accumulation faced by private insurers. At the time of its formation, it was estimated that as much as $0.40 of every private surplus dollar was owed to the federal government. In addition, the CEA is not subject to California's insurance premiums tax.[33] For these reasons, the CEA has been able to accrue capital reserves at a fast pace and, since its creation, has experienced no significant interruption in the growth and size of its reserves. It is now rated "A" by Fitch Ratings, representing a judgment of "outstanding" or outstanding strength against default.[34]

The governing board of the CEA consists of five members, three of whom are voting members: the governor, the treasurer and the insurance commissioner. The other two members of the board are the speaker of the Assembly and the chairperson of the Senate Committee on Rules.[35] In practice, designees sit in place of all of these officials.

Though privately funded, the CEA is subject to spending requirements in its enabling legislation. In 2014, the Legislature increased the proportion of the CEA budget that can be allocated to administrative expenses from 3 percent to 6 percent. Likewise, an initial requirement that limited the number of CEA employees subject to civil service provisions to 25 has been removed.

Overall, the day-to-day operations of the CEA are not wholly dissimilar from that of a private insurance company. Like a private company, the CEA must invest in risk-transfer mechanisms. One major risk-transfer option is reinsurance. Reinsurance is insurance coverage purchased by the CEA on a yearly basis to supplement further its claims-paying capacity in the event of a serious earthquake. It is insurance for insurance companies.

Assessment structure: The CEA's claims-paying capacity has a layered structure, comprised of funds that come from different sources. As currently arranged, the structure consists of five funding layers with a claims-paying capacity of $11 billion as of Oct. 31, 2014.[36] The five layers are: current policyholder premiums; risk-transfer mechanisms; funds from bonds issued in 2006 and 2014; and two potential assessment layers on participating insurers. In the event of an earthquake, the funding layers are accessed to pay claims in a strict order. This means that capital layers, from bottom to top, are only accessed after the preceding layer has been exhausted.

The first layer is comprised of the CEA's available capital. Available capital is defined in statute to include the sum of all cash and investment assets held by the CEA, minus loss reserves and unearned premiums.[37] The amount of available capital held by the CEA may not fall below $350 million.

29. California Insurance Code §10089.21.

30. Assembly Committee on Insurance, "AB 2064 (Cooley) – Analysis as Amended August 11, 2014," http://www.leginfo.ca.gov/pub/13-14/bill/asm/ab_2051-2100/ab_2064_cfa_20140815_174442_asm_floor.html

31. California Insurance Code §10089.15(a).

32. California Earthquake Authority. Bond Issuance, Series 2014. 11/7/2014. http://www.earthquakeauthority.com/%5CUserFiles%5CFile%5C10-07-2014_GB_Attachments%5CAI03_F%20-%20GovBD%2010-7-2014%20-%20P.pdf.

33. California Insurance Code §10089.44.

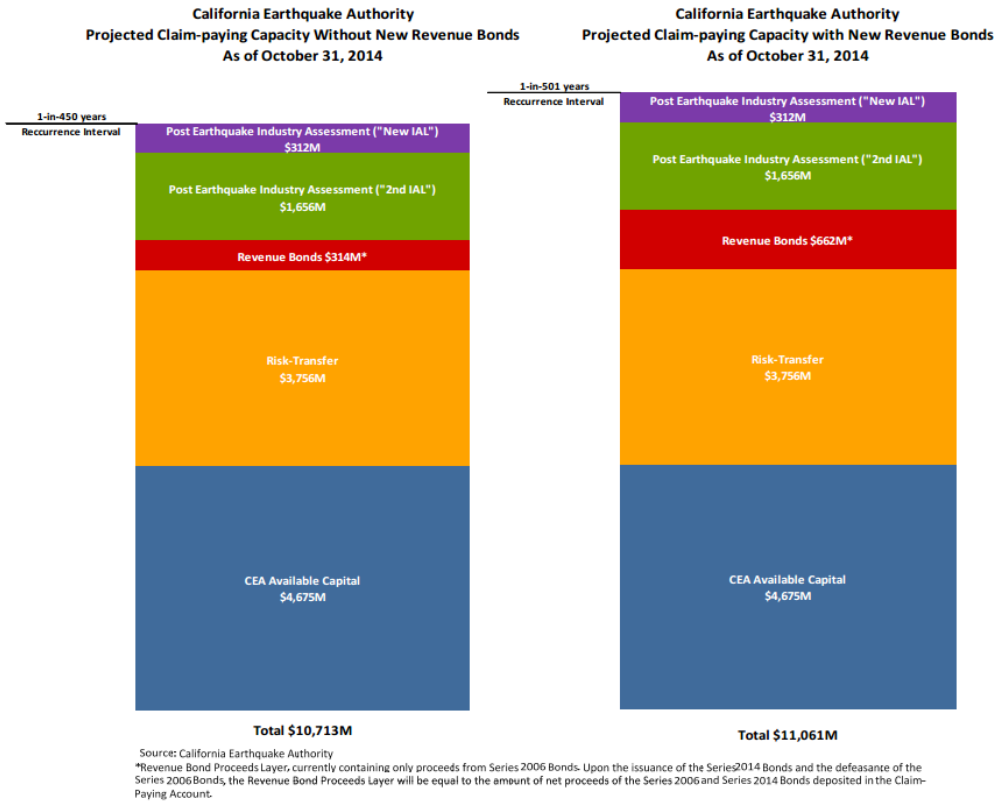
34. Martha Butler, "Fitch Affirms California Earthquake Authority at 'A'," *Business Wire*, May 17, 2013. http://www.businesswire.com/news/home/20130517005883/en/Fitch-Affirms-California-Earthquake-Authority#.VEbq8_I4rJM.

35. California Insurance Code §10089.7.

36. California Earthquake Authority Governing Board Meeting Minutes, p. 33, Oct. 7, 2014. http://www.earthquakeauthority.com/UserFiles/File/10-07-2014_GB_Attachments/10-7-2014%20GB%20mtg%20-%20CEA%20Gov.%20Board%20Meeting%20Binder%20-%20FINAL.pdf.

37. California Insurance Code §10089.5(b).

FIGURE 2: CEA PROJECTED CLAIMS-PAYING CAPACITY



SOURCE: California Earthquake Authority

To ensure it does not, the CEA is empowered to assess participating insurers to recapitalize to that amount.[38]

The layer above the CEA's available capital is comprised of two types of risk-transfer mechanisms. The two forms of reinsurance purchased by the CEA are known as "traditional" and "transformer" reinsurance. In traditional reinsurance arrangements, the covered party cedes premium in exchange for defined indemnity terms. Transformer reinsurance arrangements are fully-collateralized, allowing the covered entity to avail itself of the capital markets in the form of catastrophe bonds.[39]

After reinsurance has been exhausted, there is a layer of funding provided by revenue bonds. In 2006, after thorough study by a "financial alternatives working group,"[40] the CEA issued $315 million of revenue bonds. These bonds are scheduled to reach maturity in 2016.[41] To further supplement this layer, another $350 million tranche of revenue bonds was issued in late 2014.

The final two layers consist of industry assessments. These layers ensure that, up to a certain but ever-changing amount, the CEA may require participating insurers to contribute funds to supplement the CEA's claims-paying capacity.[42]

Originally, an industry assessment was placed directly above the foundational level. That layer, the since-expired "First Industry Assessment Layer," has left a confusing terminological legacy. The Second Industry Assessment Layer is now the first accessible IAL and the New Industry Assessment Layer is the second accessible layer. Both the Second IAL and the NIAL are required to shrink over time. Since 2010, the NIAL has been reduced by 5 percent each year. As of April 2014, the CEA's assessment limit is $1.967 billion, of which $1.656 billion is attributable to the Second IAL and $312 million to the NIAL.

38. California Insurance Code §10089.23(a)(1).

39. California Earthquake Authority, "Solicitation for Risk-Transfer Transformer Reinsurer," January 2014. http://earthquakeauthority.com/UserFiles/File/Contracting%20Opportunities/2014%20Risk-Transfer%20Transformer%20Reinsurance%20Solicitation.pdf.

40. Report of the Financial Alternatives Workgroup to the California Earthquake Authority, Dec. 31, 2004.

41. http://www.earthquakeauthority.com/UserFiles/File/CEA%20Today%20Archive/cea_today_07-06.html.

42. California Insurance Code §10089.23(a)(2).

The CEA's financing structure is robust. For the moment, since the CEA's capital structure requires that premiums paid by current policyholders do not fund previous events, it is projected that the CEA is prepared to pay for losses resulting from a 1-in-500-year earthquake. In other words, the CEA could sustain two Northridge-like events in quick succession and remain solvent. But this would be cold comfort for those who don't have insurance.

THE NEED FOR CHANGE

Increasing the earthquake insurance take-up rate in California is crucial. Californians have purchased earthquake insurance eagerly in the past. In 1996, before the Northridge Earthquake, residential earthquake insurance take-up was nearly 31 percent.[43] Property owners can be encouraged to do so again; this time, with appropriate financial support. The precipitous drop in the earthquake insurance take-up rate in California is the result of one external factor and a series of structural problems.

The external factor is that California has not experienced a major earthquake for some time. Humans have short memories and attention spans. Californians have tended to show greater interest in purchasing earthquake insurance after an event has occurred, while it is still fresh in their minds.[44] The low frequency of major earthquakes means the threat earthquakes pose is not at the forefront of people's minds, when their mandatory offer comes in the mail.

The structural problem is the disassociation of the value of earthquake insurance from its cost, both for insurers and insureds. Though the cost of a CEA policy varies widely, the average premium is $813 per year. Compared to the average California homeowners insurance premium of $939 per year, the cost of additional coverage for earthquake risk is significant.[45] Yet the cost of earthquake premiums is small when compared to the expense of replacing a home or a family's income. When faced with the additional expense of earthquake insurance – or, from an insurer's perspective, a greater proportional CEA assessment – it is necessary for consumers and insurers both to get greater value for their money. To meet that goal, the CEA must pursue reform.

Encouragingly, there is ample reason to believe the CEA can attain a higher policy take-up rate. Straightforward changes to the CEA's assessment structure, its mitigation efforts, earthquake insurance product offerings and even mortgage-loan underwriting standards could all see the demand for earthquake insurance rise.

Just as important is that there is capital to support such growth. There is a large appetite among insurers and reinsurers to take on properly priced earthquake risk. Should the CEA undertake the reforms necessary to drive take-up, there is ample capacity to underwrite the risk.

Earthquake peril is a problem with an insurance solution.

PROBLEMS AND SOLUTIONS

PROBLEM – A backward assessment structure

As the public policy objectives of the CEA have shifted over time to include providing earthquake insurance to more Californians, the assessment structure has become a disincentive to increased sales of earthquake insurance policies. Currently, insurers are assessed according to their proportion of CEA policies. Thus, the larger the share of CEA policies, the larger the CEA assessment. While facially reasonable, this means that participating insurers have no incentive to expand their sales of earthquake insurance. In fact, the prevailing incentive is to contract sales of earthquake insurance.

A company with a robust presence in the residential insurance marketplace and a de minimis proportion of CEA policies arguably enjoys a windfall, because it is able to discharge its statutory duty to offer earthquake insurance without encumbering itself with commensurate earthquake exposure. For example, if a participating insurer's share of the residential market is 19 percent, but their share of CEA policies is 34 percent, their assessment fees under the IALs are proportionally much higher than a company whose share of the residential market is 13 percent and share of CEA policies is only 7 percent.[46]

Insurers that minimize their share of CEA policies frustrate efforts to increase the overall earthquake insurance take-up rate.

SOLUTION – Remove disincentive and introduce an incentive

To remove the disincentive, CEA assessments should be shifted to reflect a participating insurer's proportion of the residential insurance market. To provide an incentive to expand coverage, participating insurers should face a separate assessment if their share of CEA policies is markedly less than their share of the overall residential insurance market share.

43. Jon Schuppe, "Northridge Quake 20 Years Later: 5 Lessons Not Learned," *NBC News Los Angeles*, Oct. 16, 2014. http://www.nbclosangeles.com/news/local/Northridge-20-Years-Later-Lessons-Not-Always-Learned-240566471.html.

44. "CEA: Policy Sales Spiked Following California March Temblor." *Insurance Journal*. 5/30/2014. http://www.insurancejournal.com/news/west/2014/05/30/330542.htm.

45. *The Insurance Fact Book 2014*, Insurance Information Institute. p.104. New York, N.Y.: Institute. 2014.

46. CEA Participating Insurers: 2014 Maximum Earthquake-Loss-Funding-Assessment Levels. 2/27/2014. http://www.earthquakeauthority.com/%5CUserFiles%5CFile%5C02-27-2014_GB_Attachments%5CAI06_B.pdf.

PROBLEM – Structural vulnerability

When the CEA was formed, policymakers sought to encourage seismic-mitigation efforts. Currently, the CEA is empowered to set aside up to 5 percent of its annual investment income, up to $5 million, to fund mitigation programs. Programs may take the form of educational efforts, research and even pecuniary incentives.

Because mitigation savings only accrue when an event occurs, the market will tend naturally to underinvest in mitigation. Mitigation efforts are crucial to reducing the cost of earthquake insurance, by reducing the overall level of risk that must be transferred. For every $1 spent on structural mitigation, $4 are saved in claims costs. Structures that are retrofitted for seismic peril present a dramatically reduced risk.

Only a fraction of at-risk structures have been retrofitted. For some, failing to retrofit is an economic decision. For others, ignorance about the availability of retrofitting options forestalls investment. Meaningful mitigation efforts tend to be costly and there are insufficient incentives to undertake the work. The CEA offers a 5 percent premium discount for retrofit homes, but should offer even greater discounts in the future. Serious effort also must be made to dispel public ignorance about the availability of seismic retrofitting.

SOLUTION – An array of mitigation efforts

A variety of structural and non-structural mitigation measures can help save lives, ameliorate injuries and reduce property damage in the event of an earthquake.

Structural improvements include seismic retrofits to foundations, wall systems, roof systems, chimneys, garages, room additions and skylights. Some retrofit solutions will differ depending on whether the home is wood frame or masonry. In addition, there are inexpensive and easy ways to protect against the interior damage that earthquakes can cause from falling items such as water heaters and large appliances, light fixtures, wall-mounted televisions and pictures and shelf items. Technical guidance on all of these is already freely available from the Federal Emergency Management Agency, as well as from private organizations such as the Insurance Institute for Business and Home Safety.

Disseminating this information will require a concerted effort on behalf not only of the CEA, but also the insurance industry. Appraising attitudes and understanding of seismic risk and mitigation options will require ongoing social science research to not only ensure that currently vulnerable Californians are prepared, but that future generations are, as well.

Public and private monetary incentives can also help motivate action. On the private side, providing deeper premium discounts for claims-saving measures could increase take-up rates. On the public side, legislation to achieve mitigation-financing flexibility could free property owners to amortize the cost of mitigation.

In particular, an earthquake version of Property Assessed Clean Energy financing could make sense. Under this type of a plan, an investor would provide upfront capital to improve a property's earthquake preparedness, allowing property owners to repay the investment through a surcharge on their property taxes over a 15- to 20-year period. The PACE model overcomes two of the biggest hurdles to widespread adoption of major property upgrades: the high upfront cost and property owners' uncertainty about when they might sell their property. Investors also are protected, because their obligation becomes attached to the property itself.

PACE programs cost nothing to taxpayers and are already approved for use in California in the clean-energy context. Significantly, early issues with GSE mortgage-lenders have been overcome, and a model now exists by which GSEs can secure their obligations in the event of a default.[47]

Another approach worthy of consideration would be to require seismic evaluations of properties in areas that are earthquake prone when that property changes hands. In conjunction with opportunities to finance seismic retrofitting, an evaluation would grade each structure to allow potential buyers to take earthquake vulnerability into account when determining the property's value. The goal would be to use market mechanisms to encourage mitigation. If a mandatory seismic evaluation proves too great a policy hurdle to tackle, a seller could be required to disclose whether they have undertaken such an evaluation.

Any one of these options could do much to spur proliferation of seismic mitigation, but premiums still must be actuarially sound. Overly generous mitigation incentives could undermine the very insurance that will be needed to fund recovery.

PROBLEM – Affordability

While the high cost of earthquake insurance is not the only cause of low take-up, it is certainly a significant factor. An additional $813 of insurance costs per year is difficult for many Californians to afford. Consumer education about seismic risks tends to occur within the context of interactions with a primary insurer. The low take-up rate in California has effectively severed that connection and created a loop of ignorance about earthquake risk that feeds into itself.

47. Stephen Lacey. "After Conflicts With Mortgage Lenders, California Restarts Residential PACE." Green Tech Media Research. 3/27/2014. http://www.greentechmedia.com/articles/read/after-fixing-a-conflict-with-mortgage-lenders-california-expands-pace.

To reduce the cost of earthquake insurance, it ultimately will be necessary to expand the pool of insureds.

SOLUTION – New policy options and tax incentives

The two costs that consumers encounter in earthquake insurance are their premiums and their deductibles. Earthquake insurance premiums could be lowered by offering an actuarially sound discount when a policyholder, or prospective policyholder, has undertaken seismic retrofitting efforts. Another way to reduce the cost shock associated with high premiums would be to offer a state tax incentive.

Uninsured losses are, with some restrictions, tax-deductible.[48] In a state like California with a high degree of underinsurance for earthquake risk, that means there is a perverse incentive to self-insure. A tax incentive would help mitigate the potential for a massive drop in collections by expanding the number of people who are insured. Because state tax deductibility seems to have not been effective elsewhere, a flat property tax credit would likely make more sense than a property tax deduction. A tax credit also has the benefit of being more progressive; that way all Californians would be able to take advantage of it.

To make earthquake insurance a better value proposition, lower-deductible policies could be offered. The CEA is already actively preparing to make filings with the California Department of Insurance to offer policies with deductibles of 5, 10, 15, 20 and 25 percent, though such products should not be expected to be available until 2016. This is a great initial effort. Other options should also be investigated. For instance, as is currently offered with commercial coverages, a policy that includes a more modest deductible (around 1 percent) but with a cost share on the first 20 percent of loss would make sense.

A long-term focus on product flexibility will be necessary for the CEA to respond to consumer demand. A good way of providing that flexibility would be to modernize the state's system of "prior approval" of property and casualty insurance rates.

POINTS OF CAUTION

A Florida model: Like California, Florida has a large natural peril for which it must prepare. Tropical storms and hurricanes are a fact of life on the peninsula, just as tremors are for Californians. To address its risk, Florida has a storm-centric version of the CEA known as the Florida Hurricane Catastrophe Fund, which operates as a state-backed reinsurance entity. To offer more affordable coverage to Floridians, the Cat Fund charges premiums to primary insurers that are too low and do not reflect the risk that residents face. The program makes up for this shortfall by using its authority to issue post-event bonds. Once issued, those bonds are paid for by assessments on virtually every insurance policy issued in the state.

In 2004, Florida was hit by a series of named storms. Charley preceded Frances, which was followed by Ivan and Jeanne. The next year, Hurricanes Dennis and Wilma hit. The damage for these storms ran into the billions. To pay claims, the Cat Fund issued bonds and instituted a 1.3 percent assessment on policies to pay the bonds back.

Ten years later, during an unprecedented period of quiet hurricane seasons, Florida is still paying for those storms. Therein lies the trouble with post-event bonding. It concentrates risk locally that should be transferred globally, at the cost of unending public liability.

PROBLEM – Subsidizing earthquake risk post-event

Here are three economic truisms. First, there are two kinds of persons in this world: those who save money and earn interest and those who borrow money and pay interest. Second, the ant is wiser than the grasshopper. Third, it's always easier to spend, or waste, somebody else's money, rather than your own.

Regarding the first truism, the CEA currently funds risk "ex ante" as opposed to "ex post." This means that, not unlike the ant, the CEA prudently funds its risk before a loss. Were the CEA to move to a system in which losses are funded after the fact, it would be necessary for the CEA to either increase its premiums or, more likely, institute a policy surcharge. Insurance is a system to offset prospective large costs in the future by substituting smaller, known costs in the present. If the CEA were to move toward an ex post form of funding, it would reduce its ability to prospectively finance subsequent losses, and force it to seek financing, grasshopper-like, after a loss occurs.

The purchase of insurance protection is rendered all the more difficult when the grasshoppers among us pine for the instant gratification associated with upfront savings at the expense of after-the-fact stability. This is the moral hazard of insurance subsidies, which tend to take one of two forms:

1. A subsidy to help at-risk persons afford to transfer their risk in advance of a loss (helping people to be ants)

48. Julian Block. "When Disaster Strikes - Unisured Home Losses." *About.com*. http://homebuying.about.com/od/marketfactstrends/qt/Unisuredloss.htm.

2. Using a government-sponsored insurance entity to charge premiums that are insufficient to pay expected losses, and having taxpayers pick up the difference through guarantees of post-event funding (encouraging people to be grasshoppers)

Both types of subsidy require taxes to distribute the costs to other taxpayers, but post-event funding is the more problematic. Buyers of the inadequately priced insurance naturally feel entitled to full payment of their losses, because they have paid a premium. Subsidizing earthquake risk by incurring debt after an event potentially places uninvolved and likely more prudent citizens on the hook for those most vulnerable and least responsive to the risk. In the case of bonds, it also burdens future generations for the incurred expenses of present day losses.

While a post-event bond approach does spread risk, it does so in a way that abrogates private decision-making processes. There is no reason for homeowners in Siskiyou County to pay a surcharge on their insurance because homeowners elsewhere chose to forgo earthquake coverage.

SOLUTION – A modified earthquake insurance mandate

Given the need to spread earthquake risk to forestall market failures or a mortgage-default crisis, we are forced to accept that payment mandates are an unavoidable reality of our political system. The problem then becomes one of making the best of a bad situation, or finding the least damaging mandate. What would Aesop's ant do?

Ants love the concept of reinsurance. Reinsurance has traditionally been the CEA's largest expense. Roughly 40 percent of CEA premiums to-date has been spent on reinsurance. More recently, because of greater competition in capital markets, reinsurance has become less expensive. In fact, in spite of ever increasing construction costs, the CEA is set to file for a rate decrease of 8.1 percent because its risk-transfer costs have gone down by 16 percent.[49] In fact, many reinsurers have begun repurchasing their own shares because they have more capital than they can find profitable ways to deploy it. Now is hardly the time to abandon ex ante risk-transfer.

The best place to insert a least-damaging mandate is at street level. Mortgage loans today typically require borrowers to secure multi-peril homeowners insurance policies, as well as flood insurance if the property is in an area with significant flood risk. Yet the GSEs, which dominate the mortgage securitization market, do not require earthquake insurance. Because of their broad reach, GSE-backed mortgages provide an effective tool for nudging homeowners to purchase insurance. To protect taxpayers from post-catastrophe financial shenanigans, a "nudge" to purchase insurance when government programs force taxpayers to back mortgages, would serve the nation well.

The concept is simple. As part of the definition of conforming mortgage loans that may be purchased or securitized by the GSEs, or that may be insured by the FHA or VA, residential borrowers in areas deemed above a certain designated level of seismic risk would be required to purchase and maintain earthquake insurance, or pay equivalently higher interest rates or mortgage insurance premiums to cover the added risk of default should the property be destroyed by earthquake. Unlike the mandate to purchase flood insurance – which applies to any federally related mortgage loan in a flood hazard risk zone, including any loan issued by a federally chartered bank –this requirement would be limited to the GSEs and federal mortgage insurance agencies. Thus, portfolio and jumbo lenders could ignore the mandate. The realistic impact might be an increase of 20 to 50 basis points in borrowing costs for those covered by the mandate who opt not to purchase earthquake insurance.

The elephant in the room when it comes to a modified earthquake insurance mandate is that, at the time of the CEA's creation, California legislators stated explicitly that the CEA should stop selling new policies 180 days after federally backed mortgage lenders begin to require earthquake insurance.[50] However, the intent of this language should not be misunderstood as concern about an earthquake insurance mandate, per se. Committee analysis is clear that the intent of the language is to prevent earthquake insurance take-up from becoming *too high!*

> The concern here is that the CEA is presently structured to take over the existing earthquake insurance market in which less than 38 percent of the property insureds buy earthquake insurance. If, however, 60 percent, 75 percent or 90 percent of the property insureds want to buy earthquake insurance because of new mortgage lending policies, that would enormously expand the exposure of the CEA and jeopardize the capacity of the CEA to pay all claims in the event of a significant earthquake.[51]

In retrospect, the optimistic assumptions of 60 percent to 90 percent earthquake insurance take-up are sobering. But as the analysis makes clear, no legislative purpose would be confounded by the introduction of an insurance mandate,

49. Don Jergler. "California Earthquake Authority Proposes to Lower Rates." *Insurance Journal*. 10/23/2014. http://www.insurancejournal.com/news/west/2014/10/23/344629.htm.

50. California Insurance Code §10089.54.

51. Senate Rules Committee, "AB 3232 (Knowles) – Analysis as Amended August 22, 1996," http://leginfo.ca.gov/pub/95-96/bill/asm/ab_3201-3250/ab_3232_cfa_960822_210017_sen_floor.html.

precisely because the goals of the CEA in the policy take-up context have changed so dramatically.

CONCLUSION

California is faced with a serious challenge. The severity of the state's seismic risk is difficult for Californians to grasp and the continued concentration of Californians in vulnerable areas seems to be irreversible. Yet the state already has an instrumentality capable of undertaking the task at hand. By repurposing the CEA and updating related policy to better reflect the mission it now espouses, fewer Californians will suffer catastrophic loss and more Californians will be able to enjoy the security afforded by earthquake insurance.

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