Impact

A regulatory impact analysis must accompany every economically significant federal rule or regulation. The Office of Policy Development and Research performs this analysis for all U.S. Department of Housing and Urban Development rules. An impact analysis is a forecast of the annual benefits and costs accruing to all parties, including the taxpayers, from a given regulation. Modeling these benefits and costs involves use of past research findings, application of economic principles, empirical investigation, and professional judgment.

Removal of the Ten-Year Home Warranty Requirement

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Summary of Rule and Economic Analysis

A HUD final rule, effective in March 2019, removed a requirement to qualify for high loan-to-value (LTV) Federal Housing Administration (FHA)-insured mortgages on newly constructed single-family homes. Specifically, a loan will not have to satisfy the requirement that either the property meets preapproval requirements or that the borrower is covered by a HUD-accepted, insured 10-year protection plan. Other requirements, such as a Warranty of Completion of Construction on new construction, will be retained.

This deregulatory action introduced greater flexibility and allows consumers to pursue cost-minimizing strategies without measurably increasing the risk to FHA of affected loans. The primary economic benefit of the rule is to reduce the cost of an FHA loan—a change that should benefit borrowers. Eliminating the 10-year warranty requirement is anticipated to provide benefits from $21 million to $30 million in annual savings for borrowers. An additional $341,000 of savings is expected from reduced paperwork by lenders. A potential cost of relaxing the requirement is the greater risk to FHA; however, evidence to date shows that this is a minor concern. To guard against excessive risk, HUD retained the requirement that the Warranty of Completion of Construction be executed by the builder and the buyer of a "new construction" home as a condition for FHA mortgage insurance. Those safeguards are not expected to fail; however, an incremental increase of

claims of approximately $1 million is possible, representing a transfer from FHA to borrowers with high-LTV loans for new construction.

Background of Rule

The National Housing Act was amended in 1979 to permit FHA to insure mortgages with high LTV ratios (more than 90 percent of the appraised property value) for newly built single-family homes if each of the homes satisfied at least one of the following two conditions:

- the dwelling was approved for mortgage insurance before construction.
- the dwelling is covered by a consumer protection plan or warranty plan acceptable to the Secretary and satisfies all requirements which would have been applicable if such dwelling had been approved for mortgage insurance prior to the beginning of construction.

In accordance with the 1979 Amendments, HUD published a final rule on October 5, 1990, that set forth the requirements for a consumer protection plan. The rule required high-LTV mortgages to be accompanied by a 10-year consumer protection plan to be eligible for FHA mortgage insurance (if the dwelling was not approved for insurance before construction).

A "ten-year warranty," also referred to as a "ten-year protection plan," is an agreement between the borrower and a plan issuer that contains warranties regarding the construction and structural integrity of the borrower's dwelling that is securing the FHA-insured mortgage. The plan must be a HUD-accepted, insured, 10-year protection plan.

A Warranty of Completion of Construction is a 1-year warranty from the builder that guarantees that a home was built according to plans approved by FHA and that the builder will remedy flaws resulting from faulty workmanship. The Warranty of Completion is sometimes referred to as a *builder's warranty* and covers major building components, such as the structure, roof, heating, windows, and electrical systems.

The purpose of the requirement was to protect property owners from defects in construction quality and, thus, FHA against claims arising from foreclosures driven by an unexpected loss in value of the property. Issuers of warranty plans submit their warranty plans to HUD for review. HUD then examines the submitted plans and, if the plans followed regulations, approves them for future use by FHA borrowers.[1] HUD currently maintains a list of 14 approved 10-year warranty plan providers; the list generally has approximately 15 approved 10-year warranty plan providers.

The Housing and Economic Recovery Act of 2008 eliminated the requirements on high-LTV mortgages, including the requirement for a consumer protection plan or a warranty plan. HUD is no longer statutorily mandated to maintain those requirements for high-LTV mortgages—but not required to eliminate them. HUD's final rule clarified that neither the 10-year protection plan nor the preapproval conditions will be required for high-LTV mortgages on new construction.

HUD retained the requirement that the Warranty of Completion of Construction be executed by the builder and the buyer of a newly constructed home. This warranty provides assurance to FHA

[1] To maintain acceptance by HUD, providers must resubmit the warranty plans for review every 2 years.

that the home was built according to plan and protects the buyer against detectable defects in equipment, materials, or workmanship supplied or performed by the builder, subcontractor, or supplier. If the structure does not meet the applicable building codes and fails to pass inspection by an International Code Council (ICC)-certified inspector, then the warrantor agrees to fix and pay for the defect and restore any component of the home damaged in fulfilling the terms and conditions of the warranty.

Justification for Rule

Reducing risk to borrowers and the FHA of substandard construction was the primary purpose of requiring the purchase of a home warranty for high-LTV originations. Much has changed in the more-than-20-years since the requirement was established. The utility of requiring consumer protection plans appears to have diminished. The quality of housing and building technology has improved. Uniform building codes and building code enforcement are more common. Jurisdictions increasingly rely on inspections performed by Residential Combination Inspectors (RCIs) or other qualified individuals, as is required by this rule. Those positive trends should mitigate HUD's previous concerns regarding the risk of construction defects. The combination of construction codes, educated inspectors, building technology, and statutes of repose provide adequate protection for FHA-insured homes against construction defects.[2]

At the time the original rule was promulgated, long-term warranties were predicted to significantly reduce the risk for FHA; however, requiring long-term warranties is no longer believed to be optimal. In most cases, requiring protection plans increases the expected cost of buying a home without necessarily providing a commensurate benefit to FHA borrowers or FHA.

The Market for Home Warranties

Home warranties can cover a variety of defects. A third-party home warranty (previously required by FHA) is comparable to a service contract. The warranty specifies how a defect will be remediated and the causes of failure that are excluded from coverage. Warranties vary by whether they cover existing homes or new construction, whether they are short- or long-term, the level of co-payments, and the extent of coverage. Short-term (1- or 2-year) warranties are designed to cover specific defects to specific systems and appliances. Long-term (10-year) warranties cover structural defects in load-bearing systems, including roof framing, walls, beams, columns, foundation, and floor framing. The expected lifetime of most of those items is well beyond the term of the warranty (National Association of Home Builders [NAHB] and Bank of America Home Equity, 2006). Generally, construction defects must be addressed if the home is unsafe; otherwise, no mitigation is required. Home warranties are different from homeowner's insurance: insurance covers financial damage due to an unexpected external catastrophe (or "peril"), whereas a warranty covers latent defects that were unobservable at the time of purchase. The warranty required by FHA includes a

[2] A "statute of repose" is a law that imposes an ultimate deadline on a homeowner suing a builder for a construction defect. The period of time allowed for making a claim typically begins at the completion of construction and extends for 10 years, although the specifics vary significantly by state. A statute of repose is different than a statute of limitation, which restricts the time a homeowner has to make a claim from the date of discovery of the defect.

1-year warranty against defects in equipment, materials, or workmanship and materials supplied and a 10-year warranty against construction, systems, and structural defects.

Warranties are usually offered by builders or sellers to generate confidence on the part of buyers. In the case of a third-party warranty, the insurer—not the seller of the home—is liable for repairs. A third-party warranty ensures that a major defect will be mitigated even if the builder has gone out of business. Real estate brokers are the primary sales channel of home warranties (Colonnade Advisors, 2018). Third-party home warranties can also be purchased directly by homebuyers, builders, and title agents. Sellers may purchase warranties to reduce risk while the home is on the market.

Whether a home warranty is worth the cost is the subject of some disagreement (Vandervort, 2016) The recommendation by consumer advocates depends on the type of warranty and the coverage offered. Some recommend warranties for new homes but not existing homes. Consumers' Checkbook recommends against warranties for existing homes primarily because repairs for major defects are not covered in the warranties for existing homes (Brasler and Giorgianni, 2019).[3] Adding to the undesirability of home warranties, repairs require co-pays from the homeowner, and homeowners are not given a choice of which contractors to use. Warranty companies can deny claims if the company determines that the defect was preexisting, a system was not properly maintained, or the damage is due to weather. Many companies impose ceilings on liability. Upgrades required by law (e.g., asbestos removal) are not covered. Some people have suggested that saving for repairs can be a better strategy for a homeowner (Brasler and Giorgianni, 2019; Consumer Reports, 2014).

Even for new homes, whether a warranty is a good choice will depend on the characteristics of the warranty. For short-term warranties, the average consumer is already protected by warranties on appliances (Ericson, 2017). If anything does happen, then the costs of fixing most of the systems covered under a short-term warranty are affordable to consumers; however, the short-term warranty may be desirable because it covers a period for which the consumer is likely to be financially strained.

Long-term warranties (10 years) covering structural defects of newly built homes meet greater approval by consumer advocates (Sichelman, 2014). Remediating a construction defect can be extremely costly. According to Warranty Week (2016), builders in 2015 set aside $2,500 per new construction for warranty claims, most of which is spent in the first year or two. The cost of a claim could be much greater. An industry study, as described by the Professional Warranty Service Corporation (2015), finds the average cost to investigate and repair a structural failure is $42,500. Significant costs arising from faulty foundations can be larger, costing an average of $200,000. Such amounts would constitute a financial shock to most households.

Construction defects cannot be prevented through responsible household maintenance. Most accepted structural claims are from damage to the foundation, which is harmed by soil movement (Short, 2015). Only 10 percent of structural claims occur in the first 2 years (Short, 2015)—one-

[3] One reporter (Vandervort, 2016) recommends warranties for existing homes because the probability of a breakdown increases with age, but he notes that consumers are "usually disappointed" with the coverage on existing homes when repair is needed.

half of what one would expect if conditional claim rates were evenly distributed across the years. Even if state law allows a homeowner to demand redress from a builder, a builder—especially of faulty homes—may be defunct or may lack the resources for a structural repair. The home warranty serves a useful purpose in providing peace of mind to risk-averse homebuyers and as a means for sellers to reduce the time on market of a unit; however, the ultimate value of the protection plan depends on the specifics of the warranty contract and consumer.

Data

Loans for homes that are either under construction or a new construction represent 10.6 percent of all FHA loans. Only the loans that are high LTV (90 percent and above) could potentially be affected. Those high-LTV loans on new (or under) construction number 85,000; represent 9.6 percent of high-LTV FHA single-family loans; and make up 6.5 percent of all FHA single-family loans (including refinance). Not all the 85,000 loans will likely be affected by the rule because some local jurisdictions have requirements concerning inspections that are as rigorous as those of FHA.[4]

Benefits from the Elimination of the Warranty Mandate

Benefits from the deregulatory action stem from three sources: savings to consumers because they are no longer being required to buy 10-year warranties; reduced costs to lenders of reviewing the warranty purchase; and reduced administrative costs to HUD. The greatest of those savings are to consumers and vary based on the extent to which consumers demand long-term warranties independent of the requirement.[5]

Benefits to Consumers

Eliminating the requirement to purchase a 10-year home warranty (or meet preapproval requirements) benefits consumers who would use resources devoted to the warranty more efficiently. The maximum gain to those consumers could be measured by the total expenditures on the home warranty.

To understand the *potential* gain to consumers, I approximate the resources devoted to the purchase of home warranties. On an annual basis, 50,000 to 60,000 warranties are issued to FHA borrowers (data provided by FHA). The analysis uses 55,000 to represent a typical year. The average coverage of the mandated warranty plans is $200,000. HUD staff estimated that the average premium charged under the plans is $2.70 per $1,000 of coverage. The average annual cost per homeowner is approximately $540 ($2.70/$1,000 x $200,000). Over 10 years, the net present value of the stream of $540 annual payments would range from $4,060 (at 7 percent) to $4,740 (at 3 percent).[6]

[4] Although HUD lacks data on enforcement of building codes through permitting and inspections, most states have adopted recent versions of the International Residential Code (IRC). Twenty states have adopted the 2015 edition and 12 more the 2012 version (ICC, 2018).

[5] Consumer safety regulations often are motivated by the argument that consumers lack enough information to protect themselves adequately.

[6] The net present of a stream of payments over 10 years (starting this year) is given by [(1+r)/r] x [1 – (1/(1+r)^10)], where r is the discount rate.

If the home warranty were a regulatory burden of no utility, then the annual savings to consumers from no longer complying would equal the full amount of the estimated annual fee, approximately $540. The aggregate annual savings would be approximately $30 million ($540 per home x 55,000 loans). Homebuyers and sellers would share in the savings, the degree to which would depend on characteristics of the market (price elasticities of supply and demand of settlement services). A greater proportion of the savings are passed through to borrowers, as demand is more inelastic and supply, elastic.

The gain to consumers is likely less than the estimate of $30 million. Probably some homebuyers would demand, and some sellers would offer, a long-term warranty even when not required by FHA. If a buyer is extremely risk averse or if a seller prefers to use home warranties to facilitate sales, then the purchase of the home warranty would be unaffected by a rule not requiring it. Although the purchase of a home warranty is not recommended unconditionally as the most cost-effective strategy (Consumer Reports, 2014), it would be justified in specific circumstances. An accounting of the economic impact of the deregulatory action must allow for the possibility that some homeowners derive utility from the home warranty. Economic theory identifies several motivations for offering warranties on products and services. The first and most obvious motivation is as insurance against product failure. For insurance to be a justifying factor, consumers must be risk averse, and a measurable chance of failure must exist. The demand for a warranty and the length of the warranty would then be correlated with the degree of risk aversion and the chance of failure. A second justification for offering warranties is as a signal of product quality to consumers (Spence, 1977). Producers would use the warranty as a signal of quality when asymmetric information is present. Because a warranty is costlier to provide when the product is of lower quality, the duration of the warranty is a way for sellers to overcome the market failure that would otherwise inhibit sales. Finally, a warranty can serve as a purchase incentive when the real estate market is slow (Hayunga, 2018).

Estimates of the prevalence of home warranties vary. A consultancy firm (Colonnade Advisors, 2018) reports a market penetration of 10 percent of home sales. One study of the Richmond housing market (Contat and Waller, 2017) finds that 16 percent of all homes sold offered a home warranty. Short (2015) cites an estimate that 30 percent of newly built homes include a home warranty; whether those figures represent home warranties, builder warranties, or both is not clear.[7] This article uses a range of 10 to 30 percent. If 10 percent (30 percent) would have purchased a long-term warranty without the requirement, then the consumer savings is $27 million ($21 million).

In the preceding analysis, there are two types of borrowers: those who receive no utility from the warranty and those who value the warranty at the average market price. There will be a spectrum: most would not buy a warranty at the break-even price but value one at a fraction of the market price. Brewster et al. (1980) surveyed residents to evaluate a prospective FHA-mandated 2-year home warranty. The researchers found that only one-fifth would be willing to pay a price that the researchers estimate to be below the break-even price, and only 2 percent would be willing to pay

[7] A builder warranty is offered by the builder, covers most structural issues, and is usually short term. A home warranty is provided by a third party. Many home warranties cover only appliances and systems within the home (plumbing, electrical, and heating, ventilation, and air conditioning [HVAC]), whereas others cover structural issues or both. The duration of coverage varies. Comparison with FHA's approved plan is difficult without significant detail concerning the product.

a break-even price. If a home warranty has value, then it should be revealed by hedonic studies of the housing market; however, hedonic studies of the housing market fail to find a statistically significant positive effect on the sales price of a seller-offered home warranty (Contat and Waller, 2017; Salter, Johnson, and Anderson, 2004).[8]

There are several explanations for this finding of non-capitalization. One is that the risk of a deficiency is too low to have a significant effect on the property market. The combination of building inspections and standards may drive the perceived probability of failure close to zero. Also, the households that would demand a warranty may not be able to influence the single-family housing market. Empirical research of the demand for automobile warranties (Dohmen et al., 2011) found that low-income consumers are more risk averse but cannot afford to pay the higher prices for a warranty; whereas the higher income consumers, who can afford a warranty, are less risk averse. Although demand may exist for home warranties as a form of insurance, low-income households will not be able to significantly influence the price for single-family homes in such a way as to reflect their value of a warranty.

The role of the warranty as a signal may be neutralized by certain aspects of the property market. Warranties can play a role in signaling quality only when the duration of warranties varies significantly and repairing a lower quality good is costlier. In contrast, the duration of home warranties is standardized and so cannot be used effectively as a signal of quality. Also, if homebuyers are not aware of some of the causes of product failure, such as foundation damage from shifts in soil (Murphy, 2010), then a signal of the builder's confidence in the building's resilience could be less effective. Finally, if local building codes and inspection requirements provide confidence in building quality, then the warranty, as a signal of unobserved effort, would not be as vital to the market (Gwin and Ong, 2000).

The weak evidence of capitalization could also be explained by consumers' attitudes toward the warranty itself. Possibly, homebuyers do not have the expertise to evaluate the warranty and so are suspicious that it will be valuable in the event of product failure.

The weak evidence of the capitalized benefits of a home warranty should support the assumption of full savings ($30 million). By eliminating the 10-year warranty requirement, annual savings to borrowers could be as high as $30 million (or as low as $21 million). The rule creates at least qualitative savings for all FHA-insured borrowers buying new homes. Those who opt to purchase warranties will be able to choose from the entire market of warranty providers and not just those approved by HUD. Those who choose to save for repairs will earn interest and may choose contractors they trust when needed.

Alternative Methods of Compliance

Providing evidence of a 10-year protection plan is not the only way to satisfy FHA's requirements for warranties and inspections of high-LTV loans to purchase new construction. For all types of

[8] A study sponsored by ServiceMaster Company, LLC, found that homes sold with American Housing Shield warranties sell for $2,300 more and spend less time on the market. Although the study was verified by a third-party accounting firm, it was not a hedonic study but a comparison of averages.

construction (proposed construction, under construction, and recently built homes), a building permit and certificate of occupancy can take the place of the 10-year protection plan. A certificate of occupancy verifies that a building complies with local building codes and is judged by an inspector to be safe. The certificate of occupancy is most commonly required for new construction; however, only some jurisdictions require a certificate of occupancy. For homes bought in those jurisdictions, complying with FHA requirements is not an additional burden. This could explain the difference between the number of warranties (52,000 in 2016) and high-LTV new construction loans (85,000 in 2016).

Other alternatives (depending on the stage of construction) include additional inspections or appraisals. Those methods seem to be less popular than the 10-year protection plan, however, perhaps because they do not provide the same level of benefits to consumers as does a protection plan.

Required Documentation

Required documents for high-LTV loans for new construction include a Builder's Certification of Plans, Specifications, and Site; a Warranty of Completion of Construction; required inspections; and, in affected areas, a Wood Infestation Report and water analysis. The rule did not relax those requirements. The only documentation requirement that was relaxed is the one stating that the borrower must provide evidence that the property was preapproved or is covered by a 10-year warranty plan. For preapproval, the dwelling must have been approved for mortgage insurance before construction.[9] This alternative is unfeasible for many lenders because very few could know that the ultimate purchaser would be FHA insured. Nonetheless, in isolated cases, preapproval may be chosen; thus, relaxing both the preapproval and the warranty requirement is necessary to ensure that the regulatory burden is reduced for all consumers. Which method of compliance is the most cost effective may vary by borrower.

Paperwork Reduction

Lenders face paperwork burden from reviewing the home warranty before closing. HUD estimated that a lender requires 0.1 hours to process one warranty. Loan officers earn a median hourly wage of $31 (U.S. Bureau of Labor Statistics, 2020); the opportunity cost of their time would be twice[10] that, or $62 per hour. The burden per warranty is $6.20 (0.1 hours x $62). At a volume of 55,000 warranties, the total paperwork burden relieved is $341,000.

Savings would extend to the U.S. government. The elimination of the warranty requirement eliminates the cost to HUD associated with review of the warranty plans submitted for approval and renewal. Administrative burdens to HUD include a review of warranty plans for acceptance, review of plan renewals, and maintenance of HUD's home warranty webpage.

[9] With the preapproval process, the local jurisdiction reviews and approves the plans, specifications, and construction materials before the start of construction and inspects the project during construction. The preapproval provides protection because the local jurisdiction enforces building codes, resulting in a high level of construction quality, which makes protection or warranty unnecessary.

[10] This estimate includes benefits, management overhead, rent, employer taxes, and equipment.

Costs from Elimination of Warranty Mandate

Eliminating the requirement of construction warranties for high-LTV loans presents a potential risk to FHA. A major structural defect would adversely affect the value of a property and potentially lead to a foreclosure. Borrowers with little equity (high-LTV loans) could be pushed into a situation of negative equity and would be more likely to default (HUD, 2010; Jones and Sirmans, 2015). FHA would bear the cost of the claim directly.[11]

When evaluating whether FHA would face a significant risk, HUD must consider, first, whether other safeguards without the requirement are sufficient to protect FHA; and second, whether not requiring a builder warranty for high-LTV loans could lead to any risk-inducing behavioral changes on the part of buyers, sellers, or builders.

The source of many construction defects is human error: construction defects can arise from deviations from design, poor management of construction, inferior workmanship, or latent defects in material. Building inspectors are expected to notice building code violations, buildings not built to design, or an obviously faulty system—but may fail. Latent defects, such as those governed by a long-term warranty, are difficult or impossible to detect until they cause an overt problem.

High levels of construction quality should limit FHA exposure to risk. That advances in building technology should yield longer lasting homes now than were being built 40 years ago, when consumer protection was mandated by Congress, would seem intuitive. Substantial evidence that the probability and cost of construction defects has decreased over time, however, is difficult to find. Indeed, the evidence is mixed.

A study by the National Association of Home Builders (NAHB) and Bank of America Home Equity (2006) finds that "the average life expectancy for some components has increased during the past 35 years because of new products and the introduction of new technologies, while the average life of others has declined." Another discussion (NAHB Research Center, 2003) blames the uneven quality of construction on the insufficient training of trade contractors. If builders rely on temporary workers, then those builders have little incentive to invest in upgrading the workers' skills. Confirming those suspicions concerning the contribution of labor, one study (Harper et al., 2010) finds negative trends of labor productivity in the construction industry. One positive trend is the use of prefabricated components. Compared with more traditional methods, using preassembled components reduces the potential for human error, construction waste, and onsite hours (Shields, 2016). Standardizing processes using digital technology should lead to less variation in construction quality (for example, see ETH Zürich, 2018). Better evaluations by geologists using improved technology could more easily identify potential hazards (NAHB, 2016).

Examining the cost of providing a warranty provides informal evidence that construction quality has improved. Brewster et al. (1980) estimate that the break-even price of providing a comprehensive 2-year home warranty would be $340 for FHA loans in 1977, which is equivalent to $1,410 in 2017 USD, or approximately $730 per year (discounted at 7 percent). That estimate is higher than the $540 charged by home warranty companies today for FHA loans, suggesting that

[11] If systemic, those mounting costs of operation would lead to higher premiums.

less risk is present now.[12] An overall positive trend in resilience, however, does not void the necessity of considering the variations from that trend that could present significant risk to homeowners.

Despite any improvements in the quality of the average home, the housing sector will remain exposed to downside risk. One source of risk is the introduction of unproven technologies. An example of a failed building technology is aluminum wiring, which was discovered to be a fire hazard. Complete replacement is estimated to cost as much as $8,000 per home (Romano, 2006). More relevant to structural integrity is the unexpected decay of fire-retardant plywood roofing used in the 1980s (Salmon, 1990).

Another source of risk can be a building boom: high-volume construction places stress on the industry to maintain the quality of new construction. An example from the most recent building boom is the use of faulty drywall, manufactured in China. Market demand for drywall surged in 2006, fueled by both a nationwide boom in residential construction and the need for extensive post-hurricane reconstruction along the Gulf Coast. Some of the drywall imported from China during that period has since been found to be problematic due to its ability to corrode metal in homes. Some homeowners complained of odors due to drywall emissions, sometimes comparing the odor to the smell of rotten eggs (HUD, 2012). Another recent example of widespread faulty construction is the deterioration of concrete used in the foundations of homes built near a quarry in Connecticut. According to the Connecticut State Department of Housing, the foundations of at least 35,000 homes in Connecticut in 41 towns face an irreversible process of cracking, flaking, bowing, and separation that can only be remediated by replacing the foundation, costing as much as $250,000 per home (Connecticut State Department of Housing, n.d.). The underlying cause is the presence of a mineral, pyrrhotite, that occurs naturally (2-10 Home Buyers Warranty, 2018b). A spokesman for the concrete companies blamed the problems on careless installation by builders during the building boom of the 1980s (Hussey and Foderaro, 2016). As of 2016, cracking appeared in houses built between 1983 and 2015. A home warranty would cover such a calamity[13] but only if the construction defect were discovered before the expiration of the warranty.

Finally, natural disasters can expose construction defects by putting greater stress on a structure.[14]

The potential cost to FHA of eliminating the warranty requirement is an increased incentive for defaults and thus, the cost of claims for FHA. If not repaired, then structural damage will reduce the value of a property; thus, caution is merited for high-LTV loans. For example, significant damage in excess of $20,000 to a $200,000 home with a loan of $180,000 would move the homeowner into a situation of negative equity. In general, negative equity is associated with a higher probability of default (Jones and Sirmans, 2015); however, there are reasons to doubt that damage would force a default and subsequent foreclosure. Negative equity arising from physical damage is unlike negative equity caused by a decline of the local housing market. First, a homeowner can retrieve the lost value by repairing the home, whereas one household cannot re-orient an entire market. Second, a household will always need a place to live. The strategic

[12] Some of the difference could be explained by advances in consumer information concerning the value of warranties.

[13] See 2-10 Home Buyers Warranty (2018a) for recommendations concerning a warranty company.

[14] When damage from an adverse event results from multiple contributing causes, and one of them is a construction defect, state law varies on the responsibility of the home insurance company.

default is made easier if the alternatives are affordable, as they would be in a collapsing market. If the damage were isolated to the household's unit, however, then the alternatives may be more expensive than repairing the unit.

Few formal studies have been conducted of the effect of unexpected physical damage on default. A notable exception is Anderson and Weinrobe (1986), who examine defaults by owners of uninsured homes suffering earthquake damage. The researchers found that the extent of negative equity was the most significant explanatory variable of the probability of default for homes. That finding does not imply, however, that damage causes defaults, only that those homeowners behave similarly to each other. Unfortunately, the authors do not compare damaged homes to those that were not damaged, so extracting the incremental effect of an uninsured catastrophe is impossible. When the authors attempt to model earthquake damage as an explicit explanatory variable, they find that the influence of the damage variable on defaults was positive, but that their overall empirical model of the probability of default was inferior. Anecdotal evidence from the foreclosure crisis suggests that whether shoddy construction was a motivator or an excuse for default is not clear (Roney, 2007). A report by HUD on faulty drywall found that, although a structural defect could increase the incentive to default, it is reasonable to expect that only a fraction of the total number of homes with problem drywall would result in a completed foreclosure (HUD, 2012).

The economic theory of risk and uncertainty is helpful, given the lack of conclusive empirical evidence concerning the cost of repair and its effects on borrower behavior. Kau and Keenan (1996) developed an option-theoretic model of mortgage default; incorporated a random process of negative shocks to the building value; and simulated the impact of the randomly occurring catastrophe on default probability and the expected cost of a mortgage insurance claim. As would be expected, the expected cost of a claim increases with the loan-to-value ratio, the likelihood and severity of the catastrophe, and the length of exposure. A few insights from the study stand out. First, the probability of default occurring from a catastrophe, even at high levels of severity, is lower than the chance of the catastrophe itself. This probability is because termination may occur for other reasons, such as pre-payment or non-catastrophic default, both of which may preempt catastrophic damage. Also, if a catastrophe occurs, any default motivated by the unexpected and precipitous decline of property value could preempt termination for other reasons. Second, the severity of damage from a catastrophe interacts with other motivators for default. At low levels of severity, such as a 10-percent loss in value, the occurrence of a catastrophe is not likely to result in a claim, even when the pre-catastrophe LTV is as high as 90 percent. The finding would be consistent with real option theory, which stresses the value of being able to postpone irreversible decisions when the future is uncertain. Households would wait to learn whether market-level appreciation is enough to compensate them for the one-time catastrophic loss. A high level of severity (80-percent loss in value) would dominate the default decision. A household would not expect to be rescued by appreciation. The middle ground (a catastrophic loss of 25 percent of the building's value) is where the catastrophic price decline would interact with typical market trends to determine the household's decision. If market fluctuations were such that prices had already decreased (increased), then the motivation to default would be reinforced (weakened).

The standardization and enforcement of building codes have greatly mitigated concerns of defective construction that might result from eliminating the warranty requirement. Economic theory (Gwin and Ong, 2000) finds that building codes are a second-best policy response to imperfect information concerning builders' efforts and a viable substitute for builder warranties. When this rule was promulgated, most states had adopted recent versions of the International Residential Code (IRC); 20 states had adopted the 2015 version and 12 the 2012 version (ICC, 2018).[15] All states require that builders assume responsibility for major construction defects. The obligation for major repairs of construction depends on state law and varies from 4 years (Tennessee) to 15 years (Iowa) after completion. As of May 2017, the most common "period of repose" is 10 years, and the median period across all states is 8 years.[16] Most claims occur within 7 years (2-10 Home Buyers Warranty, 2018a). The degree to which a borrower will want a home warranty thus depends on state law and confidence in the builder.

An outstanding question for FHA is whether no longer requiring a 10-year warranty would lead to a change in behavior by builders, sellers, or homebuyers that would lead to an increase in construction defects. The rule is not anticipated to increase systemic risk to the building sector. Given the stringency of building codes and inspections, that any builder would intentionally build defective homes in response to this rule is doubtful. FHA-insured borrowers are such a small part of the market for new homes that neither builders nor sellers have any incentive to change their business strategies.[17]

Transfers from Elimination of Warranty Mandate

Because FHA single-family mortgage insurance is based on the mutual insurance model, and except in exceptional stress situations is fully financed by premiums, the rule could be viewed as a transfer of risk from specific FHA borrowers to the rest of FHA-insured borrowers. The extent of the transfer will depend on the magnitude of the economic effects discussed in previous sections of this article. High-LTV borrowers purchasing new buildings will pay a lower cost because of reduced upfront fees. The risk to FHA is the cost of a claim arising from structural defaults. Currently, those risks are internalized (limited to the borrower) through the protection plan, which behaves as insurance. Without the requirement for a protection plan, FHA will have to pay those costs by raising its mortgage insurance premium.

The simulations of Kau and Keenan are useful to derive the impact of the warranty on FHA claim liabilities. Parameters of the model are claim period in years, loan-to-value ratio, probability of catastrophe, and catastrophe severity. The analysis provides estimates for 2-year, 4-year, 8-year, and 20-year periods; loan-to-value ratios of 80 percent, 85 percent, and 90 percent; an average annual

[15] For a complete list, see the appendix.

[16] Those figures were calculated from data retrieved from 2-10 Home Buyers Warranty (2018c). The most common type of action addressed by state law is construction defects. When a state has different periods of repose for different types of action (for example, "construction defects-tort"), the author uses the period of repose for the action that most closely resembles "construction defects-written contract" or latent defects in creating those descriptive statistics. A summary of the data is included in the appendix of this report.

[17] Although new construction and high-LTV FHA loans are only a small part of the housing market, FHA's approval of warranty companies could positively influence the transparency of all warranty plans.

probability of catastrophe of 0 percent, 0.3 percent, or 0.9 percent; and catastrophic severity of 10 percent, 25 percent, and 80 percent of home value. The 8-year period is chosen because it is closest to the 10-year lifetime of the warranty and a 90-percent LTV because the loans under consideration are characterized by a high LTV. The warranty company is assumed to pay all costs of damage in the event of a catastrophe, so the baseline annual probability of catastrophe is effectively 0 percent. HUD records do not document that even one claim has ever been made by a borrower or lender against a warranty company for a failure to resolve defects in new construction. Claims by lenders involve other reasons but never because the builder or the warranty provider refused to repair or pay a claim award related to the warranty. Between 1984 and 2017, all lender claims and foreclosures have occurred because of other reasons; none have been because of a warranty issue. Scenarios are presented for both the 0.3 percent and 0.9 percent average annual probability of defect. The author's calculations find that, based on the Poisson distribution, the probability of at least one catastrophe occurring over 30 years is between 10 percent and 25 percent, depending on the annual rate (0.3 percent and 0.9 percent, respectively). That range is consistent with the probability of structural damage. Industry experts (Short, 2015) present evidence that the risk of structural distress of any kind is 25 percent during the lifetime of the building and that the risk of a severe and major failure is 5 percent. The author considers both 10 percent and 25 percent of value for catastrophic severity. The primary estimate will be a 10-percent loss: in 2016 and 2017, the average claim settled by a warranty company on an FHA loan was $19,000, which is nearly 10 percent of the average $200,000 home. The estimates of the expected increase in mortgage insurance claims range from $440,000 to $7.2 million, with a primary estimate of $1.3 million. The estimates are calculated from Table 2 of Kau and Keenan (1996) and adjusted for 55,000 loans on a $200,000 home.

Exhibit 1

Incremental Change in Expected Mortgage Insurance Liabilities

Loss Severity (%)	Annual Probability of Catastrophe (%)	Change in Expected Liability per Loan ($)	Change in Aggregate Expected Liability ($)
10	0.0	0	0
	0.3	8	440,000
	0.9	24	1,320,000
25	0.0	0	0
	0.3	44	2,420,000
	0.9	132	7,260,000

These results are only suggestive. For a more extensive analysis, some parameters of the model would have to be updated to the current economic conditions and regulatory environment. A more representative model, however, will not change the basic conclusion that FHA will experience a small increase in risk from abandoning the warranty requirement.

Conclusion

The final rule relaxed a regulatory requirement concerning the settlement of some FHA-financed single-family properties. Some of the savings are quantifiable. By eliminating the 10-year warranty requirement, lenders are expected to save $340,000 in administrative costs of reviewing and submitting home warranties for loan approval. The greater flexibility introduced by the deregulatory action allows borrowers to take advantage of cost-minimizing strategies. FHA borrowers and lenders are expected to save $21 million to $30 million from no longer being required to purchase a 10-year warranty plan to secure an FHA-insured mortgage. How those savings are distributed depends on the relevant price elasticities of demand and supply.

The cost savings can be achieved without significantly increasing the risk to FHA. Stringent building code and inspection requirements will mitigate the risk of removing the warranty requirement. Advances in detecting the causes of structural failure reduce both the probability and the cost of any structural failure. To ensure that no observable construction defects are present in newly built homes bought by FHA-insured borrowers, HUD retained the requirement that the Warranty of Completion of Construction (form HUD-92544) be executed by the builder and the buyer of the home, as a condition for FHA mortgage insurance. In addition, to further mitigate risk, the rule required that inspections be performed by Residential Combination Inspectors (RCIs), Combination Inspectors (CIs), or—in the absence thereof—other qualified individuals. If all those safeguards fail, the estimated average aggregate loss to FHA (a transfer of risk) is $1.3 million, which is far less than the consumer benefits generated by the rule.

Appendix: State Regulations

Exhibit A1 displays the version of the International Residential Code (IRC) adopted by each state. A number indicates the specific code edition that is adopted as a mandatory state minimum. For example, "2015" indicates the 2015 edition. An "X" indicates that the IRC is not used as a standard for all buildings but that one or more state or local agencies or jurisdictions have adopted an edition of the code. A "—" indicates that the IRC has not been adopted by any state agency or local jurisdiction in the state.

Exhibit A1

International Residential Code, by State (1 of 2)

State	Edition of IRC
Alabama	2015
Alaska	X
Arizona	X
Arkansas	2012
California	2015
Colorado	X
Connecticut	2012
Delaware	X
District of Columbia	2012
Florida	2015

Exhibit A1

International Residential Code, by State (2 of 2)

State	Edition of IRC
Georgia	2012
Hawaii	2006
Idaho	2012
Illinois	X
Indiana	2003
Iowa	2015
Kansas	X
Kentucky	2012
Louisiana	2015
Maine	2015
Maryland	2015
Massachusetts	2015
Michigan	2015
Minnesota	2012
Mississippi	2012
Missouri	X
Montana	2012
Nebraska	2012
Nevada	X
New Hampshire	2015
New Jersey	2015
New Mexico	2015
New York	2015
North Carolina	2009
North Dakota	2015
Ohio	2009
Oklahoma	2015
Oregon	2015
Pennsylvania	2009
Rhode Island	2012
South Carolina	2015
South Dakota	X
Tennessee	2009
Texas	2000
Utah	2015
Vermont	X
Virginia	2012
Washington	2015
West Virginia	2015
Wisconsin	—
Wyoming	X

Source: "International Codes—Adoption by State (May 2018)." (International Code Council, 2018). These data are updated regularly by the ICC.

Exhibit A2 summarizes the periods of repose against defects in residential construction by type of action for all states and the District of Columbia except for Hawaii.

Exhibit A2

Statutes of Repose for Residential Construction, by State (1 of 2)

State	Type of Action	Period of Repose
Alabama	Construction defects	7 years
Alaska	Construction defects	10 years
Arizona	Construction defects—contract, implied warranty	8 years
Arkansas	Construction defects—injury to property	5 years
	Construction defects—personal injury and wrongful death	4 years
California	Construction defects—patent defects	4 years
	Construction defects—latent defects	10 years
Colorado	Construction defects	6 years
Connecticut	Construction defects—contract	6 years
	Construction defects—tort	3 years
Delaware	Construction defects	6 years
District of Columbia	Construction defects	10 years
Florida	Construction defects	10 years
Georgia	Construction defects	8 years
Idaho	Construction defects—tort	6 years
	Construction defects—written contract	5 years
Illinois	Construction defects	10 years
Indiana	Construction defects	10 years
Iowa	Construction defects—tort and implied warranty	15 years
Kansas	Construction defects	10 years
Kentucky	Construction defects	7 years
Louisiana	Construction defects	5 years
Maine	Construction defects	6 years
Maryland	Construction defects	10 years
Massachusetts	Construction defects	6 years
Michigan	Construction defects	6 years
Minnesota	Construction defects	10 years
Mississippi	Construction defects	6 years
Missouri	Construction defects	10 years
Montana	Construction defects	10 years
Nebraska	Construction defects	10 years
Nevada	Construction defects	6 years
New Hampshire	Construction defects	8 years
New Jersey	Construction defects	10 years
New Mexico	Construction defects	10 years
New York	Construction defects	6 years
North Carolina	Construction defects	6 years
North Dakota	Construction defects	10 years
Ohio	Construction defects	10 years

Exhibit A2

Statutes of Repose for Residential Construction, by State (2 of 2)

State	Type of Action	Period of Repose
Oklahoma	Construction defects	10 years
Oregon	Construction defects	10 years
Pennsylvania	Construction defects	12 years
Rhode Island	Construction defects—contract and implied warranty	10 years
	Construction defects—tort	10 years
South Carolina	Construction defects	8 years
South Dakota	Construction defects	10 years
Tennessee	Construction defects	4 years
Texas	Construction defects	10 years
Utah	Construction defects—contract and warranty	6 years
	Construction defects—other than contract and warranty	9 years
Vermont	Civil actions	6 years
Virginia	Construction defects	5 years
Washington	Construction defects	6 years
West Virginia	Construction defects	10 years
Wisconsin	Construction defects	10 years
Wyoming	Construction defects	10 years

Source: 2-10 Home Buyers Warranty (2018c)

Construction defects range from minor defects to major failures of design, materials, and completion of a housing structure or any of its systems. The period of repose may vary by type of defect. A patent defect is one that is obvious; whereas a latent defect is not likely to be discovered until the outward manifestation of the defect. A contract or warranty defect represents a violation of an explicit contractual agreement between the builder and homebuyer. The concept of an implied warranty imposes a broader responsibility on the builder to provide a habitable structure, built to code, and to generally accepted standards. The damages for a tort claim can be more expansive than a contract or warranty claim and include any economic loss resulting from the construction defect. Vermont does not have a statute of repose specific to construction defects. Instead, the 6-year limit on civil actions related to a breach of contract applies. Arkansas imposes a shorter period of repose personal injury than for damage to property arising from construction defects.

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