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Market Failure in Information: The National Flood Insurance Program

James Chivers Department of Economics, University of Colorado at Boulder Boulder, Colorado

Nicholas Flores Department of Economics, University of Colorado at Boulder Boulder, Colorado

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Center for Economic Analysis Department of Economics

University of Colorado at Boulder Boulder, Colorado 80309

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Abstract

The National Flood Insurance Program (NFIP) was established in 1968 and requires mandatory flood insurance for property owners who have federally-backed mortgages. Krutilla (1966) noted that a compulsory national flood insurance program could greatly improve the economic efficiency of flood plain occupancy in the U.S. However in order to realize the efficiency gains suggested by Krutilla, property owners must have sufficient information about flood risk and insurance premiums to make wellinformed home purchase decisions. Using survey data from Boulder, Colorado, we find significant evidence of market failure in information in the NFIP program. The majority of survey respondents, all of whom live in a special flood hazard area, report they did not fully understand the degree of flood risk or the cost of insuring against this risk when negotiating the purchase of their property.

I. Economic Efficiency and NFIP

In 1968 the U.S. Congress created the National Flood Insurance Program (NFIP). According to a recent report by the Federal Emergency Management Agency, FEMA (2000), the intent of the NFIP is "to reduce future damage and provide property owners with protection from financial losses through an insurance mechanism that allows a premium to be paid for protection by those most in need of protection." The NFIP currently provides coverage to millions of property owners throughout the U.S.

Krutilla (1966) outlined the potential for compulsory flood insurance to improve the economic efficiency of the use of the nation's flood-prone areas. Krutilla made three main points. (1) "Premiums proportional to risk and equal to both the private and social cost of flood plain occupance will serve as a rationing device, eliminating economically unwarranted uses of flood plain lands on one hand, while not prohibiting uses for which a flood plain location has merit on the other hand." (2) "In addition, reduction of flood loss insurance premiums can serve as a standard to measure the economic justification of alternative flood control measures and/or discrete increments in scale of protective works or other nonstructural flood control measures." (3) "A final advantage of flood loss insurance, which no alternative in flood management possesses, is indemnification for

the residual damage potential against which it is not economic to seek protection."

Krutilla was a member of the President's Task Force on Federal Flood Control Policy and as Krutilla noted, the work in Krutilla (1966) was an extension of the Task Force's 1965 draft report.¹ While the Task Force's recommendations that pertain to the points emphasized by Krutilla (1966) were incorporated into the NFIP, many would argue that the program has not yet achieved the efficiency potential suggested by Krutilla. Despite mandatory NFIP flood insurance for federally-backed mortgages, as suggested by the Task Force, historically NFIP participation has been low.² For many years, mortgage lenders were not required to make sure that flood insurance policies were in force for federally-backed mortgages. Thus home owners could initially purchase flood insurance as required by the Iaw and then fail to renew their policy with no objection from their mortgage lenders. The 1994 Reigel Community Development Regulatory Improvement Act required mortgages lenders to ensure that flood insurance policies are in force or face penalties. Thanks to this new requirement and an extensive FEMA advertising program, participation rates are on the rise.

There is considerable evidence that people tend to ignore, or at least fail to act against, small probability, high consequence events such as those faced by property owners and occupants of flood risk areas, Camerer and Kunreuther (1989). A properly functioning system of compulsory insurance should, at least in principle, avoid this problem. That is, even if people do not appreciate the risk they face by locating in the flood plain for whatever reason, compulsory insurance, as noted by Krutilla, will force them to face the social cost of locating in the flood plain.

II. Property Values and the Flood Risk Discount

In an ideal world where people are forced to face the social cost of locating in flood risk areas, basic economic principles suggest that property in flood risk areas should sell at a discount. However, results of property value studies attempting to measure the flood risk discount have been mixed.³ As noted by Tobin and Montz (1997), some studies failed to find statistically significant evidence of a flood risk discount. Muckleston (1983) and Holoway and Burby (1990) reported that

¹The Task Force's final report, Goddard *et al.* (1966) was issued in August of 1966.

²Beneson (1993) reports that as of 1993, compliance rates were on average less than 20% in NFIP participating communities.

³As a solemn reminder of flood risk, some communities have begun leaving evidence of flood damage such as flood-damaged houses as opposed to complete clean-up.

a flood discount is not evident for residential property, but is for undeveloped properties. Drawing on their earlier work from Tobin and Montz (1986), Tobin and Montz (1997) presented a theory of the relationship between flood exposure and property values. Their theory concerns property that has been exposed to flood, as opposed to simply being exposed to flood risk. According to their theory, the property values of flooded properties fall communities participating in the NFIP. Post-FIRM rates are intended to be actuarially fair while for Pre-FIRM rates, some cross-subsidy occurs within the group. For both of these types of properties, Pre-FIRM and Post-FIRM, premiums are distinguished by zones, which reflect the degree of flood risk, and whether the home has a basement, whether there is an enclosure at the base of the property, whether the building is elevated, and whether the home is a manufactured (mobile) home. In addition for a given structure within a given zone, premiums for Post-FIRM structures in some, but not all, FIRM zones are differentiated by the elevation of the lowest floor elevation in relation to the baseflood elevation. Base flood elevation is defined as "the water surface elevation resulting from a flood that has a one percent chance of equaling or exceeding that level in a given year." Table 1 presents Pre-FIRM annual premium information for \$100,000 coverage for structure and \$20,000 coverage for contents for a home with a base enclosure across three Pre-FIRM zone designation classes. We provide the information in annual and present value terms, the latter providing readers a benchmark for comparing the long-run cost of protection relative to the cost of the structure/contents.

Table 1Pre-FIRM PremiumsSingle Family w/Enclosure, \$100,000 Structure, \$20,000 Content						
	Structure		Content		Total	
Zone Designatio n	Annual Premiu m	PV Premium	Annual Premium	PV Premium	Annual Premium	PV Premium
1	365.00	5214.29	116.00	1657.14	481.00	6871.43
2	570.00	8142.86	120.00	1714.29	690.00	9857.14
3	1010.00	14428.57	209.00	2985.71	1219.00	17414.29
1 = FIRM zones A99, B, C, X 2 = FIRM zones A, AE, A1-A30, AO, AH, D 3 = FIRM zones V, VE, V1-V30						

Using the Pre-Firm examples in Table 1, the present value of premiums for structure and

on flood insurance premiums is difficult since there exists so much variability.

IV. Information and Economic Efficiency

In order to obtain the economic efficiency benefits discussed by Krutilla, potential purchasers of properties subject to flood risk must have information on the cost of compulsory flood insurance, otherwise we have one of the classic forms of market failure, imperfect information for buyers relative to sellers. Our interest in the informational aspects of NFIP began with our consideration information that was usually conveyed when flood-plain property was shown. Ashburn noted that flood risk is disclosed on the MLS listing, though sometimes incorrectly, and that for properties requiring flood insurance under NFIP, potential buyers are supposed to be notified prior to closing the survey since they ask about information acquisition in the process of purchasing. The final group of questions asked demographic questions.

Of the 320 households sampled, 130 responded to the survey resulting in a response rate of approximately 60%. The results from the information-related questions were very interesting. One question asked, "How did you learn your home was located in a special flood hazard area?" The response categories and the percentages of responses by category were: (a) flood certification, 68%; (b) MLS information, 23%; (c) FIRM, 2%; and (d) other, 7%. Another question asked, "When did you first learn of the potential flood risk associated with your home?" The response categories and the percentages of responses by category were: (a) prior to offer, 0%; (b) prior to closing 1%; (c) during closing, 74%; (d) after moving, 7%; (e) after being flooded, 7%; and (f) other 5%. Still another question asked, "When did you first learn of the cost of flood insurance associated with this home?" The responses to this question were highly, but not perfectly correlated with the response to the question previously discussed. The response categories and the percentages of responses by category were: (a) prior to closing 0%; (c) during closing, 61%; (d) after moving, 7%; (e) after being 0%; (c) during closing, 61%; (d) after moving, 7%; (e) prior to closing 0%; (c) during closing, 61%; (d) after moving, 7%; (e) prior to closing 0%; (c) during closing, 61%; (d) after moving, 7%; (e) prior to closing 0%; (c) during closing, 61%; (d) after moving, 7%; and (f) other 1%.

From the responses to these three questions we learn that information is acquired rather late in the negotiating and purchase process. In order for NFIP to efficiently incorporate the social cost of flood plain occupancy, potential buyers would need to understand the nature of flood risk and the cost for insuring against this risk *before* making an offer. The responses to these three questions suggest the opposite. An overwhelming majority of people do not acquire cost information until closing or after.

From an information perspective, it is important to understand how people felt when they learned the cost of flood insurance. To this end respondents were asked, "At the time of the purchase of your home did you find that the cost of insurance was... (a) higher than expected?; (b) lower than expected?; (c) as expected?" For this question the respective percentage responses were (a) higher, 84%; (b) lower, 2%; and (c) as expected, 14%. The responses to this question suggest that for most people, their expectation of the cost of flood insurance was biased downward. This bias, combined

incentive to develop flood prone property since they will actually reap additional profits from the undeveloped land discount for flood prone areas since they can sell the developed property to less informed buyers who are not fully aware of the costs associated with the property.

Obviously there is a need to bridge the information gap between buyers and sellers. In particular, potential buyers need to be fully informed of the cost of flood insurance prior to negotiating a purchase. A relatively easy and effective solution would be to require sellers to obtain

VII. References

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