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Discrimination based on Breed of Domesticated Dogs among Insurance Companies: Economic vs. Interdisciplinary Explanations*

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ABSTRACT: Insurance companies increasingly use dog breed as a criterion in determining eligibility for homeowners/renters insurance coverage. This study examines denial of coverage based on dog breed to determine whether this behavior is more consistent with an economic (rational/maximizing behavior) interpretation of industry behavior or with a more sociological/psychological view of industry behavior. The study reviews prior dog bite literature within the context of industry financial data, and interviews with insurance company personnel. The findings indicate that (1) even in cases where dog bite risk and liability are higher, the increased cost to insurers cannot rationally justify cancellation, and at most, justifies only a small rate increase, and (2) any liability exposure can be mitigated by taking into account other relevant factors. The conclusion is that industry behavior appears to be inconsistent with an economic perspective, and is more likely to be driven by other explanations of firm behavior.

Insurance companies increasingly use breed of dog as a criterion in determining eligibility for homeowners/renters insurance coverage (Bertolucci, 2004; Kirk, 2004; and Toutant, 2003). Breed discrimination by insurance companies negatively impacts consumers by increasing rates and causing involuntary insurance cancellation. In addition, sometimes people demarcated as having a "high risk" dog breed may decide to get rid of their dogs when they are repeatedly blocked from obtaining insurance. This can have a serious negative impact for people who have strong bonds with their dogs. In addition, it contributes to the social and economic problems of companion animal overpopulation and the unnecessary euthanasia of dogs at shelters.

*Study funded by The Toby Fund

The Role of Boundaries

The issue of breed discrimination involves several boundary issues. There are important human-animal boundary issues in breed category and insurance coverage policy. In addition, despite their boundaries, various social and behavioral science disciplines contribute to an inter-disciplinary explanation .

Breed Boundaries. Human interpretations and expectations for behavior in domestic dogs are driven in part, by categorization of these animals by breed. Such categorizations can be problematic because even when breeds do have certain tendencies in behavior, there may be too much confidence in broad generalizations based on these tendencies whereas, in fact, these tendencies actually exhibit a great deal of variation. Perhaps more importantly, most domestic dogs are not pure-bred (Bonham, 2004) and the boundaries between breeds are somewhat illusory.

Just as important, boundaries between breeds are not as clear as is often assumed. Breed labeling has been shown to be inconsistent at shelters, with the same animal being given a different breed label at different times (Marston, Bennett, and Coleman, 2004). Additionally, the breeds responsible for the greatest number of deaths have changed over time. Indeed, the projected risk of certain breeds may have more to do with the propensities of the owners/guardians than the nature of the breeds of dogs themselves (Delise, 2002). To make breed boundaries a defining characteristic neglects important within-breed differences in both inherent dog disposition and guardian/owner characteristics. Overall, it neglects to take into account the fuzziness of the breed boundaries.

Insurance Coverage Boundaries. Although some companies raise premiums based on dog breed, the majority draw a very strong boundary between breeds, denying coverage altogether to guardians of breeds they have deemed "dangerous". Allstate and the California State Automobile Association deny homeowner policies to California applicants with dogs of certain breeds including the Akita, boxer, chow, Doberman pinscher, Rottweiler, pit bull, Presa Canario, and wolf hybrid (Bertolucci, 2004). Other companies that have been reported as having breed "blacklists" include Mercury Insurance Group, Hartford Financial Services Group, Travelers, Nationwide, Selective, Quincy Mutual and Wawanesa Insurance

(Bertolucci, 2004, Kirk, 2004, and Toutant, 2003). Additional dog breeds that are on the blacklist of at least some insurance companies include: Airedale, Alsatian shepherd, American bulldog, American Eskimo, Bull Mastiff/Mastiff, Chesapeake Bay retriever, Dalmatian, German Shepherd, Giant Schnauzer, Great Dane, Husky, Kerry Blue Terrier, Rhodesian Ridgeback, and Spitz (Kirk, 2004). While some companies claim they do not discriminate, they become suddenly uninterested in writing policies when they discover homeowners have a pit bull (Humane Society of the United States, 2004 and Richard, 2004).

From an economic perspective, the prohibitive coverage boundaries established by insurance companies are seemingly irrational. For any calculable risk there is some premium level at which covering that risk becomes profitable. Therefore, a rational, profit-maximizing insurer should simply adjust premiums for dog breed, rather than denying coverage. Assuming that some customers would be willing to pay the adjusted premium, the company is better off financially offering increased premium policies than simply denying coverage. The policy of insurers to draw a strong breed boundary in denying coverage suggests that explanations other than rational risk management are likely at play.

Disciplinary Boundaries. In analyzing choices made under risk including by the insurance industry, mainstream economics treats risk as an objective, quantifiable variable that firms rationally take into account in their decisions. Economic agents are typically thought of as "risk averse", taking into account the risk inherent in choices and seeking to maximize the expected value of their choices after discounting cash flows for timing and risk. This view is consistent with the "technical analysis" perspective on risk that treats risk as subject to rational decisions based on realistic, impersonal factors (Bradbury, 1989).

Yet economics may have the most narrowly defined boundaries of the social sciences and this narrow perspective limits the explanatory power of the discipline. Swedberg (1991) gives three possible definitions of economics in relation to sociology and other disciplines. The first defines economics as the study of rational human conduct, while sociology also studies non-rational conduct. The second defines economics as the study of "atomized" human beings, while sociology studies human beings within a social context. The

third definition distinguishes economics as the study of the non-institutional context of society, while sociology studies institutional content. Unfortunately, all three of these definitions leave economics severely disadvantaged in what should be its primary content area, the study of the economy (including firm behavior). Much of what happens in the economy involves non-rational behavior, social contexts, and institutional content. This can be seen in particular with breed discrimination by insurance companies, where many of the most likely explanations for insurer behavior are considered "out of bounds" by the discipline. At the same time, economics is not given to psychological explanations, which allows for faulty individual perception to lead to biased estimates of risk.

Psychological Explanations for Dog Breed Discrimination

Attribution Theory. The original formulation of sttribution theory by Heider (1958), gives some insight into why risk assessments can be biased. Attribution theory concerns the process by which individuals assign causes to events (Kent & Martinko, 1995). Attribution theory as conceived by psychologists is highly individualistic and thought of as a cognitive process rather than as a social process (Crittenden, 1983). It has been argued that attribution theory could benefit from merging with the sociological framework of symbolic interactionism where behavior is guided by the subjective construction of reality (Stryker & Gottlieb, 1981).

From psychology's attribution theory one feature relevant to the question of breed and dog bites is the finding that people tend to underestimate the influence of situational factors, and overestimate the impact of personal disposition (Kelley, 1967). If the "personal disposition" of a dog is treated in the same way in the attribution process as a human's personal disposition, then this will be overemphasized in attributing causality to dog bites (while the relevance of the situation will be underemphasized). Judgers are also less likely to attribute personal responsibility for negative outcomes to actors with whom they share behaviors and dispositions (Jones & Nisbett, 1971). Thus, if decision-makers at an insurance company do not own a "dangerous breed" dog, they might be more likely to attribute blame to actors keeping those breeds. On the other hand, if

insurers attribute risk to mere dog ownership or lack of dog training, and the decision-makers are among the many people who also had a poorly trained dog at home, a negative attribution of blame would be less likely to be made.

Another relevant feature from attribution theory is that responsibility for serious accidents tends to be placed on either the victims or perpetrators involved, rather than accepting the possibility that outside, or even random forces, could be the cause. Such a perspective protects people from the conclusion that a similar accident could happen to them (Walster, 1966). This might apply to dog bites where the breed of the perpetrator (dog) can be blamed, rather than accepting the possibility than any dog might bite at any time.

Psychology of Risk. The psychology of risk perception studies the gap between actual risk and perceived risk (Tierney, 1999). Implicit in this is the notion that there exists an objective value of risk. The "psychometric" view on risk uneasily straddles the technical and social paradigms (Bradbury, 1989). It starts with the technical view of risk, but then allows for personal bias in judgments. While the psychometric school acknowledges that even expert judgments are subject to bias (Slovic, Fischhoff, Lichtenstein, 1977, 1984), generally the focus of any possibility of bias tends to be on the public (Bradbury, 1989).

An important and relevant concept in the psychological study of risk bias is the "availability heuristic" (Tversky & Kahneman, 1973). When analyzing risk or when estimating the frequency of a trait in a population, people often try to recall one or more salient examples. If cases are cognitively available, a hazard may be viewed as likely. Cognitively available cases can come from media accounts or even fictional accounts, as well as from a person's own experience.

Sociological Explanations for Dog Breed Discrimination

Social Construction of Risk. Sociological explanations of risk reject the psychological "risk perception" school of thought because risk is viewed as not existing independently from the human observation of risk and its social construction. Instead, the sociology of risk treats risk as embedded in a social structure (Stallings, 1990).

Perceptions of risk are dependent on social representations that define our way of viewing the world and the events that take place (Kirby, 1990). Sociologists increasingly view risk as socially constructed rather than something which can be objectively measured (Tierney, 1999). From the sociological perspective, scientific facts are not really facts at all, but rather, are inseparable from the course of scientific inquiry which creates them (Lynch, 1985). The image of risk assessment as rational and capable of finding objective truth is at odds with this perspective (Wynne, 1982).

The causes of risk that are *absent* from accounts of those risks also have an important impact on its social construction (Stallings, 1990; Gusfield, 1981). In the case of dog bites, while media accounts often mention the breed, and to some extent a narrative, which may include whether the dog was confined or chained, other variables known to be important—- such as spay/neuter status, training, and the level/nature of the dog's history of human interaction are absent. At issue here is that a virtually infinite number of other variables which are deemed unimportant in our society (color of dog, ambient temperature, what the person bitten recently ate or smelled like, etc.) are normally excluded. These actions frame and limit the possible factors people are likely to consider important in estimating risk.

It is important to note that from the sociological perspective, experts are just as subjective in their view of risk as laypeople. Regardless of the expertise of the judger, truths do not exist independent of people and their social context, and bias, irrational action, and narrow interest group behavior affect the judgment of experts (Otway & Thomas, 1982; Plough & Krimsky, 1987). Even if it is not truly objective, the use of expert technical analysis has value for claims-makers in risk arenas because it creates an authoritative appearance and allows the findings to be conveyed with the status of "fact" (McMullan & Eyles, 1999). Sociologists also challenge the notion that past accidents can be used to project future risk. From a sociological perspective, social change continually modifies societal and individual vulnerability levels (Tierney, 1999). Risk levels are continually in flux, a fact that has in the past caused problems for the supposedly objective risk estimates of the insurance industry.

Organizational "Decision-making." From a sociological per-

spective, decision-makers at organizations, including firms in the insurance industry, behave in a way that is best thought of in terms of social representations rather than rationality. Vaughan (1998:) found in evaluating the Challenger space shuttle disaster that the decisions leading to the incident were the "products of external contingencies, political battles, unacknowledged cultural beliefs, and formal and informal internal pathologies that undercut both the determination of goals and their achievement." Similarly, Lee & Ermann (1999) studied the actions at Ford Motor Co. leading to safety issues with the Pinto and found that contrary to the common media narrative of executives accepting the loss of consumer lives in a highly rational amoral calculus, in reality "perceptions and behaviors were shaped by organizational, industry, and legal/regulatory contexts." Additionally, the frames and perceptions regarding decisions can greatly differ between the actors within an organization and its own clients (Irvine, 2003). The differences found in Irvine's study set at an animal shelter may be particularly relevant to breed discrimination because it concerns organizational perceptions of behaviors of pets and their owners/guardians.

The fit of an organization's "myths" with its institutional environment has survival value in itself. These myths may be taken for granted as legitimate and can have value to help an organization survive, aside from any impact they have on work outcomes (Meyer & Rowan, 1991). Even when actors in organizations believe they are making decisions, they are typically acting according to institutional behavioral scripts, and their thinking is guided by mental schemas which are dependent on their social environment (DiMaggio, 1997; Powell & Dimaggio, 1991). In fact, the entire concept of "decision-making" is arguably an inaccurate representation of what managers do. Rather, managers and firms take actions based on institutional scripts or standard operating procedures and often reinterpret their actions in terms of decision-making after the fact in order to rationalize their actions (Laroche, 1995).

Impact of Media. In defining social problems such as dog bites, sociology emphasizes that these problems are constructed by "claims-making activities" (Nichols, 1997). Narrative is key to the construction of these problems, often via the use of "horror stories" (Johnson, 1995) or "typifying examples" of problems (Downey and Best, 1995). These stories and examples are very often disseminated by mass media. The mass media tends to focus on certain stories with particularly strong narrative potential, even when many other examples of a problem exist (Nichols, 1997). Media news presentation is shaped by their assumptions about narrative, storytelling, and human interest (Schudson, 1989). In the case of dog bites, those bites that can be blamed on a stereotyped "dangerous breed," particularly a dog that has been trained to be aggressive, might make for stronger narratives, even when they are not a typical case. A sensational case of a deadly dog bite might also make a particularly strong narrative, even if this type of case makes up a small minority of dog bite hospitalizations or medical claims.

The impact of news media results not so much from its outright statements, as it does from its role in selection and application of the cultural lenses (Binder, 1993). Framing of an issue by the media creates a dominant reading of the text, making it difficult for readers to comprehend it differently (Entman, 1991). Public discourse, including media discourse, draws on a collective vocabulary of symbols, ideas, and accepted words that construct the meaning of an issue (Misra, et al, 2003).

The media is also one of the most significant actors in the social construction of risk (Short, 1984) with increases in negative opinions about risky technologies being associated with increased news coverage of those technologies (Mazur, 1981). In its coverage of risk and other news events, successful narratives in the media tend to create links between events organizing them into patterns, and these patterns often propose or imply a causal explanation (Stallings, 1990). Furthermore, media accounts that are successful with the public tend to overwhelmingly be monocausal in nature, with the accounts tending to identify individuals as the causal agents, rather than physical or social forces (Gusfield, 1981). In the case of dog bites, the linking factor often identified by the media is breed. Accounts identifying breed as the cause of dog bites have the attributes of a successful media account in that they are monocausal and focus on a trait of the individual (assuming the dogs can be defined as "individuals").

Frames imposed on events also have a greater chance of success when they resonate with an interpretive schema of the larger cultural frame (Binder, 1993). In the debate over nuclear energy, Gamson and Modigliana (1989) argue that "progress" is a powerful

frame that resonated with deeply held American beliefs. It is possible that the "breed" frame would resonate powerfully in a culture where race differences are of significance.

Yet the media also exists within society, and has its own frame which it must rely upon in selecting and presenting news accounts, thus perpetuating that frame (Goffman, 1974). These frames are perspectives for seeing events and interactions that are grounded in a view of the world that is taken for granted (Berger & Luckman, 1966). Media frames can reflect racial views of society. In studying media depictions of welfare, Misra et al (2003) found that racialized images of welfare dependency were deeply embedded in the media discourse. It is quite possible that the frames in dog bite news coverage are also differentiated by the race of the parties involved.

Stereotyping and Effects of Gender/Race. Binder (1993) argues that discourse about potentially "harmful" music lyrics is affected by opinions of the populations represented by these groups (i.e. whether it was "white" music or "black" music). The racially-charged frames in this case were argued to tap into the audience's fears and anxieties and their perceptions of what white youths and black youths were like. A similar situation might occur in the case of dog breeds, since pit bulls owners are often described in reports as white thugs, poor urban blacks, or Latinos who try to keep their dogs as "mean as possible" (Hearne, 1991).

According to status construction theory, due to resource inequality, otherwise neutral individual characteristics such as race and gender can obtain "status value" when these visible characteristics are correlated with resource inequality (Ridgeway, 1991, 1997). These status characteristics then become generalized so that an individual with one status state (such as being black) may be assumed to be inferior and less worthy in general. Although this is not postulated in the original theoretical framework, it is possible that this generalization process may extend to devaluing the behaviors and choices the "lower status" group is associated with, such as ownership of pit bulls.

Another interesting parallel in theory on racism to breed discrimination is the concept of "cumulative causation" (Myrdal, 1944). In this conceptualization, there is a vicious circle created in race relations where prejudice by whites reduces the socioeconomic status of blacks or another race. This, in turn, reinforces the prej-

udicial belief system of the whites and perpetuates the cycle. Similarly, a cycle is created in breed stereotyping, where an expectation of aggression in a certain dog breed causes that dog breed to be kept, trained, and bred by those seeking aggressive dogs, further perpetuating the cycle. Yet, while we can speculate about the ways in which dog breed discrimination is socially constructed, statistical data can be utilized to measure potential irrational effects of breed discrimination on the insurance market.

Methodology

While certain breeds of dogs might have somewhat higher bite risk, the present study sought to answer the question, 'Is denial of coverage based on dog breed a rational economic response to risk (as is typically assumed within the discipline of economics), or does it appear to be an action better explained by alternative views of human and firm behavior?' First, we examined prior research on dog bites and their sampling methodology and results. Then we used two methodologies. The first was to examine publicly available insurance industry financial data in conjunction with prior dog bite liability research. This prior dog bite research has been frequently cited in support of breed discrimination, yet it has never been analyzed within the context of industry financial information. The second methodology was to conduct interviews for qualitative input from insurance industry representatives. It was predicted that results of both methodologies would indicate less support for the economic perspective on breed discrimination by insurance companies, and seem to strengthen an argument in support of sociological and psychological explanations.

Analysis of Insurance Industry and Risk Research

Breed Risk Data. Most studies conducted on dog bites that account for breed have used an unmatched survey methodology. These studies are "unmatched" in the sense that a comparison group of dogs from the general population is not used to obtain relevant baseline data such as breed bite frequency. One important shortcoming with these studies is that no statistical conclusions can be drawn

without some kind of control group. A publication by the American Veterinary Medical Association (AVMA) Canine Aggression Task Force points out that simply obtaining bite statistics by breed without a control group can be misleading (American Veterinary Medical Association Canine Aggression Task Force, 1991). If nine attacks are from pit bulls and seven are from Labradors, this does not in any way tell you whether pit pulls or Labradors are more likely to attack, because pit bulls may be more common in the study area's general population.

By far, the most commonly cited public data to justify breed discrimination by journalists writing newspaper articles, and by the insurance industry, was sponsored by the U.S. Center for Disease Control (CDC) (Sacks, et al, 2000 and Sacks, Sattin, and Bonzo, 1989). While many insurance companies appear to rely on this data, the CDC studies used an unmatched methodology. Furthermore, the focus of the CDC study is limited to fatal dog attacks. Despite the lack of a control group, the CDC's research may help in understanding dog bite mortality risk. However, when it used for a different purpose such as general liability risk, the results of this research can offer a very misleading picture. To begin with, the data is based on an average of 16.5 fatalities per year, while the study's authors estimate that in 1994 there were 800,000 dog bite injuries requiring medical care.

According to the CDC data, the breeds that caused the greatest number of fatalities between 1979 and 1998 were pit bulls, followed by Rottweilers and then by German Shepherds. In fact, combined, these three breeds make up most of the dog bite fatalities in the CDC study. However, the authors point out several reasons why their breed fatality statistics may be biased. The authors rely on news reports and not all fatalities were included in the data. Since attacks by one breed may be more newsworthy than others, certain breeds may be overrepresented. In addition, the authors point out that dog breed is subjective and attacks may be attributed with a bias towards breeds with a reputation for aggression.

Several other studies have examined dog bite risk by breed. Avner and Baker (1991) used injury data from a children's hospital in Philadelphia and reported that German Shepherds caused the most injuries followed by pit bulls, Rottweilers, and Dobermans. A study of severe attacks in South Carolina counties by Wright (1985)

found American Staffordshire terriers (pit bulls), St. Bernards, and cocker spaniels are the most frequently attacking breeds. Delise (2002), like the CDC, looked at fatal dog attacks. Using the period 1965 to 2001, the results indicated that pit bulls, Rottweilers and German Shepherds were the three breeds most frequently involved in fatal attacks. This study also found that a quarter of attacks came from chained dogs, and that 95% of fatal dog attacks were by unneutered dogs.

Gershman, Sacks, and Wright (1994) improved on the methodologies described above by including a matching comparison group from the general population, which allowed the authors to conduct statistical tests on the likelihood of specific breeds of dogs biting, as well as testing other relevant risk factors. Their study found that German Shepherds were 3.4 times as likely to bite as other dogs, and that Chow Chows were 5.5 times as likely to bite as other dogs. These were the two most commonly biting breeds in their sample. Rottweilers and pit bulls were lumped under "other breeds" because the number of biting dogs and general population dogs from these breeds were too small in their study to conduct valid statistical tests. Combined, only 25.8% of biting dogs came from these "other breeds", while 34.8% of the total dog population came from different breeds.[1] The authors also found that non-neutered dogs were 3.5 times as likely to bite, guard/attack trained dogs were 4.0 times as likely to bite[2], unlicensed dogs were 3.3 times as likely to bite, dogs not vaccinated for rabies were 2.5 times as likely to bite, chained dogs were 2.4 times as likely to bite, male dogs were 3.0 times as likely to bite, and female dogs who had at least one litter were 7.0 times as likely to bite.

A separate study with a matched sample from the general population was conducted in Australia (Thompson, 1997). The study found the most common dogs to attack in their study region to be Doberman pinschers, which were 4.7 times as likely to attack as other dogs. German Shepherds were 2.5 times as likely to attack, Rottweilers were 2.2 times as likely to attack, and bull terriers were 2.1 times as likely to attack.

The research results of these studies suggest that certain breeds are more prone to attack than others. However, the boundary between breeds is fuzzy and the predominance of a given breed can change from region to region, time to time, and study to study, sug-

gesting that the cause of aggressive behavior may have more to do with the nature and actions of the dog owners/guardians and why they keep certain breeds, rather than lying solely with the inherent nature of the breed itself. The studies highlight many other factors that have been found to be associated with higher bite risk and should be equally relevant to insurance companies such as sterilization, chaining, and training. Furthermore, the two studies with a matching sample from the general population allow that increased risk to be put into context. Although some dogs appear to have an increased risk for biting, the highest risk that has been demonstrated statistically for any breed is 5.5 times as high as the average dog.

Insurance Industry Financial Data

According to an estimate from the Insurance Information Institute, a source of data on the insurance market and an organization backed by the insurance industry, insurance liability claims involving dog bites totaled $345.5 million in 2002 (Insurance Information Institute, 2004a). However, the net premiums written in 2002 for the property and casualty industry were $369.7 billion, more than a thousand times higher than claims involving dog bite-related injuries (Seifert, 2004).

The same report by the Insurance Information Institute also states that dog bite liability makes up "almost one-quarter" of homeowner's insurance liability claims. This again may sound large when stated without financial context. Liability claims make up only a small portion of homeowner's insurance claims. In 2001, 72 cents for every dollar of premiums earned went to property damage, while five cents for every dollar of premiums earned went to liability claims (Insurance Information Institute, 2004b). Excluding other expenses and looking just at claims, this implies that only 6.5% of all homeowners insurance claims paid go to liability claims. If we combine this figure with the fact that a quarter, at most, of all liability claims are dog bite-related, this implies that only 1.6% *at most* of every dollar in homeowners insurance claims paid went to dog bite costs.

Based on the research previously cited, the highest risk breeds are about five times as likely to bite as other dogs. Therefore, insuring a household with this type of dog increases expected claims cost by 8%. Stated another way, insurance companies can expect to pay an additional 8 cents for every claims dollar paid if they insure a very high risk dog, even assuming they do nothing to mitigate this risk. Of course, insurance companies have other expenses outside of claims. These indirect costs associated with dog bites can be estimated by allocating the total costs of settling claims and the costs of company operations proportionally to all sources of claims. If anything, this is an overestimate of indirect claims costs, since some costs from company operations cannot be attributed to claims even indirectly. When indirect claims costs are added to the direct costs of dog bites, and this is then compared to total costs using industry data from the Insurance Information Institute, the total added cost of a high risk dog is just 5.9 cents for every dollar of total homeowners insurance expenses. This would imply that the highest amount insurers should reasonably be able to justify for increasing premiums for a family with a high risk dog is approximately 6%. This is less than the routine premium increase many insurance customers have experienced in recent years, and would not pose a significant hardship on customers[3]. Furthermore, since this 6% is allocated based on both direct and indirect costs, it already takes into account administrative expenses and the fact that insurers expect to make a profit. Therefore, outright cancellation of insurance by carriers appears to be unjustified based on industry financial data.

Figure 1 helps to put the cost of dog bites to the homeowners insurance industry in perspective[4]. The data presented is intended to give a sampling of hazards rather than an exhaustive list. As indicated, a number of one-time disasters have cost the insurance industry ten times, or even fifty times, as much as the annual costs of dog bites. In addition, many regular annual homeowners' insurance costs are a level of magnitude larger.

While dog bite payouts by insurance companies increased by 38.2% between 1995 and 2002, premiums for homeowners' insurance increased by 66.8% over that same period[5]. Therefore, the cost of dog bites to insurance companies constituted a smaller portion of premiums received in 2002 than it was in 1995.

Analysis of Pit Bull Risk. One possible counterargument that can be made regarding the financial analysis offered here is that Gershman, Sacks, and Wright (1994) and Thompson (1997), the

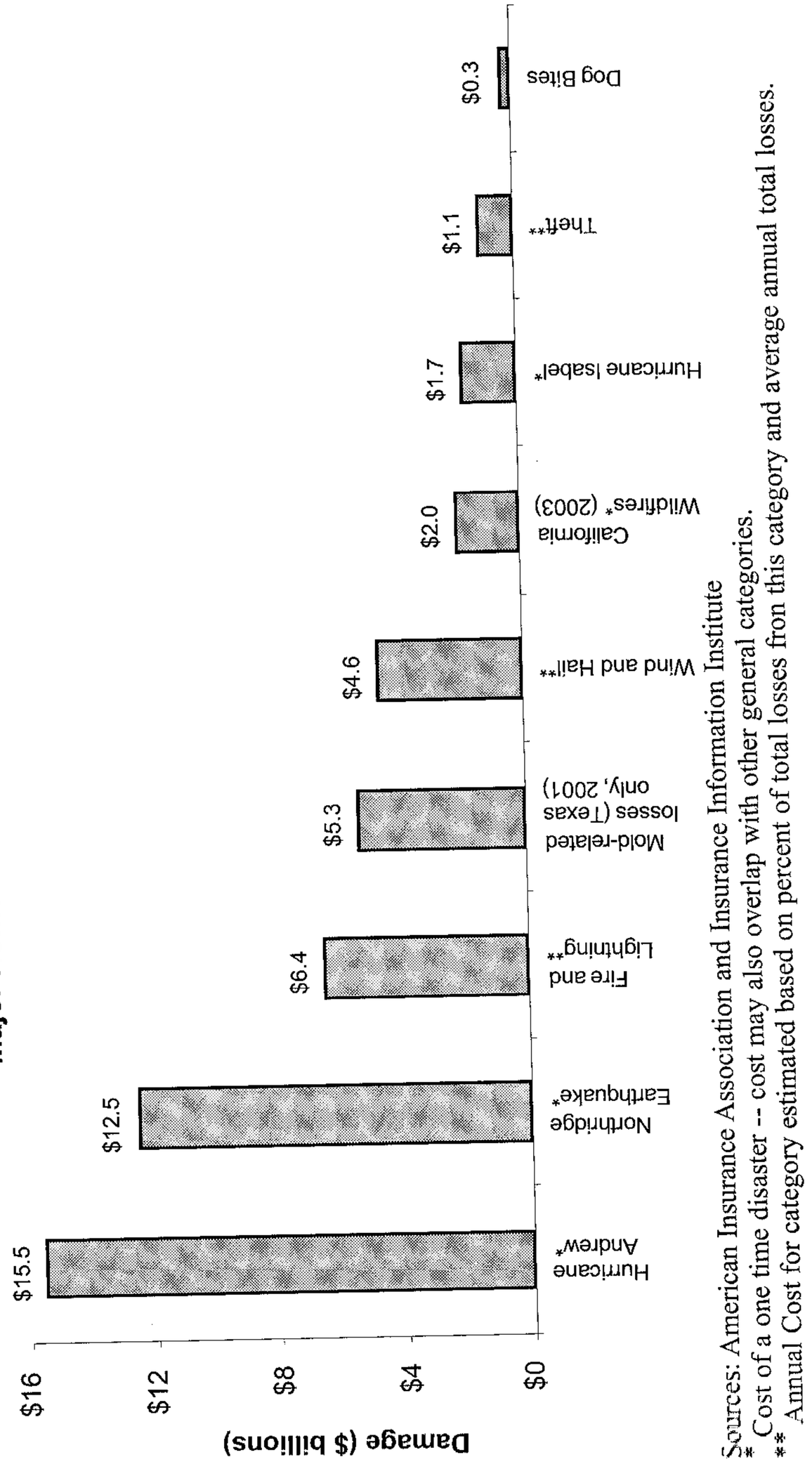

Figure 1. Dog Bites in Perspective.

Sources: American Insurance Association and Insurance Information Institute
* Cost of a one time disaster -- cost may also overlap with other general categories.
** Annual Cost for category estimated based on percent of total losses from this category and average annual total losses.

only research studies with a matching control group to allow for computing an odds ratio, do not include pit bulls.

In recent years, pit bulls have been singled out by the media as having the most notorious reputation for aggression. Dog owners themselves experience the effects of this stigmatization (Arluke & Patronek, 2000). The data on dog-bite fatalities do confirm that the breed most commonly involved in fatal attacks in recent years have been pit bulls. Just how dangerous are pit bulls relative to other dogs? According to the CDC, fatality data that is often cited by the insurance industry (Sacks, et al, 2000), 31.9% of all dog bite fatalities between 1979 and 1998 came from pit bulls (either purebred or crossbred). Although there are no refereed journal-published estimates of the pit bull population to allow calculation of a bite risk, there are some other published estimates. In Nevius (2004) researcher Alan Beck gives an estimate for the pit bull population of 6% of the general dog population in the United States. Beck bases this estimate on American Kennel Club registrations by breed. It should be noted that Beck is not an advocate for pit bulls, so there appears to be no motive for giving an upward-biased population estimate. In fact, Beck is firmly on the side of people who claim that pit bulls are a dangerous breed. Beck's conclusion that pit bulls present a greater fatality risk than the average dog is reasonable. However, the question here is whether this risk is sufficient to justify the strict eligibility boundary created by many insurance companies. Using Beck's pit bull population estimate and the CDC's 20-year fatality rates from Sacks, et al (2000), a rate can be calculated as the bite incidence relative to the breed's prevalence in the general population. According to this calculation, pit bulls are 5.3 times as likely as the average dog to be the cause of a fatal bite. This is almost exactly the figure that was used in the more generic (in terms of breed) financial analysis shown above for a high-risk breed. Therefore, this figure would be consistent with the prior conclusion that keeping a "dangerous" breed (even a pit bull) justified at most, a 6% rate increase by insurance companies.

The liability cost calculation for pit bulls is also likely to be overestimated for a number of reasons. First, there is good reason to believe that the percentage of dog bite fatalities from pit bulls is higher than is the percentage of dog bite injuries from pit bulls. That is, when pit bulls attack, their attacks are more likely to cause death

or serious injury. This would cause pit bulls to be overrepresented when using fatality data for drawing conclusions regarding insurance liability from bites of all levels of severity. Data from the Texas Department of Health (1999) supports the hypothesis that pit bull attacks tend to be more severe. The data from the study on dog attacks and bites in general shows that pit bulls caused only 7.4% of the attacks, while data on bites severe enough to require hospitalization from the same study indicates that 13.8% of the attacks were from pit bulls[6]. As already noted, the data nationally on pit bull fatalities indicate a much higher percentage of pit bulls—31.9% over a twenty-year period. Although Texas may be somewhat different than the national average, it appears that the percentage of pit bulls strongly increases as we move up in severity of attack from "all attacks requiring medical care", to "attacks that require hospitalization", to "fatal attacks." Therefore, using fatal attacks as the basis for calculating risk by breed may greatly inflate the insurance liability risk from pit bulls. Although fatal attacks incur more liability per incident than minor bites, insurance policies typically limit liability coverage to $100,000 to $300,000 (Insurance Information Institute, 2004a). Therefore, based on the average annual number of dog bite fatalities multiplied by the maximum liability in a typical policy, the total cost to insurers from fatalities is not more than 1%-2% of the total dog bite claims cost. This suggests that the vast majority of claims cost is from injuries less severe than a fatality.

A second reason the pit bull risk may be overstated using fatality figures is that much of this data relies on media accounts. As the authors of the most frequently cited study (Sacks et. al., 2000) themselves indicate, this may cause pit bull attacks to be overstated. This is because the boundary between pit bulls and other breeds is vague and the attribution of breed may be determined by the context, with aggression causing a breed to be labeled as "pit bull". In other words, if a mixed breed dog with some pit bull features causes a severe or fatal bite injury, it is highly likely that media with a "dangerous breed" frame and a desire to create a strong narrative will refer to it as a "pit bull mix."

A third reason the risk of pit bulls may be overstated is that the 6% figure used for analysis here (that originated from Alan Beck's estimate) may be too low. Beck considers his number conservative because he used a "broad" definition of pit bulls. However, the definition of "pit bull" used in media accounts will also be broad. Beck uses AKC registrations as a basis for his number. If there are more non-AKC-registered or mixed breed dogs that are pit bulls than other breeds, this will cause the pit bull population to be underestimated. There is good reason to believe that this may be the case with pit bulls. We know that a portion of pit bull guardians/owners are people who use the dogs for fighting (Forsythe & Evans, 1998). These segments of the population may be less likely to register their animal with the AKC. An independent analysis of this issue was conducted by counting all dogs available by breed over a six month period at a major national website for dog adoptions (petfinder.com) which lists tens of thousands of dogs from a wide range of sources. According to this data, 12.3% of the dogs available during that period fall under a broad classification of dogs that could be labeled "pit bulls."[7] This is double Beck's number and would therefore translate into a smaller relative cost to insure pit bulls.

A fourth reason why the risk of pit bulls may be overestimated is that in addition to other issues from using fatalities as a basis for estimating liability, there is a difference between dog bite liability and dog bites. The demographics of pit bull ownership may cause these households to be underinsured[8].

Perhaps the most important point here is that even if the estimates for pit bull costs are somewhat underestimated, they at least give some guidance as to the reasonable range of possible costs. Even if the expected liability cost for insurance companies under a technical risk calculation paradigm is double or triple that calculated here, it still remains a relatively minor cost, and one that cannot rationally justify policy coverage denial or cancellation.

Industry Interviews. In addition to analyzing insurance industry financial data, a separate component of the present study included interviewing individual insurance company representatives and industry trade group representatives. Personnel from the following companies and organizations were interviewed: Allstate, State Farm, Hartford Financial Services, Nationwide, Liberty Mutual Insurance Group, Travelers, Mercury Insurance, the Insurance Information Institute, the American Insurance Association, and the Property Insurers Association of America. Most commonly, the company representative agreeing to participate in the interview was the director or a representative from the public affairs department.

The four representatives from three industry trade organizations speaking on the matter included three public affairs representatives and a staff economist.

In terms of what the actual company policy was regarding insuring households with dogs, five of the eight companies indicated that they did use breed as a factor, two claimed that there was no official policy and that it was determined at a regional levelix, while one company said they absolutely do not take breed into account. The insurance industry trade organization representatives, consistent with the companies interviewed, all indicated that most, but not all, companies did take dog breed into account, though they did not have specific information on individual company policies.

When asked the basis for discrimination by dog breed, four of the eight insurance companies, and two of the three trade groups, specifically cited the CDC dog bite fatality study as their basis for discriminating by breed (it should be noted again that the CDC report itself clearly indicates that the study results are not suited for this purpose).

Three companies indicated that they may have some actual company experience or data to back up their policy, however, two representatives were tentative and unwilling to commit to the fact that they had actuarial data supporting their policy, while the third gave both the CDC study and their own internal data equally as support for their policy of discrimination. When asked what their internal data showed, this last company representative indicated that their data showed that certain breeds have higher bite risk than other breeds, and that their own claims experience was consistent with the CDC data regarding breeds.

None of the companies interviewed used spay/neuter as a factor. One company indicated that chaining was a factor under their underwriting policy, one company indicated that certain regions might use chaining as a factor, and a trade group indicated that they did know for a fact that some companies use chaining in their underwriting determination. This is also consistent with the statement of one insurance industry representative quoted in an article as saying that keeping a dog chained will work in a customer's favor when they judge a dog's risk (MSN, 2004)[10]. (It should be noted, however, that in all of these cases, chaining was utilized in the opposite direction of what the scientific literature suggests). Additionally,

two companies indicated that they used other factors in their assessment such as whether dogs had passed good behavior testing or training. Four companies mentioned taking a dog's history into account.

Despite repeated attempts during interviews to obtain such information, insurance industry representatives provided no evidence of data to support an argument that the actual expected liability cost of a high-risk breed is higher than our calculations. In fact, some industry and company representatives explicitly cited the CDC data on fatalities (Sacks, et al, 2000; Sacks, Sattin, & Bonzo, 1989) as their primary rationale for breed discrimination.

Discussion

It may surprise many economists, though probably few sociologists or psychologists, that most insurance companies could be denying insurance to tens of thousands of households and ignoring potential revenue based on faulty theories of risk and bad economic choices. Some economists have suggested alternative paradigms for firm behavior that can partially explain the findings here, however these economists are considered to be outside of the mainstream and draw many of their insights from disciplines such as psychology and sociology. Traditional economists typically assume that forces of natural selection will force any irrational firm out of business. However, insurance is an oligopoly with the revenue of the top four property and casualty companies making up two-thirds of the earned premiums for the entire industry[11], and with very high barriers to entry. Barriers to entry reduce the opportunity for natural selection to improve market efficiency (Hodgson, 1993). There are also other reasons non-mainstream economists have suggested for why natural selection in markets may not lead to efficiency[12]. Issues related to natural selection that are particularly important for the dog-bite rationale, include a surprisingly long time-scale in some selection processes, and the fact that unprofitable ideas can be selected for if they have psychological appeal or fit well with the overall social framework[13].

Behavioral economists have also utilized insight from psychology that may apply to this situation as well. There is strong evidence

that people can be strongly biased by media accounts[14], such as those that characterize certain breeds as dangerous. Firm decision-makers have also been shown to often do what economists call "satisficing" (Simon, 1959)[15]. Overwhelmed with excessive amounts of information, and too many options or decisions, managers tend to find a "good enough" solution to their business problems rather than looking for the optimal solution. Therefore, if insurance companies are performing adequately while discriminating by breed, managers may decide not to focus their limited attention on this issue.

The most likely forces driving insurance companies to discriminate by breed appear to be sociological. Risk perceptions in the insurance industry appear to be framed by social representations. It appears to be taken as a given by the industry that breed is appropriate as the primary construct used to define dog bite risk; the only question within this frame then becomes which breeds are high risk. This perspective may blind organizations from seeing other variables that may be equally important.

Even when firms do take other variables into account, prevailing social representations appear to have caused them to not account for them properly. The response by industry personnel to the chaining issue suggests that "under control/out of control" may be a resonant social theme for judging pet behavior in our society. Therefore, industry personnel may assume that dogs who are chained or otherwise confined are "under control" and unlikely to bite. However, dogs chained and confined long-term often develop "frustration aggression" and several studies previously cited indicate that chained dogs are actually at higher risk of biting. No studies exist indicating a lower risk of dog bites from chaining. In fact, Gershman, Sacks, and Wright (1994) found regularly chained dogs to be 2.4 times as likely to bite.

In addition, data from a study of 431 fatal attacks found that despite numerous fatal pit bull attacks, between 1965 and 2002, there were no cases of a fatal attack from any neutered American pit bull terrier (Delise, 2002). A policy of adjusting rates for spay/neuter could help insurance companies reduce their risk exposure. Yet, this was noticeably absent from the statements of the industry representatives interviewed. It is possible this is because the spay/neuter factor is outside of their socially constructed frame for what defines dog bite risk.

The insurance industry also appears to make an erroneous assumption about stable risk. While dog bit studies, including the CDC study, clearly demonstrate that dog bite risks are in constant flux based on social change, insurance industry policy treats risk as a stable variable. As Tierney (1999) points out, the assumption that past accidents accurately forecast future risk has gotten insurance companies into trouble in the past.

The interviews with insurance companies, as well as the inconsistency of company policy with claims data, both suggest that firms may be following institutional scripts and standard operating procedures rather than optimizing profits. The policy of denying coverage for a "high risk" breed that at most, adds a few pennies of risk on the dollar, appears to be based on an institutional script that treats denial of coverage as the standard tool or response for certain situations. Such a policy is difficult to reconcile with profit maximization. Furthermore, these policies seem consistent with Laroche's (1995) view that firms often take action for a variety of sociological reasons and then only later rationalize that action as a well thought out "decision", both for the benefit of themselves and for outside parties. Stereotyped response to breed may also frame their actions such that they place the dogs of potential clients into a clearly defined boundary of "dangerous" or "safe", rather than viewing breed and risk on a continuum, with premiums simply requiring modest adjustments to account for risk.

There also appears to be influence from media accounts on firms. Reports on sensational attacks from pit bulls and other stereotyped breeds appear to have influenced firms. It also appears that the authoritative nature of the CDC study has had a powerful impact on the perspectives of insurance industry decision-makers. However, these same decision-makers appear to have been blinded by their overriding frame as they miss the more subtle distinctions and caveats given by experts in those same reports and by other experts.

Conclusion

It is reasonable to conclude that certain breeds are more likely to cause serious bites than others. However, even if we assume that certain breeds have a higher risk of biting, the analysis here suggests

that this risk still makes up a relatively minor portion of the expected value of claims risk for that homeowner. Using existing research on breed risk, and estimating how many insured households have dogs, the present study has estimated a range for how much more is reasonable to charge in a premium when a high risk breed is present. It is likely that even the highest risk breeds can reasonably justify only a modest premium increase (under 10%).

Therefore, from an economic perspective, the creation of strict boundaries based on breed for who is eligible for insurance coverage is of questionable merit. Furthermore, the fact that clear discrimination of this nature exists in insurance markets seems to go against traditional economic disciplinary assumptions of rationality, and appear to be more consistent with psychological and sociological explanations of behavior.

Notes

1. The authors mention that only one dog bite incident was from a pit bull. However, this was affected by a Denver ban on new pit bulls in 1989.
2. However, there was only a small sample of guard/attack trained dogs so this particular variable was not statistically significant.
3. In fact, in 2003 average homeowners insurance premiums increased by 7.3% over all according to "Facts and Statistics: Homeowners Insurance," Insurance Information Institute, data as of September 28, 2004.
4. Data for this table is estimated based on "The Changing Homeowners Insurance Marketplace", Advocate, American Insurance Association, Washington DC, July 23, 2004; and "Facts and Statistics:Homeowners Insurance", Insurance Information Institute, data as of September 28, 2004, http:///www.iii.org/media/facts/statsbyissue/homeowners.
5. Calculation based on Insurance Information Institute (2004a) and Standard and Poor's (Seifert, 2004) data.
6. The study included all bites that broke the skin and would cause "most prudent and reasonable people to seek medical care for treatment of the wound, without consideration for rabies prevention alone", as well as attacks where the person has extreme difficulty terminating the attack.
7. Because this represents dogs in need of adoption, this estimate will also be biased. However, it is probably no more biased than breed registry data.
8. One recent study that seems consistent with the idea that pit bulls and Rottweilers may be both under-registered and under-insured is a study of canine distemper by the Conservation Medicine Center (Gorner, 2005). Most of the dogs infected have been mixed-breed Rottweilers and pit bulls. If these dogs tend to be under-vaccinated, this is also consistent with them receiving sub-standard consideration in other respects such as with registering and insurance.
9. Media reports indicate that at least some regions for these companies do discriminate based on breed.
10. "Good dogs, bad dogs and homeowners' policies." MSN, April 18, 2004.
11. Calculations are based on data from "Facts and Statistics: Industry Overview", Insurance Information Institute, data pulled 9/28/04, http://www.iii.org/media/facts/statsbyissue/industry/ .
12. For some discussion see Nelson & Winter (1982) and Hodgson(1994).
13. For more discussion of these particular issues see Frank (2003) and Frank (1999).
14. For discussions of some of these biases see Tversky & Kahneman (1974), Camerer (1995), and Cooper, (1989).
15. As originally discussed in Simon (1959).

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