TESTIMONY OF DR. BILL SPELMAN

STATE OF TEXAS §
§
COUNTY OF TRAVIS §

BEFORE ME, the undersigned authority, personally appeared William Spelman, who, being by me duly sworn, deposed as follows:

"Q: Please state your name.
A: Bill Spelman.
Q: What do you do for a living?
A: I teach at the LBJ School of Public Affairs, University of Texas.
Q: Tell me about your — your education and preparation for your job.
A: I have a bachelor's degree in political science and economics at UCLA. A master's degree in public policy from Harvard, and that's the Kennedy School of Government. And a PhD in public policy from the Graduate School of Arts and Sciences at Harvard.
Q: What is your area of academic interest at the LBJ School?
A: I teach courses in applied mathematics and applied statistics. In public management and in urban policy.
Q: Does your resume in Exhibit 25 contain a summary of your education and experience?
A: Yes.

Q: What were you asked to do by Texas Windstorm Insurance Association?
A: The Association asked me to take a look at a data set which they'd compiled, which if I understood it, included many characteristics of Hurricane Ike claims that were not slab losses. There were some 387, I think, cases which had already been adjusted for which they had — they knew the building losses, they knew the cash value replacement cost for buildings, and they also had a lot of characteristics for the buildings. And my job was to estimate, find a statistical means of identifying the effect of characteristics of the buildings on the amount of damage done by wind.
Q: Will you give a little bit of explanation of what the discipline of statistical or quantitative analysis is and how it enables you to do that?
A: The exact method I use is something called multiple regression, which is incredibly complicated and probably you don't want to hear the details about. But I teach an entire course on it and it takes about 15 weeks to go through all the details. The short version, however, is if you take a class of cases, as we did in this case, we had three hundred and eighty some odd, we can estimate a value, in this case a loss ratio for each one of those three hundred and eighty some odd cases. The loss ratio for all these cases is a little bit different. The average of all the cases was around 10 percent, but some of them were 15 percent, some of them were 3 percent. So there's some variability around the average.

EXHIBIT A

Q: What does the loss ratio mean? What is it?
A: The loss ratio can be defined in a bunch of different ways, but for -- for purposes of this study, the best way to define it is the gross building losses from wind damage divided by the cash value of the building. So it was a portion of the cash value of the building that was lost due to wind in Hurricane Ike.
Q: Did the data set provide you with the — the amount of the loss to houses and the value of those houses —
A: That's right.
Q: — for the 387 buildings that were in the data set?
A: That's correct.
Q: For which adjusters had estimated the wind portion of the loss?
A: That's correct.
Q: So when you're talking about the loss ratio, are you talking only about the wind — wind damage portion and not any flood loss?
A: That was my understanding.
Q: I just want to be sure I'm understanding the data that you used for your analysis. When you talk about being provided data by TWIA, all of those 387 buildings, the figures you were looking at were the adjusters' estimates? The adjusters that were hired by TWIA?
A: That's right.
Q: It was based on their interpretations of the loss, is that right?
A: Yes.
Q: So you didn't go and look at the property then?
A: No.

Q: When you received the data set, what did you do with it?
A: The first thing I did with it was calculate the loss ratio. We already had -- the numerator of the loss ratio was the damage done. The denominator was the cash value of the house and the first thing I did was figure out what the loss ratio itself was. Then I calculated the average loss ratio over all the buildings included in the data set, which was around 10 point — 10 percent, I believe it was 9.5 percent. What I then was doing was looking for a means of identifying which cases had particularly high loss ratios and which one had particularly low loss ratios. Depending on the construction of the building, the date of construction, type of roof, the — the date in which the roof was replaced, any additions or repairs to the building and so on. It could have been that some classes of buildings ran particularly high loss ratios, some ran particularly low loss — loss ratios. The idea is -- is there a way of predicting which ratios should be highest and which one should be lowest.

Q: What — what variables did you look at to — to try to predict the loss ratios?
A: There was a long list, but let me tell you the most important categories. Looked at the location of the building, what town is it in. We looked at the use to which the building was put, residential versus commercial. We looked at the size of the building, construction materials of the building, roof materials of the building —

Q: Would you discuss the significant independent variables that were analyzed.
A: Well, as briefly, location, use, building size, construction materials, roof materials, the original construction date, the date of any repairs and additions made, and the applicable building code, the building code that was applicable at the time that the building was constructed or repaired.
Q: Okay.
A: And those are the entire group. Some of them were significant, some of them were not.
Q: Did — did anybody give you information of what variables you ought to be looking at?
A: I had an idea that the date of construction should be particularly important because the building code had changed over time and had become more restrictive. Therefore, buildings that were constructed more recently would probably have weathered the storm better than buildings which had been — been built earlier. The date of the roof, similarly, new roofs would probably do better than older roofs. There may be – so those are the two principal pieces of information that I had gathered from my conversation with your engineering experts.
Q: Dr. Doug Smith?
A: Doug Smith, yes.

Q: Were those the only variables that were analyzed statistically?
A: I used all of them. The way I like to do analysis of this kind is to cast a very broad brush and then systematically eliminate variables that are clearly not important. So the original attempt at predicting loss ratios included a lot of variables, and I think there were 18. And then I systematically took off one variable at a time making sure that it didn't actually change anything, that stayed in the predictor, and that removing each predictor did not reduce our ability to predict. I moved then from about 18 variables down to three, there were only three variables which emerged as being statistically significant, or being good predictors of loss ratios.
Q: And which three again are those, in summary?
A: Those were the type of use of the building, Residential versus commercial. The date of the original construction. Whether the building was originally constructed in 2004 or more recently, or the most restrictive and recent building code or before that point and the date of the most recent roof. Whether the roof was added in 1989 or more recently, or whether it was an older roof from 1988 or earlier.
Q: So those three variables — did that have a statistically significant impact on the amount of loss that the 387 buildings sustained from wind damage?
A: On the ratio of the loss, that's correct, yes.

Q: Can you explain in a little bit more detail on how regression analysis allows you to make those judgments?
A: Regression analysis is a complicated form of fitting a curve. If I have two axes and I'm plotting points, on my *Y* axis, my vertical axis I might put the loss ratio for each case, and on the *X* or horizontal axis I might have some characteristic such as a date the building was constructed. So you have 2009 all the way — or 2008 all the way back to 19 — I think 1911 was the earliest day of construction in this particular data set. So I would for each case that was built in 1911 it had a loss ratio of 15 percent, I'd put a point there at 1915 at 15 percent, I put points all over that map. What regression does is it tries to fit a line among those points as best it can. And

if the points are nicely lined up, if each of the dots are nicely lined up around the line, then that suggests that that particular variable is a very good predictor. Knowing what that variable is, the date of construction, for example, which tells me a lot about what the loss ratio for that case would be. If the dots are — look like a blob, and there doesn't seem to be any structure to it and there's no way I could fit a line to it, what that suggests is knowing the value of that variable tells me nothing about the loss ratio. And what I found here was about 15 of the 18 variables I look at told me nothing about the loss ratio. So I systematically got rid of them all one by one and there were only three left that actually did tell me something useful about loss ratios.

Q: And the — did you prepare a summary of the — the three different categories and the loss ratios that are associated with those categories?

A: I did, yes.

Q: Is Exhibit 26 and true and correct copy of your report?

A: Yes.

Q: Will you explain to the judge what Table 1 is in your report?

A: Of course. Table 1 is — breaks down 387 cases into several different groups. The first breakdown is between residential and commercial buildings. And that first column under summary statistics average states that the resident — the average for all residential buildings was a loss ratio of 9.8 percent. So of all the residential buildings in this sample, the value of the building that was loss due to Hurricane Ike was 9.8 percent.

Q: Let's stop here a second to make sure I understand this. So for all of the 387 buildings that are still standing and were looked at during the period of this study, which I understand was 60 days after the storm.

A: That's right.

Q: The average loss from wind, not flood, was 9.8 percent of the cash value of the building?

A: That's right.

Q: And that's what the data set told you?

A: That's right.

Q: And —

A: For residential buildings. A little bit less for commercial buildings.

Q: So this is for the entire — the 9.8 percent is for the entire group.

A: Right.

Q: And when you started differentiating between building types, what else are you — what else do you find?

A: Okay. So first residential buildings, there's 9.8 percent. The average for commercial buildings was 5.3 percent. so that was the first test between residential and commercial. The second cut —

Q: So why do you have such a big difference between commercial and residential?

A: Couple reasons. One of them is that commercial buildings tend to be larger, and for a bunch of technical reasons you would expect that larger buildings would suffer a smaller percentage of value loss in a wind storm than a smaller building. It has to do with the surface to volume ratio, basically. You got more surface area relative to the volume in a small building than you do in a larger building.

Q: Okay.
A: Also commercial buildings were probably more — more likely to be maintained reliably than — than residential buildings. Some people maintain their buildings extremely well, some people don't, but commercial buildings have got to be more reliably maintained by and large.
Q: What other subgroups did you — did you prepare?
A: Under residential buildings, the next cut was construction date, whether it was constructed before 2004, the most recent and restrictive building code, or constructed in 2004 or more recently. What I found was that buildings which were constructed in the most recent and restrictive building code suffered a loss of about 4.9 percent on average, but older buildings on average suffered a loss of about 10.9 percent. So older buildings about twice the losses of the newer buildings.
Q: Okay. Does that make sense in terms of code upgrades and changes?
A: It makes sense in terms of code upgrades. It also makes sense in just terms of age of materials. As a building ages and the materials start to weather and are more likely to be hurt in the -- in a wind storm.
Q: Okay.
A: The third cut.
Q: What's the third cut?
A: Was on the age of the roof. If the roof was constructed after 1989, a relatively new roof, then the — the average for those cases, there were 190 cases that fit these — these criteria. Residential buildings, older buildings before 2004, and with a relatively new roof. If it was constructed – if the roof was put on after 1989 then the loss ratio for those 190 cases was 10.1 percent. For the, I don't remember the exact number, but a hundred some-odd cases where the roof was older than that, the loss ratio was higher, 12.5 percent because it's an older roof.

Q: If you have a residential building built before 2004 and it's got a roof that was built after 1989, what is your average loss ratio for that specific type of building?
A: So for — there were 190 buildings in this sample that fit those characteristics and the average loss ratios for those 190 buildings was 10.1 percent.
A: So in terms of a residential building, constructed before 2004, roof after 1989.
Q: So for a building of that category, the loss ratio is 10.1 percent of the cash value of this building —
A: That's right.
Q: — to predict the damage of the building?
A: Yes.

Q: What — what does this column mean for statistics standard error on page 3 of 3 or your report?
A: Sure, page 3. The second column is labeled "Std error," or standard error. The idea there was to get a sense for the frailties of the sampling itself. This is not the universe of all — of all cases. If we had, oh, and I'm not even sure how many more cases there would be, but if we had all the cases in the Bolivar Peninsula we would know the exact number, and if the average for cases with these classifications was 10.1, that would be it, we know exactly the answer. So since

this is only a sample, the true value, if we had all the — all the cases might be a little bit different from 10.1. It's probably not going to be 10.10000 just by chance, it's going to be a little bit different. So what I was trying to estimate here was how different the true value could be from the sample value. The standard error is the means that statisticians use to figure out how different the true value might be from the sample value. And in this case represents a measure of the variability that might happen between the true value which is not observable and the sample value which is. So that 0.7 percent can be interpreted as saying our best guess is that the true number of that loss ratio for buildings in this category is about 0.7 percent away from the measure — the number we measure, 10.1 percent. Problem is, of course, we don't know in which direction, we don't know it's exactly 0.7, it might be 0.3 or 1.0, but our best guess is it's about 0.7 percent away.

Q: Did you also express that range within a level of confidence--how is that expressed?

A: Usually that standard error is just a way station to getting to what's more — more valuable, which is the confidence in it. But the last two columns on Page 3 express what I'm referring to as a 90 percent confidence interval, by which I mean we can be 90 percent sure that the true value, which is not observable, for buildings in this category of loss ratio is between the lower number and the higher number, we can be 90 percent sure of that just based on the sample. And what this says in this category is that we — we can be 90 percent sure that the loss ratio for buildings in this category are between 9 percent and 11.2 percent.

Q: Okay.

A: It's very unlikely to be less than 9, but it's also very unlikely to be more than 11.2.

Q: So if Texas Windstorm in using these numbers, if it picked the 11.2 percent all the time when it had this category of buildings constructed before '04, we've got your 1989 residential building. If it — if it always used the 11.2 percent for that particular category of buildings, what are — what are the implications for that statistically?

A: That's a very conservative estimate for using. It means that there is only a 5-percent chance that the average for buildings in this category are higher than that number. It's considerably higher than my best guess, but it is conceivable that 11.2 is actually the — the number. It's very unlikely, there's a less than 5-percent chance that the real average for buildings in this category is more than 11.2.

Q: And when you -- when you gave your report, did you actually make some recommendations on what percentage to use in this category?

A: Yes. My estimate was based not on the 90 percent confidence interval, which I provided to — to give you and the Association a sense for how much variability there was around that -- that average. But my — my recommendations were just to use the average, 10 percent on older -- buildings with a relatively new roof.

Q: Okay. So if TWIA identified 11.2 percent they went above and beyond what you were recommending?

A: Yes, they did.

Q: Also your loss ratio that you're — that you're — you're producing here is based upon the actual cash value of the building, correct?

A: That's correct.

Q: Not the replacement cost of the building.

A: That's right.

Q: Okay. Did you use standard statistical techniques that are generally recognized in your field as reliable message for conducting the analysis that you did?
A: Yes. The standard statistical package, which is widely available in part — widely available and free in part because if anybody wanted to duplicate my numbers they could simply download the same package and apply it to the same data set and come up with the same result.

Q: If Texas Windstorm took the – the loss ratios that you — that you derived, and applied them to — to buildings that were destroyed by Hurricane Ike, would you conclude that what they are doing is insuring that the claimant is at least receiving the average payment for what other people received who had similar buildings that survived?
A: Yes.
Q: So in other words, buildings that experienced the full force of the storm, they weren't washed away, they're still there — but they had-they had the full wind exposure — and they're still there, they were estimated, they were included in 387 building data set, and — statistically speaking, what the insured got is similar to what people comparably situated had received with a building that still existed.
A: The insured with the slab claim received slightly higher because the Association estimated on the high end of the 90 percent confidence interval rather than the average. So T.W.I.A. could have overpaid — statistically speaking, overpaid."

William Spelman

SWORN TO AND SUBSCRIBED before me, the undersigned authority, on this the 5th day of June, 2009.

Notary Public - State of Texas

KELLY SUE COLLINS
Notary Public - State of Texas
My Commission Expires
MAY 21, 2011