Interview Transcript[[1]](#footnote-1)

Subject 10: Risk Modeller for Insurance

I: [explaining project]

[1:09]

I: The first question is will you just tell me about your job position and what you do?

S: Sure. So basically I’m working at [organisation] and I am leading the catastrophe risk specialism within [organisation]. Basically my job is to evaluate and supervise the insurance industry in terms of catastrophe risk management practices so particularly in terms of capital requirement and evaluation of capital. So long story short, my job is to evaluate if an insurance company can become insolvent in case of an actual catastrophe

I: Okay. And how do you make those decisions?

S: So how do I make those decisions? So basically I’m revising the assumptions of models developed by the insurance industry so we try to assess probable losses that a company might sustain in case of an actual catastrophe in order to do so we use probabilistic loss models. And so those models as you know they are an approximation of reality that simulate the physical processes of natural catastrophes so they simulate the likelihood of the event, which is the (unintelligible) but then we also simulate the exposures so this would correspond to the location of a building stock, maybe it’s value and then it would also simulate vulnerability so those three components combined would give you an estimation of the losses that you might sustain in case of financial catastrophe. So we try to evaluate that for highest probabilities and in terms of regulation, the law requires an insurance company to have capital that is equivalent at least to a 1 in 200 year event.

[3:16]

I: And that’s a blanket level of confidence, the 1 in 200 year event?

S: Yes. Basically it’s the 95th percentile of an annual probability, basically. So this is what regulation is estimated to be an acceptable risk and so if a firm has capital that is reaching this level, then we might consider that the capital is enough.

[3:44]

I: Okay. So you talked about the assumptions in the model. Do you communicate those assumptions along to anyone else?

S: Yes. Well basically my job, I’m on the other side of the fence. My job is to challenge the firms and those that understand the assumptions actually. So I’m trying to communicate with them and I’m trying to get them to communicate to me about the limitations they’re using in the model, basically. So for us it is absolutely crucial is to understand the assumptions underlying the model so what assumption has been made to treat the unknowns, for example, when, if you want to understand the exposure element for example so you need to know the location of your buildings for example if you want to assess flood risk so is your building located in a flood zone or is it on top of a hill, to make it simply, and so very often, the insurance industry has to deal with tens of thousands of buildings, tens of thousands of assets and so they won’t know that information for everyone so they have to make assumptions and they have to for example say, “Okay. I don’t know where is my asset, specifically, but I know that it’s an industrial facility in the UK,” for example industrial facilities are not located anywhere, there are some zones where they could be located in the (unintelligible) or that sort of area and so they are going to make assumptions. Okay this is located in this zone or another zone. So that’s one kind of assumption. Another assumption is that, for example, models under hazards, models will be an approximation so if you deal with an earthquake model in Japan, maybe this earthquake model is going to simulate only ground shaking components of an earthquake, but not necessarily the cross-cutting effects so maybe it will not include the tsunamis that will follow and so we try to communicate with the insurance industry to try to understand (unintelligible) for those uncertainty basically, the five that maybe you might get a tsunami following the earthquake and so perhaps the capital that has been estimated should be loaded by a factor of 10%, 20%.

[5:58]

I: Okay.

S: Stuff that isn’t immediately obvious or if I’m going too quick, if you want me to repeat this by any means.

I: No, this is absolutely perfect. So the next thing I’m wondering about is how this uncertainty is communicated.

S: Okay. Generally, it is done, for example, through, there is a qualitative and quantitative aspect. So first, the qualitative aspect is just the comment something as I mentioned so you’ve got a quake, but you don’t need tsunami so okay, so, what’s the comment from the firm explaining to us, this is uncertainty. Then there’s the quantitative aspect for example through the form of tests that could be like sensitivity testing so for example we know that maybe the construction type of a facility is unknown, but we don’t know what it is, but we’d like to see if it matters. So the firm is going to test various assumptions like okay it’s going to be a building that’s timber frame or building that is reinforced concrete or a building that is, whatever, steel frame. And we would like them to show us how sensitive is the results based on those various assumptions. And finally, which assumptions is actually key, which uncertainty really matters, should be investigated further.

[7:34]

I: Okay. Then when you’re presenting the results, how does that look?

S: Well what do you mean, in terms of, well it look in terms of, how could I say we look at losses so you’re going to have a, basically a graph and your vertical axis is going to be your probable loss and your horizontal axis is going to be the annual probability that we express in terms of return period, if you’re familiar with this concept, so basically, yeah okay, it’s 1 in 100, 1 in 200, 1 in 500. Alright? And so what we will want to see is that the sensitivity testing, we will want to see the impact on the curve you’re going to get. So you’ve got your loss as a function of your probability, so we want to see the ranges of possibilities you’re going to get based on your uncertainties. So you’re going to get let’s say a two standard deviation loss and below so basically you’re going to have a mean loss and then you’re going to have the uncertainty around it.

[8:49]

I: Okay. So are there any other ways that you communicate that information? Just beyond the loss curve, do you just use the loss curves? Is that the most common way of looking at the model output?

S: Well yes, that’s certainty the most common. Now we’re going to use, I mean as I mentioned there are a lot of (unintelligible) in the models, so they are all very specific, but we might choose other parameters another parameter is something we call the damage ratio which is going to be the ratio between the loss and your exposure. So let’s say for example you’re insuring 10,000 buildings in the United Kingdom and it is worth £1 billion and your loss is going to be £100 million so your damage ratio is going to be the loss divided by the sum insured, that’s going to be 10%, for example. That’s what you’re going to get. So this is what we want to see at the 1 in 200 year limit so we want the losses as 1 in 200 year and we’re going to be, I mean we want to see this result from the firm because we can compare it to other firms. And I just want to say we’re not communicating it, it’s the firm communicating it to us, I hope that’s clear. Here we have a bit more challenging bit dealing with (unintelligible).

[10:23]

I: Yeah. This is great. So is there any other uncertainty information that you think is necessary for this kind of problem?

S: Okay so far we want to know the uncertainty around the hazard so which is how big, how often are you going to get a wind storm occurring anywhere, so that’s the hazard, the uncertainty around the exposure data, so where do you know the locations of your hazards, what is the value of it, what are the primary characteristics and the other component would be the uncertainty around the vulnerability so how it is going to perform in case of a hurricane, in case of an earthquake, what’s going to be the damage to it, and the last component is the financial component because you have a total loss, but here we’re dealing with the insurance industry and the insurance is only insuring part of it and so they’re going to apply some financial conditions like when you try to insure your car, you’re paying a deductible to it, or your insuring only up to a given limit and so we want to know what are the uncertainties around those aspects as well.

I: A very complicated problem, isn’t it?

S: Yes it is. It’s very interdisciplinary and this is why we work with a variety of people. I used to be a research scientist before I used to do the same job that you’re doing actually, so I’ve got a seismologist background so I worked 10 years in New Zealand and France on various topics and so basically my job was really to work with geologists, engineers, economists and have to put all those things together and here at the [organisation] we try to do the same. The only things that we don’t do necessarily is research ourselves, that we try to understand those topics and put all those topics together.

[12:25]

I: Oh that’s fascinating. Very, very cool. So one of the things we’re going to do is we’re interested in people’s decision-making based on what information they’re presented. The eventual goal of this project is, so I’m an atmospheric scientist by training. We’re also working with information designers and psychologists as well. So we want to eventually design hopefully a better way or a more informative way of presenting uncertainty graphically so one of the ways we’re going to try to answer this question is we are developing an online decision game at the moment where people will just go on, they will be presented information and asked a series of questions about it. The game comes in because you have an imaginary budget and you just try to maximize your profits through the game. So once that’s developed, which will hopefully be in the next month or so, would you mind if we sent that to you? And you’re welcome to take it and send it along to any other decision makers you might think of?

S: Sure, why not. Could be fun.

I: Thank you. That would be really helpful and then we’re happy to share any results and anything with you if you’d like that as well.

[13:44]

S: Okay yes, with pleasure. We came here as a [company] to engage with academics like you to develop that sort of thinking and our goal is to steer the insurance industry toward a more robust assessment and it’s clear that integration of uncertainty is clearly lacking in the insurance industry. There is this perception that science is perfect that they are investing hundreds of millions into models and so they’ve got this feeling that the model is actually, is going to give them the answer you know like a crystal ball that is going to forecast the future. And of course it’s not true. Us as scientists, we know that models are just models, they’re an approximation of reality. And we really want the industry to be able to integrate this uncertainty into their thinking so that it will be better. And so for sure in any case, what I mean is that we have appetite to engage with you, you know and so discussions and understand what the research you do and how that works and how it could be beneficial for us.

[14:54]

I: Absolutely. Yeah, so this is a really short project, actually. The whole project is going to be over at the end of March of 2017 and I’ve only just started so it’s really very quick. We’re looking to continue doing this kind of work because we agree that it’s kind of a big problem and we’d like to help as much as we can so we are currently working on putting in proposals and talking to industry members like yourself about specific problems that potentially we could help fix so we’d be very happy to chat about further research projects if you guys are interested in that.

S: Yes. Fantastic. Since you, I can give you a specific example because you’re an atmospheric scientist, maybe it will be more meaningful to you. An issue we’ve got here at the bank is the issues around the tendencies of cats. In cat models, for example, people would assume that natural catastrophes occur randomly, for example we know that wind storms, they are actually sometimes a bit more clustered together, like waiting the bus. You think your bus is going to come, you’re going to have one bus every 10 minutes and very often you find that actually you’re waiting for 20 minutes and nothing happens and then two busses pass at the same time. And this for us, that major impact for example on capital requirement, it could increase the capital requirement by 20-30%. And those are the sort of things that are not necessarily well-captured in the models so there’s uncertainty around that, for example. And we don’t see the industry communicating this to us in a good way. It’s just an example, I understand we are dealing with various topics, but really our bread and butter is trying to go deep into things and try to have better understanding.

I: Yeah. That’s really interesting. I know one of the things that some people have done is kind of workshop format, it’s really education orientated where you can do a little decision game and it can be as simple as rolling a fixed dice and you can kind of teach lessons that way of, well, something’s happened here what do you think it is? And we could potentially do one to simulate clustering of a loss. I’d have to think about that. But that’s a really interesting problem and very costly.

[talk of further collaboration]

I: Well thank you so much for spending the time to chat to me today. Is there anything else you want to add before I let you go?

S: No, no basically. I mean if there is anything unclear to what I am saying, you will need to just come back to me, don’t hesitate. I try to do my best to answer.

I: Oh great. Well thanks again and we’ll definitely speak soon.

S: Thank you very much. Bye.

I: Bye.

1. The interviewer is denoted by “I” and the subject as “S” [↑](#footnote-ref-1)