

Climate Stress Tests: Imagine the Unimaginable

Featuring:

Matthew Lightwood, Director, Risk Solutions, Conning

Andy Sparks, Managing Director, Head of Portfolio Management Research, MSCI

Adam Bass (00:03):

This is MSCI perspectives, your source for insights for global investors, and access to research and expertise from across the investment industry. I'm your host, Adam Bass. And today is August 5th, 2021. Today we spoke last week about asset managers call for more and better data around ESG and climate investing. On this episode, we take that discussion forward by looking at how investors can use data to assess and manage climate risk as they build and manage portfolios. We'll do so through my conversation with friend of the pod, Andy Sparks, who of course heads up portfolio management research at MSCI, and with a guest making his first appearance and whom we selected for a very specific reason on top of his being an insightful experienced voice, of course.

Matt Lightwood (00:57):

I'm Matt Lightwood from Conning. Conning is a leading investment management firm. We have a long history of serving the insurance industry and there are several parts to our business. And there's two that I'll mention here. The biggest part, which is we are an insurance-focused asset manager, so managing assets on behalf of insurers globally. And the other part which I'll mention is the part that I actually sit within, which is called risk solutions. And we are a software and modeling platform provider for the insurance industry. So particularly focused on a class of models called stochastic models that allow insurance to project their assets and liabilities into the future and calculate their risks, their returns, and how much capital they have to hold against those risks.

Adam Bass (01:49):

As I mentioned, it was no accident that Matthew was one of our guests for this episode. When it comes to climate risk, modeling it, and making decisions, the insurance industry just might have some lessons to offer. I asked Matthew if he could expand on that idea.

Matt Lightwood (02:05):

Sure. Well, I think probably more than any other, the insurance industry is at its heart and historically a risk business. And we have a very useful perspective, not just for investors, I think, in the financial markets, but also the wider world. I think within finance, I think in particular, when we look at life insurance and pensions, one of the interesting things there that maybe isn't true of banks is that we have a long history of understanding really long dated risks like mortality, which is really relevant to the climate story because we often think of that as being quite a long dated risk.

Matt Lightwood (02:45):

Whereas maybe banking's been a bit more focused on [inaudible 00:02:49] and the overnight value at risk and much, much shorter measures of risk. I think that's one thing that the insurance industry is particularly experienced at. I also think we have a lot of experience in this industry with things like geographical mapping of risks, and that comes from the cat modeling worlds, the catastrophe modeling world. And I think all areas of finance could learn from that.

Matt Lightwood (03:16):

After all most investment portfolios these days have a very widespread geographical exposure. For the wider world, I think we can all learn from the insurance risk function a little bit, which in part is always trying to imagine the unimaginable and trying to understand its impact on the world. Behavioral science tells us that humans are really bad at quantifying these types of risks that might seem quite distant in time, quite far out into the future and where the trigger of that risk kind of we think of as maybe, or maybe not, it will happen to us. You know, people still smoke cigarettes, which kind of underlines the point. And if we think about there's still many people that don't believe that climate change will affect them.

Adam Bass (04:04):

Andy agreed with that and also went a little deeper into the tie in between insurance companies as investors, and their overall approach to risk as a firm, including the fact that their portfolios, well, they tend to be heavily weighted toward fixed income.

Andy Sparks (04:21):

Insurance companies are a core part of particularly the corporate bond market. They're really a primary player in that sector. And there's a lot of focus from a climate perspective on the corporate sector as well. I guess you need to go back to the role of fixed income in multi-asset class portfolios. And so, on the one hand you have asset liability players, including insurance companies, where their liabilities may look a lot like fixed income. And so on the asset side, they may be very focused on fixed income.

Andy Sparks (04:57):

But you also have from a multi-asset class perspective, you also have the role of bonds. And for many investors, the role of bonds is to serve as an anchor for the portfolio and to offer some insurance against equity market volatility. Through stormy markets, fixed income has historically tended to perform significantly better than equities has. And so just by the very nature of the fixed income sector, I think it does tend to attract a more call it conservative type of investor, very focused on risk.

Adam Bass (05:34):

When it comes to climate. There are two major areas of risk. We've covered both on the program before, but in the interest of defining our terms and for the benefit of new listeners, we'll define them again here. First we have transition risk.

Andy Sparks (05:51):

Transition risk refers to the distinct possibility that changes in public policy will impact companies, will impact sectors. And so from an investor perspective, it's very important that investors be aware of these potential changes and how they might affect valuation of financial instruments.

Adam Bass (06:14):

And physical risk, which is the damage we may see. The damage that we're already seeing, actually, from the effects of climate change. Things like larger, more frequent storms, heavy rains, and flooding that can destroy property, factories, as well as other assets.

Adam Bass (06:32):

On that note, before we leave the topic of what sets insurance firms apart, I'd like to share with you one more question that I had for Matthew about these risks and their unique effects on the firms that he deals with.

Adam Bass (06:48):

Unlike perhaps those investors in real estate and some others to a certain extent, the insurance industry is in a bit of a unique position in that they need to account for these physical risks and transition risks, et cetera, within their portfolios. But it also has the potential to have a massive impact on their core business as well. Are there risks and opportunities from there, however?

Matt Lightwood (07:17):

Yeah, absolutely. It's an interesting one because certainly the insurance industry has to consider this from both the asset and the liability side. And I think the liability side is being quite well-developed through cat modeling, a long experience with cat modeling. Whether those models need to be realigned as we start to get more data on the... Sort of one thing we might start to see is just less predictability in where these sorts of things happen and whether that needs to be brought into the liability side.

Matt Lightwood (07:53):

Also how things like government policy will evolve may also be very important in modeling the liability side. If we go towards something more like a compulsory insurance policies, potentially that could actually bring the price of insurance down because you're effectively spreading the risk a lot more widely, forcing people to spread the risk. So there are a lot of

ways the liability side could go, but I think the liability side is probably more developed than the asset side.

Matt Lightwood (08:23):

I think the asset side is starting to see some more development and some really useful frameworks being developed. And I think we're also starting to see systems being developed to help apply those techniques to existing risk [inaudible 00:08:37] in order to actually assess the risk and quantify it. But I think one of the questions that sort of speaks a little bit to what you said, Adam, that remains a little bit open is how we bring the two sides of the balance sheet together.

Matt Lightwood (08:51):

So how do we combine our climate risk assessments from the asset side and the liability side, how should those be considered or should they even be considered [inaudible 00:09:02]? You know, to what extent are these risks correlated or diversifying on both sides of the balance sheet? And I think we're still at a really early stage in trying to work that out and work out what sort of approaches are needed.

Adam Bass (09:17):

So how do we get started? How do we, as Matthew called it, imagine the unimaginable?

Andy Sparks (09:24):

Climate investing is very much about risk as well. It's a new risk. And again, this is where stress testing comes in because stress tests are ideal for looking at situations and possibilities that have never occurred before. So think of Brexit before Brexit occurred, there had never been a Brexit. So stress testing prior to Brexit was heavily utilized, look at different possibilities for the outcome.

Andy Sparks (09:52):

And with climate, we're seeing the same thing as well. So I think climate is very well suited for using stress testing tools, to the extent that market participants really don't have a strong understanding about which specific climate scenarios, both from a transition risk, but also from a physical risk perspective, which particular scenarios may be realized over the next two, five, 10, 20 years.

Matt Lightwood (10:20):

So when we think about stress tests of the past, they've kind of focused on things like what would happen to the market value of your portfolio if we were to see a repeat of 2008 today, or we were to see another black Monday or another 9/11. Those stress tests are very point in time and quite... Based on quite discreet events that had quite sudden effect on market prices.

Matt Lightwood (10:50):

Climate is quite different in that it has a very strong temporal element. So the effects on financial markets, regardless of scenario, are likely to be fairly subtle at the short time horizons, but to accumulate through time, to be quite significant. So they tend to be much smaller on a year on year basis, but they tend to be realized over quite long time horizons. Which means you have, rather than just a discrete point in time stress tests, you have this additional temporal element. And also the fact that the drawdowns are quite subtle at the scale of the year, stochastic modeling's very good.

Adam Bass (11:41):

Stochastic modeling?

Matt Lightwood (11:43):

Stochastic modeling is very closely related to a Monte Carlo simulation. So stochastic models allow you to build a model that effectively based on random numbers, but to control the way that those random numbers evolve in the future and use very specific definitions of how the random numbers are generated to produce future distributions of financial variables in this case, so that has applications in other areas.

Matt Lightwood (12:11):

So for instance, that allows you to reduce like 1,000 or 10,000 scenarios of how something like the S&P 500 or the [1400 00:12:24] equity indices might evolve in the next year, in the next 10 years, or even in the next hundred years. So stochastic modeling's very good, particularly when you want to try and project over longer time horizons, where you have a temporal element where risk and return maybe changes through time, but also in situations where there's a good deal of uncertainty around what the effects are likely to be. So stochastic modeling also allows you to factor in uncertainty and what you don't know.

Adam Bass (12:56):

As Andy and Matt both point out, investors, like the rest of us, they have no choice but to move forward in the face of uncertainty and not knowing what they don't know. But the key, the key may be that which makes us distinctly human. And that is our ability to imagine. Not only the different scenarios like we've been talking about, but we can imagine and create models as well as the technology that feeds and drives those models.

Adam Bass (13:27):

And these models, well, they allow investors to test the scenarios and measure portfolio exposure to risk across asset classes, sectors, and securities, as well as measure the potential outcomes in terms of overall portfolio performance. So let's get to what some of those tests have looked like for our guests, as well as what's driving the need for even greater innovation.

Matt Lightwood (13:54):

Demand from regulators in the last couple of years have certainly started to gather pace. And I think this has really become a global issue, certainly in the last 12 months. In Europe, we see a lot of regulatory developments in this area. So particularly from [inaudible 00:14:10], who are the umbrella organization for insurance regulators within different parts of the European union, who've released some fairly strong statements on this in the last year.

Matt Lightwood (14:25):

But I think initially the PRA in the UK really took the lead on this topic. So back in [inaudible 00:14:34] regulatory authority, again, responsible for regulation of insurance companies within the UK who were probably one of the first, although France, Netherlands also did something quite similar in releasing quite a concrete stress test in 2019 that they asked, they didn't require at that point, asking insurers to participate in.

Matt Lightwood (15:00):

More recently, in fact, last month, NRA also released a new stress test that's a lot more extensive as part of what they call the biennial exploratory scenarios. And this time round, it's very climate focus. That's quite an extensive body of work requiring the top 10 insurers, as well as a number of banks within the UK to undergo a fairly extensive stress test of their assets and liabilities.

Matt Lightwood (15:33):

In the US, I think we're seeing this largely being driven at the state level by regulators. Certainly the DFS, or the New York regulator, are releasing a lot of information on this topic, and have invested quite a lot of time and resources in developing an approach. But we're also seeing a huge amount of talk in countries across the globe. Canada and Australia very active in this area, being quite resource focused and resource intensive economies. New Zealand are also taking something of a lead on climate risk.

Matt Lightwood (16:13):

What I think is interesting from the regulatory perspective on this particular topic, both interesting, actually, and fairly unusual is that we're seeing quite a lot of harmonization geographically between regulators in different countries, in different regions. And they're all asking pretty much the same thing at this stage, which is focused on three areas. So sizing the risk, understanding the impact of that risk on a firm's business model, and then encouraging the management to look at those risks and think about how they might inform future strategic decisions. So I think that's kind of quite an interesting element here is how much togetherness there is globally on the approach.

Matt Lightwood (17:06):

And we're also seeing kind of two different ways of looking at this emerging. What I would call very prescriptive approaches, where the regulators saying, "Well, if you hold this type of asset

or that type of asset, and this is the stress we want you to apply under a particular scenario," moving through to less prescriptive approaches where maybe they define things like what the future cost of carbon might look like under a particular scenario, or how we might expect precipitation in different regions to evolve under a particular climate scenario.

Matt Lightwood (17:44):

And then they want the insurer or the financial institution to then think about how they use that information to come up with scenarios on both the asset portfolio and the liability side of the balance sheet.

Adam Bass (17:59):

When we talk about these three elements of risk, the sizing, measuring the impact, and managing it, how is that playing out within portfolios that you see?

Matt Lightwood (18:10):

Yeah. So first thing we have to do in sizing a risk, I think, and when we start to look at these climate risks is we have to actually define climate scenario that we want to consider. And these usually fall into two categories. We have what are called transition scenarios and what might be called no action scenarios or physical risk scenarios. And those transition scenarios are also usually split into two sub categories, what we call orderly transition scenarios, in which governments take early policy action by, for instance, taxing carbon, increasing the cost of carbon gradually over say the next 20 or 30 years.

Matt Lightwood (18:57):

Or they might fall into a category that we call a disorderly transition. So in which there's really widespread policy action which happens really rapidly with really high impacts on financial markets. And that might occur either in the next few years, or we can imagine disorderly transition scenarios in which governments certainly don't do enough in the next decade. And then later they're forced to implement really stringent, really rapid controls at some later date as they start to see the effects of climate change gathering pace and having real physical impacts from climate change. And that's what's sometimes referred to as a inevitable policy response.

Matt Lightwood (19:40):

But the other type is the no action type scenario. And that's usually defined as a scenario where there's no real government policy action and there's global warming which reaches somewhere in excess of four degrees Celsius relative to pre-industrial levels in, say, the next 50 to 80 years. So quite a long arising scenario. And that's sometimes called a hothouse scenario, where we get really significant global warming, really significant physical risk effect from things like increased frequency and increased severity of storms and flooding, for instance.

Matt Lightwood (20:16):

Once you've defined which type of scenario you're interested in having a look at, and typically you want to have a look at all of these types of scenarios, then the impact of that scenario needs to be sized on different asset classes. So equity, property, MBS, whatever you're invested in. And that's really the sizing bit saying, "The things we invest in and given this site scenario, what effects might we see on the pricing and the risk of assets under that scenario?"

Matt Lightwood (20:44):

Then you have to use some kind of simulation technique to apply the scenario at that particular sizing to your particular portfolio. That's the measurement bit. And then finally you have to decide what you're going to do with that information. And that is typically including, at the moment, things like thinking about how climate risks compares to other types of risk and whether you're actually adequately compensated for it.

Andy Sparks (21:10):

We may not be exactly sure of the form of the regulations, and the strength of the regulations, and what the regulations will try to ensure does not happen. But stress testing, is I think, well suited for that. And so the way that at MSCI, the way that we have configured our models, our climate models, we calibrate them to different potential transition scenarios, such as trying to limit the warming to, for instance, 1.5 degrees Celsius, or two degrees Celsius, or maybe it's going to be a higher number. Maybe the regulation will not be nearly as strong as some might hope.

Andy Sparks (21:57):

Each of those scenarios has a different impact from a modeling perspective. And as you translate that to the security level, they imply different potential valuation effects. And it's not just regulation, by the way. There are various investor climate initiatives out there that I think will likely have some effect. Using methodologies and models can give the investor an understanding of how their individual portfolios may be affected.

Adam Bass (22:29):

Let's talk about research that you and your team have done recently on this issue using scenario testing for different levels of transition risk on corporate and investment grade, as well as high yield bonds. Dive in, set the scene, if you would. What are we looking for?

Andy Sparks (22:48):

So the investment grade sector is a very large sector, of course. It has a strong investor presence from all major investor types, such as insurance companies, but increasingly ETF buyers are playing a role in the sector as well. We did one study where we looked at the potential transition risk on the investment grade sector for an increase in temperature for policies designed to limit the increase in temperature to one and a half degrees Celsius.

Andy Sparks (23:27):

We used market benchmarks as sort of representative of the market. And we created portfolios designed to offer greater climate protection, greater climate transition risk protection compared to the benchmark. And so the idea was, you have a market weighted benchmark the investor is being compared against, and they think that the benchmark has more climate exposure than they would desire. But at the same time, they don't want to deviate too much from the benchmark's general risk characteristics, or even yield and spread characteristics as well.

Andy Sparks (24:14):

And so we set up a portfolio construction exercise, hypothetical portfolio construction exercise, where we basically said, "Okay, we want to closely track the benchmark, but we want more protection against climate transition risk in our exercise," which by the way, it was... We looked at USD corporate bonds. We also looked at Euro as well as GBP corporate bonds. So we had three different currencies in our analysis.

Andy Sparks (24:49):

But for instance, for the US we actually created a portfolio that had, according to our model, 20 basis points of tracking error volatility. And it actually had a slight positive exposure to climate in the sense that the portfolio was tilted on companies that stood to benefit from a climate policy change. So these are, you could call them greener companies. And we tilted away from companies such as energy and utilities and materials, and we were more focused on other sectors.

Andy Sparks (25:28):

And we found that, with a relatively... I think many institutional investors would consider 20 basis points of tracking error risk to be relatively small. But we actually found a significant improvement in protection against climate transition risk. And we were also able to largely to preserve the portfolio spread and yield versus the benchmark. And so that was one flavor of some of the research we've done, Adam.

Andy Sparks (26:00):

We've also done some research drilling down into the high yield market. And as I said a little earlier, at the issuer level, bonds are protected. Bonds have a lot more protection than equities do. But at the benchmark level, you can have some differences. So in our analysis on the high yield market, we did compare its exposure to equities as well as to investment grade. And we found that high yield actually had more exposure to climate transition risk than the equity benchmark did.

Adam Bass (26:43):

At this point in my conversation with Andy, I asked him to clarify a point about equities versus bonds within the capital structure. And that came from a portion of the interview that we

haven't played on air. But I'm going to leave this next part in because his answer addresses an important point about the complexities that we're talking about here, and the many different perspectives that the different players within the investment ecosystem AV.

Adam Bass (27:10):

So, I'm sorry, Andy. So even... I just want to ask one question there. So going back again, like you said, to the capital structure and equities normally providing a buffer, am I hearing you that for high yield, that was not the case? Or am I misunderstanding?

Andy Sparks (27:29):

Let me see... Sorry for the confusion, Adam, and let me restate what I was saying. So at the issuer level, the equity is going to serve as a buffer and offer protection to the bonds. And that includes protection against climate transition risk. But at the benchmark level, that's a little different. So it turns out that the high yield benchmark has much different weightings to various sectors compared to the compared to, in this example, the MSCI USA equity index.

Andy Sparks (28:09):

And so high yield, the US high yield sector has far greater exposure to energy and to materials. And those sectors have a lot of negative climate exposure. And so as you think about regulations that may limit carbon emissions, it's likely to hit the energy sector much harder than other sectors. And so according to our models, the energy materials and utility sector have a lot more exposure to climate transition risk than, for instance, information technology or financials.

Andy Sparks (28:46):

And so if you look at a standard US equity index, and I'm going to use the MSCI USA as an example of that, it has a much higher weighting, sectoral weighting in information technology than an energy. And exactly the opposite is true for the US high yield sector that we looked at, which was represented by the MSCI high yields USD index.

Andy Sparks (29:17):

And so because of these differences in sector concentrations, at the index level, there's actually significantly greater climate transition risk, according to our models. And I guess part of the moral of the story here is that from an investor perspective, it's very important that investors have some way of having a granular view of the risk in their portfolio, because if you just stay in levels of generality, "Oh, fixed income versus equities," you might think, "Ah, fixed income always offers more protection than equities does." But you really need to drill down into more granular level using models that can provide granular level analytics to really determine what the risk in the portfolio is.

Adam Bass (30:12):

What about the scenarios we don't have to imagine? Unfortunately, we have seen no shortage of the effects of climate change over the last year. One effect, the recent massive flooding in Matthew's adopted home country of Germany. I asked him to walk us through that situation and explain why it stands out as a living example of why the stress testing techniques we're discussing, why they're such a vital part of assessing climate risk.

Matt Lightwood (30:42):

I think the terrible situation here is an interesting one on many levels, but I think it highlights a number of really important things to think about beyond the obvious fact that we're already in the age when we're seeing some physical risks from climate change actually being realized and actually emerging. One that comes to mind is that this occurred in a place geographically that we don't really associate with extreme weather events. And I think that points towards the limitations of using historical precedent or historical data for assessing this type of risk.

Matt Lightwood (31:25):

And this is actually what scenario analysis and stress testing is really good for. It can help us in these situations where it's very difficult to place a probability on a particular event, and we want to have a look at what might happen to these kind of what if analyses, and it can really help us challenge our assumptions and to consider outcomes that we might rationally consider to be quite improbable.

Matt Lightwood (31:50):

Another really interesting discussion that's going on within Germany that could point towards a revolution in property insurance is also the idea that there would be a compulsory level of insurance on property. So there's an estimate going around at the moment that about 50% of those impacted weren't insured against flooding from extreme rainfall. Many of these insurance policies actually contained insurance against things like avalanche, but not against extreme rainfall.

Matt Lightwood (32:25):

And I think as these physical risks start to materialize, it wouldn't surprise me to see governments move a bit more towards this type of compulsory insurance in the same way that you can't drive a car without insurance. And that would have some quite interesting implications, both for the insurance industry, but also for asset owners. So particularly owners of real estate and investors in real estate.

Adam Bass (32:51):

These investment implications Matthew mentions, they're not all found on the negative side of the ledger.

Andy Sparks (32:58):

There are some companies that are going to benefit from climate transition risk, and particularly those that are investing in green technologies and those that are maybe ahead of the market. They do stand to benefit. The point is, is that the sector... Yes, the sector label, maybe on average, you can say that the average company in the energy sector has more exposure to climate transition risk, but there will be some that may stand to gain as well. So the point is, you really do need to get granular with real modeling capability to look at the risk within the portfolio.

Matt Lightwood (33:35):

Yeah, it's been interesting to see the story evolve over the last couple of years, and it's almost taken on a life of its own hasn't it? I think long-term, we'll see some kind of reordering of the economy and financial markets that's hopefully not too disruptive to align with the transition to a lower carbon economy. Shorter term. I think a lot's going to depend on what happens at

[COP 00:34:01] 26 in Edinburgh in November. So when governments will sit down and try and work in earnest to thrash out some kind of global plan.

Matt Lightwood (34:10):

Much will depend on exactly what concrete plans are agreed, and on what timeline those things are going to happen. But it's really hard to predict what's going to come out of that. Is it going to be action or is it just going to be more words? I think it wouldn't surprise me to see COP 26 as a pivot point where we start to see some much more significant repricing of assets based on climate risks. And I'll be very interested to see how that unfolds.

Adam Bass (34:41):

That's all for this week. Our thanks to Matt and Andy, and to all of you for listening. For more on stress testing the effects of climate change, visit [MSCI.com](https://www.msci.com). Next up on Perspectives, our diversity, equality, and inclusion series continues with a look at the importance of mentors and role models. Don't miss this special report from perspectives correspondent, Oliver Williams. Until then, I'm your host, Adam Bass, and this is MSCI Perspectives. Stay safe.

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