Cutting edge analysis of climate risk on Real Estate.

WHITE PAPER

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1. Introduction

There can be no mistaking the effects that climate change has had on communities around the world in 2021.

Heavy rainfall has caused widespread flooding and landslides in Germany, Australia and wide tracts of the US.

There have been ferocious wildfires and droughts in California, Greece and Australia, while the hottest-ever temperature in Europe was recorded in August – 48.8^{0}C in Sicily.

Hurricanes are becoming stronger and more intense, especially in certain parts of the US and Japan.

Images of these events on our TV screens leave nothing to the imagination. In addition to the fatalities and enormous emotional despair they cause, these natural disasters have a destructive impact on property, infrastructure and agricultural land. What's more, with global temperatures on the up, we expect to see an increase in the frequency of climate disasters over the coming years.

Besides the societal impact, Climate change also has major implications for real estate investors. It's already having an impact on real estate valuations, and its impact is only likely to increase in the future.

At Kempen, we incorporate a consideration of future climate risks into our long term investment process, because extreme weather events have a significant effect on how the value of real estate evolves over time. Using a large amount of climate data enables us to obtain unique insight into the physical climate risk that properties are exposed to, now and in the future. In this article we look at how we incorporate extreme weather events today and changes in the future into our global property investment process.

2. Great data, great insights

High-quality forward looking data about extreme weather events is crucial if we're to be able to accurately quantify climate risk. At Kempen, we decided that data has to have three essential characteristics if it's to be used in our real estate investment process: it has to be comprehensive, reliable, and comparable. What's more, we look to use global data because we invest in real estate from around the world.

In our search for climate risk data we looked to three types of organisations providing this kind of information: academic institutions, global reinsurers and non-governmental organisations (NGOs). After much research, we found that academic institutions generally focus on a single type of natural disaster, such as earthquakes or tornadoes. It was a similar story for NGOs, and an additional drawback was that these bodies tend to concentrate exclusively on the regions in which they operate rather than on a global basis. Thanks to the nature of their activities, reinsurers around the world turned out to be well placed to provide data on all types of natural disasters at the global level.

As part of our search we investigated the climate data provided by German reinsurer Munich Re. This global company, like us, is strongly data-driven. In addition to reinsurance, Munich Re is also active in insurance-related risk solutions. Over the past 40 years it has systematically collected data that can be used to assess the climate risk that individual buildings around the world are exposed to, and are likely to be exposed to going forwards. As far as we have been able to ascertain, no other institution possesses such high-quality data with such a vast reach. We officially entered a partnership with Munich Re at the start of 2021.

The climate risk data in Munich Re's database comes from two sources: external data from IPCC coordinated climate modelling projects and internal natural catastrophe models. These natural catastrophe models are calibrated with claims data from Munich Re own business. The combination of these two data sources results in a database containing information about the climate risks facing all properties around the world. It classifies 12 types of natural disaster, including flooding, wildfires, hailstorms and high winds. In addition, information is available on non-climate related natural hazards, such as, earthquakes and volcanic eruptions.

From our perspective one of the big advantages of Munich Re's datasets, which it has used successfully for its reinsurance business for many years, is that represents a business tested view of today's risks. And an ideal basis for factoring in potential future risks. Future risks are based on the three scenarios set out by the Intergovernmental Panel on Climate Change (IPCC): RCP 2.6 (1.6 degrees of global warming[1]), RCP 4.5 (2.4 degrees of global warming) and RCP 8.5 (4.3 degrees of global warming). This enables projections of climate risk to be made up to the year 2100.

[1] Compared to preindustrial times (1850-1900). Number from IPCC: Table SPM-2, in: Summary for Policymakers (archived 16 July 2014), in: IPCC AR5 WG1 2013, p. 21

3. Integrating the data into our investment process

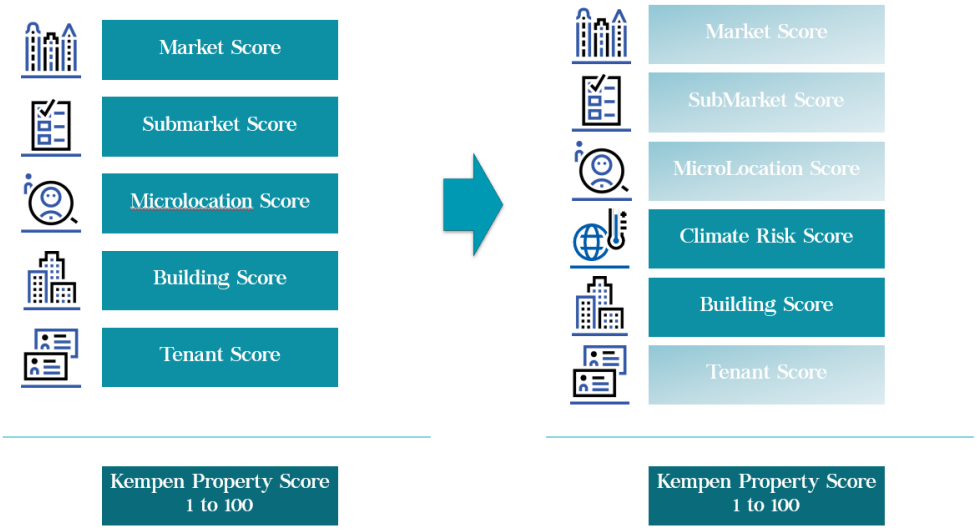
We believe the listed real estate market is inefficient and that there are valuation discrepancies to be found, both at the company level and at the level of the individual properties in their portfolios. Our bottom-up investment process focuses on finding listed real estate companies that are undervalued and overvalued relative to the quality of the underlying properties that they own. One factor that drives our decision making is that we are convinced that the impact of climate risk on the value of real estate is not yet fully appreciated by the broad market, and that this leads to mis-pricings.

We examine a variety of factors at the company level but the three most important are the quality of its management team, its balance sheet (leverage) and its ESG policy. We also look at the quality of its underlying properties, considering two aspects: the physical condition of the buildings, which accounts for around 20–30% of the score we assign them, and their locations, which account for the remaining 70–80%. Since 2012 we have used a totally data-based valuation model to assess the value of each individual building that forms part of a listed or private property fund, wherever it is in the world. For each individual building our model calculates a property score, which ranges from 1 to 100, and was until recently derived from five sub-scores based on:

- the region in which the building is situated
- the sub-region
- the precise location
- the quality of the building
- the quality of the tenant(s).

We show this in illustration 1. Over the course of nearly a decade, we have built up a database that contains all this information for nearly 500,000 properties around the world.

Illustration 1: Proprietary valuation analysis: Kempen Property Score



Source: Kempen Capital Management, November 2021

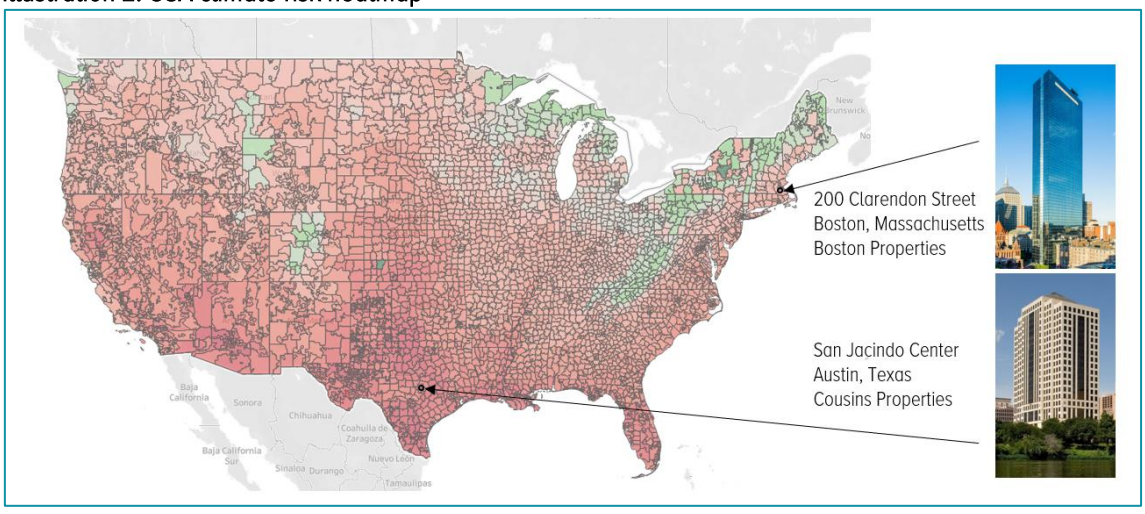
We recently added a sixth sub-score to our model: an assessment of the climate-related risk each building is exposed to. This is based on two factors: the preparedness of the building itself to cope with weather events, and its location. For example, a building located close to where a river could regularly cause flooding will be at high risk of damage. This damage could be severe if the building is not properly protected against flooding, for example by the construction of embankments. We would assign such a building a low climate risk score.

Integrating Munich Re's climate risk data into our model helps us calculate more accurate valuations for each building because it enables us to assess the potential impact of future climate-related events on the properties. The model also enables us to conduct sensitivity analyses under the different climate scenarios from the IPCC. Furthermore, we have an instrument that, depending on future climate change, leads to a more accurate assessment of risks at the individual building level and identifies stranded assets in good time.

Climate risk is a significant consideration for certain real estate owners nowadays. Last year, a large US hotel chain was told by an insurer that the amount it would pay out for each natural disaster that hit its hotels was to be reduced. On top of that, the chain would have to pay the first 5% of the claim itself from now on. The company's properties included a hotel in the US Virgin Islands, on which Hurricane Irma had wreaked enormous damage in 2017, forcing it to close. The company has since sold this hotel due to its limited insurability.

To get an idea of how incorporating an assessment of climate risk affects valuations for an entire real estate market, we applied Munich Re's data to the US and Australian office markets. Incorporating climate risk in our valuation process for the entire US office market results in valuations that are on average 3.3% lower than our previous valuations that did not incorporate climate risk. For Australia the average reduction is 3.7%.

Illustration 2: USA climate risk heatmap



Source: Munich Re, Boston Properties, Cousins Properties, Kempen Capital Management, November 2021

As well as enabling us to value a whole market taking into account climate risks, we can determine values for each of the individual 500,000 buildings in our database. For example, let's consider two office blocks in the US (see illustration 2): one in Boston, Massachusetts and the other in Austin, Texas.

Illustration 3: Climate risk impact on real estate valuation

Valuation without Climate Risk

- Tower in the south of the U.S.
- Build in 1987
- 120m high
- 32 floors
- Kempen Property Score: 70
- **KCM Valuation: USD 239m**

Valuation with Climate Risk

- **Higher** exposure to natural disasters:
  - Drought
  - Wildfires
  - Extreme heat
- Kempen Property Score: 62
- *Valuation change with -7% to USD 222m*

San Jacinto Center, Austin, Texas

Valuation without Climate Risk

- Tower in the east of the U.S.
- Build in 1976; Refurbishment in 2006.
- 241m high
- 62 floors
- Kempen Property Score: 74
- **Valuation: USD 1920m**

Valuation with Climate Risk

- **Higher** exposure to natural disasters :
  - Floods
  - Tropical cyclones
- Kempen Property Score: 71
- *Valuation change with -2% to USD 1880m*

200 Clarendon Street, Boston, Massachusetts

Source: Kempen Capital Management, November 2021

A comparison of the two buildings (illustration 3) shows us that the office building in Austin (climate risk score: 47) is exposed to higher climate risk than the one in Boston (climate risk score: 58). These scores impact the all-important overall property score: incorporating climate risks results in the value of the office in Austin falling by 7%, and that of the building in Boston by 2%. This clearly demonstrates how crucial the climate risks affecting a particular location can be on a building's valuation.

As a result of the relatively high exposure to climate risk of the office building in Austin, we calculate that investment in the building, as a percentage of operating income, needs to increase by 3 percentage points to 25.5%. This is necessary to better protect the building against climate change, reduce the need to pay higher insurance premiums and minimise the risk of vacancies resulting from tenants not wanting to rent a building that is poorly protected against adverse weather.

The data leaves no doubt in our minds that current real estate company valuations fail to take any account at all of future climate risk. What's more, our lower valuations for the US and Australian office markets show that while examining climate risk at a global level is useful, it is not enough. The examples of the office buildings in Boston and Austin show that detailed understanding of climate risks at a local level is vital if we are to arrive at more precise valuations.

As investors we are of course most interested in the impact of climate risk on future valuations. In our model we assume that the IPCC's RCP 4.5 (+2.4 degrees) scenario is the most likely to pan out; we believe RCP 2.6 is too optimistic (given CO2 emissions are still increasing) and RCP 8.5 too pessimistic. Our valuation model applies an investment horizon of 40 years and the RCP 4.5 scenario for 2050 corresponds best to this. The lower valuations that we calculate for the US (-3.3%) and Australian (-3.7%) office markets are based on this scenario.

The advantage of this methodology is that we can also conduct analyses using different scenarios, such as RCP 8.5 (+4.5 degrees). After all, we cannot exclude the possibility that the world's efforts to combat climate change turn out to be inadequate. Under the RCP 8.5 scenario, the current valuation of the office building in Austin is 16% lower and that of the office building in Boston 9% lower. These are considerable differences from the valuations we calculated under the RCP 4.5 scenario – 7 percentage points lower for the building in Austin and 2 percentage points lower for the building in Boston.

It remains to be seen what real estate companies will do now that the potential effects of climate risks on the buildings they own is becoming clear. They run the risk of some of their properties losing a considerable amount of value – or even becoming stranded assets – over the long term. They have two options: sell the property in question (which merely transfers the problem to a different owner) or invest in climate-proof renovation for those properties in locations that are subject to considerable climate risk.

One example is the Australian city of Brisbane. The city's prestigious business district, known as the Golden Triangle, is home to a large number of modern office buildings close to the Brisbane River. In recent decades the river has regularly burst its banks, causing severe flooding and an enormous amount of damage. A question for engagement arises; What actions are the owners of these office buildings taking now that the climate-related risks their properties are exposed to are manifesting themselves ever-more frequently?

Another option is to build on sites exposed to fewer climate risks. This is exactly what some property developers in the US are now doing – they are increasingly looking to build new properties inland rather in coastal regions. The question is whether this is sensible given that inland areas of the US are going to be confronted with higher temperatures over the coming years. Our partnership with Munich Re can help in this respect: we have been able to pinpoint what should be relatively climate-safe regions for real estate up to the year 2100.

4. An active approach

Real estate managers have two options when it comes to climate risk: ignore it or adopt an active approach to it.

Ignoring it would involve continuing along the same path and viewing climate risk as non-existent or negligible because it cannot be quantified properly. Managers adopting this approach need to consider how they will respond to their clients and other stakeholders when they start to ask questions about the impact of climate change on the value of their investments.

At Kempen, we have chosen a more active path. Thanks to our partnership with Munich Re we have incorporated global climate risks into our investment process, enabling us to calculate more realistic valuations, now and for the rest of this century. This means we can enter informed dialogues with real estate companies to discuss their vision, long-term investments and contribution to sustainability.

We believe that integrating climate risk into our investment process results in more realistic valuation model for properties around the world. What's more, by engaging with real estate companies on climate risks we can work together to create sustainable buildings.

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