



News **Earthquake, Ecuador/Peru – February 2019**

During the early morning hours of Friday, 22 February, a powerful earthquake was registered in the eastern part of Ecuador. The earthquake was reported with a 7.5 magnitude and occurred at a depth of approximately 132km according to the US Geological Survey. The epicenter is located in a rural area, around 300km southeast of the capital, Quito, in the border area with Peru. Two aftershocks were registered within half an hour of the first shock by Peru's official geophysics institute, each with a magnitude of 6 and 6.6 respectively.

South America's western coastline is one of the world's most active earthquake zones as, there, the Nazca plate moves east relative to the South America plate at a rate of about 70 mm/year. The Peru-Chile Trench, stretching for approx. 5'900km (3'666 miles) along South America's west coast, regularly experiences strong earthquakes including the most powerful earthquake ever recorded – the magnitude 9.5 Valdivia earthquake in Central Chile from 1960.

Last week's earthquake was among the strongest recorded intermediate depth earthquakes in the region since 1900. Another magnitude 7.5 earthquake had occurred about 400km south-southeast beneath Peru in September 2005. The actual damage caused by earthquakes is strongly influenced by the magnitude, i.e. the amount of energy released, as well as the earthquake depth. The more shallow an earthquake, the higher the damage on the surface. Given the relatively high depth of Friday's earthquake and the fact that it occurred in a rural area, both economic and insured losses are expected to remain limited.

The ILS community, nevertheless, closely monitored and analyzed the event. In February 2018, the World Bank's International Bank for Reconstruction and Development (IBRD) had issued four cat bonds protecting Chile, Columbia, Mexico and Peru against earthquake risk on a parametric basis. The cat bond covering Peru earthquake risk also covers parts of Ecuador (as well as Northern Chile and western Bolivia) as strong earthquakes there can cause damages also in Peru. The beneficiary of the cat bond is the Republic of Peru as the bond is meant to provide capital for disaster recovery financing in case of a strong earthquake. Given the low insurance penetration in countries such as Peru, most damages from natural catastrophes are uninsured and those affected often rely on state or international financial support to be able to rebuild damaged property after a catastrophe.

The cat bond covering Peru earthquake risk was issued with a nominal size of USD 200m. The trigger is based on a parametric index derived from the earthquake magnitude. The magnitude and location of the earthquake determine how much the cat bond would pay out. In case of Friday's earthquake with a magnitude of 7.5 occurring relatively far away from Peru's capital, Lima, the cat bond is likely to not experience any loss based on the current information available and current assessment. However, a slightly stronger earthquake magnitude in the same region could have triggered a 30% payout for the cat bond, even though economic and insured losses for Peru could still have been limited.

This highlights the main issue with parametric cat bonds: they can include relatively high basis risk, i.e. a potential mismatch between actual losses and whether the cat bond pays out or not. This basis risk can be beneficial for the cat bond sponsor, i.e. actual losses remain limited but the cat bond pays out; or it can be beneficial for the investor, i.e. actual losses are high but the cat bond does not pay out. Parametric trigger structures do have the advantage of being more transparent than indemnity structures and allowing a faster assessment of whether there will be any loss. Also, for countries such as Peru, where actual data on historical or even recent

catastrophe losses is not reliable, parametric structures provide usually the only investor-accepted solution to transfer catastrophe risk to the ILS market.

The 2018 cat bond was the first securitized ILS transaction to transfer Peru earthquake risk to the ILS market. In the traditional reinsurance market and ILS private transactions, exposure in Latin America tends to focus on Chile which has a more developed insurance market due to the high earthquake risk.

As a result and based on the current information available, the portfolio manager does not expect an impact on CSA ILS/ CSA ILS Fixed from this event.

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28 February 2019

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