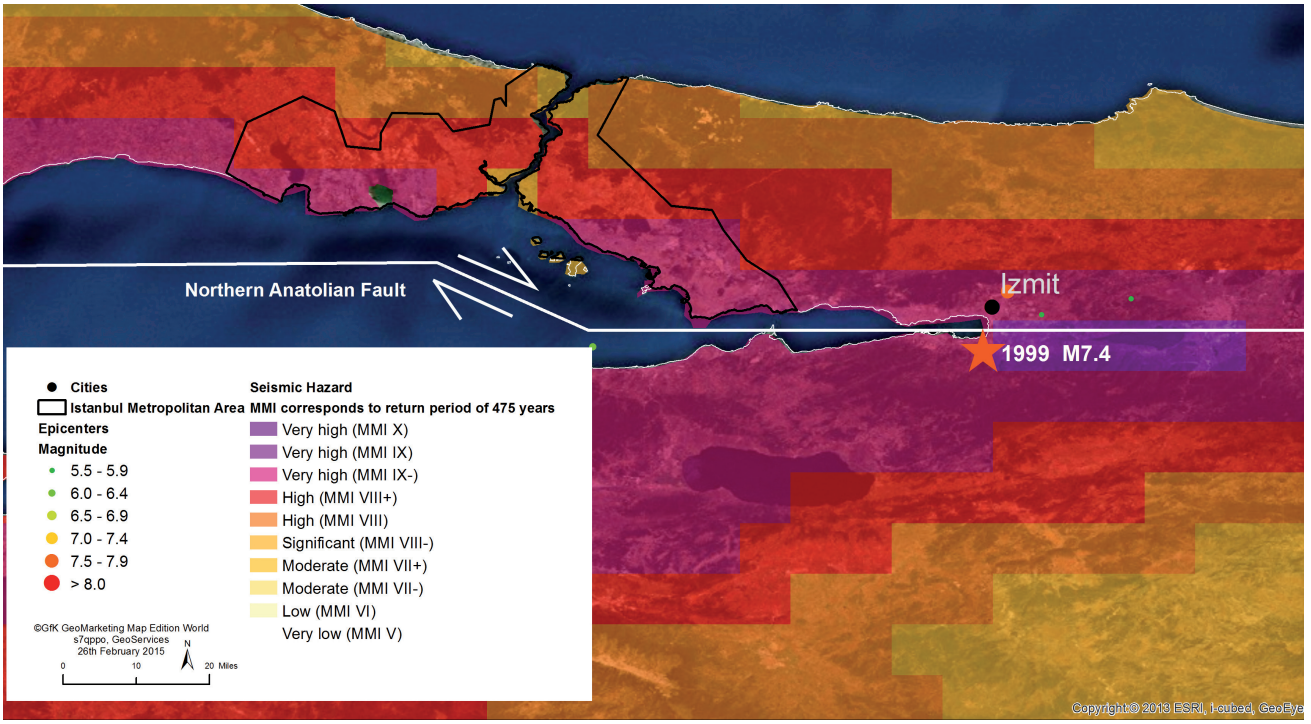
Swiss Re

Risky Cities:

Istanbul

Istanbul is Turkey's powerhouse, generating more than 40% of the country's GDP. The 14 million people in its metropolitan area live under the constant threat of severe earthquakes. And the next one could very well be just around the corner. The government is acutely aware of this threat and has already done a lot to strengthen its resilience to destructive seismic activity. That said, should a Magnitude 7 (M7) or stronger quake strike the city, the loss of life would be immense, not to mention economic losses as high as USD 120 bn. Using Swiss Re's models and detailed hazard data available in CatNet®, we have analysed the potential impact of this risk and other natural perils for the greater Istanbul area. This analysis is part of Swiss Re's report: "Mind the Risk – a global ranking of cities under threat from natural disasters" which compares the human and economic exposure of 616 cities around the world.

What is Istanbul's risk?



CatNet® map showing the seismic hazard for metropolitan Istanbul and Izmit further to the east. The Northern Anatolian Fault runs just south of greater Istanbul and, in 1999, caused devastation following a M7.4[1] rupture close to Izmit (Source GSHAP).

Straddling the Bosphorus strait between Europe and Asia Minor, Istanbul occupies a key strategic location both commercially and geopolitically. The densely populated metropolis is highly exposed to earthquake risk with the Northern Anatolian Fault running just south of the city beneath the Marmara Sea.

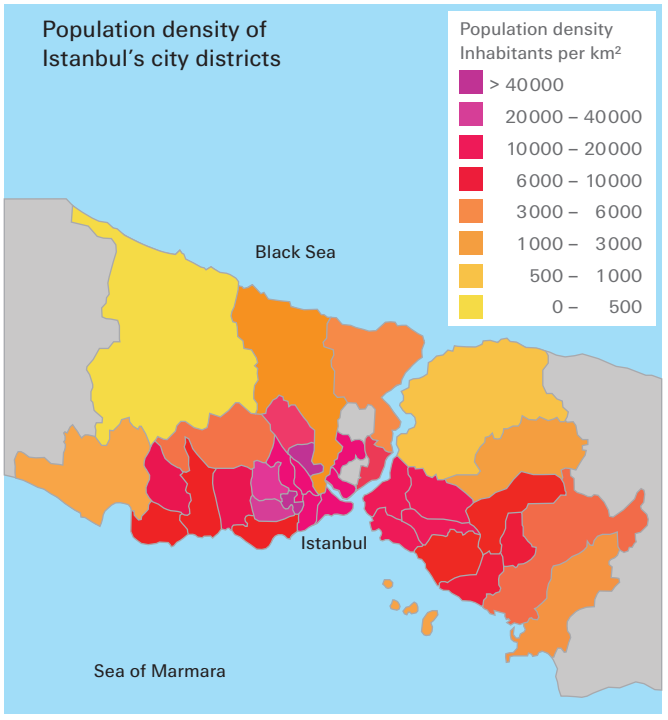
Turkey is no stranger to devastating seismic activity. In 1999, for example, the Kocaeli and Düzce quakes, at M7.4[1] and M7.2 respectively, were the most destructive the country had seen in 60 years. Economic losses were put at approximately USD 20 bn, of which only about USD 1 bn were insured. At the end of the day, the government had to finance around USD 6.4 bn for emergency relief and reconstruction, while the private sector shouldered most of the loss burden.

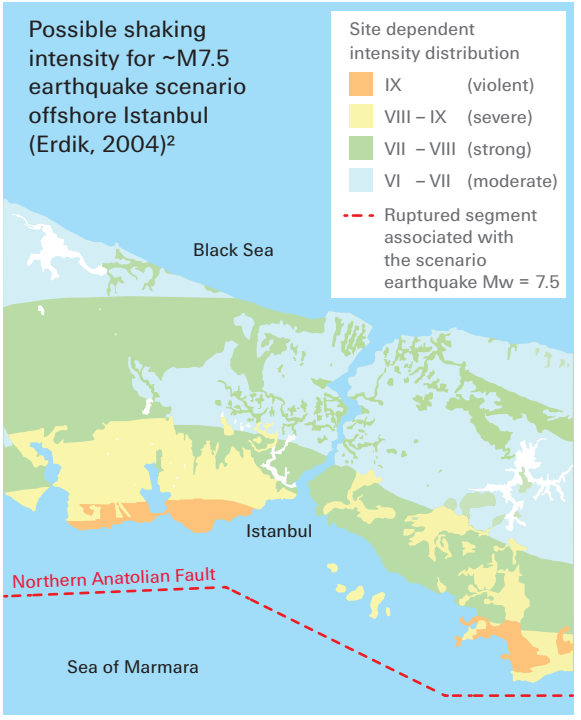
The consensus among leading experts is that the next major event is likely to occur further west, which would put Istanbul right in the firing line. One of the likely scenarios is a ~M7.5 tremor 10 to 15 km off the coast of Istanbul[2].

[1] Source: KOERI (Kandilli Observatory and Earthquake Research Institute)

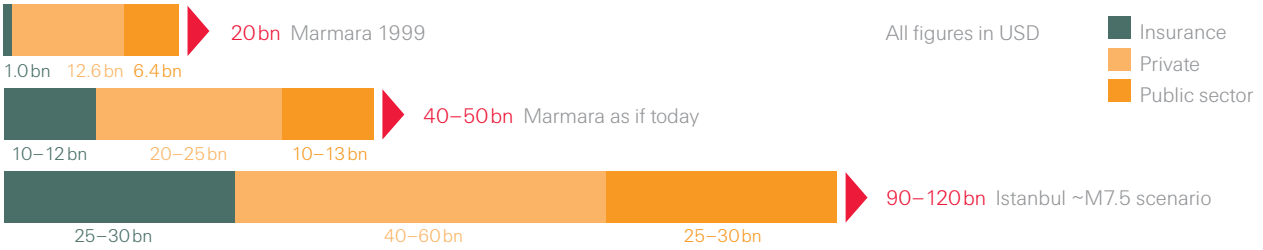
[2] Erdik, M., 2004: Earthquake Vulnerability of Buildings and a Mitigation Strategy: Case of Istanbul

What might happen?





Who picks up the bill?



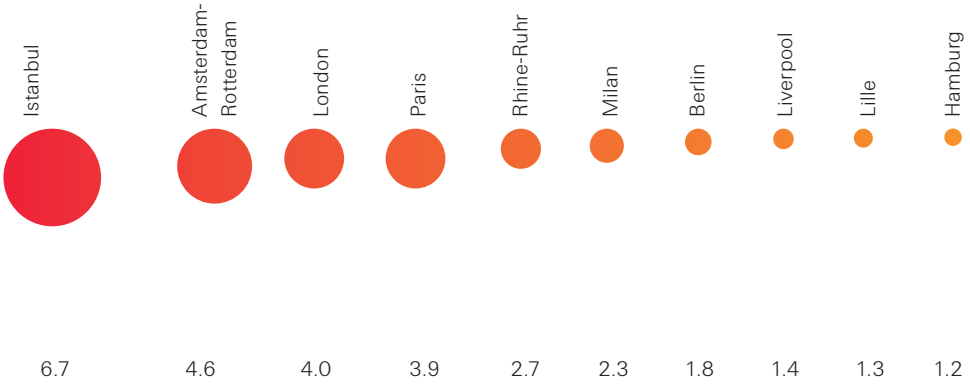
The Marmara earthquake 1999 triggered economic losses of ~USD 20 bn, which would amount to USD 40–50 bn in today's values. Only ~USD 1 bn (5%) was insured at that time. If an earthquake of similar magnitude were to strike Istanbul today, Swiss Re estimates an economic loss of about USD 90–120 bn. Of this, the public sector would have to bear approximately USD 25–30 bn.

Based on our knowledge from past events, also in other parts of the world (e.g. Christchurch in New Zealand), we estimate that the scenario in question would generate direct economic losses amounting to between USD 90–120 bn. That said, insurance penetration has increased significantly since 1999, thanks to the creation of the Turkish Catastrophe Insurance Pool, which provides insurance to homeowners, and efforts of private insurers to increase insurance penetration. Coverage has also increased in the commercial sector. We estimate that USD 25–30 bn would be covered by insurance in the above scenario. However, the government would still have to cope with a similar amount for emergency response costs and reconstruction of public buildings and infrastructure.

Scenarios for other quake-exposed cities in Turkey (Bursa, Izmit, Antalya, and Adana) predict economic damage as high as USD 10 bn.

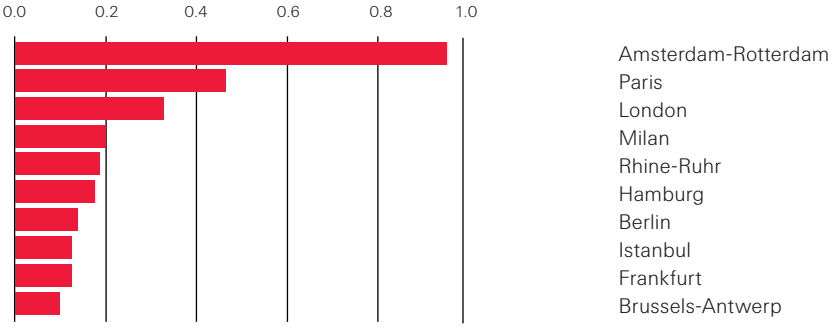
How does Istanbul compare internationally?

Human impact
Millions of people potentially affected by natural hazards*

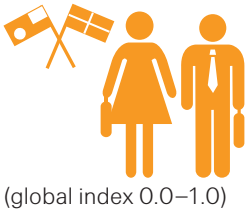


Economic impact
Value of working days lost*
in absolute terms

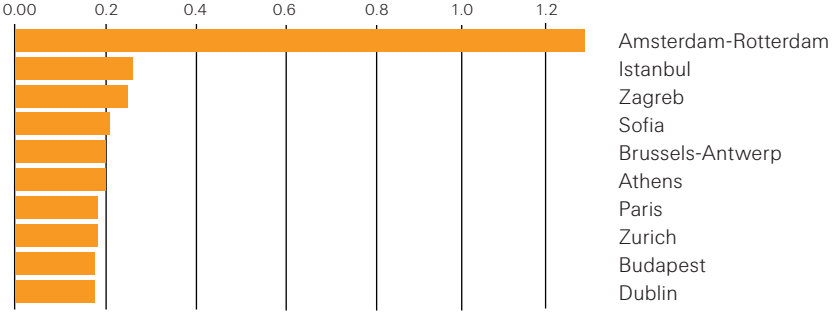
(global index 0.0–1.0)



Value of working days lost*
relative to national economy



(global index 0.0–1.0)



* Combined risk from five perils (earthquake, river flood, storm surge, windstorm and tsunami), a global comparison based on aggregated numbers

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What cities need

An important part of resilience is how well an urban community can bounce back from the financial consequences of a disaster such as an earthquake, in other words how rapidly it can mobilise the resources necessary to expedite its economic recovery.

Risk transfer solutions for the public sector

While the Turkish Catastrophe Insurance Pool addresses the earthquake risks of homeowners, and private insurance solutions are available to protect commercial enterprises, the government budget remains exposed to severe seismic events in Istanbul. The city's growing exposed values require a broader redistribution of risk and a wider financing mix, including ex-ante risk financing tools on government level. By directly insuring itself against earthquake risks, the government can broaden its disaster financing mix and reduce its dependency on budget re-allocations and foreign debt financing.

Parametric insurance

Unlike traditional insurance, parametric instruments use measured or modelled data like the physical characteristics of a disaster (e.g. the magnitude of an earthquake) to determine payouts. Such a payout model aims to mirror the actual damage on the ground and enables a much more rapid settlement. It can also provide financing for risks which would otherwise be uninsurable (e.g. emergency relief costs, public infrastructure). This is critical for cities that require budgetary liquidity following a catastrophic event. The rapid payout is possible because a lengthy loss adjustment is not required to assess the actual damage on the ground. An earthquake-impacted community can therefore receive rapid cash to help with emergency response, debris removal or other expenses. Parametric deals can be settled in days or weeks.

Weather insurance products

These are examples of a parametric insurance cover that protect cities against the impact of adverse weather on their property or their ability to operate as expected. This can be in the form of unusually heavy rain or snow requiring additional resources to respond, extreme temperature, or strong wind which may put strain on city services. Such products are generally based on meteorological data such as daily temperature changes, frost or precipitation. They allow local governments to control the financial risks associated with adverse weather.

Global Partnerships – our capability and solutions

To avoid raising taxes and diverting critical assets when the city and its residents are hurting most, Swiss Re offers risk transfer solutions that can assist with covering the financial burden public entities face. Its risk management experts can also help public authorities prepare for natural disasters more comprehensively than perhaps they have done in the past.

The value of CatNet® www.swissre.com/catnet

The CatNet® functions and data facilitate a professional overview and assessment of natural hazard exposure for any location worldwide. This makes CatNet® a valuable tool in preparing local, regional and cross-regional risk profiles.

Concretely, it

- provides swift hazard checks for regions you are unfamiliar with
- generates customised maps combined with satellite images
- enables you to import your location data to illustrate risk exposures combined with natural hazard data
- provides country-specific insurance conditions, claims experience and natural disaster loss dimensions