The Effects of Earthquakes On Indonesia's Economy

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Contents

List of Figures

How Frequent and Powerful Earthquakes Affect Indonesia's Economy

Indonesia is known for having an abundance of earthquakes because it is located in Southeast Asia close to the equator, and has several intersecting tectonic plates, resulting in "frequent and powerful seismic activities."(Gignoux & Menéndez, 2016) The country is also small which means these earthquakes heavily affect all of Indonesia. The earthquakes create economic effects which can potentially harm the country or city for large periods of time and the fact that these earthquakes are common only means that recovering from these effects will be harder and tedious. Being hit with multiple earthquakes will lead to devastating blows to infrastructure and most importantly land. Indonesia's economy heavily suffers from earthquakes due to the loss of jobs and one's private property (cars, homes, valuables, etc...), how common they are, and the damages they cause to land and infrastructure.

The Destruction of Infrastructure and Land and the Effects they have on Indonesia's Economy and Society

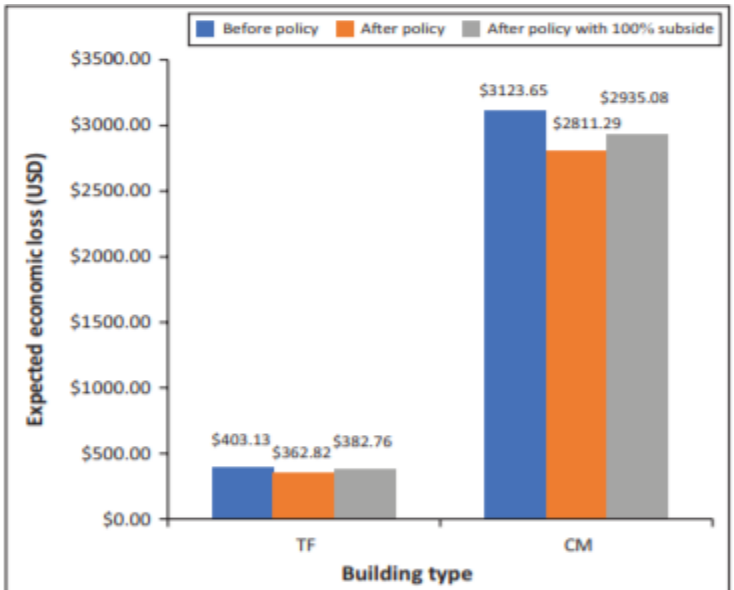
Earthquakes can cause heavy damage to a country's economy, especially when they are so common in such a tight space. Indonesia has suffered from many earthquakes throughout the 20th and 21st century and those earthquakes have caused damage to the country's infrastructure and land. These earthquakes can sometimes amount to billions of dollars worth of damage and the common occurrence of these earthquakes only makes it worse. Many of Indonesia's infrastructure fall due to the absence of earthquake-resistance materials. Buildings and homes without good design will be destroyed and will cause casualties/injuries, leave people without a home, and of course a loss of money for the individual and the city/country. Hospitals, banks, and other essential places would be damaged as well as crops and farms which creates a whole

variety of problems. People will lose their assets and will not be able to find healthcare or housing and people will lose their jobs.

Improving on Infrastructure

Another problem that arises from the destruction of land and infrastructure is how the area of effect can be recovered or restored. The costs of rebuilding will be tremendous, and the restoration period may not even focus on helping the individuals but only on repairing the damages to infrastructure and land. Considering that earthquakes with magnitudes of 6 or over are soo common(Fig 2), it is necessary for cities to be built out of strong and durable earthquake-resistant material that can prevent major damages and further pursue a better lifestyle. A study was done by a group of scientists to see theoretically what material would be able to prevent the most damage and casualties.(Aulady & Fujimi, 2019) They took the idea to replace confined masonry and timber frame houses, which held the most casualties and economic loss in the Bantul region of Indonesia, with refined concrete houses, which are extremely durable to earthquakes with magnitudes up to 8 on the Richter scale. This project/house is called Simple Instant Healthy House (RISHA) and it proves to be effective in preventing casualties and economic loss (See Fig 1) The article also further goes into detail on how they would promote the project and ways to improve on it to make it appealing to the public. The project would help mitigate economic loss and casualties and provide a reliable and appealing resolution to the issue at hand.

Figure 1



Note. The graph shows the comparison of economic loss before and after applying the policy of RISHA. The graph makes it clear that applying RISHA decreases economic loss. Aulady MFN, M. F. N. (2019). Earthquake loss estimation of residential buildings in Bantul regency, Indonesia. *Jamba*, *11*(1), 756.

Effects of the Destruction of Land and Agriculture on the Economy

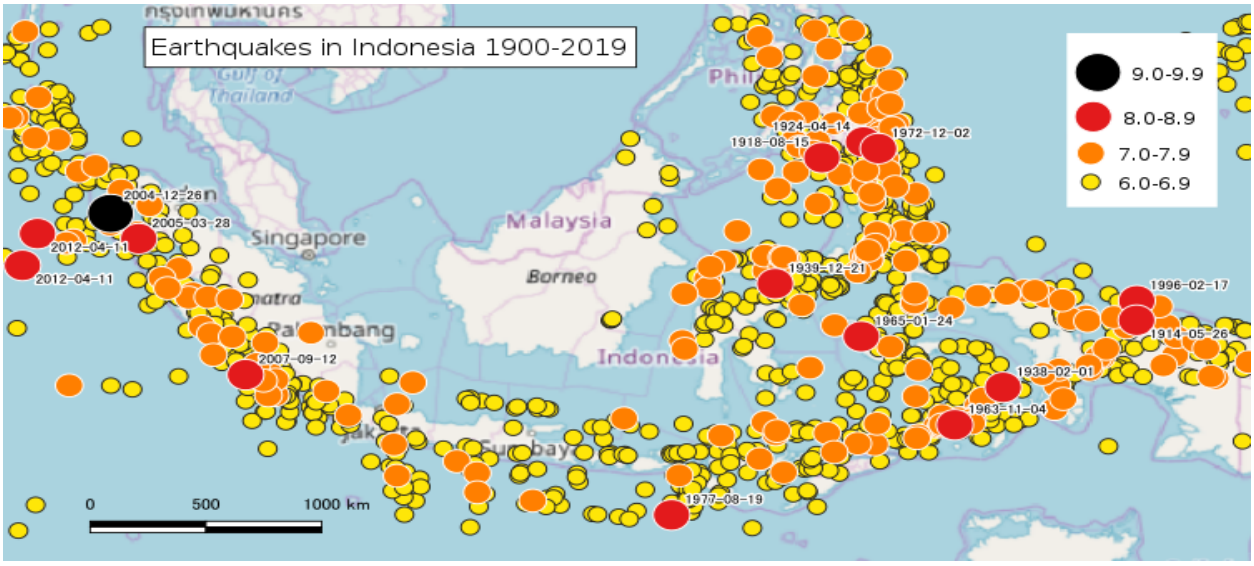
When earthquakes occur, many aspects of people's lives are changed; many people lose their jobs and are left without a home. The land of the area affected by the earthquake can greatly change and the earthquakes may also create tsunamis and landslides which can damage irrigation systems and agriculture including crops and livestock. This also results in the loss of work for farmers and fishery workers who rely on the environment for work and income and would have to find another source of income for however long it might take for the land to recover and be suitable for working conditions. “Earthquakes can also disrupt supply and marketing chains, which are essential for agricultural production and markets.”(Gignoux & Menéndez, 2016). Earthquakes can cause loss of jobs through other means as well. Naturally, businesses will be affected by the effects of an earthquake through the loss of assets. Some people get injured and of course, some die, which can leave their families who rely on them for money in a rough spot.

How severe and common earthquakes will affect the economy heavily?

Indonesia is close to the equator and is “located at the intersection of several tectonic plates and, as a result, has to contend with some of the most frequent and powerful seismic activities in the world”.(Gignoux & Menéndez, 2016) The commonness and the severity of these earthquakes are what makes living in the area terrifying. Living in areas that are prone to many earthquakes will lead to high and constant risk of economic loss throughout the country. Earthquakes are soo common that cities have been hit with multiple earthquakes with

magnitudes of 6 or higher within the past 100 years (See Fig 2). These earthquakes can put cities and individuals into long-term economic loss and would take several years to fully recover and soon after the restoration period the risk of another earthquake still exists. Cities in Indonesia such as Bali, Lombok, Sumatra, Sulawesi, etc… have experienced various amounts of earthquakes with each earthquake having great repercussions on their economy. For example, Lombok experienced two earthquakes in 2018 within just one week, a 6.4 magnitude earthquake(July 29, 2018) and a 7.0 magnitude earthquake(August 5, 2018). The total economic losses totaled to 5.04 trillion IDR(about 364 million USD). (Government of Indonesia , 2018) The earthquakes were devastating for the city and the city would of course still be in face of a threat of another earthquake. The country suffers the terrifying fact that they know these activities will continue to occur, yet the people of Indonesia have no way of knowing when, where, or how.

Figure 2



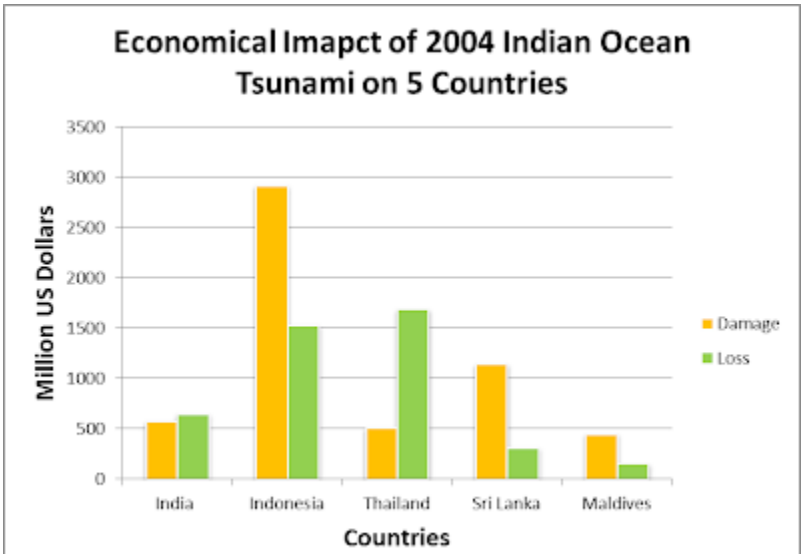
Note. This shows the various earthquakes Indonesia has experienced from 1900-2019. These earthquakes span from a magnitude of 6-9.9 and are color-coded to specify the range of the magnitude for each earthquake. This figure is very overwhelming in the fact that Indonesia has

experienced a vast number of earthquakes in only a little over a century. Congress, U. S. (n.d.). Latest earthquakes.

Indonesia's Worst Earthquake

Indonesia has experienced various amounts of earthquakes throughout the past 100 years including a 9.1 magnitude earthquake in 2004 in Sumatra, the 5th highest recorded earthquake in the world. This earthquake caused a massive tsunami and affected "18 countries from Southeast Asia to Southern Africa", which killed "more than 250,000 people in a single day and [left] more than one million homeless". Indonesia suffered the most casualties, having "122,232 deaths and 113,937 missing."(Ramalanjaona, 2011) In general, this tsunami had an immense impact on the economy of not only Indonesia but all the other countries that were victims of the disaster. The tsunami resulted in a substantial impact on fishing and tourist industries and totaled to several million dollars of economic loss. The tsunami also created several social and environmental problems including "water pollution, flooding, and endemic diseases"(Ramalanjaona, 2011) which can also affect the economy in unique ways. Tsunamis have many health hazards such as the risk of malaria, typhoid, infections, etc…(*Tsunami health hazards* 2004). People who do not have access to healthcare would have to spend massive amounts of money in order to treat their injuries/illness. The 2004 earthquake/tsunami has had one of the deadliest impacts of a recorded natural disaster in the history of the world which goes to show the scale on which Indonesia was affected.

Figure 3



Note. The graph shows the economic impact the 2004 Indian Ocean Tsunami had on India, Indonesia, Thailand, Sri Lanka, Maldives. Indonesia suffers the highest damage while being second-highest on loss. Google Sites. (n.d.). *Damage - economic - indian ocean - earthquake, Tsunami*. Google Sites.

Conclusion

Earthquakes can cause economic effects due to various factors including how severe the earthquakes are, how common they are, and the destruction they cause. Earthquakes pose a large threat to Indonesia as shown in the 2004 Indian Ocean Earthquake. In order to resolve the issue, the government of Indonesia must employ policies such as the RISHA policy, which creates safer and earthquake-resistant houses and buildings, that can help Indonesia cope with earthquakes in the long-term process. These policies will not only resolve social problems but also economic problems and would be of benefit for all people residing in Indonesia.

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