



Portfolio Protection against Earthquake Disaster for Second-Tier Financial Institutions in Indonesia ‡,†

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EQII: Earthquake Index Insurance

Indonesia's financial sector faces one of the highest earthquake exposures in the world. GlobalAgRisk, in collaboration with PT. Asuransi MAIPARK Indonesia and Aon Benfield Asia Pacific, is developing index based earthquake insurance (EQII) to help protect Indonesia's vulnerable financial institutions from this powerful natural disaster risk. After careful study, it is clear that most of the geographically concentrated financial institutions lending to small and medium enterprises are highly vulnerable. This vulnerability has a direct impact on the banks that make loans to these institutions and this note is designed to explain those impacts and how EQII can be used to strengthen the resiliency of the sector to earthquake risk. Second-tier financial institutions can use EQII to reduce costs associated with lending to geographically concentrated primary lending institutions. The focus is on institutions whose banking activity is regulated by Bank Indonesia or the soon to be consolidated Financial Services Supervisory Authority (OJK), but the outlined principles are equally applicable for the providers of commercial and social capital to any type of primary lending institution that has vulnerability to earthquakes.

Diversification is an Incomplete Strategy

Natural disasters adversely affect financial institutions (FIs) at all levels. The impact of a systemic shock such as the 2009 Padang earthquake is perhaps most readily apparent on localized, geographically concentrated FIs (e.g. BPRs, KUBEs, etc.). Due to their concentrated portfolios, primary FIs are vulnerable to substantial spikes in bad loans following an earthquake disaster. When disasters affect many borrowers at the same time, these institutions experience portfolio-level problems that erode their capital base and can lead to insolvency. At the same time, geographically concentrated FIs have limited institutional protection against earthquake risk and limited ability to access new capital following a disaster. In addition, most of the clients of FIs do not have access to any form of earthquake insurance.

The resulting capital and liquidity shortages affect the ability of these institutions to service their debt obligations to second-tier banks (e.g. regional banks, apex institutions, micro-finance investment vehicles (MIVs), commercial banks, etc.). Although geographic diversification helps protect the overall portfolio of the second-tier banks from localized disruptions, it is nonetheless an incomplete strategy that entails costs and forgone future benefits.

When local FIs suffer losses due to an earthquake, the second-tier bank may experience costs and losses from restructuring or adjudication of bad loans. Even when an FI is able to meet its liabilities, the impact of the disaster may reduce its creditworthiness and reduce revenues from lending to that FI in the future. When a local FI is lost as a borrower, the second-tier bank incurs additional costs to identify and establish a relationship with a replacement. Therefore, prudent financial risk management suggests supplementing diversification with other strategies that can more fully protect financial interests of second-tier institutions. These benefits are passed down to local FIs and its clients, contributing to larger goals of financial inclusion and poverty reduction.

Index Insurance and the EQII Mechanism

Index insurance is designed to transfer correlated risk, such as earthquake risk, into international risk pooling markets. Index insurance uses a third party metric which serves as the sole basis of a payment. Financing of the insurance is secured in advance of an earthquake disaster and includes transparent rules and conditions under which payments are made and the size of the payment. EQII is designed to make payments that are proportional to the expected impact of the earthquake event, once a minimum magnitude has been

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surpassed. An important advantage of index insurance is that payments can be made rapidly while avoiding a complicated claims process. The payments rebuild the capital base of the FI without appearing as a liability on the balance sheet. Thus, a widespread use of index-based earthquake cover such as EQII has the potential to strengthen the entire financial system in Indonesia.

The mechanism for EQII is based on an intensity index of earthquake-induced ground motion that is mapped spatially. Payment rates increase as the event intensity increase, and is weighted to reflect the geographic spread of the financial institution's portfolio as well as population density.

Financial Dynamics of Earthquake Risk

Unmanaged natural disaster risk limits growth and imposes costs at each stage of the banking system. Local FIs who cannot effectively manage their credit risk ration lending to their borrowers. Because of this risk exposure, second-tier banks limit the amount they might loan if the risk was not present. Equity investors will also be less willing to invest. Using insurance against a disaster is one mechanism to overcome this problem and improve access to lending and increase the income for the entire financial sector.

The dynamics of unmanaged risk exposure has a macro effect on access to credit and terms of credit that hinder financial market development and, consequently, economic growth and poverty reduction. The fact that earthquake risk is pervasive in Indonesia means that the expected occurrence of bad and non-performing loans is also higher which is then translated into higher interest rates charged to borrowers. Addressing earthquake risk using a more efficient mix of strategies than geographic diversification alone should mean:

- Greater access to credit;
- Lower interest rates;
- More lending and higher economic growth and profits for the entire financial sector;
- Greater local FI resiliency; and
- Greater ability of local FIs to respond when the community needs the capital the most—after the earthquake.

EQII: Portfolio Level Insurance

Second-tier banks benefit from portfolio insurance that strengthens the resiliency of borrowing FIs to earthquake risk. When a disaster occurs, the insurance payout comes as an influx of funds to the local FI as income on its balance sheet, increasing its capital base, and can also be used to address acute liquidity needs. Therefore, insured FIs are less likely to default due to earthquake-induced portfolio losses. Because building relations with strong FIs is costly, a second-tier bank does not want to see these FIs fail. Im-

portantly, portfolio insurance can lower the cost associated with lending to geographically concentrated FIs. When a portion of a local FI's portfolio is insured using EQII, it is in a better position to meet its liabilities to second-tier banks following an earthquake disaster. FIs that use insurance to increase their resiliency to disasters are better customers in the long term as they are more likely to grow and generate new revenue opportunities for the bank. Portfolio insurance also strengthens the local FI so that it can possibly lend more heavily after the disaster. In general, when local FIs can more effectively manage their risk, they can lend more in exposed regions and at lower interest rates.

Second-Tier Banks Lead in EQII Purchase

Portfolio insurance purchased by geographically concentrated FIs increases their resiliency to earthquake risk and makes them a better client to second-tier lenders. Therefore, EQII can confer an important indirect benefit to secondary institutions. Because EQII is a new product, second-tier institutions are in a good position to take the lead as early adopters of this important earthquake risk management innovation. As an efficient way to initiate the market for the sector, we propose that second-tier banks purchase EQII for their existing or new capital loan clients. A second-tier bank could buy a small amount of insurance for the borrowing FI, maintain its previous interest rates, and anticipate higher expected profits. Alternatively, it could also slightly lower the cost of lending and maintain expected levels of profits.

This more efficient outcome results when the cost of the premium for a specific amount of insurance (sum insured) is less than the change in the cost of risk (ΔR) from insuring a borrower, times the probability (θ) of incurring those costs: $Premium \leq \theta * \Delta R$.

In other words, if the insurance premium is less than the expected cost of a disaster taking into account the probability of having a disaster, then it lowers the second-tier bank's overall cost. This condition should hold for a competitively priced insurance product. This result is strengthened by the geographic spread of the insured FIs, which contributes to lowering the price of the insurance.

The FIs will likely benefit from purchasing a larger sum insured than the amount recommended by the above formula. By making the first purchase of EQII on behalf of borrowing FIs, second-tier banks can play an important role as pioneers in adopting this important risk management innovation, which can help the local FIs recognize and evaluate the value of the insurance to further manage their portfolio risk.

In addition, the local FIs would benefit from the pricing advantage of a second-tier bank purchasing the first layer of insurance. This is because the bank's size conveys some market power in the negotiation with reinsurance providers and because the purchase creates a more efficient risk pool, both of which should reduce the cost of the insurance.