

Agenda—10 years

Advancing economics in business

Why does it always rain on me? A proposed framework for flood insurance

Originally published in September 2011. 2015 commentary by Oxera

Insuring against natural catastrophes is a global problem. We draw on research recently conducted for the Association of British Insurers on how to support the provision of private sector insurance against flood risk, and describe a possible new market-based model for the provision of flood insurance

Since this article was written, the UK insurance industry and government have been working on developing and implementing Oxera's model, which is due to be rolled out in the summer of 2015.¹ In the final model, insurers will compete for household business and pass the flood risk for high-risk properties to a central pool (known as Flood Re). The subsidy for the pool will be funded by a levy on all buildings and contents policies in the UK, as well as premium payments from those households insured by the pool (to be determined by Council Tax band). The way in which the levy is set is complex, but an advantage of the model is that both the levy and the accessibility criteria for accessing subsidised insurance can be changed over time as more information (about the impact of climate change, for example) becomes available. This makes the pool flexible and responsive.

¹ See Association of British Insurers, 'Flood Re explained', available at: <https://www.abi.org.uk/Insurance-and-savings/Topics-and-issues/Flooding/Government-and-insurance-industry-flood-agreement/Flood-Re-explained>.

Floods, and the damage that they cause, are a problem throughout the world. The UK is unusual in that cover against flood damage is available to residential customers and small businesses as part of the standard terms of property insurance. The arrangements for flood insurance in other countries range widely, for example, from complete public sector provision in Iceland, to complete private provision in Germany (although there is no provision for very high-risk properties), and no public or private provision in the Netherlands.¹ In many countries (e.g. France, Spain, Canada and Japan), flood insurance is offered as a public-private partnership.²

In the UK, the provision of flood insurance is governed by an agreement between insurers and the government (known

as the Statement of Principles on the Provision of Flood Insurance), under which the insurance industry promises to continue to provide cover for flood insurance, provided that the government works towards managing the level of flood risk in the UK.³ The agreement is regarded by the industry and government as being unsustainable, and therefore will not be renewed when it expires in mid-2013.

Based on research undertaken by Oxera for the Association of British Insurers (ABI), a possible new model is outlined below that could support the widespread provision of flood insurance by the private sector and be implemented when the existing Statement of Principles expires.⁴

Although the Statement of Principles has largely achieved its objectives of contributing to the widespread availability of flood cover to households and small businesses in the UK, the insurance industry has pointed out that it has also led to negative effects and distortions in the functioning of the market for property insurance in the UK. It has contributed to a degree of pricing by insurers below the risk-reflective price in relation to existing policyholders.⁵ This leads to distortions in the market for property insurance, since new entrants are able to choose customers exclusively from low-risk areas, thereby not incurring the relatively high costs of providing flood insurance to high-risk properties. Another distortion is that underpricing (i.e. setting premiums below the risk-reflective level) is likely to restrict the development of a specialist market providing flood insurance to high-risk properties. Furthermore, assurances provided by the Statement that insurance cover will continue to be provided may also reduce incentives for property owners to invest in flood risk management at a community or property level.

Following the expiry of the Statement of Principles, alternative arrangements will be required to ensure the ongoing availability and affordability of flood insurance.

The market dynamic at the time meant that new entrants were able to enter the market only in areas of low flood risk, with incumbent companies consequently underpricing flood risk in high-risk areas (and therefore cross-subsidising those high-risk properties from the premiums paid by low-risk properties). This was unsustainable, and was likely to result in the market being unable to provide insurance against flood risk in high-risk areas, except at fully risk-reflective prices which might have been significantly higher than the existing premiums.

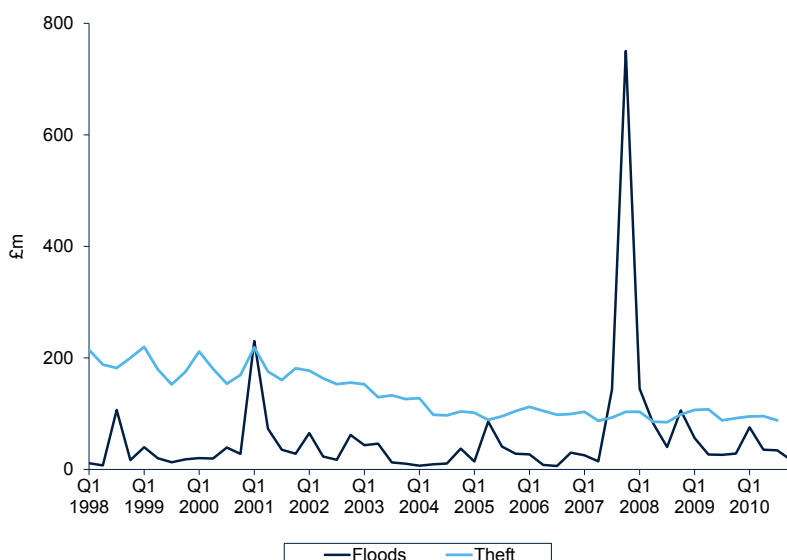
The new market model enables the private sector to continue to insure against flood risk for low- and medium-risk properties, while providing affordable cover for those households in high-risk areas (provided that certain criteria are met). In addition, the model makes the extent of the cross-subsidy (from low- to high-risk properties) explicit for the first time, and thus enables stakeholders to debate whether this cross-subsidy is equitable.

Why is flooding different?

There are a number of reasons why flooding (and other natural catastrophes) may be different from other insurable events, such as theft and fire, that are covered by property or motor vehicle insurance.⁶

- The risk across insured parties is correlated.** Flooding differs from other types of risk, in that a major flood can damage many properties in a concentrated area at the same time. This contrasts with other types of risk against which property insurance provides cover, such as theft. For example, although the burglary rate in certain neighbourhoods may be higher than in others, if one particular property is burgled, it is unlikely (although perhaps not impossible) that an entire street or neighbourhood will have been burgled at around the same time. Other risks, such as fire, have the potential to spread to neighbouring houses, but can usually be more easily controlled than flooding.

Figure 1 Claims profile over time (£m)



Source: ABI.

- Profile of the event.** As illustrated in Figure 1, the occurrence of a flooding event is 'lumpy'—i.e. a flood event may occur once in every 75 years in the UK and, when it happens, the impact can be substantial. This makes the profile of payouts different to those of other general insurance products such as motor, travel or theft insurance.⁷

The infrequency of flooding may also make the pricing of risk more challenging, since it may be a considerable length of time before the insurance company becomes aware that the risk has been mispriced. The occurrence of flooding in a certain area may indicate that the risk is higher than insurers initially expected. In addition, where future risk may be different from past risk, under- or overpricing as a result of these types of changes may again take a long time to manifest itself. Since mispricing becomes clear only after a relatively long time, the cost of mispricing flood insurance may therefore also be higher than for other types of risk.

- Relatively high costs of assessing risks.** The riskiness (and hence the risk-based premium) of other events covered by general insurance can generally be measured on the basis of certain characteristics that can be easily observed, such as age or location. This fits with the high-volume, low-transaction cost business model that most insurance providers in the UK and other countries have adopted: application processes have been automated and standardised, and assessing the underwriting risk usually requires little or no manual intervention. Accurately assessing flood risk, however, is generally more expensive and requires manual intervention, and therefore does not sit neatly within this high-volume, low-transaction cost framework.
- Climate change.** The frequency and intensity of flooding may increase in the future due to changes in climate. Interpreting the likely impact of these trends is an ongoing challenge for the industry, in a way that may not be present in the provision of cover against other types of risk.

The model does not, in itself, reduce the risk of properties being flooded (for example, it does not increase spending on flood defences), and this has been the subject of some criticism, for example by the UK's Committee on Climate Change in February 2015.¹ However, it does enable better data to be gathered on flood risk, as one organisation (Flood Re) will be responsible for insuring most of the high-risk properties in the UK. This is an important advantage of the Oxera model. Flood Re will then be able to use this data to identify the appropriate measures for managing flood risk in different areas. In addition, insurers have an incentive to invest in technology and processes that enable them to identify low- and medium-risk properties. If they can identify these properties more effectively than their competitors, they can offer a lower premium to those consumers in low- and medium-risk properties and therefore obtain

more business. In this way, the market model incentivises firms to gather better data on flood risk and how it is evolving over time.

¹ Letter from Professor Lord Krebs to Brendan McCafferty (2015), 'Designing Flood Re to encourage flood risk reduction', 2 February.

Although these flood-specific characteristics do not necessarily mean that flood insurance cannot be offered by the private sector, they do mean that private sector provision of flood insurance may be less straightforward than the provision of other types of insurance, and/or a different business model might be required.

Flood insurance in other countries

Oxera's research indicates that the private market in the UK can offer flood cover on terms that are both risk-related and generally affordable to the vast majority of properties. However, in a free market (without arrangements such as the Statement of Principles and/or underpricing), the provision of flood cover to very-high-risk properties may result in relatively high premiums for the owners or occupants, which could raise issues of affordability. Oxera explored what a solution to this issue might look like. For flood insurance to continue to be available and affordable, also after the expiration of the Statement of Principles, a subsidy to high-risk properties may be required. This means that an alternative arrangement should allow for a mechanism to identify high-risk properties (so that any subsidy would be offered to high-risk properties only) and a mechanism to determine and monitor the amount of subsidy.

Analysis of arrangements for flood insurance in other countries indicates that they do not provide a robust and practical way of identifying high-risk properties. Some models (e.g. in Spain or France) do not require the risk of an individual property to be defined, since all properties receive the relevant flood cover from a public or semi-public underwriter that sets the premiums to cover the risk at a country level, without differentiating by individual property risk. One of the disadvantages of such a public sector insurance system without risk differentiation is that it does not give property owners incentives to invest in appropriate resilience and prevention measures.

In other countries, such as the USA, a high-risk property is defined by reference to its location—a line on a map is used as a reference: if a property is on one side of the line, it is considered to be high-risk and eligible for a particular subsidised premium; if it is on the other side, it is considered not to be high-risk.⁸ Unless the line is drawn with a high degree of accuracy (which, even if claims data were available, is very difficult due to the relatively infrequent nature of flooding), low-risk properties may end up being included in the high-risk area. Perhaps more importantly, high-risk properties may be left out and their insurance premiums will rise significantly since no subsidy will be

provided. In addition, because moving the lines (as, for example, better information becomes available) may reduce the value of some properties and therefore negatively affect their owners, in practice any such move may prove politically difficult.

An alternative model

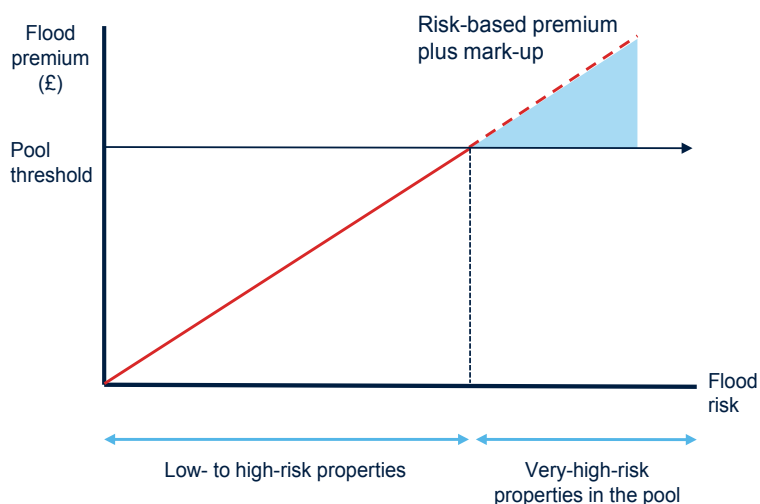
For an alternative arrangement to provide a solution for high-risk properties, it should allow for a mechanism to identify them (so that any subsidy would be offered to these properties only) alongside a mechanism to determine and monitor the amount of subsidy. The following framework could be used to design such a model.

- In line with current practice, insurance companies would assess each application for property insurance and determine the appropriate risk-based premium that they would be prepared to charge, including for the flood aspect of the household insurance.
- If the risk-based premium for the flood aspect is below a certain threshold, flood cover would be offered on a commercial basis; if above a certain threshold, the property would be deemed high-risk, and cover for the (defined) flood risk could be ceded to a pool. The pool (an entity separate from the existing insurers) would provide flood cover at a premium lower than that which the insurance companies would be willing to provide for the same level of cover, with the insurance companies underwriting the other property risk aspects within the property insurance policy and maintaining the relationship with the customer. Premiums within the pool might still be risk-reflective to some degree, but would be below the fully risk-reflective price, and would therefore require a subsidy.
- The insurance company would not be obliged to offer the 'pool' insurance; however, to do so for high-risk properties would be likely to be advantageous for its potential customers. This is because the risk-reflective premium would be higher than the pool premium, by design. The premium within the pool could be expressed in terms of a percentage of the value insured, or as a flat premium, or maintain a degree of risk-reflectivity.

Figure 2 overleaf provides an illustration of the framework.

To the extent that the premiums charged in the pool are less than the expected cost—i.e. to the extent that the solid line (representing the premium that would be charged by the pool) is lower than the dotted line (representing what the premium would be if it fully reflected the expected cost)—there is a requirement for a subsidy, represented by the shaded area. Note that, by definition, the premium would always be lower than the expected cost in the pool, since the pool would aim to make cover for flood risk available for those in high-risk areas who might struggle to afford a fully risk-reflective premium.

Figure 2 Identifying properties to be included in the pool



Note: The shaded area indicates the subsidy to owners of high-risk properties.

Source: Oxera.

A key question within this framework is how to set the threshold. If set too low, it would make it less attractive for insurers and other organisations (e.g. specialist brokers) to offer flood cover outside the pool, as well as making the pool (and hence the cross-subsidy) too large. If set too high, premiums could become unaffordable for those with very-high-risk properties. By controlling the level of the threshold, the stakeholders could make an explicit trade-off between affordability and cross-subsidy factors.

One practical way of setting the pool threshold would be to charge a flat amount—i.e. whatever the sum insured, or the risk of the property, the amount that the pool would charge for flood cover would be the same for all property owners. The advantages of this would be that it is easy to understand and communicate to stakeholders. Furthermore, no detailed information on the value to be insured would be required in order to assess whether to transfer a property into the pool (insurers do not always know the value of a property that is insured when a quote is offered). However, there is some correlation between claims costs and the sum insured (i.e. rebuilding costs in the case of buildings insurance, and replacement costs in the case of contents insurance). This means that, under a flat premium approach, high-value properties in the pool would on average receive more subsidy than low-value properties. This could be mitigated in a number of ways, for example by imposing a claims limit (which would cap the payout to policyholders within the pool), or a cross-over point, above which policyholders would pay an incremental percentage of the sum insured.⁹

Insurers would have an incentive not to refer properties to the pool if they can offer cover for flood risk at a price lower than the pool threshold: if at least one of their competitors offers the risk-reflective price (which is below the pool threshold), the consumer would save money by switching provider.

Models based on this framework would therefore use standard competitive pressures to provide appropriate incentives to insurance companies and consumers.

The framework has a number of advantages.

- It would introduce a market-based mechanism to identify (very-) high-risk properties, thereby avoiding the challenging issue of requiring an industry agreement on a definition.
- It would still require the pool premium threshold to be set, but, as explained above, this would be a market-based mechanism that could be easily changed over time.
- It would also be more transparent than the existing model. For example, comprehensive, industry-wide data on the number of (very-) high-risk properties and the level of cross-subsidy would be available for the first time. This information could be monitored, and used to assess the targets set for the government and industry.

For the first time, the model will allow stakeholders to understand who is receiving subsidised flood insurance, and the extent of that subsidy. This will enable stakeholders to discuss whether the subsidy provides value for money—indeed, this question has already arisen in the response from the Committee on Climate Change cited above—and whether the criteria for access to that subsidy should be changed so that it focuses on particular groups (for example, whether small businesses should be able to access the scheme as well as householders, or whether particularly high-value properties should be excluded).

- In addition, the funding details of the pool—i.e. who provides the funding, and how much it is—would be measurable.

Lastly, since it is transparent, a number of parties (including, for example, government, consumers and industry) could participate in the funding. This would enable the distribution of risk between different parties in a way that is not currently possible.

The part of the market that currently works well (provision of flood insurance to low- and medium-risk properties) would not be affected by this model. For these properties, flood insurance premiums would continue to reflect the risk of flood damage to the property. Even for high-risk properties, the framework could apply a degree of risk-based pricing within the pool—i.e. those properties at very high risk could be charged more than high-risk properties. Retaining an element of risk-based pricing would provide incentives for owners of properties within the pool to reduce their level of risk to the extent that this is economic, since their premiums would be lower, in line with the decreasing risk.

Concluding remarks

It is apparent that there is no ‘off the shelf’ solution for flood insurance. Although floods occur throughout the world, no country appears to offer a model of market-based flood insurance that is both widely available and affordable. There are many areas of the economy where markets do not work perfectly. The market for flood insurance is one such area, characterised by imperfect information about the risk of flooding and the cost of the claim should a flood occur. However, the framework proposed here provides a solution that allows the part of the market that is functioning well (providing cover against flooding for low- and medium-risk properties) to continue to function, while allowing a solution to the market failure (providing cover to very-high-risk properties) to be based on market principles. That such solutions can be found is likely to be of interest in areas beyond flood insurance.

The UK insurance industry has historically been unusual in providing insurance against flood risk as a routine part of domestic buildings and contents policies. The way in which the flood insurance market was evolving up to 2011 was putting this coverage at risk, and was likely to lead to properties in high-risk areas being either unable to obtain insurance, or being able to do so only at the fully risk-reflective price. The Flood Re model enables this private sector insurance against flood risk to continue, while providing affordable insurance to many properties in high-risk areas. Oxera is aware that insurers in a number of other countries are interested in whether the model could also be used elsewhere.

While nothing can compensate for the emotional damage caused by flooding, affordable insurance for flood risk at least helps those affected to recover from the material damage. Extending this model to enable a greater provision of flood insurance therefore improves consumer welfare by enabling markets to function well.

¹ In Iceland, property owners must purchase insurance against natural catastrophes, with the premium being paid to Iceland Catastrophe Insurance (a publicly owned company). In the Netherlands, no public or private flood insurance is available although after a flood event, the government has often provided financial support to those affected. In Germany, flood insurance is available as an optional add-on to property insurance, bundled with cover against other natural catastrophes. See Consorcio de Compensación de Seguros (2008), ‘Natural Catastrophes Insurance Cover. A Diversity of Systems’.

² Summaries of insurance against natural catastrophes in different countries around the world are available in Consorcio de Compensación de Seguros (2008), ‘Natural Catastrophes Insurance Cover. A Diversity of Systems’. See also Swiss Re (1998), ‘Floods—An Insurable Risk? A Market Survey’.

³ Association of British Insurers (2008), ‘Revised Statement of Principles on The Provision of Flood Insurance’, July.

⁴ The model outlined does not necessarily reflect the opinions of the ABI or its members.

⁵ Association of British Insurers (2011), ‘The Extent to which the Flood Element of Home Insurance is Underpriced for Domestic Customers at Significant Risk’, January.

⁶ These aspects have been documented in the literature—see, for example, Comité Européen des Assurances: Property Insurance Committee (2005), ‘The Insurance of Natural Events on European Markets’, or Swiss Re (1998), ‘Floods—An Insurable Risk? A Market Survey’.

⁷ See, for example, Cavallo, E. and Noy, I. (2009), ‘The Economics of Natural Disasters – A Survey’, Working Paper, Inter-American Development Bank, No. 09–19, November, pp. 25–6.

⁸ The US system has more than one level of high risk, and other dimensions also affect the eligibility of a particular property for a particular premium; nevertheless, the principle remains that pre-identified location is the main driver of eligibility for subsidy payments.

⁹ This could potentially also mitigate another effect of the flat pool premium approach—namely, that low-risk/high-value properties might be transferred into the pool not because the risk is high, but because the value is high, resulting in a relatively high risk-based premium (i.e. higher than