Title:

Managing the future financial risk of flooding

IA No: Defra1446

Lead department or agency:

Defra

Other departments or agencies:

HM Treasury, Communities and Local Government, Environment Agency

Impact Assessment (IA)

Date: 10/06/2014

Stage: Final

Source of intervention: Domestic

Type of measure: Secondary legislation

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Summary: Intervention and Options

RPC Opinion: Not in scope

Cost of Preferred (or more likely) Option				
Total Net Present Value:	**Business Net Present Value**	**Net cost to business per year** (EANCB on 2009 prices)	**In scope of One-In, One-Out?**	**Measure qualifies as**
-£188m	n/a	n/a	No	n/a

What is the problem under consideration? Why is government intervention necessary?

To date, flood insurance has been widely *available* mainly due to agreements between government and insurers. Premiums are currently *affordable* because a lack of information on flood risk has meant that there is an informal cross subsidy between customers at low risk of flooding and those at high risk. With recent advances in flood mapping, insurers are increasingly able to set premiums that are more reflective of risk. Whilst ultimately, more risk-reflective premiums are economically efficient, if the transition is too rapid those living at higher flood risk may face increases in premiums which are not compensated by reductions in other costs (e.g. mortgages). There is therefore a rationale to improve equity and reduce transitional costs as part of a transition to risk reflective premiums.

What are the policy objectives and the intended effects?

To ensure the availability and affordability of flood insurance, without placing unsustainable costs on wider policyholders and the taxpayer. Doing so will provide assistance to those likely to be disadvantaged by a transition to more risk-based flood insurance pricing including any potential "unbundling" of flood risk cover. A successful implementation would entail insurance terms adjusting towards risk-reflective pricing at a pace that allows choices to be made by policyholders facing long-term increases in insurance costs unless action is taken, and avoids any risk of instability in insurance, mortgage and local housing markets.

What policy options have been considered, including any alternatives to regulation? Please justify preferred option (further details in Evidence Base)

Baseline (Option 0) - no intervention - allow free market to develop without transitional measures;
Option 1 – Set up a subsidised insurance pool for flood-risk properties funded by an insurance levy;

The preferred policy approach is option 1 (known as Flood Re) as justified in the previous impact assessment published in the draft Water Bill in November 2013. There are wider socio-economic and equity reasons for pursuing the Flood Re scheme which are not fully reflected in the strict value for money calculations made in this Impact Assessment – for example it brings more certainty to future evolution of insurance prices with beneficial effects not only on policy holders but also in other markets such as the property market and mortgage lending. Flood Re also ensures industry support in managing a smooth transition during the interim period between the Statement of Principles ending and the new policy coming in.

Will the policy be reviewed? It will be reviewed. **If applicable, set review date: 06/2020**

Does implementation go beyond minimum EU requirements?			N/A		
Are any of these organisations in scope? If Micros not exempted set out reason in Evidence Base.	**Micro** No	**< 20** No	**Small** Yes	**Medium** Yes	**Large** Yes
What is the CO_2 equivalent change in greenhouse gas emissions? (Million tonnes CO_2 equivalent)			**Traded:** n/a	**Non-traded:** n/a	

I have read the Impact Assessment and I am satisfied that, given the available evidence, it represents a reasonable view of the likely costs, benefits and impact of the leading options.

Signed by the responsible SELECT SIGNATORY: Owen Paterson Date: 28-11-2013

Summary: Analysis & Evidence

Policy Option 1

Description: Subsidised insurance pool for high-risk properties ("Flood Re") funded by an insurance levy

FULL ECONOMIC ASSESSMENT

Price Base Year 2013	PV Base Year 2013	Time Period Years 10	Net Benefit (Present Value (PV)) (£m)		
			Low: -365	**High:** -22	**Best Estimate: -194**

COSTS (£m)	Total Transition (Constant Price)	Years	Average Annual (excl. Transition) (Constant Price)	Total Cost (Present Value)
Low	8	1	16	142
High	12		49	431
Best Estimate	10		33	287

Description and scale of key monetised costs by 'main affected groups'

Net costs of underwriting the separate pool liability are estimated to be up to £10-40m per year compared with covering the same risks under the baseline (where they would be pooled with non-flood risks). Administrative cost of setting up the pool (£8-12m), then running the pool (£6-10m per annum) plus costs of collecting a levy (~£1m per year) are borne by government and industry. The cost of the levy is excluded as this is a transfer payment.

Other key non-monetised costs by 'main affected groups'

It is estimated that costs passed on to low-risk insurance customers, to cross-subsidise the pool, do not result in a net reduction in insurance of non-flood perils, after accounting for the fact that customers at flood risk returning to the market are also insured against these perils (if policies continue to remain "bundled" under the baseline). There is some allocative inefficiency from market intervention, though this may be limited over a 10 year period; greater if the policy is perpetuated beyond this.

BENEFITS (£m)	Total Transition (Constant Price)	Years	Average Annual (excl. Transition) (Constant Price)	Total Benefit (Present Value)
Low			8	66
High			14	120
Best Estimate			11	93

Description and scale of key monetised benefits by 'main affected groups'

There are positive "equity" benefits to those in lower income groups from receipt of effective subsidy, . In net terms this is £6m per annum. The "participation" benefit from keeping people in the insurance market and avoiding the wider economic costs of non-insurance is £2-8m p.a. Best estimates are mid-points.

Other key non-monetised benefits by 'main affected groups'

Receipt of effective subsidy is excluded as this is a transfer payment (but gives rise to equity impacts as monetised above). A pool would mitigate wider social impacts arising from any rapid increase in insurance premiums including the avoidance of localised instability in housing markets and increased confidence for mortgage lenders, thus ensuring mortgage-ability and saleability of properties in high flood risk areas.

Key assumptions/sensitivities/risks **Discount rate (%)** 3.5

The key driver of the relatively poor economic performance relative to the baseline is the additional cost of covering the separate pool of high risk, which is uncertain. The option assumes the "worst case" (i.e. immediate) transtion to risk-reflective pricing under the baseline. All estimates are highly tentative, especially those around avoidance of economic costs of non-insurance.

BUSINESS ASSESSMENT (Option 1)

Direct impact on business (Equivalent Annual) £m:			In scope of OIOO?	Measure qualifies as
Costs: 2.9	**Benefits:** 0	**Net: 2.9**	No	N/A

Evidence Base (for summary sheets)

Index of tables and boxes

Introduction

1. This revised Impact Assessment sets out an updated analysis of the preferred option now embodied in the Water Act to address the issue of availability and affordability of flood insurance during a period of transition in the insurance market, primarily arising from improving flood risk information. This updated has been performed in light of the latest evidence and is issued as part of consultation on secondary legislation. The government objective and approach received strong support during consultation and in debates in both Houses during the passage of the Water Bill through Parliament. In light of this, the preferred approach continues to be a subsidised insurance pool (Option 1 – A subsidised insurance pool for flood risk properties) known as Flood Re. For analysis of other options considered at earlier stages, including the Flood Insurance Obligation please see the earlier Impact Assessment issued in November 2013. The main changes from the previous impact assessment published along the draft Water Bill arise from:

    a. a new estimate facilitated by the industry of the number of households falling into Flood Re. This number is now 356,000 as compared with the initial estimate of 500,000.

    b. A more reliable estimate of the overall liability of the pool. A leading risk model provider estimates this risk to be around £121m whereas in the previous impact assessment it was £192m as obtained from a single sample of risk reflective prices provided by one insurer to Government in confidence.

    Both of these factors lead to changes to our previous estimates which merits a revision of the impact assessment, although headline conclusions of the costs and benefits of interventions have not changed.

The problem under consideration

2. The home insurance market in the UK is unusual in the extent to which private insurance cover for floods is widely available as a standard peril covered by general home insurance without direct government involvement in the market (either through public insurance or ex-post compensation). This is largely the result of a succession of agreements made between Government and the insurance industry that started in the 1960s following a series of major flood events. Under these agreements, the industry broadly agreed to make flood cover a widely available part of household insurance, in return for an undertaking from government to provide adequate investment in flood management measures, particularly flood defences.

3. The inclusion of flood cover as a standard peril in home insurance is desirable in that it provides a single product that satisfies customers' and mortgage lenders' needs and avoids underinsurance for, and unbundling of, some risks.

4. Up until relatively recently, detailed information on the degree of flood risk affecting individual properties has not been available. Hence the insurance industry's side of the agreement was, in practice, to provide flood cover for all, and implied a measure of cross-subsidy from those not at risk to those who are; which has kept premiums at a reasonable level, even for properties at very significant flood risk.

5. Since the 1990s, spatial information on the likelihood of flooding has become widely available and has been undergoing continuous improvement. Both public authorities such as the Environment Agency, and private companies servicing the insurance sector, have developed increasingly sophisticated flood risk models and maps.

6. The improvements in the understanding of flood risk have made it possible for insurers to differentiate individual properties (and therefore premiums) based on flood risk. There are benefits to insurers from risk-based pricing, namely more effective underwriting and more competitive premiums for "low" or "no" risk customers (although in practice it is estimated that universal pooling of flood risks only adds 2-3% to premiums for those at no or low risk). However, there are also costs - for example licensing of proprietary risk models. Insurers are already

starting to set premium prices more reflective of flood risk and it is reported by the industry that around a fifth of policyholders in flood risk areas now pay a premium reflective of their risk[1].

7. The existing agreement, the Statement of Principles, between government and the Association of British Insurers (ABI) on behalf of their members (who make up the vast majority of the retail home insurance sector) came into force in 2000, was renewed with revisions in August 2008 and expired at the end of June 2013. It committed ABI members to continue to provide flood cover for properties where the probability of flooding is below 1.3% (1 in 75 chance) per year, or there are plans to reduce risk to below this level within the next five years. Properties built since 2009 are not covered by the agreement. There are separate but similar agreements for each of the other UK administrations.

8. The Statement of Principles does not include any commitment to constrain the price of insurance. Indeed, the agreement states: "*the premiums charged and policy terms will reflect the level of risk presented and are not affected by this commitment*". But while ABI members have, in theory, been free to price according to risk within the current agreement, they have nevertheless stated that the agreement has encouraged a continuation of the price cross-subsidisation, perhaps reflecting agreement reluctance on behalf of insurers to be seen as price-competitive across their range. The ABI has been clear however that it does not see a renewal of the Statement of Principles as the long-term solution, for the following reasons:

    - The agreement distorts the market by preventing ABI members from withdrawing from their high-risk portfolio, while new market entrants or insurers who are not ABI members have no such restrictions;

    - A renewal of the agreement would not address the issue of rising premium prices and properties that insurers may deem uninsurable at any economic price without government intervention.

9. Movement towards more risk-reflective pricing for flood risks in the property insurance market should lead to more efficient insurance provision allowing insurers to select their optimum portfolio of risk. This could allow the development of specialist insurers and reinsurers (which are already emerging) able to cover the riskier end of the market, expanding customer choice and allowing insurers to optimise costs and compete better within their own market segment.

10. Risk-reflective pricing also provides important signals within the property market, incentivising management of flood risk. For example, a high premium for a property at flood risk could increase awareness of the risk and encourage consideration of property-level protection measures, where that was economically efficient. The history of cross-subsidisation has, up to now, blunted such incentives, arguably contributing to a "moral hazard" for properties built before 2009 (the Statement of Principles does not apply to properties built since then).

11. In addition, if the current market direction towards more risk-reflective pricing continues, eventually we might expect:

    - High insurance premiums to incentivise risk reduction activities, where efficient, which would then be "rewarded" by adjustments to premiums. The total Present Value of premium savings would need to be greater than the cost of risk reduction for this to be economically efficient;

    - Properties in very high risk situations, if neither insurance nor risk reduction (including making properties flood resilient) is efficient, could be recognised as such and action taken.

    - Possibly some adjustment in the housing market, such that housing costs (prices and rents) reflect flood risk and associated insurance premiums, to a degree. High insurance premiums would tend to be at least partially offset by correspondingly lower house prices and rents. It should be noted however that the empirical evidence for differences in house values following flooding or variations in bills is mixed at best

[1] ABI Research Brief: Under-pricing of the flood element of home insurance for domestic customers at significant risk. Association of British Insurers. Sept 2010

12. Whilst such an insurance market is likely to be economically efficient and arguably desirable, there may be some impacts in the transition to this state:

- Increases in insurance premiums (which are not offset by reductions in other costs such as mortgage repayments or rents[2]) may prompt withdrawal by policyholders from the property insurance market as a whole, or from cover against the risk of flooding. This could compromise households' ability to deal with the financial impacts of a major loss, not just from flooding but from other perils covered by property insurance such as burglary or fire, and in the case of mortgagees, could mean contravention of mortgage conditions, with knock-on impacts for mortgage lenders.
- As the market develops we may observe insurers changing the products they offer to allow customers to opt out of flood insurance while still having other risks insured. This "unbundling" is typical for other markets such as health insurance but also for building insurance in some other countries. The "unbundled" element would likely be priced at risk – or potentially at a higher level if competitive pressures for such unbundled products were less than for equivalent cover in a "bundled" package. That said, ABI and other stakeholders have not so far argued that this will be the direction of the flood insurance market and we do not observe this so far occurring in a significant proportion of the market. As such, we assume in this impact assessment that policies will remain "bundled" under the baseline. The implications of this assumption do not change many of the conclusions regarding availability and affordability of insurance (even if unbundled, flood insurance in principle remains available albeit at a risk-reflective cost). That said, unbundling may limit adverse impacts for flood risk customers under the baseline if it means they can, at least, continue to afford cover for non-flood perils.
- To the extent that property values do tend to decrease (though as above, evidence for this is mixed and such a decrease is unlikely to be significant) there may be impacts for existing occupiers at higher flood risk due to increased insurance premiums. Specifically:
    - Existing owners of mortgaged property in flood risk areas may see their property adjust downwards in value to account for the increased insurance premiums. There may be difficulties in selling the property unless at a discount, or unless steps are taken to make the property resilient. Note however that even if increased insurance premiums feed through in full to a downward adjustment in house prices, such reduction in value would soon be recovered by the ordinary upward trend of market values;
    - Existing owners of properties in flood risk areas without mortgages may also have to bear costs associated with increases in insurance premiums and any offsetting reduction in property value. For example, homeowners relying on property values for income (e.g. in old age) or a subsequent investment may face a reduction in the capital sum available to them on disposal. As above however, the extent of potential property price adjustments would be fairly modest.
- For those seeking to buy properties in flood risk areas, mortgage lenders may be wary of offering loans where there may be concerned about the impact of increased insurance premiums on borrowers' financial position, especially if house prices are slow to adjust downwards to compensate. However, where property markets do adjust (and potential lack of mortgagability should in theory hasten this), then the sums borrowed would be less, which might mitigate lenders' concerns.

Rationale for intervention

13. Whilst risk-reflective pricing may be economically desirable, the transitional impacts set out above imply that there could be significant negative short to medium-term impacts for existing occupiers at higher flood risk. The potential for this group having to incur such impacts when they could not be foreseen when decisions about where to live were made, prompts an *equity* rationale for intervening to ease transitional burdens. This would facilitate an orderly transition to

[2] Even if offset there may be some withdrawal, even though a much smaller one, because of a substitution effect as insurance becomes more expensive.

the long-term economically efficient outcome. There is also a potential *economic* rationale for intervention to minimise the consequences of transitional non-insurance in higher flood risk areas as a result of increasing premiums, which could imply certain resource costs on the wider economy (such as health impacts and potential increased demands for temporary re-housing).

14. In practice, there will be a range of impacts on existing flood risk occupiers. For many, the impact will be small. For others, impacts may be more significant, particularly for those who find themselves in areas of higher flood risk with few resources to deal with rising insurance costs and little prospect of bearing the risk without insurance (see later analysis of the The).

15. Evidence gathered to date suggests that property insurance products for business are more bespoke with less historic cross-subsidy of flood risks across higher and lower risk groups. As such, there may be less of a transitional issue. Even if this is not true however, some types of business may be better placed to respond to insurance cost increases than households, due to greater capital resources, allowing adjustments such as relocation or flood management. Where businesses need to be located in the floodplain (e.g. because of access to water bodies for abstraction, discharges or transport), there may also be scope to invest in property level flood defences, and/or pass on costs to customers especially where competitors are also similarly constrained.

16. The potential impacts on the more vulnerable parts of the business sector (e.g. small start-ups) were considered during development of the detail for the intervention, and further evidence was invited during consultation. Post-consultation there remains insufficient evidence to justify the inclusion of commercial insurance products in this intervention and this is therefore excluded from the policy, the rest of this Impact Assessment therefore focuses on household customers only.

17. For large landlords of rented residential property, we understand that insurance is generally bespoke. As such, the exclusion of landlords from potential interventions targeted at households is not expected to lead to adverse impacts for tenants (where insurance costs are passed on into rent) whose contents would be able to be covered separately by Flood Re. In addition, the mobility of tenants will tend to lessen impacts in any case (e.g. potential for "lock in" due to negative equity would not apply).

Policy objective

18. To ensure the availability and affordability of flood insurance, as part of a transition to the free market, without placing unsustainable burden on wider policyholders or the taxpayer. Doing so will provide assistance to those likely to be disadvantaged in a transition to more risk-based flood insurance pricing. A successful implementation would entail insurance terms adjusting towards risk-reflective pricing at a pace that allows choices to be made by policyholders facing long-term increases in insurance costs, unless action is taken.

The Baseline case (non-intervention)

19. In the absence of intervention, the current Statement of Principles is not renewed and the insurance market can be expected to continue to develop so that insurance premiums increasingly reflect flood risk. This process has already begun. According to ABI estimates[3], 22% of policyholders at flood risk already pay a premium which reflects actual risk. This leaves 78% of policyholders for whom policies are what the ABI would term "underpriced" – that is, paying a premium that does not fully reflect the flood risk with implicit cross-subsidisation from other policyholders.

20. Increasing insurance premiums in higher risk areas is likely to heighten awareness of local flood risk and provoke additional flood prevention activity by individual households and businesses,

[3] ABI Research Brief: Under-pricing of the flood element of home insurance for domestic customers at significant risk. Association of British Insurers. Sept 2010.

and by public bodies. As the exact response is uncertain, no additional risk prevention is assumed under any of the options.

The current situation

21. Average UK insurance premiums for buildings and contents cover are currently £176-232 and £90-117[4] respectively (note however that these products are often bought together at a discount, which complicates the picture). A significant uncertainty in any assessment of how the market will develop is the speed and extent to which insurers will move to fully risk-reflective pricing – and the precise nature of the latter (which may include a combination of higher premiums, higher excesses and flood insurance being "unbundled" from other perils and sold as an add-on to policies).

22. A further uncertainty is the extent to which some households, who would otherwise want to take up flood insurance, have already been priced out of the market by the current partial move towards risk-reflective pricing. It could be argued that as there has been nothing to stop insurers pricing according to risk already (the Statement of Principles does not constrain insurers on price), the experience in recent years is indicative of the likely future pace of adjustment. If true, this suggests price increases may be relatively slow (perhaps 2% of flood risk policies each year moving to risk-based terms). There are theoretical reasons to suggest that any adjustment towards risk-reflective pricing may be either slow or even partial:

    - Assessing flood risk for each property involves a cost to assess the risk and determine terms;
    - Even where insurers do make assessments, the science of predicting flood damage at individual property level, whilst improving, is still uncertain. This is especially the case for surface water flood risk. The reputational damage from over-inflating premiums may lead companies to decide that it may not be worth a move to full risk-reflective pricing in many cases;
    - Insurers may decide that making a loss on the flood component of household insurance is worthwhile if a customer's business is profitable overall, and the alternative is the loss of the customer altogether.
    - More generally, at least one study of the competitive structure of the insurance industry suggests that there may be incentives for companies not to depart radically from established pricing conventions, though this has not been empirically tested[5] and competition from new entrants to the market may weaken such incentives.

23. The extent to which the above considerations might make any move to risk-reflective pricing relatively gradual is difficult to determine, since insurers' pricing strategies are necessarily commercially sensitive. The likely speed of adjustment if the market is allowed to operate freely is a key uncertainty affecting choices about policy interventions in flood insurance. If the market would actually be subject to a relatively orderly natural transition for the reasons above, then intervening would be inefficient and could even hasten an artificially rapid adjustment by insurers, which in turn could heighten transitional costs if the policy response turns out to be less than effective. In other words, intervening runs the risk of making matters worse. The issue of how the fundamental uncertainty in a free market transition affects costs and benefits of potential approaches is discussed further throughout this IA.

The scale of flood risk and deprivation in England

24. As a first step, we estimate the total population of English households within river and coastal flood risk (probability) bands, and how these break down into quintiles (blocks of 20%) of the Index of Multiple Deprivation scale. The results of this analysis are shown in Figure 1 below. In summary, 2.4 million properties in England are at some risk from river and coastal flooding. Of

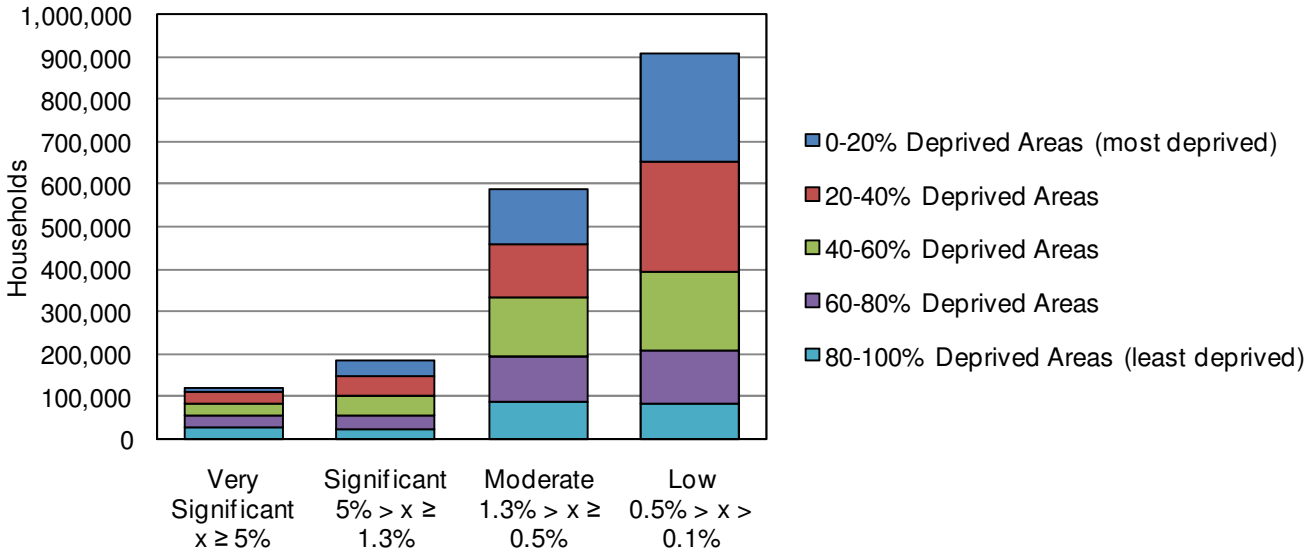
[4] Source: AA British Insurance Premium Index , January 2013. Ranges are based on "shoparound prices" vs. "market average quoted premiums". www.theaa.com/newsroom/bipi/201301-bipi.pdf

[5] Kesternich and Schumacher "On the Use of Information in Repeated Insurance Markets" Discussion Paper No. 280, Discussion Paper Series of SFB/TR 15 Governance and the Efficiency of Economic Systems. University of Munich, Germany 2009

these ~1.8 million are households. Of these, ~900,000 are at "low" risk[6], ~600,000 households are at "moderate" risk[6], just under 200,000 are at "significant" risk[6] and ~120,000 households are at "very significant" risk[6]. Of the latter, ~12,700 are in the most deprived quintile.

25. These initial descriptive statistics are based on modelling of river and coastal flood risk only, and do not include properties at surface water flood risk. It is estimated that the total number of properties (households and non-residential buildings) at *some* risk of surface water flooding is ~3.8 million, giving a total population of properties at some risk of any type of flooding of ~5.2 million. (2.4m from rivers and the sea, plus 3.8m from surface water, less 1m at risk from both sources). About 4m of these 5.2m properties are estimated to be households.

Figure 1: Households at river and coastal flood risk by deprivation band. Source: Environment Agency National Flood Risk Assessment (NaFRA) for England, 2009 and Index of Multiple Deprivation (IMD) for England, March 2011.



Worst-case scenario: financial impacts on households

26. Analysis has been conducted based on data from a leading insurer and other industry sources to estimate the impacts on households of a "worst case" baseline scenario that entails a rapid move by insurers to risk-based pricing. Industry data has been subject to independent review commissioned jointly by government and the ABI[7]. The analysis assumes, based on evidence from markets like Germany which are close to being "free", that insurers are mostly able to continue to make insurance *available*[8], including through the use of measures such as commercial reinsurance, but at a price reflective of the risk, which may or may not be *affordable*. The baseline option does not include any behavioural response to increased premiums e.g. activity to reduce risk and hence reduce insurance costs. This analysis, reported below:

    - Is based on current and risk-reflective (technical) insurance premiums for UK households at flood risk, including from surface water;
    - Uses data on insurance take-up by income decile (blocks of 10%) to account for existing non-insurance. 28% of the bottom income decile have buildings insurance compared to 87% in the top decile largely due to home ownership rates;

[6] "Low" risk in the EA's National Flood Risk Assessment is defined as an annual probability of flooding of 0.5% (1 in 200) or less. "Moderate" risk is greater than 0.5% (1 in 200) but less than 1.3% (1 in 75). "Significant" is greater than 1.3% (1 in 75) but less than 5% (1 in 20). "Very significant" risk is an annual probability of flooding greater than 5% (1 in 20). Modelling validated most robustly at the 'significant' level of risk. Source: Environment Agency National Flood Risk Assessment (NaFRA) for England, 2009 and Index of Multiple Deprivation (IMD) for England, March 2011.

[7] Independent review of flood insurance analysis, Prof Stephen Diacon, May 2013.

[8] Based on the German market, risks up to a 10% annual chance of flooding would appear to be commercially insurable. See Annex 1.

- Links premium increases with income estimates to calculate the proportionate impacts on household incomes (accounting for non-insurance);
- Assumes an immediate move to fully risk-reflective pricing by insurers (i.e. worst-case).

27. More information on the methodology underlying the analysis of premium and household affordability impacts is in **Error! Reference source not found.**.

28. Results by income group are presented in **Table 1** below. The results suggest that under a "worst case" transition, around 429,000 households may see *some* upward adjustment in "technical premium" (i.e. that calculated actuarially before considering other pricing factors) during a move to risk-reflective pricing. This compares with the total estimated number of households at some flood risk from any source of about 4 million (see paragraphs 26-27). 95% of these 429,000 households will face price rises as a proportion of their disposable income of below 2% (~412,000 households) and a further ~17,000 households are estimated to face price rises of between 2-5% as a proportion of income.

Table 1: Number of households experiencing impacts on their disposable income in a move to fully risk-reflective pricing (worst-case rapid adjustment). Data disaggregated by income quintiles. Source – Insurance industry data on flood premium costs and HMT data on household income.

Impact as % of income	0-20%	20-40%	40-60%	60-80%	80-100%	Total
x < 2%	41,600	68,400	91,100	99,100	111,900	412,100
2% <= x < 5%	9,000	7,600	0	0	0	16,600
Total	**50,600**	**76,000**	**91,100**	**99,100**	**111,900**	**428,700**

Note: figures are rounded to nearest 100 given significant uncertainties in the analysis

Worst-case scenario: impacts on insurance take-up

29. As insurance premiums increase, there will be a tendency for insurance take-up to reduce, following the normal relationship between price and demand. This effect may be constrained by the requirement imposed by mortgage lenders for buildings to be insured. Nevertheless, not all properties are mortgaged and even where they are, there may be property owners who choose not to continue insuring (which would be in breach of mortgage conditions).

30. The proportion by which the quantity demanded of a good declines for a given proportionate increase in price, is called the *price elasticity of demand* (PED). PEDs can be estimated empirically using econometric techniques and those for many goods and services are reported in the academic economics literature. For insurance products however, the extent of evidence is fairly modest and we are not aware of any peer-reviewed studies from the UK insurance market. Much of the literature on PEDs for insurance products relates to health insurance in the United States. However, three estimates of PED for household insurance have been found as part of a literature review. One[9] relates to flood insurance in the United States, which is highly price "inelastic", with a PED of -0.32. This means that for every 1% increase in price, take-up can be expected to decline by only 0.32%. Another US study[10] estimates the PED of private household insurance (including catastrophe cover) at between -0.86 (New York, moderately inelastic) and -1.08 (Florida, slightly elastic). Finally, an Australian study[11] differentiates between buildings and contents insurance and gives PEDs of -0.1 (highly inelastic) and -0.75 (moderately inelastic), respectively.

31. So whilst there is uncertainty in estimates of PED in the literature, there is reasonably strong evidence that insurance is a relatively price-inelastic good. We use the Australian estimates from Tooth (2007) to inform an approximate estimate of the possible extent of reduced insurance take-up under the "do nothing" scenario, in the absence of knowing the true demand function for property insurance in the UK (see **Box 1** overpage).

[9] Browne and Hoyt (2000), as cited in Grace et al. (2004) – see next footnote.

[10] Grace, M. F. et al (2004), *Homeowners insurance with bundled catastrophe coverage*, Journal of Risk and Insurance, Vol. 71 No. 3.

[11] Tooth, R (2007), *An analysis of the Demand for House and Contents Insurance in Australia (A report for the Insurance Council of Australia)*, reported in the Council's *Submission to the Review of Australia's future tax system*, October 2008

32. The assessment of the impact of a "worst-case" move to risk-reflective pricing on the take-up of buildings insurance, by income quintile, is presented in **Table 2** (page 11). The analysis has been restricted to buildings policies as withdrawal from these policies is felt to involve the most significant economic impacts (see later sections). However, withdrawal from contents policies would also be expected (indeed the evidence (e.g. the Tooth study) suggests that contents cover is likely to be more price sensitive). **Table 2** is based on average buildings premium estimates from industry sources, consistent with the affordability analysis presented earlier in this section. Based on ABI (2010), we assume 78% of households are currently paying an average premium (i.e. not reflecting flood risk), and the average increase in premiums under the baseline scenario will be around 100%[12]. Based on buildings insurance price elasticities which average -0.1 across the income distribution, there may be a decline in take-up of insurance of around 7% amongst higher risk households.

Box 1: Price elasticities for insurance

The *Price Elasticity of Demand* is defined as the proportionate change in the quantity demanded for a product per proportionate change in its price. For "normal" goods and services, quantity demanded declines as price increases so elasticity estimates are negative. A figure of greater than -1 (e.g. -0.5) indicates "inelastic" demand – that is, for a 1% increase in price, demand declines by less than 1% (0.5% in this example). A figure of less than -1 (e.g. -1.5) indicates "elastic" demand, where quantity demanded changes by more than the proportionate change in price. Price elasticities are typically different at different price levels (points on the "demand curve" which describes the relationship between price and quantity demanded).

Estimating price elasticities for insurance products is less straightforward than for some other products. Insurance is a service, often simply taken or not (e.g. buildings insurance), so the "quantity demanded" is not always easy to define. There is also debate in the literature about what constitutes the "price" of insurance – given policies will have a package of terms including premium, excesses and so on. Any differences in the degree of "bundling" of different risks (flood, fire, theft, legal protection, loss of income etc.) together in one product also complicates the picture. These issues suggest general caution is needed when considering the "price elasticity of insurance".

In forming a view of the possible responsiveness (elasticity) of demand for home insurance to price changes, we have started with the Tooth (2007) estimates for the following reasons:

a) there is a differentiation in the Tooth study between buildings and contents insurance. For this impact assessment we have focussed on the impacts of reduced holding of buildings insurance, since this would seem to have the most material wider economic impacts (as distinct from a lack of contents cover);

b) estimates reflect a high degree of compulsion over the holding of buildings insurance for mortgage purposes, which is also the case in the UK;

c) Tooth differentiates elasticities for take up (yes/no decision), versus deciding on expenditure levels, in a two stage decision framework. We are most interested in the decision on whether to insure or not irrespective of the quantity purchased (which is not so relevant to buildings cover where repair or reinstatement can largely be viewed as either covered or not), and assessing this at the aggregate level – i.e. how many households across the country might choose not to insure if prices increase;

d) the Australian model for flood insurance is broadly a free market one similar to that of the "baseline" scenario in this impact assessment. Clearly however, key differences between Australia and the UK remain – notably the underlying nature and extent of flood risk – which should be noted.

[12] See Table 4for more details of estimated current prices and those under a worst-case risk-reflective scenario.

The basic Tooth estimate of elasticity of -0.1 for buildings insurance has been varied by income band using results from an econometric analysis conducted by Defra of UK household insurance data taken from the 2010 ONS Living Costs and Food survey. This analysis has derived an indicative UK-specific demand function with associated price elasticities by income band. We have retained the average Tooth figure as a central estimate, but used the Defra analysis to inform proportionate variation in elasticity by income band. Sensitivity analysis is then applied. Further analysis will be undertaken before implementing any policy approach to validate as much as possible, the estimated demand function for insurance. Note that issues such as the potential for "unbundling" of flood cover further complicate the analytical picture. Further review of the literature will also be undertaken for any new evidence on insurance demand and elasticities.

In the meantime the **general uncertainty surrounding elasticity estimates – and their use to approximate a fully-specified demand function over large price changes - is highlighted.** (See the main text for further discussion of analytical uncertainties)

33. It should be noted that if the general price elasticity estimate is doubled (made more elastic) – a small change in absolute terms - the range of reduction in take-up also doubles. This shows that estimates of reduction in take-up are quite sensitive to changes in estimated elasticities. One further caveat with this analysis is that price elasticities are generally only calculated in respect of fairly small changes in price, and for a "normal" (convex) demand relationship, will tend to overestimate response for large changes in price[13]. For all these reasons, the estimates should be viewed with caution.

Worst-case scenario: impacts of non-insurance

34. Systematic evidence on the net impacts of suffering flooding whilst uninsured (compared with a situation where insurance is held) is difficult to come by. It is assumed for this Impact Assessment that the impacts felt by a flooded household without insurance are likely to be:

    i Lack of habitable living accommodation for an extended period. Observation from flood events shows there is variation in the time people are out of their homes depending on issues such as access to good quality clean-up and building services and we assume that holding insurance will facilitate access to these services;

    ii. Adverse health impacts, notably from stress. Studies such as RPA (2004)[14] highlight the variation in health and stress effects arising from different flood experiences;

    iii. Potential loss of employment due to i) and/or ii).

35. These are impacts which can be mitigated (though in the case of i) and ii), probably not completely eliminated) by the availability of insurance (particularly buildings cover). Where insurance is not available to the household, there is likely to be a cost to "UK plc" (and in practice the state) from:

    i. Provision of alternative accommodation for those made homeless (local authorities)

    ii. Provision of healthcare (National Health Service)

    iii. Unemployment-related benefits (Department for Work and Pensions)

36. The provision of alternative accommodation and healthcare include real resource costs to the economy, as the need for these resources is exacerbated by not having insurance for flood events (e.g. alternative housing is likely to be needed for longer than if insurance is held). We assume that any loss of employment is a transfer payment so, whilst a cost to government, it is not a net economic cost to the nation. The rationale being that since loss of employment in these

[13] This is one reason why we have erred on the side of using the more inelastic central demand elasticity from Tooth (2007) rather than adopt the more elastic (but not yet fully validated) Defra central estimate of -0.4.

[14] *The Appraisal of Human Related Intangible Impacts of Flooding*, FHRC and Risk and Policy Analysts, 2004 (Defra R&D report FD2004/TR)

circumstances is likely to be made up by others, there will be no net change in activity within the economy[15].

37. Other resource costs may arise which are not borne by the state. For example, costs associated with not dealing with flood damage promptly or effectively (e.g. the rotting or corrosion of building fabrics due to ineffective drying). Arguably these are unlikely to translate into national economic costs, unless they increase the likelihood of a property becoming uninhabitable again in the future, or more permanently.

Monetising the impacts of drop-out from the insurance market

Requirement for alternative accommodation over longer periods

38. According to the leading industry manual *The Benefits of Flood and Coastal Management* (the "Multi-Coloured Manual", Flood Hazard Research Centre 2005 as updated), 64% of households who experience flooding seek alternative accommodation for an average of 22 weeks. For households not managing flood risk through insurance (or having resources to self-insure), it is assumed that the period for which alternative accommodation is required is longer. Assuming the national average rental value for a dwelling (Source: DCLG statistics), and that the extra period of time for which accommodation was required (over and above the "average" case) is one year, the additional cost of alternative accommodation for each non-insuring household would be ~£6,000. The time period of one year is based on anecdotal evidence, in particular that one year on from recent major floods, there has remained a number of households who have not yet been able to return to their homes, some of whom remain out of them for some further period.

39. Alternatively, given that conventional temporary accommodation is often in short supply after flood events, local authorities often use caravans to accommodate displaced families (often in their own gardens where possible). Authorities tend to purchase new caravans and then dispose of them on the second-hand market once they are no longer required. A web survey[16] of new and used prices for larger caravans (4-6 berth) suggests new caravans average around £20,000 and used ones (of good quality and only a year or two old) about £10,000. So the net cost to a local authority might be in the region of £10,000 per "non-managing" household. Taking an average of the fixed building and caravan costs (in the absence of firm evidence on the relative uses of the two types of accommodation, and erring towards being conservative) suggests a cost per household of **£8,000**.

Health

40. In *The Costs of the 2007 floods in England* (EA Evidence Reports 2010), the Environment Agency summarise results from an earlier study[17] of the *willingness to pay* (WTP) to avoid the health and stress effects of flood events, which suggest that the per-household WTP to avoid infrequent flooding (e.g. the residual risk implied by a typical urban flood defence scheme) is about £200 per year, or £4,700 as a capitalised present value sum, calculated over the typical life of such a flood defence scheme (taken to be 50 years). Note that "health and stress effects" here are those arising from factors such as anxiety and post-traumatic stress, which may be influenced by different degrees of insurance, and do not include injury or death arising directly from flood events (which are not). Assuming a typical standard of protection of an urban flood defence scheme is up to 1% (i.e. it provides protection against events more probable than the "1 in 100 " annual chance flood), the figure of £4,700 can be loosely regarded as the Willingness to Pay to avoid, on average, "half a flood" (1/100 x 50)[18]. In turn this means that average WTP to avoid one flood event is double this amount, or £9,400. However, this estimate relates to the avoidance of a "normal" flood experience, which is likely to involve insurance.

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[15] It might be argued that the cost of actually raising the public finance to meet transfer payments like unemployment benefits implies a cost on the economy (opportunity cost of public funds), but this effect has not been included. To the extent this applies, the costs of non-insurance could be higher.

[16] Using the new and used caravan search facility at www.chichester-caravans.co.uk, accessed 29/3/2012.

[17] *The Appraisal of Human Related Intangible Impacts of Flooding*, FHRC and Risk and Policy Analysts, 2004 (Defra R&D report FD2004/TR)

[18] This is a highly simplified assessment which assumes there is only one "above design" event, which has a probability of 1%: in reality there will be a distribution of flood events less probable than 1:100 years. This means the actual expected "fraction of a flood" will tend to be higher; this makes the assessment of baseline health impact conservative.

41. Without insurance, health impacts will potentially be greater. Using a similar scaling-up factor as for accommodation costs (52/22, in that case relating to weeks[19]), an estimate for the implied extra cost of health impacts in an uninsured situation (over and above an "insured" one) would be **£12,800**. This is calculated as (£9,400 x 52/22) - £9400. The health and stress impacts included in this assessment relate only to flood events actually occurring, and not the anxiety associated with the anticipation or threat of events. Such anxiety is likely to be exacerbated in the absence of having insurance cover. As such, the assessment of health costs from non-insurance may be understated. On the other hand, it could be argued that anxiety associated with anticipating flooding is already embodied in the price elasticity for insurance – i.e. it is the threat of not being covered which contributes to insurance being fairly price-inelastic.

Aggregate monetary estimate of the impacts of non-insurance under the "worst case" baseline

42. The above monetary estimates suggest that the economic cost per "non-managing" household (i.e. one neither insuring nor able to self-insure) of a significant flood event might be in the region of £21k (£8k + £12.8k, rounded)[20]. Combining this estimate with the earlier figures for potential reduction in insurance take-up, and numbers of households likely to experience flooding, a broad-brush estimate of the aggregate "UK plc" cost from declining insurance affordability has been assembled. This is set out in **Table 2** below. It should be noted that this is only in relation to a decline in buildings policies – there may also be economic costs associated with not having contents cover (particularly for items such as furniture, domestic appliances etc.). In addition, the more general caveats from the analysis of reduction in take-up (see Paragraph 35) should be recalled.

Table 2: Indicative aggregate annual economic cost of a decline in insurance affordability

Impact as % of income	**Income Quintile: Bottom (0-20%)**	**Second (20-40%)**	**Third (40-60%)**	**Fourth (60-80%)**	**Top (80-100%)**	**Total**
Households facing some **buildings** premium increase	46,197	66,405	81,404	99,073	111,949	405,029
PED	-0.17	-0.10	-0.09	-0.08	-0.07	
Decrease in households taking up buildings insurance	3,407	3,082	3,113	3,461	3,366	16,427
Proportion of those properties flooding p.a. *	1.4%	1.4%	1.4%	1.4%	1.4%	
Extra uninsured homes flooded each year	48	43	44	48	47	230
Aggregate "UK plc" cost p.a. @21k/household (£m)						**4.8**

** Average probability of flooding for those 600,000 homes seeing some increase in their buildings premiums is estimated to be 1.4%. This is based on an analysis of risk-reflective premiums for a sample of these households (from industry) and an industry estimate of the average size of a buildings insurance claim after flooding of £40,000.*

43. Out of the 405,000 households expected to face some increase in their buildings premium[21] (though the majority of these will be small increases), we estimate that around 16,000 households may decline to take up buildings insurance cover under a worst-case transition. Out of these, around 10,000 are in the bottom three income quintiles. Using an estimate that around 1.4% of the households facing some increase in premiums may experience flooding each year (see footnote to **Table 2**) this suggests that around 230 households that choose not to insure might be expected to flood in any given year. At an economic cost of £21k each (43), this

[19] See paragraph 9. With insurance, households are out of their homes for an average of 22 weeks; the assumption without insurance is that they would be out for one year (52 weeks).

[20] This is about the same as the typical damage to property fabric and contents from a significant flood event (around £20k per household flooded).

[21] Out of a total number of households facing some increase in buildings and/or contents premiums of about 600,000.

suggests an annual UK cost of about **£5 million**. This cost will tend to decline over time, as households adjust and current residents in flood risk areas are replaced by new occupants who may find insurance more affordable, e.g. if they have paid a little less for their houses or have otherwise taken account of the potential for higher insurance premiums in financial planning.

44. This estimate of the economic cost of households not insuring is based on a number of assumptions, particularly with respect to the proportion of households ceasing to insure, and the proportion of these likely to flood each year. In particular, the latter could feasibly range from 0.7%-2.8% given differences in parameters affecting the annual probability calculation (notably the average claim assumed within risk-reflective premiums used to derive it – see the footnote to **Table 2**).

45. As such, a plausible range in estimate might be **around £2-10m** for the annual "UK plc" economic cost of households no longer being insured for flooding. This estimate, which relates only to buildings policies, does not include any costs of non-insurance arising from other perils which would also no longer be covered where buildings policies are no longer held e.g. fire and burglary. Around two-thirds of the range of impact **(i.e. £1-6m, or £3m as a central estimate)** arises due to households in the bottom three income quintiles.

46. In principle, the impacts of a reduction in insurance demand from households at flood risk may need to be offset by any benefits of an increase in demand from households at no (or very low) flood risk, if the cessation of cross-subsidy of flood premiums leads to a material reduction in premiums for the latter group. However, it is well known in economic theory that if demand elasticity is the same for both groups, changes in demand resulting from a transfer between both groups, such as those arising from a subsidy or the cessation of a subsidy, will cancel out, that is, changes in the number of households buying insurance will be the same in both groups but with opposite signs. For the analysis in this Impact Assessment, we therefore assume that the "other perils" impacts are broadly offsetting under the do nothing option and therefore also under the "do something" options which broadly seek to re-formalise the cross-subsidy under the Statement of Principles. We accept though that this calculation is based on a number of high-level assumptions[22]

Accounting for existing investment plans and new properties moving into risk

47. The analysis of the baseline scenario assumes that flood risk remains the same over time. It does not take account of plans by flood risk management authorities (notably the Environment Agency) to invest in new or replacement flood defences and other management measures. Neither does the analysis take account of changing flood risk due to deterioration of existing flood defences, climate change or development in flood risk areas.

[22] One assumption is that policies remain "bundled" under the do nothing option. To the extent that flood cover is "unbundled" from other perils, then there may be a net increase in cover for other perils if those priced out of the market for flood insurance nevertheless continue to insure other perils with a separate policy.

48. Investment in flood risk management will create the conditions for insurers to revise premiums downwards in the light of reduced risk. Offsetting this effect will be the fact that any "new" households shifting into flood risk (or experiencing greater flood risk) because of climate change or other reasons may see upward pressure on premiums. The significant uncertainties in these factors, the relatively short term transitional nature of measures being considered and the Environment Agency Long Term Investment Strategy whose aim is to match the lower climate change scenario (see **Box 2** overpage) suggest that the assumption of no change in flood risk is a reasonable one for comparing options against the baseline scenario.

Box 2: Climate change projections

As a working hypothesis we assume that the effects of climate change and investments in flood defences are broadly offsetting. On the one hand, a report commissioned by Defra, assuming no new investment in flood defences, forecasts an important increase in the number of properties at risk in the next 5 years.

Table 3: Number of residential properties at 1.3% or above risk of flooding in England and Wales (in thousands)

Defra (based on UKCP09 climate projections)		**2012**	**2020**	**2050**	**2080**
	minimum	365	475	525	695
	intermediate	365	690	870	960
	maximum	365	825	1,000	1,085
Annual rate increase					
	minimum		3.35%	0.96%	0.95%
	intermediate		8.29%	2.31%	1.43%
	maximum		10.73%	2.69%	1.62%

Source: Ramsbottom et al. "Climate Change Risk Assessment for the Floods and Coastal Erosion Sector". Defra, 2012.

If these projections were correct, if no action was taken to phase out the policy over time, and if flood defences do not change in these 20 years, this could lead to more households coming within scope of the policy. However the government's intention is to phase out the policy over time, and, the Government has also announced its intention to increase the level of investments in flood defences with a new long term floods capital settlement at record levels to 2020/21. Also, the authors of the above mentioned report warn that there is too much uncertainty around their figures for the 20s and that they should not be used for policy purposes. Therefore, we offer these calculations for illustrative purposes but with the same warnings as in the report.

Summary of the baseline case

49. A summary of the analysis of the baseline option, under a worst case scenario where insurers move immediately to a position of full risk-reflective pricing, is given in **Box 3** overpage.

Box 3: Summary of the "worst case" baseline option (immediate transition)

- Against a backdrop of 4 million households at risk of flooding (from all sources) in England, some 430,000 households might be expected to experience *some* increase in insurance premium, in a situation where transition to risk-based pricing is full and immediate. For some 410,000 of these households however, increases are likely to be *relatively* small (below 2% as a proportion of income), reflecting the proportion at low or moderate flood risk.

- Households facing increases in insurance premiums likely to amount to 2% or more of income could number around 17,000. All households in the latter category are likely to be in the bottom 40% of the income distribution.

- Across all households facing some increase in premium, take-up of **buildings** insurance policies might be expected to decline by about 4% on average but perhaps by 7% among the lowest

income households. These estimates are based on price elasticities of demand for insurance products and are highly uncertain. There would also tend to be withdrawal from **contents** cover.

- For those people who cease to take household insurance, there is likely to be significant hardship if a flood or other adverse event (fire, theft etc.) occurs. At a national level, the impact of "non-insuring" households could be felt through increased temporary housing, health and possibly unemployment benefit costs (though the latter is a transfer payment and loss of work will tend to be taken up by others). The initial national economic cost of an increase in non-insuring households is tentatively estimated in the region of £5m per year (central estimate), based on withdrawal from buildings cover, though this is based on limited evidence and is uncertain. Around £3m (central estimate) of this arises because of withdrawals from the market in the bottom three income quintiles.

- The worst-case baseline option could also lead to wider impacts which are not easily monetisable. Individual insurers may withdraw from flood cover and although others (e.g. specialist insurers) are likely to fill the gap, there may be temporary perceptions of widespread removal of cover which could cause some localised instability in housing markets, at least for a period. Properties may not be saleable if mortgage lenders serving buyers also have perceptions of lack of availability of cover, or are concerned about the impact of high premiums on buyers' finances. However, where housing markets adjust (property prices fall – note evidence for this is mixed and reductions may only average around 10% if they do happen), then buyers will be commensurately better off though vendors may have to sell at a reduced price.

Alternative transition scenarios

50. The "worst case" baseline option implies immediate transition from the current level of risk-reflective pricing (22% of households already pay a risk-reflective price) to full risk-based pricing. Given the factors set out in paragraph 21-22, notably that risk-based pricing is neither a costless nor certain activity for insurers, such an assumption is likely to exaggerate the extent and urgency of the problem in the absence of action. At the other end of the scale, extrapolating the trend in the evolution of risk-based pricing in recent years would involve about 2% of at-risk properties being added to the population of those facing fully risk-reflective premiums each year. This approach suggests that a transition to full risk-based pricing might take nearly 40 years. This also seems unlikely given anticipated improvements in flood risk information.

51. The likely rate of transition is a fundamental uncertainty. In the analysis which follows, options are assessed in cost-benefit terms against the "worst case" baseline set out above, but in reaching conclusions on options, the impact of slower transition under the baseline is assessed.

Options for intervention

52. To consider potential responses to developments in the insurance market and the ending of the Statement of Principles, three working groups of Defra, HM Treasury and stakeholders were set up in 2010. *Working Group 1* considered options for managing the financial risks of flooding after 2013. The Group agreed a set of common principles and tested strategic options against those principles. It gathered evidence, listened to perspectives from community groups, insurers, local government and other experts. The report of the three working groups was published in December 2011[23].The analysis presented here builds on the work of Working Group 1, which identified two approaches: the setting up a of a risk pool to enable subsidisation of high-cost flood insurance; and/or the facilitation of transition to a free market through targeted assistance and information provision. The pool was the preferred option and received strong support in consultation. Other options such as a "do minimum" option, directly subsidising flood insurance for households at risk or setting an obligation on insurers were analysed in the impact assessment published in December 2013.

53. The following option has been considered in detail, including an assessment of their costs and benefits compared to the baseline.

[23] See http://www.defra.gov.uk/publications/files/pb13684-flood-risk-insurance.pdf

Option 1 – Set up a subsidised insurance pool for flood-risk properties;

In the economic assessments which follow for each option, an appraisal period of 10 years has been selected. This is consistent with general practice for impact assessments. In practice, the preferred option (the "Flood Re" pool, Option 1) – and implicitly, other options - are likely to be reviewed every five years, with adjustments to facilitate suitable transition out of the options made at these review points. Ultimately the current aspiration for policy life of Flood Re is 25 years, though the full policy life cannot be modelled without knowing how transition out of the policy might be managed in the light of real market developments. For example, transition could be effected through reduction of the defined target group, or increases in subsidised premiums over time, in response to market developments. Implicitly our economic analysis of all options is based on two 5-year "review" periods, but without building in any transition arrangements, or accounting for the original target group naturally being replaced by new residents in flood risk areas over time, both of which are likely to reduce benefits and (in the case of transition arrangements), at least some of the costs.

Option 1 – A subsidised insurance pool for flood risk properties

Description of option

54. Working Group 1 recommended that government consider the viability and desirability of a subsidised insurance pool for properties at flood risk as developed and proposed by the Association of British Insurers (known as "Flood Re"). Such a pool would operate as follows:

    - A body would be set up to insure any household against flooding at a certain price Where insurers can offer cheaper cover, they would do so, but for households that fulfil the pool entry requirements (which will be based primarily on whether the risk-reflective premium for that property exceeds an eligibility threshold to be set according to Council Tax band), insurers could choose to pass the flood risk to the pool. In doing so, the customer would pay a capped premium for the flood component of their insurance which would be ceded to the pool.
    - Claims costs for policies in the pool would be funded partly from the capped premium income. However if the pool only contained the capped premiums of pooled policies then funds would be insufficient to meet expected claims. This is because the policies in the pool would have risk-reflective premiums higher than the capped premiums. To ensure that the pool has sufficient income to cover the expected risk (claims costs), it would need to be subsidised. This would be funded by a mandatory annual fixed levy on all UK insurers.
    - A reinsurance contract would provide financial backing for the pool to help ensure that claims costs could be met even when the accumulated pool fund is in deficit, such as following a large flood event. Compared with other forms of providing financial cover (e.g. holding a capital reserve which would be subject to year on year fluctuation), reinsurance has the benefit of smoothing the annual variability of Flood Re's finances. However, reinsurance would not be available from the market for all potential claim scenarios which implies a need for either the industry, government or both to underwrite some situations.

55. Design choices for a pool are set out below and have implications for the level of support provided to households, the scale of any residual liability, and the costs, benefits and risks of the pool.

    - **The value of the industry levy**: a higher levy would reduce the exposure of the pool to losses (with excess levy revenue in any one year being used to build up a reserve) but would mean that impacts on bills would be more likely to be felt by all policyholders.
    - **The premium threshold for policies being pooled**: a high threshold would reduce the exposure of the pool but mean policies were affordable to fewer households.
    - **Proportion of flood claim costs retained by insurers**: the proposed approach involves no risk retention by insurers, with the pool meeting the full cost of any claims. An element of risk retention would reduce the exposure of the pool and retain incentives on insurers and households to limit claims, but make offering cover less attractive to insurers, and policies proportionally more expensive to households.

- **Degree of targeting of support, for example by policyholder income**: this would reduce the pool's exposure or size of levy necessary and helps avoid poorer households subsidising wealthier ones, but would involve extra administration. Imperfect targeting may reduce the policy impact, known as "deadweight".
- **Type of cover supported**: buildings cover is a requirement for mortgages and prices are more sensitive to local flood risk, but limiting the pool to buildings policies would mean no direct support for social/private tenants.

56. A variety of pool designs were explored with the ABI. The proposal, as reflected in the Memorandum of Understanding (Annex 10) and in the consultation on the proposed approach, has the following attributes:

- £180m levy p.a. to create a pool for ~350,000 households across all Council Tax bands except band "H".

- Support is targeted towards those in lower Council Tax bands by increasing the cap for each successive band. The proposed net (of insurer overheads and profits) flood-only premium cap for a Band A household would be £210 (buildings and contents). This increases across the CT bands, reaching £276 for Band D and £540 for Band G. Taking account of average prices for non-flood perils and adding in an assumed 40% of the gross price for insurer overheads and profit leads to the estimated overall combined premiums under the Flood Re proposal set out below. These are presented alongside our estimated risk-reflective premiums under a baseline scenario, and corresponding average prices paid currently (under the Statement of Principles) by households at flood risk (taken from the ONS).

- To address a situation where the capped flood risk insurance premiums paid by customers whose flood insurance policies are placed within Flood Re and the proceeds of the fixed levy turn out in any given year to be insufficient to fund Flood Re, below the threshold where reinsurance could be called on, Flood Re will charge each of its member-firms an additional amount from their own resources to fund the shortfall.

Table 4: Estimates of overall gross premiums (combined buildings + contents) paid under Flood Re, a worst-case risk-reflective scenario and currently under the Statement of Principles

Council Tax Band*	**A**	**B**	**C**	**D**	**E**	**F**	**G**
Flood Re proposal	£650	£650	£720	£800	£920	£1,100	£1,550
Risk-reflective	£801	£801	£811	£910	£995	£1,141	£1,684
Current (SoP)	535	525	570	630	710	825	1145
Average % increase between current and Flood Re Prices	21%	24%	26%	27%	29%	33%	35%

Note: * Band H is not included in the Flood Re proposal.
Sources: Flood Re proposal and data from ABI and leading insurers.

Analytical approach and assumptions

57. Estimates of revenue flows (premiums and levy) have been made, alongside projections of likely claims on the pool. Analysis is based on 2000 25-year simulations of flood events, drawn randomly from a distribution generated from industry data. This has allowed calculations to be

made of the likelihood of deficit within the pool and has informed the calculation of economic costs and benefits.

58. The effective aggregate subsidy (i.e. the difference between risk-reflective and capped premiums) per Council Tax band is derived from the above premium estimates and national statistical data on household expenditure on insurance products by income[24]. The aggregate subsidy in each band is then multiplied by HM Treasury *Green Book* "equity weightings" in order to derive the "welfare" value for that band.[25]. In the *Green Book*, the equity weightings apply to income quintiles rather than Council Tax bands. In order to assign an equity weighting factor to each Council Tax band, the distribution of CT bandings has been divided into quintiles and then mapped to income quintiles assuming a perfect correlation between house value and income. This results in the mapping shown below. The welfare (equity-adjusted) values for all Council Tax bands are then summed to determine the overall net equity benefit (see "Benefits" section and **Table 7** below for more details).

CT band	**Derived equity weight** (see text)
A	2.25
B	1.45
C	1.05
D	0.75
E	0.45
F	0.45
G	0.45
H	0.45

59. The following other assumptions have been made in the analysis of pooling options:

- The insurance levy raises ~£180m per year which is in accordance with the ABI's estimates of the value of the current cross-subsidy for the 350,000 highest-risk households (Source: ABI discussions). Such a sum could be raised through a 2.6% levy on all domestic household insurance policies in the UK, which equates to £10.50 per combined buildings and contents policy;
- Collecting the levy incurs an administrative cost of ~£1m per year. This is a tentative working assumption derived in conjunction with HM Treasury.
- Administrative costs of the pool itself have been estimated using an ABI analysis of how a pool would be staffed and associated annual running costs incurred by the pool administrator. Defra has developed this analysis to include overheads and start-up costs incurred by the pool administrator, and the start-up and ongoing costs likely to be incurred by the insurance industry. In summary, the start-up costs of the pool (to all parties) are estimated at £8-12m and the ongoing costs also at £6-10m per annum. More detail on the approach used to derive the administrative costs of this and other options is provided in (Annex 2: Admin costs in Flood Re**)**
- Insurers pass the full benefit of the price capping on to policyholders;
- Both buildings and contents policies can be ceded to the pool. Support can be targeted towards lower income households or lower council tax bands without deadweight or additional administration costs. In reality there would be a trade-off, with deadweight difficult to remove entirely. Targeting via council tax bands is the simplest approach but is imperfect.

Results of financial analysis

60. Due to the unpredictable nature of flood claims, the financial performance of a pool can vary significantly. This and the scope for large liabilities from a large single flood event, or a series of smaller events, are key inherent concerns with this option. Commercial reinsurance is likely to be available to underwrite a pool and could be used to manage these liabilities. Buying reinsurance

[24] Household spending on insurance in 2010. ABI Data Bulletin. May 2012. www.abi.org.uk/Facts_and_Figures/62677.pdf.

[25] The Green Book: Appraisal and Evaluation in Central Government. HM Treasury. 2003.

would reduce the risk of large-scale losses, but would increase the frequency of smaller-scale losses as the costs of the reinsurance leave less levy income to meet claims from smaller events that fall beneath the reinsurance treaty excess. So while reinsurance can helps to smooth the losses, it means the pool is more likely to run into deficit over time, which would need to be taking into account in setting the amount of the levy and the premium thresholds Other risks of a subsidised pool arise from irregularities in information: information on flood risks held privately by insurance companies may differ from that of the pool operator, and in some situations there may be incentives for insurers to cede policies to the pool that may not meet the criteria.

61. Analysis of the chance of the pool being in deficit raises particular concerns. Note that although the chance of deficit tends to decline over time there can still be outcomes involving deficits in later years. The liability for the pool is therefore likely to require ongoing management even if a major flood does not occur in the first few years.

- The approach to managing this inherent uncertainty, agreed with the ABI as part of the MOU in June, is for the pool to take out reinsurance to help manage its liabilities. Should the combination of the pool's income from the levy and premiums, any reserves, and its reinsurance cover, be insufficient for Flood Re to cover its costs, Flood Re would levy top-up contributions from insurers to fund the shortfall. **Table 5** below shows the results of our analysis, including the probability that top-up contributions are required over the 10-year period of this Impact Assessment. This shows that the pool income exceeds expected annual losses so over time the pool *should* be in profit most of the time, However, it also indicates that the financial outcomes can vary, and there is also the possibility of a shortfall in the pool's finances which would need to be made good through additional top-up contributions from insurers.

Table 5: Results of financial modelling of the Flood Re proposal.

Details	# of House-holds	Support received by the lowest CT bands (A&B) [26]	Support received by the highest CT bands (F,G & H[27])	Expected annual pool 'profit'	Likely number of times top-up contributions would be required in the first 10 years
Tapered support for all CT bands except band H, with reinsurance covering aggregate annual losses between £250m & £2.5bn (assumed) and levy claw back through top-up contributions	356,000	44%	10%	£53m	0.3[28]

Economic assessment of Option 1

Costs

62. Many of the financial flows involved with a pool are transfers rather than net economic costs. For example, whilst the levy is a cost falling on the industry and likely to be passed on to policyholders, it is exactly offset by an equivalent gain to the pool ultimately benefitting (other) policyholders. It therefore does not constitute a net economic cost.

[26] This subsidy is defined as the difference between the risk reflective price and flood re price, if we multiply this subsidy per policy by the number of insured households in each CT band we will get the total subsidy going to each band.

[27] Band H properties are not included in the Flood Re proposal and therefore receive no support.

[28] A number smaller than 0.5 means that, on average, the top-up levy most likely will not be called in the first 10 years.

63. Central to any discussion of the costs of a subsidised pool like Flood Re is whether there are net economic costs associated with the transfer of flood liabilities from insurers (under the baseline) to Flood Re, which involves a concentration of risk since flood risks can no longer be pooled together with insurers' other risks (e.g. with offsetting risks which might be more correlated with dry weather like subsidence or fire). This means that more financial provision has to be made for each £1 of potential (expected value) flood claim in Flood Re, compared with that £1 of potential claim risk pooled with insurers' other risks. Whilst the risk itself has not increased, there is a greater cost of capital in providing reserves or other financial "cover" for a given amount of risk if that risk is not spread.

64. This cost of capital is either an opportunity cost in terms of profits foregone on higher-return activities, the cost of borrowing, or an increased reinsurance cost. In practice, the proposal for Flood Re is to cover a large proportion of the liabilities with reinsurance rather than holding large reserves. In this case, the greater cost of capital requirement associated with the concentrated liability shows up as a higher charge made by reinsurers than would be the case for a more mixed set of risks of the same value. Reinsurance may also be more expensive than other forms of covering liabilities, e.g. through general insurers' reserves, if the general level of return on capital which reinsurers seek is higher (e.g. because they hold the reserves in place of the customer).

65. The net economic cost of the Flood Re liability has been estimated by assessing the net charge for the portion of risk which is reinsured (claims above £250m, up to £1bn), and comparing that with what it would have cost to provide for the same liabilities under the baseline. (NB this ignores any net economic cost associated with Flood Re liabilities below £250m and above £1bn).

66. ABI approaches to reinsurance brokers suggest that the annual gross charge for Flood Re's reinsurance would be around £73m per year, for an annual expected value claim of £30m (based on expected pool losses; in practice there will be great variability in claims from year to year). This suggests that the sum of reinsurer's admin, overhead and capital costs (including profit) account for about 60% of the gross charge. The quotes obtained may not be representative so a lower cost rate of 30% of gross charge (based on HM Treasury intelligence) has also been used to inform a range of net cost. For an annual expected value claim of £30m, the range of net cost of reinsurance is therefore estimated at between £13-43m per annum[29].

67. The next step is to subtract an estimate of the cost of covering the same "volume" of liability (i.e. an annual expected value loss of £30m under the baseline free market scenario. Although in practice, insurance take-up (under the "worst case" baseline) is estimated to be reduced by up to 7%, for the most part, insurance cover is likely to remain profitable for insurers and as an approximation a broadly similar level of liability is assumed as under the Flood Re option (albeit now managed by the industry as part of their wider risk provision). Data on the marginal cost of capital for general insurance liabilities is not available but an illustrative 10% has been assumed. This can be thought of as either the net opportunity cost of reserves or the net cost of reinsurance or other financial cover (e.g. borrowing). This implies the annual cost of capital for managing the liability under the baseline would be around £3m per annum. In **10-year present value terms**, the estimated cost of the liability under Flood Re and the baseline is presented below along with the net economic cost.

68. As **10-year Present Values** the estimated economic cost range for the additional net liability of the pool is therefore **£83-341m**. The large variation in these estimates reflects the range in assumed reinsurer cost and profit rates, but the key point is that the pool would impose net economic costs (compared with other options, other things being equal) because of the way high risks are pooled together and the net cost of managing this liability.

Table 6: Economic costs of covering Flood Re liabilities

10-year PV costs (£m)	**Low case**	**High case**

[29] Net cost of reinsurance is calculated as c% of the gross charge (with c = 30-63%). Gross charge is (Expected value of claim)/(1-c). So for an expected value of £30m, Gross charge is £43m-£73m, meaning net cost of reinsurance is £13-43m.

a. Net cost of Flood Re reinsurance after expected claims (equivalent to overheads, capital costs and profit)	112	370
b. Cost of providing for equivalent liabilities under the counterfactual	29	29
Overall net economic cost of Flood Re liabilities (= a-b)	**83**	**341**

69. Flood Re's design involves the use of reinsurance to manage the volatility in the scheme's spending as well as allowing Flood Re to call on insurers for "ad hoc" contributions in specific scenarios. Alternative approaches would be to significantly increase the levy paid by all insurance customers (to provide a buffer for volatility), or through the Exchequer financing any shortfall and recovering it from Flood Re in future years. Either of these would apparently increase cost-effectiveness through avoiding the cost of reinsurance. However, increasing the levy would impact households with unpredictable and sometimes large costs, against the intended aim of the policy. Publicly financing shortfalls – which by using the lower cost of capital for the public sector would apparently reduce costs for a wide range of interventions in financial markets – would at the margin have the potential to cause government's wider cost of borrowing to increase, through increased and more unstable public borrowing. Alternatively, if it were to be accommodated within the existing fiscal envelope then there would be an opportunity cost associated with other public spending (potentially with a much higher economic return) having to be curtailed. Furthermore, for the Exchequer to manage significant financial variability through the general account in this way would expose public finances to unhelpful volatility.

70. In addition to the costs of the liability, there are costs of administration. These are estimated to be ~**£1m** for administering the levy plus **£8-12m** of setup costs to establish the pool (of which £5-6m would be for the administrator and £3-5m for insurance companies and brokers). Once the pool is up and running there would be an estimated ongoing cost of **£6-10m per annum**, with £3-4m incurred by the administrator, £2-4m to the industry and £1m for collecting the levy. For more details of the administrative cost calculations see Error! Reference source not found.. Adding set-up costs to ten years' worth of ongoing costs (and assuming half of the ongoing cost would be incurred alongside the start-up cost in the first year), total present value administration costs are in the range **£60-90m**. This includes the levy collection cost. The range reflects different assumptions regarding the average staff cost rate (see **Error! Reference source not found.**).

71. In total, the range of 10-year Present Value costs is therefore **£142m to £431m**. Basing the best (central) estimate on the mid-point suggests a **10-year Present Value cost** of **£287m**.

Benefits

<u>"Equity" benefits</u>

72. The financial benefits of a subsidised pool are also often transfers rather than net economic benefits; for example, the implied subsidy to policyholders. However there is an economic "equity" benefit associated with the subsidy where recipients are relatively income-deprived.

73. There is a positive equity benefit for those in Council Tax bands A to C offset by a negative equity benefit arising from supporting the remaining Council Tax bands, giving a net equity benefit of **£6m per year** (See **Table 5**). This is a relatively small net benefit in comparison with the total aggregate subsidy, a result that arises because the higher council tax bands D-G (and by implication income groups) still receive a reasonably large share of the subsidy (40%), which is only slightly offset by subsidy accruing to the lower bands (60%). The targeting of lower council tax bands in Flood Re only just redresses the inherent regressive tendencies of a subsidised pooling option.

Table 7: Effective annual subsidy and net equity benefit by Council Tax band.

CT Band	A	B	C	D	E	F	G	H	**Total**
A. Aggregate financial subsidy (£m)	5.3	5.9	4.6	4.3	2.6	1.0	1.6	0.0	**25.3**

CT Band	A	B	C	D	E	F	G	H	**Total**
B. Equity weight	2.25	1.45	1.05	0.75	0.45	0.45	0.45	0.45	
C. Equity-weighted subsidy (£m) (=AxB)	11.9	8.5	4.8	3.2	1.2	0.4	0.7	0.0	**30.8**
D. Net equity benefit (£m) (=C-A)	6.6	2.7	0.2	-1.1	-1.4	-0.5	-0.9	0.0	**5.6**

"Participation" benefits

74. In addition to the equity benefit, there will be economic benefit arising from keeping households in the insurance market and avoiding the wider economic costs of non-insurance. For the pool option, this has been estimated by assessing the degree to which premiums are reduced compared with the baseline (no intervention option), and applying the price elasticity estimates per income quintile (discussed earlier) to determine the increase in demand.

75. With the pool in place, it is estimated that about 14,000 households are "kept" in the buildings insurance market compared to the worst case baseline. (This compares with about 20,000 households which are estimated to drop out in a move from the current situation (Statement of Principles) to the worst-case baseline option). This results in a reduced economic cost of non-insurance compared with the baseline, and therefore a net economic "participation" benefit of Flood Re of an estimated **£4.2m per year** (See Annex 1: Calculation of participation benefit for Flood Re (Option 2) for details of the calculations). Applying a similar "half and double" range as for the baseline cost, gives a range for annual "participation" benefit of **£2m – £8m**.

Total benefits

76. The total annual economic benefits of the pool ("Flood Re") are therefore an equity benefit of £5.6m (paragraph 73), plus a reduction in the costs of non-insurance ("participation benefit") of £2m-8m (paragraph 74), resulting in a **total benefit of around £8-14m per year, or £66-120m as a 10-year Present Value benefit**. Taking the mid-point of this range gives a central (best estimate) Present Value benefit figure of **£93m**.

Net Present Value

77. Subtracting costs (paragraph 71) from benefits (paragraph 76), the economic **Net Present Value of Flood Re over 10 years** therefore ranges between **-£365m** (combination of low benefits and high costs) **and -£22m** (high benefits and low costs), with a **central (best estimate) figure of -£194m.**

Unmonetised factors

78. Flood Re (and other options for intervention discussed in this Impact Assessment) would also lead to mitigation of some of the wider impacts arising under the "do nothing" scenario (as set out in the final bullet of Box 3), namely the avoidance of localised instability in housing markets. It could also give confidence to mortgage lenders concerned about the impact of high premiums on buyers' finances, maintaining mortgagability and hence saleability of properties in flood risk areas. Longer term effects on property values are not expected to be significant however. Offsetting these positive impacts may be some "allocative inefficiency" from intervening in the market and preventing price signals for insuring against flood risk developing. In addition, no account has been made in the analysis for the original target group being displaced over time by newcomers to those areas at flood risk, who under the do-nothing scenario need not have exposed themselves to the financial impacts of higher insurance premiums and so cannot legitimately be regarded as beneficiaries of the policy. This "leakage" effect will tend to reduce the stated benefits of the policy, as will any commencement of transition arrangements within the ten year period which will reduce the population of beneficiaries (albeit possibly with some accompanying reduction in costs – though many of the admin costs are fixed).

Summary and conclusions of the assessment of a subsidised "Flood Re" pool (Option 2)

79. Based on the monetary analysis above, the economic performance of a "Flood Re" pool appears highly uncertain as it involves a negative net present value (after considering costs though before considering wider non-monetised factors). It should be noted however that a key driver for this result is the uncertain extent of the net economic cost or inefficiency from transferring correlated flood risks into a separate pool, especially if managed using reinsurance to smooth the annual variability of claims and make Flood Re's finances more stable. In terms of monetised benefits, estimates are highly tentative but benefit associated with improved equity appears more significant than keeping customers in the market for wider economic reasons.

80. **Implications of alternative baseline transition**: Where a counterfactual "do nothing" transition to risk-reflective pricing would actually have been slower or more partial (without the pool) than assumed in the analysis above, then the net benefit of Flood Re is further reduced. Introducing the pool will of itself tend to accelerate risk-reflective pricing by insurers, since by pricing in this way they can transfer flood risks to the pool. Even making a commitment to monitor the market with a view to introducing a pool in the future may have some accelerative effect on risk-based pricing.

Other options considered

A "do minimum" option

81. A "do-minimum", subsidy and obligation options were analysed in detail in the impact assessment published along consultation. The "do minimum" option consisted mainly in improving provision of advice and information to households at higher flood risk, encouraging the insurance industry to develop its own, new and innovative ways of maintaining some level of cross-subsidy for customers at most risk and facilitating community-led actions. Government could provide funding to local authorities to develop projects that reduce flood risk and help ensure the availability of affordable insurance within the community. Solutions might include funding for property-level protection, insurance-with-rent schemes for those in social housing, specialist advice to households, contributions to local community flood defence schemes, detailed local risk mapping or installation of equipment such as gauges to improve community flood readiness.

A direct subsidy

82. Under this option, government would provide a subsidy to those above a defined risk level to bring their insurance premiums down. Insurers would continue to price risk and provide all the other aspects of insurance they do currently: write policies, carry risk and handle and meet claims. There are two ways that such a model could be delivered. Firstly, a subsidy could be channelled through insurers, based on evidence of the policies they have written for the target group. A second model would be to provide the subsidy directly to end customers. This approach might have an economic efficiency advantage in that consumers would still "see" risk-reflective insurance prices and therefore experience some signalling of flood risk. Also, an agreed "reference model" of flood risk and technical premiums would be required to avoid divergent views amongst the industry and government about the true level of risk-reflective premium and therefore the due subsidy.

An obligation on insurers

83. This option would take the form of an obligation on insurance companies to each underwrite a certain proportion of UK households defined as being at greater flood risk. Creating a level playing field for insurers via regulation would avoid the competitive pressure to withdraw from flood risk areas. The need to offer sufficiently attractive terms to such households would mean insurance would be more readily available and affordable.

Greater targeting of flood management investment

84. The flood risk management investment programme already prioritises funding towards flood defence schemes in deprived communities at significant flood risk. This is justified on economic welfare grounds: those at the bottom of the income scale value marginal benefits more highly than those higher up the distribution (as reflected in the HM Treasury *Green Book* "equity

weights" discussed elsewhere) and annual average flood damages are greater in higher risk situations.

85. However, there could be scope to go further either to a) invest additional capital to enable schemes which would benefit the target group, but not currently , to go ahead; or b) to further "skew" investment decisions towards the target group within existing budgets. However, this would represent an indirect way of addressing the immediate policy problem relating to insurance availability and affordability – though clearly on-going investment in appropriate flood management is vital to the long term operation of the insurance market.

State provision of flood insurance

86. Working Group 1 noted the international precedent for state provision of flood insurance, in place of private market provision. In the Netherlands and the US, the state is effectively insurer of flood risks, with no private provision. In France, Belgium and Spain there is private provision of a tightly-regulated and state-backed natural disaster insurance scheme. However, the Working Group noted (and this Impact Assessment reconfirms) that such approaches do not seem to be a proportionate solution to the problem identified, and go beyond the essentially transitional rationale for government intervention in the UK context where private insurance provision is seen as being efficient, sustainable and profitable as long as risk is managed within certain bounds. As such, state provision of flood insurance has been ruled out from the "long list" of potential approaches.

Summary and conclusions of option assessment

87. Summary results of the option assessment reported above are set out in the table below.

Summary of options assessment (£m, 10-year Present Value except where stated)

Option:	**("Flood Re" Pool)**
Total cost *high-low (central)* *of which:*	142-431 (287)
Adminstration/operation	60-90
Cost of separate liability	83-341
Total benefit *low-high (central)*, of which:	66-120 (93)
Equity	48
Participation	18-72
Net Present Value *low-high (**central**)*	**-365 to -22** **(-194)** *
Benefit: Cost Ratio (central)	0.3 *
Main non-monetised impacts (see paragraph 78)	***Costs***: some potential for reducing insurance take-up for non-flood perils in low/no risk group compared with baseline (assumed to be offset by b) below). Some allocative inefficiency and potential for "leakage" of benefits as original target group moves from flood risk areas (limited over a 10-year horizon). ***Benefits***: a) Avoidance of instability in local property markets under the "worst case" baseline, maintaining mortgagability etc. b) Maintenance of insurance for non-flood perils in the high flood risk group (where policies remain "bundled" under the baseline).
Implications of slower transition to risk-reflective pricing under	NPV declines. Holding implementation in reserve is not an option since this would accelerate a move to full RRP by industry to trigger introduction and

the baseline	risk transfer.

Notes:

* - Result driven by potential for large economic costs of covering a separate pool liability, but the magnitude of these costs is a particular uncertainty.
** - Result may be improved if there are equity benefits.

88. Analysis suggests that:

- Flood Re can offer benefit in terms of equity and market participation by households (subject to specific design), but economic performance appears very variable. The key issue is the potential economic cost of any net liability for a separate flood insurance pool, with the expected costs of managing this liability highly likely to be in excess of the benefits delivered to high risk households, particularly if reinsurance is used to smooth Flood Re's finances. Flood Re has been assessed relative to a baseline, where a free market for flood insurance is established with an immediate transition to risk-reflective pricing. Where one of the options is implemented and the true baseline situation would have involved more gradual or partial transition, the benefits of the approaches analysed will turn out to be less than estimated. This will also be true to the extent that the marginal price increases to low or no risk customers (compared with the baseline scenario, if not the current situation) who will be subsidising high flood risk customers under the options turn out to have any material net impact in terms of reduction in household insurance to cover non-flood perils (after allowing for increase in insurance of such perils amongst the high flood risk group). On the other hand, some benefits have not been monetised in the assessment – notably the avoidance of the impacts of any short-term instability in local property markets and potential maintenance of mortgagability.

- The general level of uncertainty in the benefit-cost analysis is again highlighted; estimates are based on a large number of assumptions and the analysis is perhaps most useful as a framework for expressing the pro and cons of different approaches rather than as a set of firm numerical estimates, Analysis will continue to be refined as policy moves towards implementation.

- Policy is intended to be revised every 5 years. The transitional period for each of the options has not been analysed within this Impact Assessment because of uncertainties around future negotiations on Flood Re levy setting.

Preferred policy approach

89. The government's preference is to work with the industry to secure the affordability and availability of flood insurance. The preferred policy approach (as reflected in the consultation on our proposed approach and the Memorandum of Understanding, established with the Association of British Insurers.) is known as Flood Re. The rationale for moving forward with a subsidised insurance pool is that Flood Re protects high-risk properties and makes insurance widely available. This sits well within insurers current business models and the support of the industry would help to ensure a smooth transition in the interim period Despite the "best estimate" monetised benefit-cost calculations being unfavourable, there are economic and particularly social factors not fully reflected in this, in particular the importance of providing certainty for individuals, and the avoidance of potential impacts on local housing markets, from concerns about the availability and affordability of insurance. The industry estimate that Flood Re will reflect the existing cross-subsidy in the market and in the short term bills will not increase in general. Over the long term (as a transitional policy) a gradual increase in bills (in response to a reduction in subsidy) for those households at risk will cushion the move to a free market, and risk reflective pricing.

90. In addition to this novel approach we are also seeking powers in reserve through the Water Bill to regulate for affordable cover should Flood Re prove unworkable or not deliver our policy goals, or if prices in a free market prove unacceptable, providing a fall-back (Option 4) known as the Flood Insurance Obligation. Providing a fall back option should provide reassurance to those at risk of flooding that the government will ensure they have access to affordable insurance in the future one way or another.

91.

Risks and assumptions

92. There are inherent uncertainties in much of the analysis presented here both in terms of information on which to base policy design (much of which is privately held by the insurance industry) and the degree of confidence surrounding policy outcomes. The latter ultimately depends on insurer and household behaviours – which in turn are dependent on the fundamental underlying uncertainty surrounding flood risk. All of these uncertainties interact. However the quality of the evidence (both qualitative and quantitative) is considered appropriate particularly considering the further analysis carried out, particularly in terms of highlighting the basic impacts of the different options and their relative (if not absolute) costs and benefits to promote debate on potential interventions.

93. Besides the fundamental uncertainty regarding speed of market adjustment referred to above[30], a further area of uncertainty surrounds the real economic costs of allowing households to withdraw from the insurance market because of excessive prices. In particular, analysis is based on a simple Price Elasticity of Demand analysis rather than a fully-specified demand function for insurance. This is a very simplified approach and has embodied a number of assumptions both in terms of the level of PED and its application to large price changes (see for example Annex 1: Calculation of participation benefit for Flood Re (Option 2)). Whilst the estimate of £2-8m per year (with a central estimate of about £4m per year) is clearly uncertain, it is felt to be a reasonable indication of the order of magnitude, and we are continuing to work on improving our understanding of the real demand relationship for insurance.

94. Finally it should be noted that the economic assessment of all options is based on the fact that they are intended to facilitate an orderly and equitable transition from the current situation of informal cross-subsidy (and implicit moral hazard arising from blunted incentives for local flood risk management) to a more economically-efficient future where flood risk is better signalled and moral hazard in development and risk management decisions is reduced. In a situation where transitional measures become more permanent, then issues of allocative inefficiency and moral hazard would persist which would tend to imply additional economic costs from sub-optimal decisions being perpetuated.

Costs and benefits to business

95. The Better Regulation Executive has confirmed that the options presented in this Impact Assessment are out of scope for the “One In, Two Out” regulatory budgeting system. Options are highly likely to be classified as tax and spend (or, in the case of Option 4, imputed tax and spend) measures. This Impact Assessment is also out of scope for Regulatory Policy Committee consideration.

[30] Some analysis on the likely speed of the adjustment in the case of the obligation is offered in Annex 8.

Annex 1: Calculation of participation benefit for Flood Re (Option 2)

Participation benefits are estimated in this impact assessment using estimates of Price Elasticities of Demand (PEDs) in the absence of knowing the full demand relationship for property insurance. However, a PED is a ratio of two percentage changes and one consequence of using PEDs for the large price changes examined here is that results depend on the starting point (denominator) used to calculate the percentage price change. This means that the impact of a move from a low price to a high price is not (as it should be) equal and opposite to the impact of moving back from the same high price to the same low price. To overcome this issue, the participation benefit of introducing Flood Re (which is also used to inform the benefit assessment for other options) is estimated as the average of two estimates:

a) the magnitude of impact using the "low" (Flood Re) price as the denominator (starting point). Although artificial, this can be thought of as a situation where Flood Re is implemented end-to-end with the existing Statement of Principles (implying little change in practice), so participation benefit is estimated by simulating a removal of Flood Re so that customers are exposed to the baseline scenario (worst case risk-reflective pricing). The number of people dropping out of the market in this scenario shows the participation benefit of Flood Re;

b) the impact using the "high" (risk-reflective) price as the denominator (starting point). Again, although both scenarios are only analytical constructs to overcome a mathematical issue, scenario b) can be thought of as a situation where Flood Re is only implemented after a move to fully risk-reflective prices has occurred.

Calculations

Impact as % of income	**0-20%**	**20-40%**	**40-60%**	**60-80%**	**80-100%**	**Total**
Buildings Premium Paid under counterfactual	£639	£655	£716	£752	£978	
Buildings Premium Paid under pool	£395	£406	£447	£545	£1,066	
%age change in premiums under pool compared with counterfactual	-62%	-61%	-60%	-38%	8%	
Change in demand	0.10	0.06	0.05	0.03	0.00	
Households facing some increase in buildings premium under counterfactual	40,673	62,032	75,210	82,425	95,660	356,000
Increase in households taking up buildings insurance	4,151	3,947	3,860	2,448	0	14,406
Proportion of those properties flooding p.a. *	1.4%	1.4%	1.4%	1.4%	1.4%	0.0%
Extra uninsured homes flooded each year	58	55	54	34	0	202
Aggregate "UK plc" cost p.a. @21k/household (£m)						**4.2**

Annex 2: Admin costs in Flood Re

TABLE A5-1

Admin costs (all parties) - UPPER ESTIMATES

Pool (Option 2)		
Item		**Value (£m)**
One-off		
Establishing pool:		
Legal arrangements inc procuring a model (*)		2.80
Transferring policies (year 1)		3.55
Companies/brokers:		
Training		2.72
Software changes		2.72
Total one-off		11.78
Ongoing (per annum)		
Running of pool (pool administrator):		
Maintaining model		2.10
New business (ordinary year)		0.31
Claims		0.31
Analysis/forecasting/levy adjustements		0.31
Reporting/auditing (inc FSA requirements)		0.31
Overheads		1.06
		4.41
Companies:		
Separating flood risk premiums		1.26
Approaching pool with new business		0.31
Levy admin		0.54
		2.11
Brokers/sales:		
Extra processes		2.17
Total ongoing pa		8.70
Costs to government:	Set up	6.34
	Annual	4.41
Costs to business:	Set up	5.43
	Annual	4.29

Subsidy (Option 3)		
Item		**Value (£m)**
One-off		
Establishing administrator:		
Contracting process/licensing model		13.19
(No initial transfer of policies)		0.00
Companies/brokers:		
Training		2.72
Software changes (making model available)		3.72
		19.63
Ongoing (per annum)		
Running of scheme (administrator):		
Supporting/making available reference model		2.57
Processing reimsursement claims from insurers		4.98
(No claim costs)		0.00
Analysis/forecasting/levy adjustements		0.31
Reporting/auditing		0.16
Overheads		2.98
		11.00
Companies:		
Separating flood risk premiums		1.26
Approaching administrator (new business)		0.31
Levy admin		0.54
		2.11
Brokers/sales:		
Extra processes		2.17
		15.29
Costs to government:	Set up	13.19
	Annual	11.00
Costs to business:	Set up	6.43
	Annual	4.29

Obligation (Option 4)		
Item		**Value (£m)**
One-off		
Establishing regulator (assume one body):		
Legal arrangements inc procuring a model		15.07
(No initial transfer of policies)		0.00
Companies/brokers:		
Training		2.72
Software changes (making model available)		3.72
TOTAL		21.50
Ongoing (per annum)		
Running of obligation scheme (regulator):		
Setting annual obligations by company		0.16
(No claim costs)		0.00
Analysis/forecasting (no levy adjustment)		0.16
Supervision and enforcement		0.16
Overheads		0.94
		1.41
Companies:		
Supporting/making available reference model (**)		2.57
Separating flood risk premiums		0.00
Audit/liaising with regulator		0.54
Levy admin		0.00
Setting the obligation and auditing		0.63
		3.74
Brokers/sales:		
Extra processes		4.35
		9.49
Costs to government:	Set up	15.07
	Annual	1.41
Costs to business:	Set up	6.43
	Annual	8.08

Key:

Higher estimate than Option 2

Lower estimate than Option 2

0.51388028

(*) Includes the procurement of a model in Flood Re at a cost of £2.8m. With one similar to that used with the obligation or subsidy, the cost would be £5.16m

(**) Implementation costs will be passed from the administrator to insurers

TABLE A5-2

Admin costs (all parties) - LOWER ESTIMATES

Pool (Option 2)		
Item		**Value (£m)**
One-off		
Establishing pool:		
Legal arrangements inc procuring a model (*)		2.80
Transferring policies (year 1)		2.30
Companies/brokers:		
Training		1.36
Software changes		1.36
Total one-off		7.82
Ongoing (per annum)		
Running of pool (pool administrator):		
Maintaining model		1.56
New business (ordinary year)		0.16
Claims		0.16
Analysis/forecasting/levy adjustements		0.16
Reporting/auditing (inc FSA requirements)		0.16
Overheads		1.06
		3.24
Companies:		
Separating flood risk premiums		0.63
Approaching pool with new business		0.16
Levy admin		0.27
		1.06
Brokers/sales:		
Extra processes		1.09
Total ongoing pa		5.39
Costs to government:	Set up	5.10
	Annual	3.24
Costs to business:	Set up	2.72
	Annual	2.14

Subsidy (Option 3)		
Item		**Value (£m)**
One-off		
Establishing administrator:		
Contracting process/licensing model		8.67
(No initial transfer of policies)		0.00
Companies/brokers:		
Training		1.36
Software changes (making model available)		2.36
		12.39
Ongoing (per annum)		
Running of scheme (administrator):		
Supporting/making available reference model		1.43
Processing reimbursement claims from insurers		2.49
(No claim costs)		0.00
Analysis/forecasting/levy adjustements		0.16
Reporting/auditing		0.08
Overheads		2.98
		7.14
Companies:		
Separating flood risk premiums		0.63
Approaching administrator (new business)		0.16
Levy admin		0.27
		1.06
Brokers/sales:		
Extra processes		1.09
		9.28
Costs to government:	Set up	8.67
	Annual	7.14
Costs to business:	Set up	3.72
	Annual	2.14

Obligation (Option 4)		
Item		**Value (£m)**
One-off		
Establishing regulator (assume one body):		
Legal arrangements inc procuring a model		8.62
(No initial transfer of policies)		0.00
Companies/brokers:		
Training		1.36
Software changes (making model available)		2.36
		12.34
Ongoing (per annum)		
Running of obligation scheme (regulator):		
Setting annual obligations by company		0.08
(No claim costs)		0.00
Analysis/forecasting (no levy adjustment)		0.08
Supervision and enforcement		0.08
Overheads		0.94
		1.10
Companies:		
Supporting/making available reference model (**)		1.43
Separating flood risk premiums		0.00
Audit/liaising with regulator		0.27
Levy admin		0.00
Setting the obligation and auditing		0.31
		2.02
Brokers/sales:		
Extra processes		2.17
		5.29
Costs to government:	Set up	8.62
	Annual	1.10
Costs to business:	Set up	3.72
	Annual	4.19

Key:

Higher estimate than Option 2

Lower estimate than Option 2

0.33501733

(*) Includes the procurement of a model in Flood Re at a cost of £2.8m. With one similar to that used with the obligation or subsidy, the cost would be £5.16m

(**) Implementation costs will be passed from the administrator to insurers

Annex 3: Equalities impact assessment – flood insurance

Summary

The Equality Duty protects nine different characteristics: Age, Disability, Gender reassignment, Marriage and Civil Partnership, Pregnancy and maternity, Race, Religion and belief, Sex, Sexual orientation. This paper summarises the Government's assessment of the potential impact on the nine protected characteristics of flood insurance policies (on Flood Re and the Flood Risk Obligation). We compared the impacts of the two policies against the impacts of the free market, as outlined in the wider Impact Assessment.

1. We ruled out any impact on the following groups: Gender reassignment, Marriage and Civil Partnership, Pregnancy and maternity, Religion and belief, Sex, Sexual orientation.

2. We considered currently available evidence to determine whether the policies would affect the following groups: Disability, Age, Race.

It is important to distinguish the impacts of a flood event from the impacts of the policies themselves. A substantial body of literature exists already on the mental health and social impacts of a flood event, which can be felt particularly acutely by the elderly and the disabled. This evaluation has focussed on assessing the impact of the two policies (which are primarily financial interventions), such as whether they would create practical difficulties or financial disadvantages, for any of the protected groups. Instead we have highlighted some key reports available on the impact of flooding in the reference section.

Disability

This is a very broad category which includes physical disabilities such as colour blindness and learning disabilities such as dyslexia. Obtaining household insurance requires a person to read and understand complex information, and shop around for the best insurance deal and make a decision based on a range of factors. Some disabilities could make tasks such as checking online flood risk information, conducting an online price comparison, contacting a broker, negotiating with insurers and reading and understanding policy details difficult.

We think there should be very little change in the 'customer experience', because people will continue to seek insurance in the same way as before (insurance can be obtained online, on the phone or via a broker). However, we consider that under the free market and the Obligation, on average people might choose to carry out slightly more price comparison activities than those insured under Flood Re. However, the competitive environment under the Obligation should lead insurers to increase efforts to win the custom of households at higher risk of flooding. As such, we would expect companies to go further in their attempt to provide a customer experience that respects and addresses the needs of individuals on the register. People might also be more likely to choose to commission information on flood risk than at present, should they wish to opt-in to the register, for example.

There are several ways in which these risks could be mitigated. Risk management authorities can continue to ensure that they follow standard Government accessibility guidelines when making flood risk information available (for example offering the information in both written and map format).

Age

Children would not be directly influenced by flood insurance policies because they do not purchase home insurance. They could be indirectly influenced if there are impacts on parental finances; however we were unable to find robust evidence linking family size, deprivation and flood insurance costs.

As discussed in the disabilities section above, there may be some impact on older people on shopping around for an appropriate policy, under the free market or the Obligation. In terms of the financial impact of the policies, evidence shows that older people tend to live in lower value properties (see references 1 and 2). Under the Obligation, where two properties on the register differ in value, insurers may prefer to provide cover to the lower value property due to smaller potential

claims, benefitting older people. Under Flood Re, support would be targeted by council tax band and therefore older people living in lower value properties would be likely to benefit from discounted premiums.

Race

We expect little or no direct impacts on racial groups. We recognise that anyone that has only limited English, or speaks English as a second language, could experience difficulties with finding or fully understanding the details of appropriate policies. This would not be substantially different to the current situation under any of the flood insurance policies, but the free market or the Obligation policies could see people conducting more price comparison to get the best deal.

In terms of the financial impact of flood insurance policies, there may be a link between racial groups in terms of population distribution and occupancy trends. Different flood insurance policies could have an impact on different racial groups, if for example some racial groups tend to live in urban areas or tend to live in deprived areas.

References and key points

1. A market monitoring study commissioned by Defra (2013) and conducted by JBA explores the level of difficulties that people may face when searching for suitable insurance, particularly if they live in areas that are recognised by insurers as at flood risk.

2. Joseph Rowntree Foundation report (1996) *Local tax benefits*. http://www.jrf.org.uk/sites/files/jrf/1577-local-tax-benefits.pdf

    - 5,740,833 households in Britain had a low income and lived in bands A–C (including 2,898,888 pensioner households) and that 181,450 households in Britain had a low income and live in bands F–H (including 101,008 pensioner households).

3. Office for National Statistics (2013) *Home ownership and renting in England and Wales – Detailed Characteristics* http://www.ons.gov.uk/ons/rel/census/2011-census/detailed-characteristics-on-housing-for-local-authorities-in-england-and-wales/short-story-on-detailed-characteristics.html

    - 76 per cent of those aged 65-74 owned their own homes - the highest across all age groups.

4. Office for National Statistics (2010) *Focus on Older People* http://www.ons.gov.uk/ons/rel/mortality-ageing/focus-on-older-people/older-people-s-day-

    - In 2008, the average weekly expenditure of households headed by someone aged 65 to 74 was £354, of which 32 per cent was spent on food and non-alcoholic drink, domestic energy bills, housing and council tax. For households headed by someone aged 75 or over, average expenditure was £217 per week, of which 40 per cent was spent on food, energy bills, housing and council tax.

    - In 2008/09, an estimated 1.8 million pensioners in the UK were living in poverty according to the most commonly used official measure (less than 60 per cent of equivalised contemporary median income after housing costs)