

# Analysis of UK SME Consensus PD Data in Flood Risk Areas

February 2020

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## Overview

Recent severe flooding<sup>1</sup> has been a major issue in the UK, with a number of English regions experiencing multiple storms and at least double their usual rainfall. This article focuses on how banks can benchmark their flood risk assessments for UK small and medium sized enterprises (SMEs).

Coincidentally, the Bank of England recently announced their BES consultation<sup>2</sup> on “stress testing the financial stability implications of climate change”<sup>3</sup>. The objective is “to test Banks resilience to physical and transitional risks” associated with climate change. Some bank portfolios contain significant climate event risk; the Bank of England estimate that about 10% of mortgage exposure across England lies in flood-risk zones.

Physical risks include damage to property and infrastructure caused by extreme weather events. Indirect risks include:

- customers are unable to access company services due to road & rail closures
- suppliers unable to deliver goods to customers
- increased insurance costs and risk of higher excesses reducing profit margins

The Bank of England proposals would extend the modelling horizon to 30 years (reflecting the expected impact of climate change, and time for policy changes to take effect over a longer period).

The physical variables being considered for inclusion in the scenarios include global and regional temperature changes, as well as the frequency and severity of specific climate events such as flooding, freezing and drought. The BES would specify very granular geographic projections of climate events, including flood risk projections.

The BES consultation paper splits the modelling approaches between Corporates, Households & Governments. Banks will be expected to engage directly with Corporate counterparties on their climate disclosures, due to the challenges of gathering geographically granular data where companies have a large number of assets spread across countries. For Corporates, this implies a significant new data collection and management overhead<sup>4</sup>.

For small and medium sized enterprises (SMEs), the impact of climate change is expected to be more localized. Reviewing bespoke climate disclosures for every SME is not practical; banks typically use postcodes to bucket risk exposures as part of their SME lending<sup>5</sup> and benchmarking<sup>6</sup>. For SME portfolios, stresses should probably be modelled on the basis of physical risks arising from granular geographic location.

<sup>1</sup> [https://en.wikipedia.org/wiki/2019\\_England\\_floods](https://en.wikipedia.org/wiki/2019_England_floods)

<sup>2</sup> Biennial Exploratory Scenario (BES) December 2019

<sup>3</sup> <https://www.bankofengland.co.uk/news/2019/december/boe-consults-on-proposals-for-stress-testing-the-financial-stability-implications-of-climate-change>

<sup>4</sup> [http://427mt.com/wp-content/uploads/2017/11/Measuring-Physical-Climate-Risk-White-Paper\\_Four-Twenty-Seven-2017.pdf](http://427mt.com/wp-content/uploads/2017/11/Measuring-Physical-Climate-Risk-White-Paper_Four-Twenty-Seven-2017.pdf)

<sup>5</sup> <https://home.barclays/news/2017/10/barclays-publishes-lending-data-across-uk-postcodes>

<https://www.rbs.com/rbs/news/2019/10/q1-2019-rbs-postcode-lending.html>

<sup>6</sup> <https://www.creditbenchmark.com/mapping-uk-sme-credit-quality>

## Flood Risk Data

The UK Environment Agency models flood risk<sup>7</sup> using information on 175,000 flood defence assets under a range of different events in 50m x 50m squares, summarised by postcode units. The four flood risk likelihood categories are:

- High: each year, there is a chance of flooding of greater than 1 in 30 (3.3%).
- Medium: each year, there is a chance of flooding of between 1 in 30 (3.3%) and 1 in 100 (1%).
- Low: each year, there is a chance of flooding of between 1 in 100 (1%) and 1 in 1000 (0.1%).
- Very Low: each year, there is a chance of flooding of less than 1 in 1000 (0.1%).

## Analysis

Credit Benchmark collects UK SME PD data from all major UK banks as part of their credit portfolio benchmarking service. The SME dataset consists of over 140,000 monthly observations<sup>8</sup>.

To analyse the sensitivity to flood risk across the UK Corporate SME population the Credit Benchmark dataset has been linked to the UK Flood Risk data by postcode. Each UK SME is then allocated to flood risk categories.

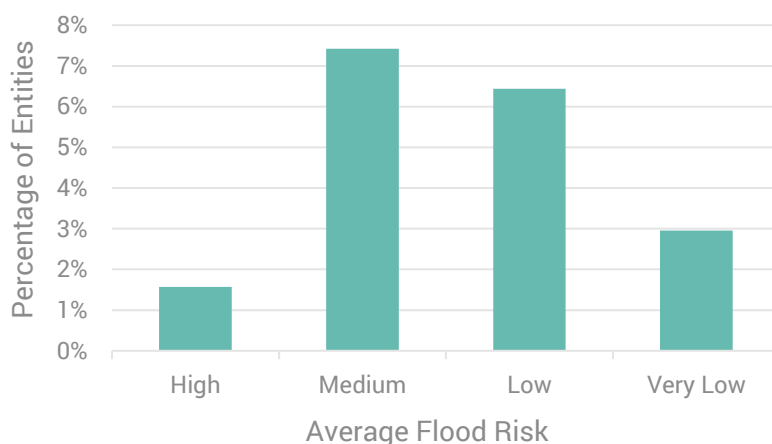
The Environment Agency defines the extreme flood outline as all areas with High, Medium, Low or Very Low flood risk. If there are no properties within any of these flood risk zones then we label the flood risk as "None".

UK Flood data shows the total number of properties in a postcode along with the total number predicted to be within each flood category. Given that the economic impact of the flooding will extend beyond the immediate postcode, for example due to road & rail closures, we have calculated an average flood risk for the postcode.

## Results

Figure 1 shows the SME distribution across flood risk areas.

**Figure 1: Percentage of Entities by Flood Risk Zone**



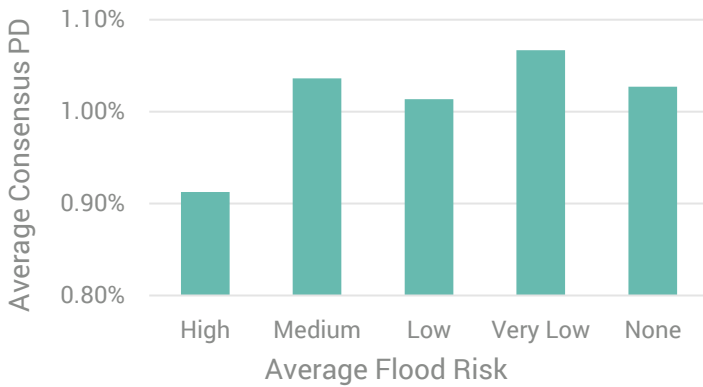
Just 1.6% of entities are in High flood risk areas, with 7.4% in Medium risk, 6.4% in Low risk and 3.0% in Very Low risk. The balance – 81.6% have no significant flood risk. In other words, nearly 20% of the UK bank SME portfolio is exposed to some flood risk, and 9% is in the medium to high category. This is similar to the 10% figure reported by the Bank of England for mortgage exposures.

<sup>7</sup> <https://environment.data.gov.uk/portal/home/item.html?id=d406e2bc010b45f9b07a7c14b13a74ff>

<sup>8</sup> Companies House identifiers are used in data management

Figure 2 shows average PD by flood risk.

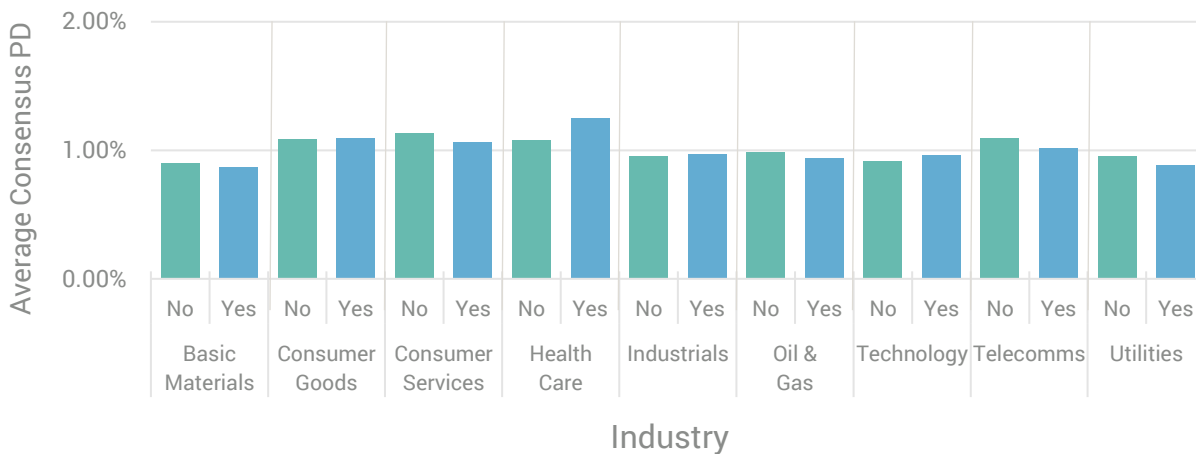
**Figure 2: Average Consensus PD by Flood Risk**



There is little correlation between flood risk and PD. On the one hand, Very Low risk areas have a slightly higher PD (1.06%) than those with None, while Medium risk areas have a higher risk than Low risk areas, but Very Low risk areas show the highest PD, and High flood risk areas show the *lowest* consensus PD at 0.9%.

Figure 3 shows the average PD between SMEs in a flood risk zone vs those outside.

**Figure 3: Average consensus PD by Flood Risk and Industry**



Health Care SMEs in a flood risk zone have slightly higher PDs, but in other industries there is no obvious difference.

### Conclusions

- Nearly 20% of SMEs are in postcodes with some risk of flooding.
- There is no overall correlation between flood risk and PD
- There is no obvious flood risk effect on PDs across various industries, with the possible exception of Healthcare.

These results suggest that (1) there are many other drivers of credit risk that would need to be taken into account before we can estimate the marginal impact of increased flood risk, but (2) it is possible that flood risk has not yet been fully factored in to the main credit risk models used by UK banks for SME estimates.

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