

How Will Climate Change Impact Banks?

By Tony Hughes

https://www.garp.org/#!/risk_intelligence/culture-governance/all/modeling-risk/a1Z1W000003mp3pUAA

Since the issue of [climate change stress testing](#) burst onto the radar screen, I've become a little obsessed by Hurricane Katrina. That event, in 2005, not only caused widespread human suffering and enormous insurance losses but also dramatically altered economic growth prospects for New Orleans, Louisiana and – more generally – Gulf Coast communities.

It is estimated that the population of New Orleans fell by more than half in the immediate wake of the disaster; moreover, to this day, it remains roughly 20% below the pre-Katrina peak.

With climate change likely to increase the intensity and frequency of extreme weather events, understanding the effect of climate events on financial interests should be the first step toward building a data-driven climate risk stress testing platform.

While the effect of Katrina on insurance interests is obvious – property damage was estimated to be more than \$100 billion – the effect on other institutions like banks and credit unions is somewhat harder to discern. Fortunately, the academic community has put forward a few articles that have taken an in-depth look at the effect of Katrina on household finances.

[One paper](#), by Tatyana Deryugina, Laura Kawang and Steven Levitt, used tax return information to determine the effect of the storm on household income and employment. The researchers were able to compare those affected, including many who left the city, with a control group composed of people who lived in broadly comparable, more northerly cities prior to 2005.

The most interesting finding from this research was that Katrina had only a muted, temporary, negative impact on income and employment. What's more, the researchers found that, after a few years, those impacted by Katrina enjoyed significantly higher incomes than the control group who were unaffected by the massive storm.

Several drivers of this outcome were identified, the most curious of which concerns labor mobility. Normally, people remain rooted in a specific location because of the high fixed cost of relocation. When forced to move, however – often with an insurance check in their back pocket – people can choose their new location, in part, to maximize potential earning power. The data from Deryugina et al. confirm that, by and large, people relocating in the wake of a disaster succeed in these endeavors – a silver lining to an exceptionally dark cloud.

Impact on Household Credit

An even [more pertinent paper](#) for our purposes was produced by Justin Gallagher and Daniel Hartley. They used data from Equifax credit files and information on the local severity of Katrina-related flooding to calculate the effect of the storm on household credit performance. Again, the data they used allowed them to follow individuals who moved as a direct result of the hurricane.

The biggest impact was to reduce total debt loads for the most flooded households. Rather than rebuild, people affected by Katrina-related flooding opted to use insurance payouts and government assistance to retire mortgage debt and move elsewhere.

While 90-plus day mortgage delinquencies rose for flooded residents in the months after Katrina, the effect was surprisingly muted. The researchers found a brief spike in the default rate in early 2006, but this quickly reverted to something resembling the normal level. They also found some evidence that longer-term default rates fell for the most flood-affected group, consistent with the income dynamics identified by Deryugina et al.

Two other findings are relevant for banks building climate risk stress test models. The first is that credit card balances rose somewhat in the months immediately following the disaster, but quickly reverted to

their pre-storm levels. This is surprising because it would have been understandable for victims to use unsecured credit to smooth consumption in the wake of such a huge income shock.

The second finding is that mortgage originations fell sharply in the local area and, consistent with a large population decline, remained weak throughout the observed post-storm period.

If a bank were conducting a stress test on the basis of these findings, the biggest impact would be in the calculation of pre-provision net revenue (PPNR). If we consider a hypothetical bank whose territory was, and is, limited to the most flooded areas of New Orleans, we would find only a small spike in subsequent credit losses for the institution.

A reasonably well-capitalized bank should be able to cope with a shock of this magnitude. Its business, however, would have failed, due to a combination of the severe reduction in the scale of its mortgage book and the precipitous decline in new originations.

Real banks are much better diversified than this. Gallagher et al. considered the behavior of “local” banks, defined as those with more than 24% of mortgages held in the New Orleans CSA. These institutions saw originations eventually recover to pre-storm levels, while non-local lenders basically deserted the city. These non-local lenders are usually much bigger national or super-regional banks, able to weather such a shock and capable of following displaced clientele to their new location.

While local banks faced a revenue crunch – including several years of poor mortgage originations and elevated mortgage pre-payments – they ended the post-Katrina period roughly at par in terms of new loan generation. The desertion of non-local banks meant that, despite a shrinking market, local players had – and continue to have – more pricing power than they did previously. Top-line profits may be lower for these banks at the post-Katrina steady state, but overall profitability may be somewhat enhanced.

Parting Thoughts

Moody's Analytics [research](#) suggests that some countries, including the U.S., Canada and many nations in Europe, will gain a small macroeconomic boost as a result of climate change. In these locales, the main impact will be [migration of capital and labor](#) from places made less hospitable by the warming planet (like New Orleans) to places made more hospitable (like, perhaps, Boston or Denver).

Most financial climate risks are diversifiable, provided there are some people, places or industries that actually benefit from the new reality. It's a process that brings disruption for banks – particularly those rooted to a specific location – but also opportunities.

This is the inherent paradox of climate risk stress testing. For some banks - those capable of anticipating the winners and losers - it will be a boon rather than a burden.

Tony Hughes is a managing director of economic research and credit analytics at Moody's Analytics. His work over the past 15 years has spanned the world of financial risk modeling, from corporate and retail exposures to deposits and revenues. He has also engaged in forecasting of asset prices and general macroeconomic analysis. Please [click here](#) if you'd like to read other recent articles Tony has written as part of his “Modeling Risk” column.