TC NOTES

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FOOD SECURITY: IMPLICATIONS FOR SUPERVISORS

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FOOD SECURITY: IMPLICATIONS FOR SUPERVISORS

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FOOD SECURITY: IMPLICATIONS FOR SUPERVISORS

Introduction[1]

Food security is more relevant to financial supervisors than might be first apparent. It is at the junction of many issues that supervisors would recognize as fundamental to their usual work areas. This Note addresses how the issue of food security is relevant to supervisory objectives such as institutional soundness and the maintenance of sound, fair and stable markets, as well as consumer protection and retail market conduct.[2] Supervisors with a market development mandate have a further reason for interest in this topic.

This Note examines the topic of food security, providing relevant context. It specifically addresses the issues that supervisors face, given their mandate and the overlap of issues. Given the topic, some detail is provided to better understand the common solutions, including index-based insurance; to highlight supervisory and regulatory issues; and to contribute to risk-based supervisory assessments of financial institutions.

Food Security

The United Nations' Sustainable Development Goals (SDGs)[3] adopted in 2015 provide a unifying set of policy targets that guide the development agenda and motivate many stakeholders. SDG 2 focuses on the goal to "end hunger, achieve food security and improved nutrition, and promote sustainable agriculture". To this end, food security is a global issue.

Food security has been adversely impacted by many issues, including conflict[4], supply chain issues, inflation (especially in food and transportation costs), climate change, and biodiversity loss. Gender is also a critical consideration, given the disproportionate impact of food insecurity on women and girls in many countries. This provides a linkage to other SDGs and localizes the issues to national and local levels.

Many governments have adopted definitions of food insecurity. For example, the Canadian government defines food insecurity as "the inability to acquire or consume an adequate diet quality or sufficient quantity of food in socially acceptable ways, or the uncertainty that one will be able to do so". These definitions connect the global and national goals to individual and household outcomes and lead us to the most vulnerable in society, especially those that have difficulty sustaining nutrition in the face of adversity and shock.

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[1] This note was prepared by Craig Thorburn. Please address any questions about this Note to publications@torontocentre.org

[2] See Toronto Centre (2020).

[3] See https://sdgs.un.org/goals

[4] The conflict in Ukraine significantly increased food insecurity. For example, Ukraine and Russia combined supplied 30% of the world's wheat, 20% of maize, and 80% of sunflower seed products. Global supply chains, and inflation shocks, became a constant focus. However, the issue has a far longer history as causes are multifaceted. Every "crisis" brings the subject back onto the agenda.

Food insecurity solutions at this individual level include access to appropriate financial products. Financial inclusion is a government objective in many jurisdictions that includes the contributions of financial supervisors. Concerns regarding food insecurity also include the consequences in terms of other issues such as energy use, health outcomes, child welfare, and education.

At the national level, efforts to improve climate-resilient agricultural production and productivity include recognition of the role of access to finance and risk transfer products. Improved access to risk transfer products has been shown to increase farm productivity which, in turn, can then be leveraged through access to credit.

Governor Antoine (Governor of the Eastern Caribbean Central Bank) mentioned …

"Given what we are seeing right now, with the price of food and the possible shortages because of the war in Ukraine, it becomes even more important for us, as a region, to produce more of our own food. At the moment, at least 80% of the food in this region is imported. That is way too high. And the drivers of this high percentage of imports are meat, cereals and fruits and vegetables."

He said if we would seriously tackle food and nutrition security, then we need to focus on increasing more of these items.

"There is a big discussion going on now in the region to reduce the food import bill by at least 25% over the next three years," he observed.

Reported from the Governor's speech, June 2022.

https://theanguillian.com/2022/06/governor-timothy-antoine-of-eccb-reports-on-anguillas-economic-status/

Supervisory overlap

Financial supervisors do consider economic issues such as inflation and interest rates, especially as they relate to financial soundness, risk exposures and reasonable asset and liability valuation. They are also engaged in the impact on the financial sector of climate and biodiversity-related risks, the fair treatment of lower-income and less financially literate customers, financial inclusion (especially access to credit and insurance), and the institutional risk management associated with the providers of relevant products and services. In many cases, supervisory authorities have made public statements, guidance, and regulatory instruments covering some or all of these subjects in their own jurisdiction. All these elements are also part of the "food security agenda".

Solutions - De-Risking Agriculture

Several programs to support food security have taken on the theme of "De-Risking Agriculture". These two simple words capture much of the vision as well as create motivation for action.

Farmers are well aware of the risks that they face. The quality and quantity of commodities produced can be impacted by weather, disease, and pests. Many have adopted strategies to reduce this risk. A popular strategy is to diversify activities so that if something adverse happens to one, then the other activity might soften the negative impact. This strategy comes, however, at the cost of reduced farm income compared to a successful crop (or livestock) made up entirely of the most productive variety for that farm.

Farmers also face considerable seasonal variations in income and expenses. As a result, credit products and their experience with them can leave some farmers averse to taking on credit. In addition, even expected income is exposed to commodity price risk.

Financial solutions that target these risks include bundled credit guarantees and carefully designed insurance. Risk transfer helps both farmers and their lenders to be more comfortable that the credit risk can be handled in the event of production risk adversity while funding for replacement farm inputs can support future production. As is normal for all types of insurance, risk transfer where farmers access insurance offers far more cost-effective diversification than can be achieved through their own individual efforts. Depending on the location and nature of the farming activity, risk transfer may, for example, involve the risks of too much or too little rain (or both), sudden storm damage, pests, flooding, and wildfires. Farmers are also incentivized to invest their own savings in advanced farming methods and thereby increase their productivity and incomes.[5]

Some programs also address commodity price risks either directly or through improved transparency of market prices to allow farmers to make better decisions about when to market their crops once they are harvested.

Why is index-based insurance an attractive solution?

In the last decade or so, agricultural insurance has seen a significant shift from indemnity-based products to parametric or "index-based" insurances, where the insurance payment is determined based on an index threshold being triggered. Index-based insurances have been developed for weather-related risks or other natural catastrophe perils, but they can, conceptually, cover anything defined by an index.

The index-based cover is promoted by insurers, agricultural and development experts, governments and donor agencies, as it can produce quick payment of claims without physical assessment of individual farm losses after an event. It also greatly reduces the cost of the administration of claims and, therefore, premiums as there is no need (or less need) to assess individual claims in person on site. In addition, the rapid payout is particularly valuable for low-income segments with very limited resources or reserves of their own.

Promising innovations have been pursued in product delivery. Efforts to overcome data constraints (sometimes simply characterized by a lack of or insufficient numbers of weather stations) have led to innovations drawing on satellite imagery data sets and Internet of Things (IoT) sensor devices. Mobile phone connectivity has been used to leverage geolocation data for crops and to evidence planting schedules. Drones have been used to reduce the costs of supplementing other sensing data for claim validation.

But challenges remain. Products tend to be subject to pilot studies and refined over time, but because they depend on agricultural cycles, the pilot processes can take years to go through several iterations. Many products target cropping, but relatively fewer projects have been established for livestock. Similarly, many projects target farm owners, especially those with smaller holdings, but many people in rural communities depend on the same farming success even though they do not "own" a farm of any size. The issue of subsidies is also topical in this area.

With that in mind, what are the tasks for supervisors?

Supervisory involvement

Data and technical skills

Financial sector supervisors have a pre-eminent position through their engagement with the financial sector that is much stronger than that of other parts of government. As a result,

[5] See, for example, African Development Bank (2019) covering Ghana, Tanzania, Uganda and Zimbabwe; and World Bank (2022) covering Rwanda.

there will be demands from a range of parts of government, including ministries of agriculture, to support initiatives in this area.

As organizations that collect and publish data on the financial sector, there will be requests for information from supervisory authorities, and where data are not collected, these will then become requests for authorities to use their powers to collect new information. Practical considerations need to be added to the discourse to see if it is necessary to collect all the desired data, let alone to do so with the same frequency that is used for financial sector monitoring or indefinitely. A targeted “one off” survey approach may help as it will allow some refinement of the approach before the investment in new regular data collection.

Supervisors also may find that their industry and technical knowledge is in demand. Insurance, in particular, is not a skill set that is broadly available across government, and other agencies may seek views on proposals simply because the supervisory authority understands the material far more than they do.

In both cases, there is a risk that initial requests may appear small but could increase exponentially. Supervisors must balance their supportive approach and the usefulness of being informed of the broader effort with their own resource constraints. Making data demands of institutions also places a burden on the entities that may not distinguish between the supervisory authority and the ultimate agency or ministry making the request. Good communication with the requesting authorities is important. Additionally, if the task becomes more substantial, some additional funding may even be possible to cover the costs.

On either front, taking a proactive approach ensures that the standing of the supervisory authority is maintained.

Digital Finance

Many of the innovations in inclusive finance benefit from greater use of technology in the delivery of financial services. Agriculture, especially for the underserved, is no different. Digital financial services, contracting, signatures, and mobile money are all useful ways to reduce the cost-of-service delivery for all relevant products. Given that cost can be a significant barrier, then cost reduction is important.

Supervisory challenges can also increase when some digital delivery is introduced. This is covered more generally in Toronto Centre (2019 and 2023).

Climate as a short-term and longer-term consideration

As many of the relevant risks are climate-related, it is useful to consider the impact of climate change and biodiversity loss on products developed to target and support agriculture. Although the short-term approach is to consider that these products are short duration, so the time horizon is limited, the longer-term view should take account of the fact that the incidence and magnitude of adverse weather events are expected to increase, so, for example:

- products may need to have charges increased (particularly insurance premiums) or be supply constrained;
- for insurers, reinsurance may become more costly and harder to arrange;
- customers may become more reliant on access to credit and the risk transfer provided by the insurance precisely as it becomes more difficult to provide; and,
- the same customers may need to change their practices and risk mitigation to continue to be eligible to access the products.

A situation where products are made to be accessible but only to see them progressively become less so does create issues of market conduct as well as reputational and financial stability issues. When providers withdraw or restrict products or sharply increase costs at a time when customers face increased exposure to adversity, this can lead to a more general view that these providers and all their products are untrustworthy or designed to favour only a small group in society, bringing the whole of banking or insurance into question. This reputational risk might flow to the supervisory authority whom customers perceive "should have done something about it".

Consequently, it is not sensible to focus on the short-term nature of the products alone. Importantly, projects to address food security should stress the need to transition farming practices to resilient and sustainable approaches and not simply focus on the immediate risk transfer in the current cropping environment. This can be useful for both conduct and prudential supervisors to review to also gain an assurance that these issues have been or are being addressed.

Banking on success

Although it is easy to consider that insurance issues are the most complex, it does not mean that issues for bank supervisors are taken care of simply by recognizing the risks that are transferred to the insurance sector. In cases where bank lending is advanced on the basis that the risk is reduced because of insurance, then there are still potential issues for the banks and banking supervisors, just as there would be when considering a new customer group for any lending product or a new business partnership. They include:

- Does the bank truly understand the extent that the risk is transferred and the extent that it is not? Insurance may leave some residual risk with the policyholder or may cover some perils and not others. As a result, risk transfer may be partial and should not be taken for granted as being a total risk transfer. Banking supervisors should consider this as they review the credit risk that banks retain under such programs.

- What conditions exist to ensure that the insurance is maintained? As with other insurance, banks may need to ensure that the cover is maintained. In the case of crop insurance, especially index-based insurance, renewal is not as automatic as might be assumed. Banks may wish to align their lending duration with the policy and cropping periods. Supervisors may also wish to consider this as they review the product exposure and performance.

- When a bank is distributing the insurance product (bundled or not with bank lending), has the bank and the insurance company developed effective contractual relationships between each other? Are the incentives for bank staff aligned with effective customer service and delivery and the proper and fair treatment of these customers? Is customer communication of their rights and obligations supported by the sales processes? Are sales that might be bundled together properly disclosed? If customers are able to make alternative choices of provider of part of the service, is this unreasonably restricted in practice? What conditions might give rise to the termination of the relationship? How would customer service be addressed for current customers in the event of a termination? In the event of disputed claims, how can the customer relationship be managed to avoid reputational risk to the bank? Supervisors will be interested to assure themselves that the bank and the insurance company have addressed and are managing these issues.

- What other products might be part of the overall package? How might commodity price risks or other financial market volatility be addressed? Where a bank is offering some services normally provided to more commercial clients, are its processes, risk

management, disclosure and customer treatment issues appropriately modified to reflect this different customer profile?[6]

- Bank supervisors should ensure that they are collaborating and exchanging information with the insurance supervisors in their jurisdiction on this particular issue rather than only on more general matters.

Subsidies

As mentioned above, the issue of subsidies is likely to arise in the area of agricultural insurance, and crop insurance in particular. There are cases where the government provides a subsidy, somewhere one of the private sector partners provides a subsidy, and somewhere both might do so. For example, the Thailand Rice Insurance Scheme distributes government-subsidized insurance through a bank with a significant rural presence. If customers take a loan at the same time, the bank subsidizes the balance of the premium.[7]

Subsidies should be transparent, and, to that extent, they should be premium-based subsidies instead of claim subsidies when it comes to insurance. Transparency helps the client to know the true cost of the product as well as the cost that they have to pay. If the subsidy is reduced in future or the targeting of subsidies changes, then there is a greater likelihood that some customers will continue with the product based on its fundamental merits.

Transparency also avoids the reduction of a subsidy being interpreted by customers as a cost increase by the provider, which could damage the reputation of the sector. Consequently, supervisors should insist on any subsidies being transparent even if the existence and magnitude of subsidies are not within their mandated area of concern.

That said, not all agricultural products need to be subsidized to be successfully distributed. One key example is mentioned in the box.[8]

> The HARITA (Horn of Africa Risk Transfer for Adaption) scheme integrates risk transfer with mitigation efforts. Farmers are able to make payments for the insurance using credits earned through work on risk improvement schemes, so avoiding out of pocket costs. “Subsidies” are replaced with the option of using funding for improvement schemes directly as credits toward premium costs. This is a case illustrating that the argument that “all schemes have to be subsidised” might not be true.

Index-Based Insurance Regulatory and Supervisory Fundamentals

Creating an enabling environment that is supportive of index-based insurance requires a number of well-known issues to be addressed, as discussed in IAIS (2018). Additionally, the Access to Insurance Initiative (A2II) has followed up with further case studies and notes.[9] This section summarises each of the issues with current perspectives.

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[6] Several high-profile cases of significant reputational failure for banks that offered inappropriate foreign exchange and commodity price management products to farmers have occurred, highlighting the care needed. See for example https://www.fxloans.org/the-swiss-franc-appreciation-and-the-sorry-saga-of-fx-lending/

[7] For a fuller explanation of the Thai Rice Insurance Scheme, and the Public-Private Partnership, see A2II (2017).

[8] For more information on the HARITA scheme see, for example, https://unfccc.int/climate-action/momentum-for-change/lighthouse-activities/horn-of-africa-risk-transfer-for-adaptation-rural-resilience-initiative

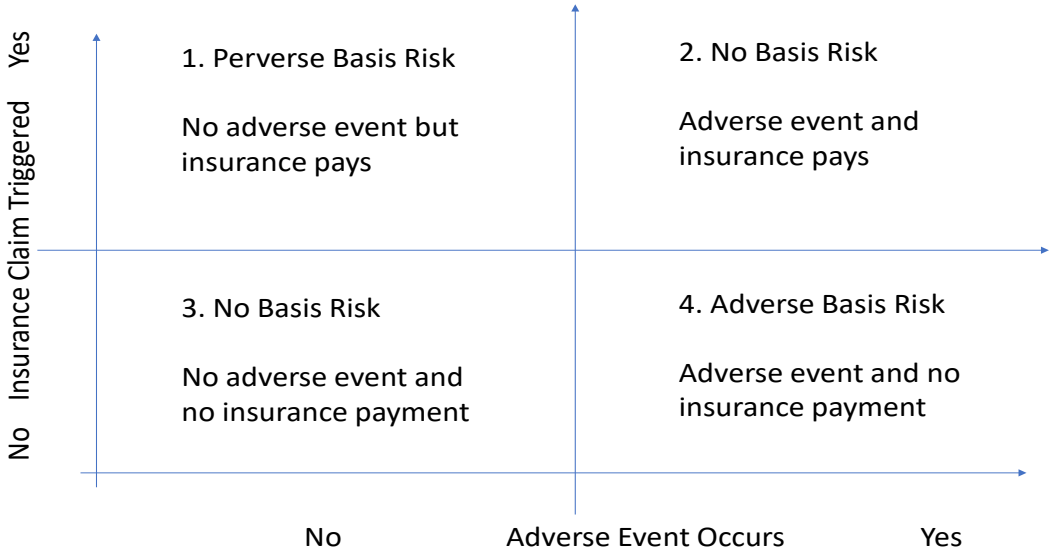
[9] See A2II (2021).

Basis Risk

Basis risk in insurance is the risk that an adverse event intended to be insured by the client may occur (or not) without matching whether the insurance product makes a payment (or not), largely due to the terms and conditions of the contract. For index-based insurance, this insurance product condition is represented by the triggering (or not) of the index condition.

This is one of the most discussed concerns regarding index-based insurance, as the claim event is determined by an index that may not match the occurrence of the adverse event perfectly. There are two types of basis risk where the payout may not match the intended insured claim event, as shown in Figure 1. The principal concern is “adverse” basis risk (box 4), where the customer incurs considerable hardship when the adverse event occurs but the claim is not paid. “Perverse” basis risk events, where claims are paid when events do not occur (box 1), are also a concern as they add to the price of the insurance and may make it unaffordable, as well as providing benefits when they are not needed and undermining efforts to improve insurance literacy in the community.

Figure 1: Basis Risk



To illustrate how basis risk might appear in practice, consider a simplified example of index-based insurance making a fixed payment triggered by the arrival of a category 1 hurricane in a country. Now imagine that such a hurricane does, in fact, cross the coast as envisaged but only quickly skirts the coast and moves on. Even if the country is small, a farmer on the other side of the country may only experience tropical storm winds below hurricane strength and more limited rainfall and so does not incur the usual “category 1 hurricane” damage. That farmer would still be eligible for a payout identical to their fellow farmer located directly under the hurricane path – an example of perverse basis risk.

More complex cases exist, for example, where rainfall at particular weather stations has been used for the index, but actual rainfall is less evenly distributed across the geographic area. This is a case where the risk faced by individuals may not be well matched by the index, and so outcomes may be adverse or perverse. That is, a farm location may suffer considerable damage, but the weather station did not quite reach the trigger level as it was located in a less impacted place, leaving the policyholder with a very adverse result.

Some index-based insurances use an index constructed from a range of data items to better reflect the risk of each farmer. However, this adds considerable complexity, and it could lead

to further basis risk where the constituent components do not end up behaving as expected, either as a result of changing correlations or unforeseen data collection challenges. For example, Normalized Difference Vegetation Index (NVDI) approaches use data to examine vegetation colour as a measure of drought and, therefore, available fodder for livestock. This approach has merit, especially when weather stations are sparse, but there have been cases where the vegetation appeared green, but what had actually occurred was that edible fodder had been overtaken by a noxious weed, so livestock losses were significant despite the index not being triggered. If the insurance was intended to provide protection against stock losses, then this is a case of adverse basis risk.

Efforts to reduce basis risk start with efforts to construct an index that replicates the expected claim events as far as possible, although this can add complexity and, as a result, reduce the benefit of rapid claim payment. This might be considered, in Figure 1 terms, as trying to define better and more precisely the point where the matrix distinguishes from “no trigger” to “yes trigger” on the vertical axis.

Another approach to adverse basis risk is to “lower the trigger” so that the insurance pays not only when “bad things happen” but also when “slightly adverse events occur”. This amounts to adjusting the product so that “box 4”gets smaller. This has the disadvantage that it increases expected claims and, therefore, the premium costs for the effective insurance of extreme events.

As a result, adding complexity or lowering the trigger are approaches that have their critics. So, when adverse basis risk occurs, with adverse events and no claim trigger, product promoters have sometimes turned to ex-gratia payments as a solution to the reputational risk.

In reality, many purported basis risk-related events have shown themselves to be more an issue of a lack of understanding of client perspectives of adversity by product providers and index designers. Additionally, product explanation that (in hindsight perhaps) was ineffective can be a problem. Considerable design effort is expended on clarifying the point between a trigger event occurring and not occurring (the vertical axis in Figure 1), but the research to find precision on the horizontal axis is sometimes very general, as can be seen by ex-post issues arising. But poor product explanation is not basis risk – it is just a convenient scapegoat.

As a result, the IAIS (2018) has highlighted the benefit of improved disclosure and explanation of product triggers in advance as a critical issue. Supervisors should discuss how basis risk has been addressed with those proposing these products. They should also consider reviewing the disclosure approach and customer educational material, especially for retail customers. This review would normally look to understand how customers might be made aware of the level below which the product would not make any payout and then the impact of graduated or stepped benefits.

Proportionality especially considering micro, meso and macro level customer risks.

Proportionate approaches are fundamental to more inclusive financial sector regulation and supervision. Proportionality is one of the critical ways that regulation and supervision avoid creating barriers of cost or affordability or other challenges that could impede insurers and customers from reaching each other and communicating effectively.

The risks differ very significantly depending on whether the insurance client is a sovereign government (so-called “macro”), a sub-national institution in the public or private sector (meso), or local households, farmers and other micro, small and medium-sized enterprises (micro). This is well understood when it comes to most market conduct and consumer protection risks and where the risk of misunderstanding is high, given the potential complexity of the product.

For meso and macro clients, it may be reasonable to take account of their expertise and lesser risk to supervisory objectives to invoke proportionality to allow a less intensive supervisory approach. Some sovereign risk transfer schemes are not transacted locally at all despite a legislative requirement that insurance in the jurisdiction can only be written by locally licensed insurers.

Additionally, adverse basis risk events are potentially unfortunate but manageable at macro and meso levels but catastrophic to the customer at the micro level. For this reason, there has been a tendency to move away from micro level coverage of index-based insurance, relying instead on the meso or macro insured party to provide "non-insurance policy type" benefits to the ultimate micro beneficiaries. So, for example, a regional bank might be the meso beneficiary who, in the event that an insurance payout is received, would intend to use the funds to offer loan repayment concessions to impacted "micro level" borrowers. However, to avoid reputational concerns for both the macro or meso client and reputational contagion for the sector as a whole, it is critical that micro customers understand that they do not have "insurance" guarantees from the bank in such a case. If a macro or meso customer does promise "insurance" type guarantees to micro customers in advance, then its options to deal with an adverse basis risk situation will be significantly and severely constrained compared to if it has not promised "insurance".

Where micro customers are the beneficiaries, the IAIS suggests that a backtest of the index performance can be a useful disclosure tool. Indeed, this would go a long way to clarifying the dividing line between the "adverse events" in Figure 1. This points to the usefulness identified by the IAIS for this quite specific requirement and, at the same time, that it is important for supervisors to consider developing specific guidelines, instructions or expectations for customer disclosure by insurers and their distributors for these products before and at the point of sale, at least in the micro case.

Given the basis risk concerns and the additional challenges of disclosure and product education, distribution, product design, understanding customers, barriers of affordability, cost and distrust, some index-based insurance projects have increasingly gone to the sovereign level by seeking to issue the cover to the national government rather than through meso or micro level clients of insurance products. This is unfortunate as it is undesirable to see technical skills and developmental initiatives focus away from the micro-level and particularly vulnerable customers.

Definitions of Insurance and Insurable Interest

In many jurisdictions, the insurance law was prepared to cater for indemnity insurance only. Legislation may need to be amended to recognize index-based insurance. The definition of an insurance policy might also cast doubt on whether an index-based policy is an insurance contract for supervisory, accounting, taxation and other legal purposes.

The IAIS (2018) has expressed the view that index-based insurance should be considered to be insurance for supervisory purposes regardless of how the other issues are resolved. Products should be issued by licensed insurers and should be subject to both prudential and retail market conduct supervision (including product disclosures and complaint handling). This avoids confusion for customers and potential duplication or exposure to systemic reputational risks if products are not consistently regulated, supervised and subject to retail market conduct requirements.

Often the cause of the problem is wording in the insurance law in some jurisdictions that an "insurable interest" must exist for a contract to be defined as insurance in the jurisdiction. Other jurisdictions do not have this issue as they rely on other definitional elements to define an insurance contract. Perverse basis risk might be considered to bring into question whether a contract meets the insurance definition and is an insurance contract when an "insurable interest" written with indemnity insurance in mind is one of the conditions.

Typically, when insurable interest is defined with indemnity insurance in mind, it prohibits the situation where a claim payment can exceed the actual loss incurred by the policyholder. It is thought of as distinguishing insurance from gambling, where a payout can be received without any loss (beyond the initial lower "bet") or to protect against social and moral situations, such as insuring a person's life and thereby acquiring a significant financial incentive to see it ended. In a perverse basis risk scenario, a policyholder could receive a full payout without incurring any loss at all, which raises the question of whether the contract meets such a legal definition.

Several solutions can be considered to address this problem, including, for example, (i) removing the requirement for insurable interest as a condition that a contract is an insurance for supervisory purposes; (ii) changing the insurable interest definition to emphasize the ex-ante expectation of loss compared to the expected benefit from the product; or (iii) simply carving out index-based insurance from the obligation. Insurance supervisors often initiate government action on amendments to the insurance law.

Removing insurable interest from a definition in the insurance legislation does not mean that it should be removed from sound underwriting considerations by insurance companies. Obligations on insurers to have sound practices for all risks that they take on and manage should remain.

Any clarification should also consider combined policies that may have both index-based and indemnity-based benefits.

Although this lack of legal certainty is a widely held concern that can cause market participants to take a cautious approach to market entry, it is not clear that any actual cases have been litigated. Nevertheless, it is a potential concern that market development might be hindered by caution. It is also a supervisory concern that, unless the issue is resolved, a future legal case may significantly disrupt all such products in a jurisdiction.

The alternative, that index-based insurance be treated as derivatives, is not recommended by the IAIS because:

a) It would require replication of all financial sector protections for retail customers to apply. Derivatives usually do not have the same protection, instead requiring customers to be more sophisticated before transacting; and
b) the product is widely called insurance, so retail customers would perceive it to be insurance and have it regulated by the insurance supervisor. There is, therefore, a severe reputational risk to the supervisory authority if something goes wrong. Disclosure in advance is rarely sufficient in such situations.

A Credible Index

Index credibility is critical to a well-functioning product. For an index to be credible, it has to be:

- **Reliably calculated**: an index should be clearly defined, with a clear process for calculating the value of the index.
- **Timely:** to secure the benefits of timely payment of claims, it is desirable for the calculation of the index to take only a short time, avoiding delays caused by the definition of the index or reliance on data that are not available or published in a timely manner.
- **Calculated by a credible agency**: the reputation of an agency can be an advantage to product credibility. Errors, restatements, calculation corrections, and perceptions of bias are problematic.

- **Robust:** the agency should be committed to providing the service for the period required.
- **Transparent**: ideally publishing the results, for example, as a "determination".

Even with a lot of planning, things can go wrong, so it is useful for contingency plans to be in place and well documented.be

Supervisors should review these characteristics with their supervised institutions. This might be done as part of the product approval process if the jurisdiction uses it or through inquiry and the risk assessment of financial institutions directly. Insurance companies should, as part of sound risk management, have considered these issues and be in a position to explain their results to their supervisors.

Pilots and other Experimental Approaches

Many index-based insurance initiatives start in an experimental way. There are many reasons for this, including the possibility that the insurance law may not be fully reflective of index-based insurance or that other regulatory considerations may still be under development. Distribution, product structure, customer base take-up, etc., might also be in an experimental test phase. To that end, innovation is encouraged by pilot approaches.

Many supervisors might already have pilot arrangements in place through "sandboxes"[10] or other similar methods. Others might do well to consider putting something in place along these lines.

The IAIS (2018) has outlined several pilot phases that may be relevant. In summary, the issues noted include giving attention to constraining risk, dealing with the commitment of project participants, and considering the situation for customers both during and after the project phase.

Phase	Key Characteristics	Supervisory issues
Research studies	Projects where the main goal is to produce a research paper often compare trial groups with and without access to a particular product. Although the learning might be used in future in new pilots, there is no view that this will definitely be with the same customer group.	Customers obtain temporary access to a product that may not be offered in future even if successful. Project highly dependent on the technical skills of the researcher. The limited number of customers may be key to short-term proportionate approaches to licensing, reporting, risk and capital that do not fit the more generally applying regulatory approach.[11]

[10] See Toronto Centre (2017).

[11] There have been examples where a research project was funded fully by credible donors so that it effectively covered all possible claims for the full sum at risk on the products offered without reference to an insurance company or to any risk-sensitive capital model.

Proof of concept	Main goal is to test and learn, and ultimately validate, the proposed concepts.	Customers obtain temporary access to a product that may not be offered in future if unsuccessful. Project highly dependent on the technical skills of the project team. Limited number of customers may be key to short-term proportionate approaches to reporting, risk and capital.[12]
Scale up	Although the concept has been proven, scaling up is uncertain. The main goal is to find the pathway to larger-scale operations.	Customers obtain temporary access to a product that may not be offered in future if unsuccessful. Project highly dependent on the technical skills of the project team. Potential higher number of customers means less scope for "concessional" practices. Efforts to put all requirements in place for normal market operation should be advanced in parallel and be complete by the end of the pilot so that normal operations do not present continued compliance challenges.
Normal market operations	No longer in pilot phase	Normal supervision applies. Effective management risk controls and technical skills, and licensing, reporting and capital requirements should be fully operational.

All pilot sponsors (the key players who are critical to the delivery of the pilot) need to be fully committed for the duration of the "phase". Some pilots run into difficulty, especially if the reinsurer, for example, is committed for one year, but the rest of the partners have a three-year timeframe. Donors might also be parties that have different timeframes and commitment levels than others. If a phase ends, it is possible that the pilot might move to the next phase, replace some of the key players with new ones, rearrange based on the learning from the completed phase, or not be continued at all.

When the project ceases to continue, then it is useful to consider the situation for customers. First, there will not be continuing insurance cover from the provider taking part in the pilot. Second, even if there was an unsuccessful volume, some customers may have accessed the product and found it was positive for them. It is unfortunate if they find that the withdrawal of the product sets them back in terms of other benefits (such as access to finance in particular) in an unanticipated way.

In the agricultural space, pilots may take longer to conclude as they may be reliant on seasonal influences. This might mean that the time spent "in the sandbox" might be longer than most other product innovations.

Supervisors can adopt proportionate approaches to pilots at each stage. They should seek information and encourage sponsors of projects to keep them informed. They should check that the above conditions for sponsor continuity and any residual risk at the end of a pilot phase have been addressed. Initial stage pilots such as those in research or proof of concept are, by definition, limited in the number of policies and size of the risk that they will take on, so they may be given different approaches to address supervisory issues such as licensing, solvency requirements, risk management, reinsurance, reporting and disclosure. However, as a project seeks to scale up and reach maturity, it should also be bringing its

[12] When the number of policies issued is constrained and sums insured are small, as is often the case in small policy holder coverage, then the total losses might not be material to an insurer so supervisory concern regarding pricing and capital parameters that might delay the pilot trial would seem to be premature and disproportionate.

operations into compliance with the legislation and supervisory requirements that apply more normally to the market. Supervisors should be satisfied that plans to “normalize” are in place and acceptable in a similar way that they would for any other transitional or recovery provision.

Conclusions

The considerable overlap of issues between food security and financial supervision suggests that it is a topic of considerable relevance for supervisors. In particular, the complexity of issues introduced by new products and interdependencies between different financial sector players means that the risk profile of financial institutions can change. If successful, this change can be very material.

To that end, risk-based supervision demands that supervisors follow the issues and inform themselves of the responses of their supervised institutions. For insurance supervisors in particular, index-based insurances also create some particular challenges, as outlined in this Note, which may require regulatory amendment and supervisory attention.

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