
Interlinking in Practice

The Ethiopian Project on Interlinking
Insurance & Credit in Agriculture (EPIICA):

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The interlocking puzzle of input use in agriculture:

- Rain-fed agriculture exposes farmers to huge risks in the purchase of inputs:
 - I pay for fertilizer today, will it rain tomorrow?
 - Risk is a commonly given reason for low input use in Ethiopian agriculture (Dercon and Christiansen, 2009).
- Most farmers need credit in order to be able to make the purchase of fertilizer + seeds in the leanest season.
 - Research from Kenya indicating that many farmers indicate at harvest time they would like to use fertilizer in the next season, but then don't.
- The large correlated risks from weather make agricultural lending extremely risky.
 - Most developing countries have very thin rural credit markets, rely on government subsidies and guarantees.

The interlocking puzzle of input use in agriculture:

Implication:

The presence of large correlated risks prevent:

- banks from lending to agriculture.
- farmers from using inputs.
- Since the core source of correlated risk is weather, index insurance seems to provide a natural way to resolve this problem:
 - Provision of insurance to lenders means that they can take on the risk of lending to agriculture.
 - Provision of insurance to farmers means that they can afford to take on the risk of using and borrowing for inputs.
 - Simultaneous provision of credit and insurance allows us to create 'state-contingent loans':
 - Receive inputs on credit, if the weather is bad you pay nothing back, if the weather is good you pay loan + premium + interest on both.

The promise of interlinking:

- Crowd in credit supply:
 - By protecting lenders from the core source of correlated default in agricultural lending, you make them willing to enter markets that they would not otherwise have been.
- Crowd in credit demand:
 - By presenting farmers with an explicitly state-contingent form of credit, you make them willing to borrow to finance investment that they would not otherwise have been.
- Crowd in insurance demand:
 - Three primary explanations for the low uptake of index insurance products are:
 1. Cash constraints at the time of purchase
 2. Behavioral issues (time inconsistency) making it difficult to pay cash up front for an uncertain future benefit.
 3. Lack of trust that the insurance company will actually pay out
 - Providing clients with a state-contingent loan appears to ameliorate or solve all three of these problems.

Potential modalities for interlinking:

■ Insure the lender:

- Here, we are concerned with a lack of credit supply and see interlinking primarily as a way of permitting banks to enter agricultural finance.
- Questions:
 - When we insure lenders, do they pass the state-contingency on to their clients? If not, presumably no demand-side benefits from the interlinking.
 - Do we care? If the logic for the intervention is supply-side, then leaving banks to try to collect on debts even when they have been paid simply increases bank profits and increases the number of markets they are willing to enter.
 - How does this interact with government policy/amnesties?
 - If banks fear debt holidays under weather shocks, they may see this product as a way to protect themselves.
 - In equilibrium if governments know the banks have this product they may be more likely to declare such holidays.

Potential modalities for interlinking:

■ Insure the borrower:

- Here, we are concerned with increasing demand.
- By harmonizing the insurance payout with the timing of loan repayment, a state-contingent loan can be created.
- Question: should we explicitly interlink credit + insurance to market a single financial service, or sell them in parallel?
 - Will borrowers always use the insurance payout to repay lenders? Is it perhaps optimal to retain the option of payout + default for borrowers?
 - If credit already exists in the community, is it better *not* to explicitly interlink the credit and insurance product so as to retain competition in the credit market?
 - If the products are explicitly interlinked, the joint product is completely redundant in the face of a government debt amnesty, thus demand low. If they are not explicitly interlinked, the government can forgive the debt and the insurance will pay out, retaining additional benefits for farmers.

Our solution to the interlinking question:

- Provide loans to farmers that are explicitly weather-contingent:
 - Farmers take loans to purchase inputs, insurance premium is added on to the loan amount and paid immediately to the insurer.
 - The beneficiary of the insurance policy is the bank itself, so if the weather index triggers the bank is paid with certainty (no intermediaries between bank and insurer).
 - The Cooperative Unions sit between the financial institutions and the borrowers and serve several critical roles:
 - First, they aggregate transactions and decrease the fixed costs of making loans.
 - Second, they are entities with the legal authority to contract with banks, much easier for formal financial institutions to deal with than smallholder farmers.
 - Third, they can use their extensive relationships with primary cooperative and farmers to serve as enforcers of the loan contracts, minimizing default risks.
 - Credit contracts written with Unions.

Our research partners:

Ethiopia's largest private-sector firms in insurance and banking:

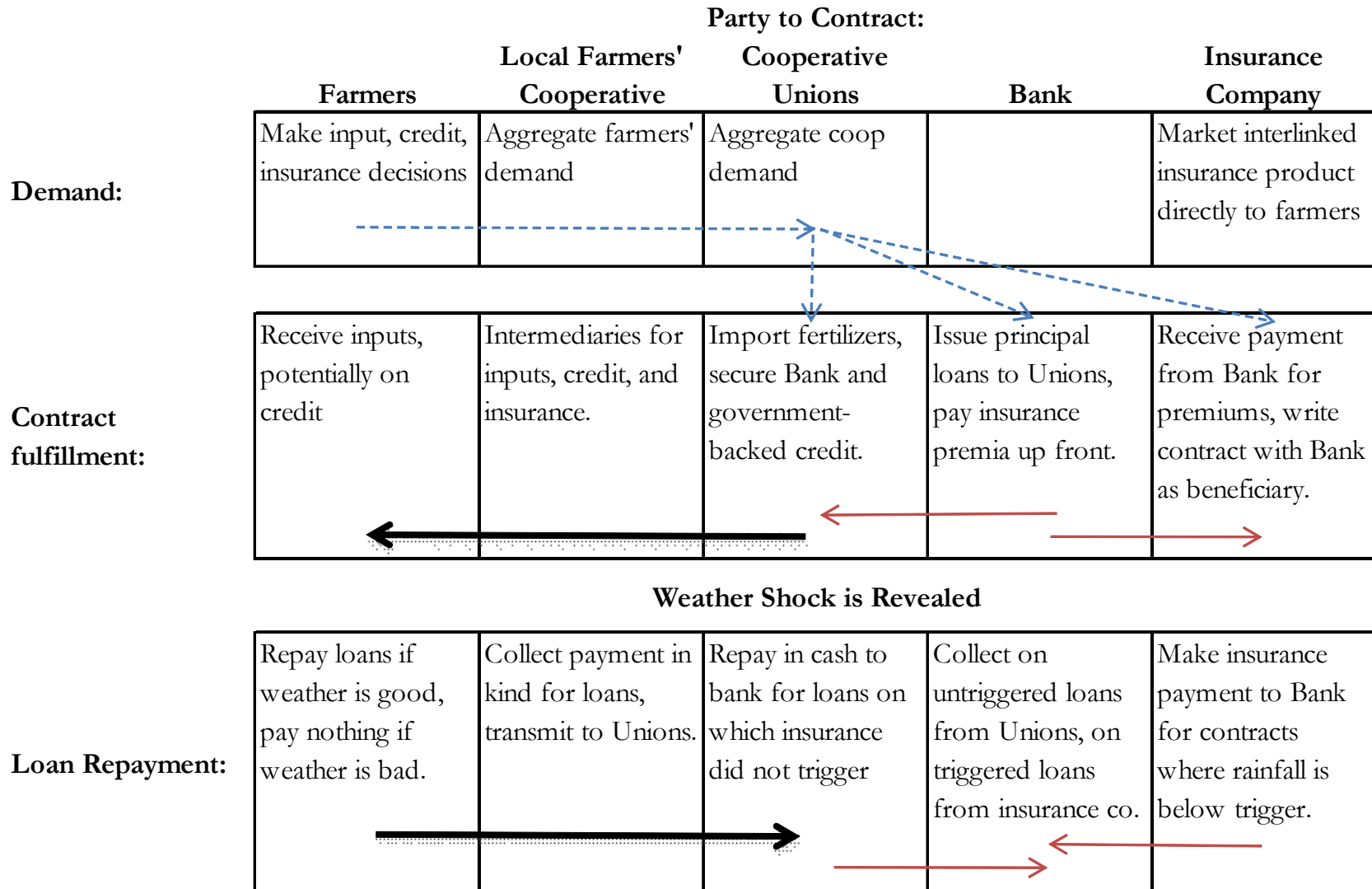
■ Nyala Insurance:

- Provide rainfall & frost-based index insurance to farmers in Northern Shoa, North & South Wollo, and Gojam.
- Insurance is intended to cover the *inputs* to production, not the output of the farm.

■ Dashen Bank:

- Provide credit to farmers that will be backed up by the Nyala product; serves as a form of collateral substitute in ag lending.
- Contracting is done through Cooperative Unions, who recruit farmers through Kebele-level cooperatives. No loan contracts with farmers.
- This means that Dashen can contract with only a few, financially sound and legally well-founded intermediaries, who in turn use their relationships with farmers to enforce contracts.

A schematic of our contract:



Outcomes of the research project:

- Our study is intended to capture:
 - Impact of Standalone and Interlinked insurance on demand, use of inputs, farm yields.
 - Optimal pricing with interlinking on the demand side
 - What are the determinants of uptake and how do they differ between the standalone and the interlinked treatment arms.
 - Experimental estimation of demand curves for insurance with and without interlinking.
 - Impacts on farmer behavior:
 - Does insurance provision increase the use of inputs by farmers?
 - Do we see an increase in yields as a result?
 - Can the provision of intelligent financial services be a part of triggering a 'green revolution' in Ethiopia?
 - Ultimately, can cooperation between index insurers and banks be the vehicle to expand private-sector credit to farmers?

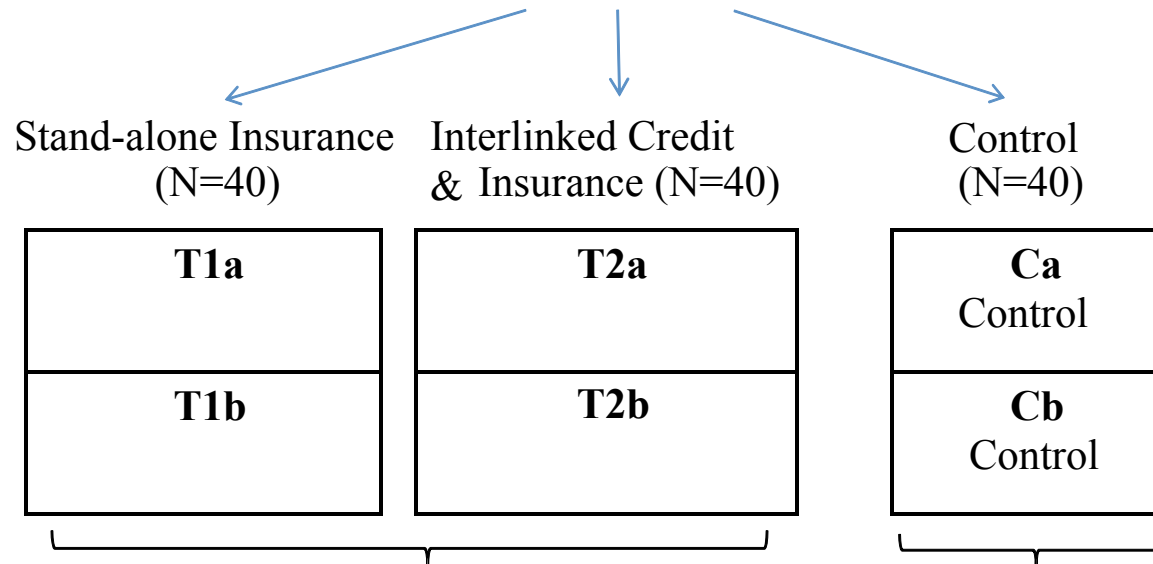
The research design:

- Randomized controlled trial in 120 kebeles (villages) with a coop survey and 20 farmer surveys in each.
- Two arm trial:
 - A control group (40) receives no insurance and no credit.
 - A 'standalone' arm (40) receives only the index insurance product; we don't prevent the use of credit but we also don't provide any explicit form of interlinking.
 - The 'interlinked' arm (40) receives state-contingent loans.
- The study will then be conducted by comparing each of the two treatment arms to the control, and to each other.
 - Provides a simple, transparent measure of the impact of insurance, the impact of interlinked insurance, and the impact of the interlinking itself.
- Three years of household surveys to track farmer behavior.

The research design:

120 Kebeles selected by Nyala

Random assignment



Credit users at baseline

Non-credit users at baseline

Subsidy to price of insurance randomized at Kebele level

Survey experiment randomized at household level. For each Kebele:

- 6 coop households survey only
- 6 coop households survey + insurance promotion
- 6 coop households survey + promotion + price voucher
- 2 non-coop households

- 18 coop household surveys
- 2 non-coop households

Longer-term question on supply side:

- Can the provision of index insurance crowd in private sector credit to agricultural markets?
 - Long history of government 'amnesties' on agricultural loans when drought occurs.
 - Historically, virtually all credit to ag has been provided or backed by the government.
 - Government is now interested in trying to have the private sector take over more of this role, but a viable commercial model has yet to emerge.
- The empirical strategy: Track over the course of time as index insurance is switched on in new parts of the country:
 - Use institutional data from Dashen to track the spatial coverage of agricultural lending to see the extent to which they expand credit in the *places* that the insurance will cover them.

Issues in Interlinking: Government amnesties:

- Does the government *pay off* loans during amnesties or *declare a debt holiday*?
 - If the former, supply-side problem is already solved and no role for interlinking in promoting ag. lending.
 - If the latter, creates a form of perfectly correlated risk for lenders for which index insurance would in principle be ideal.
 - Debt holidays + index insurance for lenders generate an unusual form of basis risk, where the risk in the difference between the states in which a holiday is declared and the states in which the index triggers.
 - By extension, should indexes intended to be useful on the supply side be fit including political economy variables that help predict response of governments? For the private lenders, becomes insurance against governmental action.
 - Dynamic strategy of this game complex; can a government enforce pass-through of conditionality by declaring a holiday whenever the insurance triggers?

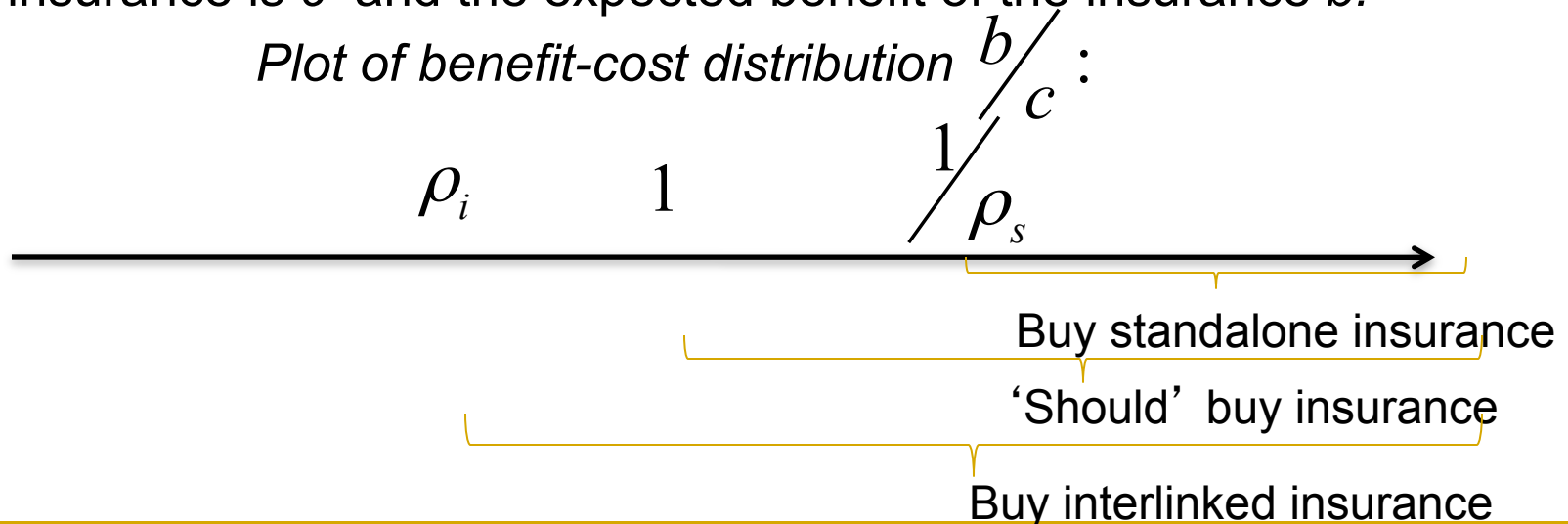
Issues: Lack of Contract Enforcement:

Simple explanation for why uptake is low: contracts can't be enforced all the time.

- Farmer believes his chance of getting the insurance payout is less than one, this depresses demand for standalone index insurance.
- However, farmer also believes that the chance of having to repay a complicated loan product is less than one.

Say probability that contract can be enforced ex-post is ρ , the cost of insurance is c and the expected benefit of the insurance b .

Plot of benefit-cost distribution $\frac{b}{c}$:



Lack of Contract Enforcement (2):

- This way of thinking suggests that differential uptake of interlinked versus standalone insurance is not a sufficient statistic.
 - To call an interlinked product a success, you have to see both that people demand state-contingent loans and that they repay them!
 - Because our project is directly expanding the supply side, we have no perfect credit counterfactual.
 - Virtually no fully private credit in the smallholder agriculture sector in Ethiopia, Dashen would not enter this market without the insurance.
 - Hard to infer what their repayment rate would have been had they not used interlinking.
 - Thus, the most relevant counterfactual is to track the default rate at the individual level on the standard loans made through coops & Unions.

Lack of Contract Enforcement (3):

- Ethiopia has no private ownership of land & a centralized system for the import and delivery of inputs.
- Credit and enforcement system for ag finance similarly dominated by the public sector.
 - Gov't forced last year's ag lending to be guaranteed by regional governments; public-sector employees become engaged in collection system, including use of extension agents as debt collectors.
 - Many parties want the private sector in ag lending, but can they collect?
 - Unions likely can use their political power to coerce repayment for individuals, so ultimately contract rests on dynamic incentives of access to large-scale private sector finance at the Union level?

What have been Dashen's concerns?

1. Establishing the legal nature and the financial soundness of the Unions, entities with whom they had not dealt previously.
2. Pricing: they want pricing to be attractive. Lowered initial interest rate from 13.5% to 11%, very concerned that the insurance premium be subsidized downwards. (product seen as CSR within Dashen?)
3. Client selection and loan collection: Effectively done by village cooperatives; do they have the skill and the coercive power to make and collect loans? Very little relationship between Dashen and the village cooperatives.
4. New foray into uncollateralized lending. Want a DCA guarantee as well as insurance; not a strong statement of confidence!
5. A competitive and regulatory environment in which they have little experience:
 - what will the government do on ag credit supply in the coming year?
 - what will be the nature of future government debt amnesties, and how would the private sector be effected?

Concluding Points:

- Interlinking has the promise of reducing key obstacles to the provision of index insurance on the:
 - Supply side: Enables lenders to take correlated risks they would otherwise have been unable to, e.g. to enter agriculture.
 - Demand side: State-contingent loans resolve several potential sources of weak demand for index insurance:
 - Credit constraints
 - Time inconsistency
 - Insurer credibility.
- However, many fundamental design issues remain:
 - Complex multiparty contracts, potential for AS or MH *in the interlinking*.
 - All normal issues of AS remain in these credit markets even once you have taken away involuntary coordinated default.
 - Dynamic strategic relationship with implicit government guarantees to borrowers, banks.