

Interactions of Formal and Informal Insurance

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1. Introduction

Formal and informal financial systems are crucial to the global economy, enabling individuals and businesses to access financial services. To better understand these systems, it is essential to examine their inter-relationships, that is, the impact they have on each other. This, in turn, has crucial implications for policy.

Though the heart of this chapter concerns the interactions of formal and informal insurance, the dividing line between insurance and credit can be a bit arbitrary. Potential default on debt raises issues of contingencies for shocks. Both insurance and credit can be seen as smoothing mechanisms that complement each other, e.g., borrower is willing to pay lender more if the lender is in an adverse state, encouraging lending, and borrower is happy to pay less if in an adverse state, hence more willing to borrow, as in the early work on risk sharing of Udry (1994). In short, insurance and credit, as products, are complements to each other. Likewise, debt can fund investment, but insurance mitigates the risk of random returns, so investments with debt and insurance are more likely to be undertaken in together,

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again as complements. Carter, Cheng and Sarris (2011), a theory paper on interlinked credit and insurance markets, explore this theme in more detail, emphasizing collateral and risk. This premise of complementarity was tested with an RCT reported in Gine and Yang, though with mixed results, largely only the loan had been taken up, suggesting that perhaps household had informal insurance already. On the other hand, Rampini and Viswanathan (2016) show that total promises are limited by collateral when there is limited commitment, that a promised payment on debt competes with the promise to pay the premium in high-income states, and that the first intertemporal motive can dominate. The larger point is that insurance and credit often cannot be considered separately, and in this chapter, we adopt the broader view of insurance.

Likewise, regarding formal vs. informal, as noted in Section 2 below, much of the literature tends to overlook one side or the other. For instance, some papers evaluate formal programs without delving into the informal side, assessing the success or failure of formal interventions in isolation of the informal sector as if it were not there. While a successful policy change or formal intervention may suggest that the informal system were inadequate, the latter may not be analysed, and there can be surprises, as will become clear below. On the other side, other papers examine the functioning of village economies as if they operate in isolation from formal systems, downplaying the connection between them. Well-functioning local systems may suggest that no outside intervention is necessary. However, this approach could again lead to policy errors, as is also argued below.

Section 3 briefly reviews another approach taken in the literature, that financial systems as a whole are evaluated for efficiency, determining salient obstacles to trade without distinguishing the institutions or mechanisms, that is, without

distinguishing formal from informal. Alternatively, researchers might stratify by participants vs. non-participants in a formal system or in an informal system, separately examining each one at a time. Though this can be informative, it runs the risk of ignoring interactions.

Section 4 gets more into the heart of the relationship between formal and informal financial systems, exploring at a greater level of detail the potential interactions and impacts of formal and informal on each other. Some studies suggest that formal and informal systems are substitutes, while others find them complements. These opposing but not mutually exclusive views indicate that our understanding of the interactions between formal and informal financial systems needs further research.

Section 5 highlights literature that shows how external formal interventions can have unintended consequences, damaging informal networks and causing welfare losses. The evidence on this is substantial, though the various contributing authors differ in what they surmise to be the mechanism at work.

Yet section 6 presents recent work showing how a formal sector intervention can amplify informal networks, making them stronger and more functional than before. Nevertheless, that same intervention simultaneously damaged those who were not part of the pre-existing network. This section also highlights the various tools used in the literature: multiple data sets, transaction-level data summaries, differences in differences methods, and structural models. In this section, all these are taken to the same application.

Section 7 illustrates some of the mechanisms that intimately link the formal and informal sectors, highlighting relationships familiar to high-valued wholesale

markets in advanced countries. Finally, Section 8 summarizes the key findings and emphasizes implications for future research.

2. Views of Formal and Informal Systems

As outlined above, here we set the stage for interactions of formal and informal and insurance, and other systems, by noting, albeit briefly, the more typical literature, which largely ignores one side or the other.

2.1 Formal Financial Systems

The World Bank's International Finance Corporation (IFC) significantly focuses on insurance, particularly for the agriculture sector. Hazel et al. (2010) discuss the background and potential of insurance programs for the agriculture industry and the challenges encountered. Despite the attention given to these programs, there needs to be more evaluations with microdata. Gine et al. (2008) and Cole et al. (2013) conducted randomized control trials in India and found limited uptake of reasonably priced insurance products even among the risk averse. Cai et al. (2009) explore evidence from a natural experiment in China that limited take up is due to a lack of trust in the provider. In contrast, index-based livestock insurance seems effective in Mongolia against the climatic threat of severe winters, or "dzuds", which prompt herders to conduct vast sell-offs, often at depreciated prices. Jensen, Barrett, and Mude (2017), Janzen and Carter (2019) Larson (2023) highlight the need for further research on the effectiveness of formal insurance programs.

More has been done on the credit side, though, as Banerjee and Dufflo (2014) note, few programs directed at larger firms have been evaluated with microdata. The authors use exogenous government policy variation in India and find that most firms use directed credit to expand production and then contract afterward when it is withdrawn. The more voluminous literature on credit comes from microfinance interventions, sometimes referred to as quasi-formal as they lie between informal markets and larger formal sector providers. This literature includes the much-cited work, Fafchamps, Mckenzie, Quinn, and Woodruff (2014), an RCT in Ghana that rates of return on injected credit are high. Banerjee et al. (2015) provide an assessment of randomized experiments on granting credit in six countries (i.e., Angelucci et al. (2015); Attanasio et al. (2015); Augsburg et al. (2015); Crepon et al. (2015); Karlan and Zinman (2011); Tarozzi et al. (2015)).

Relevant to this review are findings concerning heterogeneity and potential negative impact. Meager (2022) uses hierarchical Bayesian methods to pool across these above studies, finding negligible if not negative impact of microfinance on low-profit small borrowers, with gains and wide dispersion at high deciles of profit. The idea that interventions have heterogeneous impacts and can cause losses is also contained in Kaboski and Townsend structural model (2011). A million baht was injected in each Thai village quickly, right after the election of a new prime minister, not anticipated, and injected regardless of the village population, thus giving variation in per capita treatment.² Households who would benefit from lenient terms of default are precluded from default with the easier credit access of the village funds, and they become more indebted and pay interest on that debt. For others not credit constrained, enhanced credit liberates money previously used as a buffer stock

to hedge risk. The village fund experiment will reappear in the various sections below as more and more is done with it.

2.2 Informal Systems

2.2.1 Well-functioning village economies

In contrast to formal insurance programs, there is substantial research on the functioning of village economies as insurance systems. For example, Townsend (1994) examined this premise in villages in India using ICRISAT panel data and found that a full insurance benchmark of Arrow and Debreu fits surprisingly well. Chiappori et al. (2014), with monthly Thai village data, fail to reject full insurance. Ravallion and Chaudhuri (1997) highlighted the important policy implications of these findings; if the insurance premise were true, then there would be less need for outside formal interventions apart from redistribution. Ravallion et al. (2015) remain skeptical of the insurance premise.

In the field of political science, Wade (1988) views villages as republics, each with its own governance systems. However, a number of studies in political science have the premise that village systems can be quite imperfect. Indeed, Wade (1998) was asking what factors allow for cooperation, noting village cooperation does not always happen. He concluded that landholdings across households of similar size and most households dependent on irrigation are key to cooperation. In economic terms, there are 'public good; and 'willingness to pay' aspects. Indeed, there is a concern that ICRISAT data in India were not representative, that villages were selected for willingness to participate in proposed agricultural crop experiments. Below selection into large-scale micro finance seems to have necessitated changes in governance and so is potentially related.

2.2.2 Identifying Village and Other Insurance Failures, by Geography and Sector

A subsequent literature aims to identify the effectiveness of risk sharing in different subgroups and locations and to quantify the differences. Deaton (1997) studied insurance across regions in Cote d'Ivoire, utilizing LSMS panel data, and discovered significant partial insurance, despite previously held views. Townsend (1995) utilized pseudo-panel data derived from the aggregation of SES cross-sectional surveys to reveal that risk sharing varies by sector and region, especially limited for small and medium enterprises (SMEs) near Bangkok. In short, from these studies, there is insurance, but it is incomplete.

Suri (2008) examines insurance both within and across villages simultaneously. Using a two-tiered regression analysis of income and consumption data, they find that insurance is more prevalent within villages than across villages. Likewise, Samphantharak and Townsend (2018) use the Townsend Thai Monthly Survey and show, using an analysis of risk premium in rates of return for SMEs, profits over assets, that within-village systems, though not perfect, function much better than across-village systems. Idiosyncratic shocks are somewhat well covered within villages, but aggregate village-level shocks are not much covered across villages.

Nevertheless, using the same survey, Kinnan et al. (2020) find kinship groups and networks are key to within village smoothing. For those not in a gift-giving network, idiosyncratic sickness shocks lead to liquidity shortfalls and propagate throughout village networks, creating an aggregate shock. As across-village smoothing is worse than within village, on average, one surmises that the geographic span of informal networks has limits. Can the formal sector compensate? Alem and Townsend (2014)

evaluate the impact of existing formal institutions on investment and consumption smoothing, a risk-sharing model, by using Townsend Thai annual panel data across four provinces. They found that access to the Bank for Agriculture helps with risk sharing quite well, while other formal sector institutions, such as commercial banks, are less effective.

3. Imperfect Financial/ Information Regimes, Distinguishing Obstacles

Karaivanov and Townsend (2014) utilize a combination of structural tests and computational methods based on mechanism design and linear programming to evaluate financial constraints--moral hazard, limited commitment, hidden output, and saving/borrowing only--referred to as constituting financial/information regimes. Likelihood functions are used to estimate the parameters of technology and preferences on data from the Townsend Thai data for each regime. The regimes' likelihoods were compared pairwise to determine the closest fit to actual data. Results showed regional variation, with exogenously incomplete regimes (i.e., saving/borrowing regimes) fitting best in rural areas of northeast Thailand and the imperfect information regime (i.e., moral hazard) fitting best in central and urban regions near Bangkok. This is also consistent with the evidence in Ahlin and Townsend (2007) on repayment in joint liability groups, and in Paulson and Townsend (2004) on SME entry, each using entirely different data sets gathered in 1997 covering the same geographic areas. So, on the positive side, we learn that obstacles vary and should be taken into account in evaluations. On the downside, no explanation of varying frictions is offered, though to anticipate, we come back to that below.

Other studies also compare different obstacles to trade. Kinnan (2021) argues that when insurance is limited by either moral hazard or limited commitment, forecasting

a household's current inverse marginal utility uses lagged inverse marginal utility (LIMU), only, without any other past information, but when hidden income constraints become relevant, LIMU alone is not sufficient for predicting consumption. There are many other papers aim to distinguish the financial constraints (e.g., Ligon (1998), Kocherlakota and Pistaferri (2009), Meh and Quadrini (2006), Attanasio and Pavoni (2011), Krueger and Perri (2011), Broer (2011), Ai and Yang (2007), Schmid (2008), Dubois et al. (2008)).

Connecting to what was mentioned earlier, one can stratify by informal networks. Kinnan and Townsend (2012) analyzed consumption smoothing within informal networks in a village, where households were connected by kinship; they found that almost full risk sharing. Likewise, Karaivanov and Townsend (2014) find the same in testing those financial regimes when stratifying by those with kin. Similarly, firms in Spain that are family-connected through boards of directors performed better in terms of implications for capital and investment data. (Karaivanov, Saurina and Townsend (2019)) Unbanked firms in Spain, but with family connections, had a financial structure like a credit/ insurance model with moral hazard and unobserved effort. In contrast, single-banked firms had a more limited financial structure, similar to a traditional debt model with exogenously imposed restrictions. A takeaway is that informal systems, though limited, remain important as one moves to advanced economies, with the formal sector again coming up short.

4. Interactions of formal with informal insurance systems: substitutes or complements?

We come to the main theme of this chapter, the interaction of formal and informal credit and insurance systems. This goes beyond whether one system works better

than another, as just reported, interesting though those patterns may be. Rather, the question is whether formal and informal sectors are substitutes for each other or instead complements of each other.

4.1 Substitutes

As noted earlier, within the village, insurance systems can function well, pooling idiosyncratic shocks. But this can leave households vulnerable to common village-level aggregate shocks. Chiappori et al. (2014) allowed for heterogeneity in risk aversion, estimated by allowing households to differ in the extent to which they bear those common aggregate shocks. Risk-tolerant households effectively provide insurance to the more risk-averse households and are compensated with higher-than-average consumption as a premium.

If, in this context, external formal insurance were offered, e.g., IFCT weather insurance products, this could undercut the provision of insurance against aggregate shocks offered by those risk-tolerant households. The latter group, the insurers, could be made worse off. IFCT insurance across villages has the advantage of geographic pooling, so external insurance for village aggregate shocks could be less expensive. This is a cost factor to be weighed off against preferences, are risk-tolerant insurers within the village closer to risk-neutral than outside providers might be, despite diversification of the latter? If not, insurance purchases within a village are better off with external sources. In sum, here, formal and informal are substitutes, one potentially dominating the other and with heterogeneous impact.

Related themes are explored in a rainfall insurance RCT analyzed in Mobarak and Rosenzweig (2012), with the premise that informal risk sharing in India takes place

among sub-castes. Informal risk-sharing networks lower the demand for formal insurance only if the network indemnifies against aggregate risk.

Substitution and selection is a well-explored topic in the literature on formal and informal credit sources. The evidence largely supports the thesis that the substitutability of formal with informal is limited. Bell, Srinivasan and Udry (1997) investigated the institutional structure for short-term loans by farmers in two districts in the Punjab. Formal sector cooperatives offered lower interest rates than private sources, and the authors found evidence for a sequential structure in which farmers were rationed in formal access. Further, the demand for formal credit was inelastic with respect to interest rates.

Hoff and Stiglitz (1990) also find limited substitutability but reached somewhat different conclusions on causes, focusing on the market structure. Using survey data from countries including Thailand, India, Pakistan, and Zaire, the authors found that the introduction of government-subsidized credit did not improve the terms offered by informal loan providers. Informal credit sources such as usufruct loans, trade-credit interlinkages, and village- and kinship-based credit systems, among others, are available to some borrowers and lenders and not to others, making the informal credit markets segmented and monopolistically competitive.

Finally, Karaivanov and Kessler (2018) explore the substitutability and choice of formal vs informal credit, focusing on enforcement. Informal loans are enforced by threat of breaking social ties, a kind of indivisibility, effective if the network is large, but likewise costly to all parties if/when it happens. Formal loans are enforced with collateral which is more divisible in principle and transferable. We return to these themes below.

4.2 Complements

Complementarity is an alternative hypothesis. Chandesekar, Townsend, and Xandri (2018) study which node is the most valuable in terms of allowing pass through of formal liquidity injections to network members. They find that households that participate in the market when the market is thin, when there are few linked transactions, are the most valuable carriers of liquidity, in terms of welfare gain. This is confirmed in the data from Thailand, where such valued households are observed to have higher than average consumption, as if they are being compensated for providing insurance to others. Thus, if liquidity is provided externally and in advance, as a credit line or buffer stock but is costly for the formal sector to provide, liquidity can reach others through the village network. The complementarity of formal with informal is highest when the key node is selected judiciously, the most valued player. Related to the articles reviewed above, formal sector costs, or timing of formal connections relative to informal meetings, are key.

The credit literature is also consistent with complementarity and reveals additional factors. Gine (2011) studied the persistence of informal finance in rural credit markets in Thailand using maximum likelihood methods. Some households borrow simultaneously from both formal and informal sources, yet others from each separately. The results showed that enforcement rather than transaction costs was the dominant factor explaining the mix of formal and informal sources. Similarly, Peterson and Rajan (1997) observed that larger firms use trade credit to on-lend finance obtained from formal sources to smaller, financially constrained firms. This view is related to Jain's (1999) perspective, in a sense working in reverse, that the

formal sector is effective in deposit mobilization but has an information disadvantage in lending and so uses observed partial funding in the informal sector as a screening device. Similarly, Conning (2001, 2005) finds the informal sector acts as a delegated monitor.

Relatedly, Chandrasekhar, Kinnan, and Larreguy (2018) also find that social sanctions and the enforcement phenomenon are key, but return to the context of explicit networks. The premise of the study is that little was known about the extent to which social networks can substitute for formal contract enforcement and even less about how the introduction of contract enforcement affects transactions traditionally mediated informally through the social network. Through high-stakes games across 34 Indian villages, the authors randomized subjects' partners and contract enforcement and found that cooperation depends on the underlying social network. Close pairs in the network cooperated even without enforcement, while distant pairs did not. The authors also found that pairs with unequal network importance showed less cooperation in the absence of enforcement, as might have been anticipated by Wade (1988). The results highlight the importance of considering the underlying social network structure and one's position in the network when evaluating the effectiveness of contract enforcement.

Also revealing of the role of social networks is Banerjee et al. (2019), who find that the Thai village fund program leads to increased profits and capital for households with high total factor productivity (TFP) but not for households with low TFP. This is related to the heterogeneous treatment outcomes in Banerjee et al. (2015) and Meager (2022) above, but here the network is explicit. The allocation of the loans directly to borrowers was virtually random, but the impact of those loans was not.

Specifically, loans from village funds to unproductive borrowers can happen when a borrower has family ties to the village fund committee, Vera-Cossio (2022), and make their way through informal networks to productive investors. So social networks are complementary to the formal village fund intervention, a point explored further below.

In summary, in the comparison of formal versus informal, there is evidence for imperfect substitutability, with exceptions, and evidence of a strong role for complements, with factors varying from different provision costs, timing, and varying enforcement mechanisms

5. ‘Collateral Damage’: Adverse Interaction Effects

Going the other way, Banerjee et al. (2020) found that the introduction of microfinance in Karnataka and Hyderabad, India, had a shrinking effect on social, financial, and other types of networks. The number of network links diminished in villages exposed to microfinance, which might be seen as a substitution effect. However, links between households unlikely to ever borrow from microfinance were also likely to disappear as a kind of collateral ‘unintended’ damage. They found that households unlikely to take up microcredit suffered the most significant loss of informal borrowing and risk sharing. The authors conjectured that the explanation for this phenomenon was the importance of chance meetings and socialization in network formation, which happened less for direct recipients of the intervention, thus impacting yet others through loss of links.

Binzel, Field, and Pande (2013) also found that improved access to formal financial services led to an increase in formal borrowing and a decrease in informal borrowing, as substitution might suggest. But again, there was a decline in informal

trust-based institutions and a decrease in the risk-sharing capacity of informal networks. The authors observed a shift in resource sharing and transfers away from financial network links, yet in this study, towards social links, possibly towards members for whom they feel greater altruism. The takeaway from both studies is that networks have limited span/ functionality to overstate, almost as if they can only do one thing at a time well.

The study of Heß, Jaimovich, and Schundeln (2018) also provides such evidence. The introduction of a Community-Driven Development program in The Gambia resulted in lower transfers in social networks. However, the authors attributed this to somewhat different channels, not on a limited span. Firstly, the program led to wealth effects and a shift towards a more formal economy, which reduced the need for informal transactions. Secondly, the benefits of the program were captured by the elites, leading to reductions in social capital and economic transactions, a theme we have encountered earlier.

These findings all suggest that the introduction of formal financial institutions can alter transactions that might have otherwise taken place informally through social networks and damage welfare. But again, the mechanism in each study is different, suggesting further work to sort out among multiple hypotheses.

6. Enhanced Informal Networks

Ru and Townsend (2020) find that the role of preexisting informal kinship networks was strengthened after the introduction of a quasi-formal Thai village fund program as a kind of complement through its implementation, specifically the enforcement mechanism, alleviating obstacles to trade. Still, there was ‘collateral’ damage, as well, in the sense that those not in the in kinship network suffered a deterioration in

their previous arrangements. The analysis uses many techniques covered in the earlier sections and several different data sources, with the distinguishing characteristic that all are combined into a single effort.

One feature utilized is transaction data. A consistent accounting framework with a variance-covariance decomposition provides the background. The authors can quantify the mechanisms used to smooth monthly budget deficits, both consumption-income deficits and more inclusive consumption+investment-income deficits that include financing capital acquisition. While using cash (paper currency) was the largest device filling the gap, gifts were the second largest. Further gifts are larger for the more inclusive definition of the deficit, including investment financing. Informal kinship networks play an important role in smoothing household consumption and financing investment.

Timing associated with the introduction of the quasi-formal village fund intervention gets at the amplification and also the damage. The role of gifts in smoothing monthly budget deficits (including consumption and investment financing) increased significantly after the introduction of the village fund program, relative to before, for those with a kinship connection in the village, while that smoothing role of gifts decreased for those without kin. This held true when limiting attention to those with/without a kinship connection to village fund borrowers. In this sense, the informal network was enhanced. But for households without kinship connections, gifts play a significantly smaller role in smoothing deficits following the introduction of the village fund, again a kind of ‘collateral’ damage. As with the earlier literature more work is needed to understand this attenuation.

Ru and Townend (2020) also use structural models to detect financial information regimes. Specifically, they use the annual panel data of household-level consumption, production, investment, and capital stock to analyze the shift in financial regimes following the introduction of a village fund program. As described earlier, Karaivanov and Townsend (2014) utilize maximum-likelihood estimation to compare four financial regimes, using Vuong (1989) tests: two exogenously incomplete regimes (saving only and lending/borrowing) and two relatively less constrained regimes (moral hazard with unobserved effort and costly state verification (Townsend (1979))). The results show that the costly state verification regime is a better fit for high TFP households after the introduction of the village funds, whereas the lending/borrowing regime continues to dominate for low TFP households. The findings suggest a shift in the financial regime induced by a relatively large village fund program in 2001, with more external funds at stake than previously, with the tools for administration, which include an enhancement by the informal sector. Here also, the positive impact on high TFP households and not the lower ones reminds us of the early findings on heterogeneity in impact by size (e.g., Banerjee et al. (2015) and Meager (2022)).

Ru and Townend (2020) further compare the four financial regimes but do so in the monthly survey data. As shown in previous research, the lending/borrowing regime prevails over all other regimes for the entire household sample and all-time intervals from 1999 to 2011. However, this changed after the implementation of the million-baht fund program. When considering only the bottom 25% of relatively poor households based on their initial wealth in 1999 and stratifying the sample into pre- and post-village fund periods, the authors find that while the savings-only and lending/borrowing regimes are tied and dominated the other regimes during 1999-2001, the costly state verification (CSV) regime emerged as dominant among these poorest households from 2002-2011. The shift to CSV was particularly pronounced

among households with kinship connections to village fund borrowers, as evidenced by their relatively high regime likelihood. On the other hand, households in the village with no kin connections appear to have experienced a decline from the moral hazard regime before the village fund to a tie between savings and lending/borrowing (although the likelihoods for all regimes in this group were low). This echoes the collateral damage idea here through the lens of these structural models.

Risk-sharing is a crucial factor for these poor households, as seen in their reliance on gifts and smoothing to manage their financial needs, including investment. However, obstacles exist, as was discussed in Section 3. The structural costly state verification (CSV) model is one such obstacle, as the cost of verifying otherwise unobservable income/output becomes a critical variable, hindering risk-sharing and access to funding. Verification is related to enforcement. If a claim is verified to be false, social sanctions are employed. At one extreme, if verification is free (i.e., zero cost), it is always optimal to audit agents, either by a "principal" or the community as a whole, resulting in a CSV financial regime that is essentially a full information, full risk-sharing investment model with fully observed income. On the other extreme, if the verification cost is exceptionally high, the community would rarely, if ever, audit agents, leading to a hidden output financial regime where the true production of the agent is never verified.

Estimating the key verification cost for various subsamples and time intervals, households with kin connections to village fund borrowers have significantly lower verification costs as compared to before the arrival of the village fund. The kinship network became more activated after the introduction of the village fund in the sense of having relatively lower verification costs.

7. Interlinked Formal and Informal Financial Instruments:

The work of Sripakdevong and Townsend (2022) sheds light on the actual underlying mechanisms that link formal and informal sector loans, focusing on timing. In their study of Thai data, they trace chains of credit transactions on the borrowing and repayment side. When a formal sector loan comes due, and a borrower experiences a temporary shortfall, the borrower wants to remain in good standing and so borrows from informal sources as a bridge loan to repay the formal loan. Once able to borrow again formally, the borrower repays the informal loan. Longer chains are pieced together as informal lenders borrow from others.

Although late payments can happen and propagate along the chain, early repayment of loans from borrowers experiencing beneficial shocks can also reverberate along the chain.

Risk-sharing regressions confirm that those involved in such credit financing schemes have lower transaction costs, presumably capturing the costs of state verification. The repayment of a village fund loan emerges as a special case of a sophisticated village money market, not unlike the relationship-based borrowing and lending in the financial markets of New York.

8. Conclusion

This chapter provides a comprehensive and up-to-date overview of the formal and informal financial systems and their interactions, offering valuable insights for researchers, policymakers, and practitioners. We have learned that formal insurance and related products can be helpful, though the many gaps in the financial system

detected in analytic work exist despite the presence of formal sector providers. Further, and potentially related, many studies reviewed in this chapter suggest that the impact of formal provision must be considered in the context of pre-existing informal systems. Informal lenders may charge higher costs, as in early literature, but the informal sector may also possess alternative cost advantages, such as enforcement, and be associated with informal networks engaged in risk sharing, at least at the local level. To the extent that informal networks do less well in risk sharing across villages and that formal and informal are complements rather than substitutes, that may suggest a reason for the formal sector absence.

Risk sharing can vary and is subject to obstacles to trade, which can vary by sector or region. Data on this can guide interventions to where they are most needed and easiest to remedy. Policy interventions should take care to preserve the good parts of these informal systems, rather than, say, an ill-conceived goal of replacing the informal sector, typecast as consisting of usurious money lenders. To the extent that formal sector is a fallback option, with increasing attractiveness as costs of access are reduced, exit from an informal system relying on social sanctions is less painful; thus, local damage is done.

Mindful of interactions, formal interventions should judiciously choose target injection points in a stochastic network, distinguishing risk sharing from enforcement. Further obstacles to trade in informal systems can be influenced favourably by large-scale formal interventions, allowing such interventions to have a beneficial amplification effect larger than what otherwise might appear to be the case from pre-intervention data.

Exactly how to use new digital technologies to enhance welfare without undercutting existing relationships or ways to compensate losers is a priority for research going forward. Harder still is to understand the collateral damage done to those not in networks and specify remedies.

In conclusion, by understanding the interactions between formal and informal financial systems, policymakers, and practitioners can better design policies that support both types of systems, leading to more effective and sustainable solutions for financial inclusion and development.

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