Financial Aggregation of Risks for MSMEs in Developing Economies: A Conceptual Framework of Financial Aggregation and Microinsurance Effects.

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Abstract

Business vulnerability is a function of the extent of risks faced and the ability of the business to adapt to adverse changes in circumstances. Financial Aggregation arises out of the link between economic interactions at the micro level and their macro based risks Microbusinesses in developing countries are often highly vulnerable to a range of risks including natural disasters, corruption, poor weather conditions and illness. This vulnerability creates a need for insurance but ability to take out appropriate insurance is frequently limited by financial resources, availability of insurance policies and information on these policies and financial education levels. On the supply side, microinsurers are faced with high marketing and administrative costs and the microinsurance market is further distorted by information asymmetries, adverse selection and moral hazards. This limits interest in the microinsurance market from commercial providers, with microinsurance frequently being available through non-profit agents. This paper investigates the relationship between vulnerability, risk appetite of microbusinesses and their propensity to insure. In building a conceptual framework, we explore the factors that impact financial aggregation and the uptake of microinsurance. We observe additionally that improved financial education and more effective information may help to increase the extent and quality of microinsurance.

Keywords: Financial Aggregation, Microinsurance, Microbusiness, Risk, Risk Appetite, Business Vulnerability;

Introduction

Micro, Small and Medium Enterprises (MSMEs) are immensely vulnerable to economic, environmental and socio/political risks. However these risks do not in the ordinary course of events arise singly but are the results of events which may happen simultaneously and losses from these events may thus become aggregated. Aggregation of risks arises out of the economic interactions between risks at the enterprise and local (micro) level and wider national and international (macro) risks. The micro risks arise from the day to day business risks of the individual economic agents. The macro risks are possible events in the wider world and wider economy. Aggregation of risks can arise from any combination of risks, whether micro or macro. For instance, adverse events arising from government tax policies and interest rates and new regulations (all macro risks) may coincide with local or family events such as local weather changes or illness (which are micro risks). These events need not arise one at a time but can accumulate within a short timespan. Some risks, such as natural catastrophes, are uncontrollable and unpredictable.

Munich Re Economic Research (2013) report that 'The average percentage of direct losses per year with respect to GDP is highest in emerging economies at 2.9%, compared with developing economies (1.3%) and industrialized countries (0.8%,)'.

To a greater extent MSMEs can handle some of micro and macro level risks through both formal and informal means. It is the uncontrollable uncertainties that can wipe out the whole livelihood of these MSMEs. Small businesses are not immune to risks arising from geographical shocks (O'Brien *et al* 2006; Srivastava and Shaw 2014; Joyette, Nurse and Pulwarty 2015). Floods, tsunamis, earthquakes and the like can be devastating to micro and small scale businesses. These enterprises' own level of financial vulnerability adds to the level of aggregated risk. Moreover, MSMEs in these highly exposed developing countries are

not always in a position to raise sufficient capital to reinstate damaged assets and restore enterprises post-disaster (Gurenko 2004).

In addition to the risk of natural disasters there is also a considerable risk of manmade disasters affecting smaller enterprises. Small businesses in developing countries may be at a higher risk from corporate crimes involving non-compliance with building codes and health and safety violations by other businesses with which they share buildings (Ibem 2011; Rafi, Wasiuddin and Siddiqui 2012).

The emergence of new financial instruments and risk mitigation schemes such as insurance risk transfer to global financial markets have motivated many developing country governments and institutions to consider these instruments for MSMEs to mitigate financial loss and financial aggregation as part of the disaster risk management process (Linnerooth-Bayer *et al* 2009).

Insurance enables the transfer of risks to an insurance organization or to a mutually constituted insurance pool. However for insurance to be available the insured party pays a premium and underwrites a small proportion of the loss (the latter to prevent moral hazard) for a certain amount of cover. Insurers will, however, only cover pure risks and not speculative risks. Uncontrollable risks like earthquakes, floods etc. are deemed fundamental risks which in theory are not insurable. However with capacity available worldwide, today many of the fundamental risks are covered.

Small businesses reliant on local markets may also be vulnerable to local economic risks, which are not generally insurable. Nevertheless insurance demands a premium to be paid for the risk cover and this can be a problem for micro and small business enterprises, who may not have a consistent month on month income. These businesses can find themselves reverting to informal, high interest loans or selling their assets or engaging in low risk and potentially low output activities (Varangis *et al* 2002).

The growth of microinsurance has proved a novel scheme to reach out to this sector to ensure cover is available to the most vulnerable at affordable prices (Mechler, Linnerooth-Bayer and Peppiatt 2006; Apostolakis, van Dijk and Drakos 2015). There are microinsurance models in place (Cohen and McCord, 2003), including the use of mobile technology to pay premiums and to collect benefits.

The provision of microinsurance does not necessarily alleviate financial risk aggregation. Firstly, many of the micro businesses may find it difficult to save to pay even a basic premium and the level of cover may be low at best. Secondly, in many instances there is financial exclusion preventing certain entrepreneurs from accessing banking facilities to enable investments and savings. The accelerating development of mobile technology seemingly plays a significant role in mitigating this circumstance (Prashad, Saunders and Dalal 2013; Prashad *et al* 2014).

Our study seeks to inquire whether microinsurance through the various modes impacts the level of financial risk aggregation. The microfinance literature in the main and the microinsurance literature specifically has discussed the limitations of small businesses arising from the extent of their productive assets (Stiglitz, Sen and Fitoussis 2009), risk bearing capacity (Kondo 2007) and financial capability (Zeller and Meyer 2002; Rutherford 1999; Churchill 2007).

Vulnerability literature on SMEs has explicitly considered the relationship between vulnerability, resilience and adaptive capacity (Fiksel, 2003; Dalziell and McManus, 2004; Kitching *et al* 2009), yet there is still a need for further investigation of the relationship between perceptions of hazard and vulnerability. Low income groups, including many owners of microbusinesses are vulnerable to fundamental personal risks arising from poverty and illness (Bhattamishra and Barrett 2010; Cohen and Sebstad 2005; Dercon, Bold and

Calvo 2008). This creates a vulnerability of a quality not faced by most large businesses, the survival of which is not usually bound up with the personal wellbeing of the owners.

There have been some studies that show that vulnerability combined with a specific risk appetite impacts the propensity to insure (Reynolds *et al* 2001; Cohen, McCord and Sebstad 2005).

Therefore we develop two contributions: the first is a conceptual paradigm for the analysis of the relationship between vulnerability and risk appetite among microbusiness owners, their perceptions of insurance and propensity to insure. The second is an examination of these relationships in the light of the existing literature on risk, microbusiness and microinsurance.

The concept of financial aggregation of risk can, in principle, provide the theoretical base for a more in-depth analysis of risks and risk management for MSMEs in developing economies. We do not intend to provide a totally developed theory of financial aggregation of risk but we introduce a conceptual framework that intends to enable further discussion and testing of the relationship between risk, vulnerability and insurance in microbusinesses.

In summary, in this study, we develop a conceptual model to explain the complex relationship between risk appetite, business vulnerability and insurance take up (propensity to insure) and its impact on financial risk aggregation.

The remainder of the paper is organized as follows. First we present a framework for the discussion of microinsurance. Then the nature of risk and the variables by which risk may be described and categorized. We then discuss the factors affecting risk appetite, risk aversion and propensity to insure.

We follow this by exploring the nature and development of financial risk aggregation and microinsurance. Finally we discuss the study's conceptual contributions in order to form conclusions, identify the study's limitations and suggest avenues for future research.

Microinsurance: Probability of Utilisation

The framework for our discussion of the uptake of microinsurance is illustrated in Figure 1. In order to predict the probability of utilisation of microinsurance, it is necessary to understand the potential policyholder's exposure to risk and their attitudes towards risk and insurance. It is also, however, necessary to understand the factors affecting the probability of microinsurance being offered. The combination of these factors determines the probability of insurance contracts being taken up.

Figure 1. Conceptual Model for Microinsurance

Insert Figure 1 year here

As shown in Figure 1, the propensity to insure is a function of both the potential supply and the potential demand. The potential supply of microinsurance can be described in terms of the availability of insurance policies and their perceived quality, in terms of cost efficiency, appropriateness to the risks faced and speed and accuracy of processing claims (Matul, Tatin-Jaleran and Kelly 2011).

Risk, Risk Attitude and Risk Appetite

The demand side depends on the business owner's attitudes to risk and the risks actually faced. Three separate but interlinked factors (see Figure 1) which need to be considered are risk, risk attitude and risk appetite. Risk is the level of probability of a variety of adverse events. Risk attitude is the personal attitude of the business owner towards risk in general, prior to consideration of the risks actually faced. Different business owners will have different risk attitudes in the same circumstances, with some being highly risk averse and some being willing to accept a high level of risk. Risk attitudes may be affected by a number of factors, including innate psychological disposition, potential domestic consequences of

risk and education. Education may result in a more risk averse attitude to common events with extreme consequences (Izadkhah and Hosseini 2005) and a more relaxed attitude towards risks which are more remote or of less consequence, although the act of drawing attention to risks can have a distorting effect in relation to the relative seriousness of dramatic and mundane risks (Slovic 1986). Education may also contribute to an understanding of how risks can be managed (Twigg 2004). In addition, a more risk averse personality may seek more information about imagined risks and the information obtained may lead to a modification of attitudes, towards either a more relaxed or a more risk averse position.

Owners may vary in their attitude to risk and in their perception of what creates and aggravates risk. Gilmore, Carson and O'Donnell (2004) found that business founders perceived cash flow risks to be particularly critical and that succession planning, delegation, diversification and business expansion were all risk factors. The individual's perception of where risk lies is a key part of risk attitude.

While risk attitude is a personal and subjective reality, risk appetite is a commercial and behavioural one. Risk attitude will influence risk appetite, with a risk averse person adopting a lower risk appetite in business matters. However risk appetite is also influenced by other things, including business vulnerability, that is, the level of adverse events which can be endured before the business fails. A certain level of vulnerability may be inherent in the business environment or be forced on the business owner by available business options. The more vulnerable the business in present circumstances, the less additional risk the business owner will be willing to take. Risk attitude and business vulnerability are therefore internal and external influences respectively acting on the business owner and affecting risk appetite.

One factor affecting risk appetite is the reason for starting in business. Block and Sandner (2009) and Block, Sandner and Spiegel (2015) found that necessity entrepreneurs were more risk averse than opportunity entrepreneurs and the two types of entrepreneur may

differ in both their pre-existing risk attitude and their experience of business risk, which may be of particular significance for developing countries, where there is a greater prevalence of necessity entrepreneurship (Reynolds *et al* 2001). Necessity entrepreneurs may also be motivated to close their own businesses and enter employment elsewhere when the opportunity arises (Ghosh and Guha 2015). This may be of particular relevance to microinsurance for small businesses in developing countries, because of the prevalence of necessity entrepreneurship there (Reynolds *et al* 2001). This may reduce the willingness of business owners to undertake business activities which involve higher personal or financial risks but in cases where they do undertake risky activities it may increase their likelihood of taking out insurance where it is available.

A business owner with a lower risk appetite might avoid risks where possible, thereby reducing the need for insurance but might also have a greater propensity to insure for a given level of risk. Meanwhile, the specific risks faced by the business must be considered in the light of the circumstances in which the business operates, as it is this that creates vulnerability, the risk of business failure or other serious consequences. Vulnerability to risk is not wholly avoidable and, combined with a low risk appetite, creates a propensity to insure, which will lead to insurance being taken up if suitable insurance is available (Cohen, McCord and Sebstad, 2005).

Risk Appetite and Propensity to Insure

Beyond the nature of the risks themselves, the uptake of microinsurance is influenced both by personal factors affecting microbusiness owners, by availability of risk management tools to reduce the need for insurance and by availability of insurance if required. Risk appetite is one factor which may affect the willingness of business owners to engage in activities which increase risk and subsequently their likelihood of insuring against the risk if insurance is available.

Risk management tools include use of information networks (Gilmore, Carson and O'Donnell 2004), use of experiential knowledge within core competencies (Gilmore, Carson and O'Donnell 2004), production of a formal business plan (Blackburn, Hart and Wainwright 2013) and use of tried and tested technologies (Blackburn, Hart and Wainwright 2013).

Risks and the Nature of Risk

Microbusinesses exist in agriculture, fishing (Inda-Diaz *et al* 2009; Mmopelwa *et al* 2009), manufacturing (Ghosh and Guha 2015) and retailing (Eversole 2004). Morduch (1994) identifies three structural sources that create vulnerability for the low income population likely to be engaged in microbusinesses in developing countries:

a) Weather and price variability of crops for agricultural communities

b) Poorly developed financial institutions

c) Weak social insurance institutions weak

These low income groups sometimes possess alternatives to the weak financial and insurance sector in that they may revert to self-insurance or informal insurance mechanisms such as borrowing from extended family or investing in assets with lower risk-adjusted returns such as jewellery and livestock (St. Bernard 2003; Miller *et al* 2006; Cook 2009). Remittances may also be used to compensate for natural disasters (Combes and Ebeke 2011), although reliance on remittances can create a further vulnerability in cases where relatives sending remittances are working in the informal economy or in legitimate but dangerous jobs (Powers, Magnoni and Zimmerman 2011). Therefore, shock events outcomes are stabilized by reduction of food stocks, sale of assets, calls for gifts from relatives and friends or local and family borrowing (Matul *et al* 2013). Matul, Tatin-Jaleran and Kelly (2011) provide an example of more permanent welfare sharing groups in Kenya, where members of the group contribute to a fund to provide payouts on the death of a family member and to contribute to healthcare costs.

However the financially vulnerable often pay heavily for the chance to save as the cost of informal loans can be significant (Rutherford, 1999). These loans are generally used to cover the basic living requirements and savings and insurance are at lower end of the priority list. Availability of financial resources is one factor in determining the propensity to insure and the lack of resources to fund insurance and to provide for savings to fall back on increases business vulnerability (Dayson, Vik and Ward 2009).

Small businesses and microbusinesses face, if anything, a wider range of critical risks than large multinationals. Because the microbusiness is more focused and uses a smaller range of resources, it is less able to absorb losses caused by local events or to diversify into industries with low or negative correlations of risk.

Owner-managed businesses in particular are vulnerable to business interruptions occasioned by the death, injury or illness (Eversole 2004) of the owner or by the owner's personal legal or financial troubles.

Small businesses in any economy face risks associated with trading partner insolvencies (Gilmore, Carson and O'Donnell 2004), reliance on outsourced logistics firms (Li and Chen 2010). Value chain risks can affect all sizes of business (Pujawan and Geraldin 2009). Smaller businesses, however, may be more vulnerable to the breakdown of links in the supply chain if they are not a major node in the business network and therefore have fewer alternative suppliers or customers. In addition, smaller businesses may face information asymmetries in their relationships with larger customers and suppliers and logistics firms (Li and Chen 2010), who may be better placed to exploit market information.

Although the probability of economic crime by employees, customers and outsiders than for larger businesses (Broadhurst, Bouhours and Bouhours 2013), which are more lucrative and more sustainable targets for the criminal, small businesses are less well placed to recover from serious crime losses. The Association of Certified Fraud Examiners (2014)

found that the worldwide average loss from a single fraud at a business employing fewer than 100 people was US$155 000 in 2014, which was more than the average loss for businesses employing 100 to 9999 people, with small enterprises being vulnerable to cheque tampering and financial statement fraud, as a result of the use of less sophisticated payment channels and inadequate resources for internal operational and financial reporting controls (Gunduz and Önder 2013). Small businesses may also suffer as a result of economic crimes involving corruption (Ionescu 2009; Mushkat and Mushkat 2012; Coogan *et al* 2015) and targeting big business and government (Ksenia 2008), which can deprive small businesses of access to adequate infrastructure (Tsaturyan and Bryson 2009), communications (Sutherland 2015) and healthcare (Hunt 2010) or divert labour and economic resources into illegitimate business (de Andrade 2008). In addition, small businesses may be more direct victims of corruption in cases where they are either approached for a bribe or excluded from contracts by recipients of bribes from other businesses (Luo and Han 2009). This risk is essentially uninsurable.

A further uninsurable risk arises from microbusinesses conducting their business informally (Srivastava and Shaw 2014; Ghosh and Guha 2015) or illegally by, for example, operating as an unlicensed street trader (Eversole 2004), which presents the risk of temporary or permanent closure, as well as exposing the business to both risks and opportunities arising from corruption and from political lobbying either to shut down or to legitimate illegal traders. Working in an unlicensed business also presents difficulties in obtaining insurance or other assistance, leaving these businesses particularly vulnerable to disasters and adverse events (Srivastava and Shaw 2014).

Handley-Schachler and Navare (2010) propose a scheme for categorising risk according to seven variables: cause; location of control; people affected; nature of effect; location of the effects; frequency; degree of effects; degree of symmetry; and predictability. This taxonomy was developed for the wider social impact of risks relating to transport and

requires modification in the discussion of insurance for microbusinesses. The question of the people affected is less relevant here, even if third party insurance is involved, as the only relevant risks are those which have an impact on the business itself. Externalities are essentially beyond the scope of microinsurance except to the extent that the insured business can be made liable for costs arising from them. The nature of the effect is also of little interest in the case of microinsurance. While illness and injury to owners or employees and damage to property are potential risks, the only effects relevant to the continuation of the business are those which ultimately have a measurable financial effect, even if the immediate effects relate to personal illness, injury or property damage. The location of the effects is likewise irrelevant, as only those risks which have an effect on the business at its place of operations are relevant, even if the risks are caused by events in other places. Finally symmetry is not relevant to insured risks, as only the downside probabilities are taken into account in the insurance contract and the upside probabilities are irrelevant.

However there are two further variables which are of greater importance in the microinsurance contract: information asymmetry (Chiappori 2000) and correlation or covariance with other policyholders' risks (Skees, Hazell and Miranda 1999; Alwang, Siegel and Jorgensen 2001; Dercon *et al* 2008). We therefore propose that insurable risks for microbusinesses may be categorized by seven variables:

1. Cause
2. Location of control
3. Frequency
4. Degree of effects
5. Predictability
6. Information asymmetry
7. Policyholder cross-correlation

Some of **causes of risk** are more significant to microbusinesses than to larger businesses. The risk of death or illness to key personnel, especially owners who provide both capital and labour to the business are more serious for businesses where there are limited opportunities to replace these personnel. Apart from the risk of business closure, the death of the owner of an unincorporated business and inheritance of the business assets by an heir who regards the business as a going concern but is unwilling or unable to manage it creates agency and tenancy problems where the manager of the business or leaseholder of the business premises has interests which are no longer aligned with the new business owner or landlord.

Causes of risk vary between different types of microbusiness. Small rural businesses might be threatened by adverse weather conditions or plant or livestock diseases but poorer farmers may also be based on marginal land in areas prone to flooding or earthquakes, while urban businesses are likely to be based in areas which have been preselected for habitation because of their relative safety from natural disasters. Subsistence and small scale commercial fishers may be threatened by pollution and overfishing (Inda-Diaz *et al* 2009) and by poisoning related to their occupation (Mathee *et al* 2013). In the case of risks of disease and crime, densely populated urban areas may be subject to greater threats from organized crime and epidemics but rural areas may have lower levels of policing and poorer access to health services.

In addition, while some microbusinesses may have only one employee, others may employ family members or other staff. This presents labour market risks of competition from other employers and also risks of industrial disputes. Ghosh and Guha (2015) found that even employing family members reduced microbusiness profit margins in Mumbai slums compared with businesses with no employees beyond the business owner. Eversole (2004, p.134) provides an example of one microbusiness owner who had already been forced to close one business because of high rents and poor industrial relations and who no longer

employed any non-family-members in her second business. Industrial disputes are not usually insurable from the employer's side. In addition, microbusiness owners may be at risk of violence or appropriation of earnings by domestic partners (Banthia *et al* 2012; Green *et al* 2015).

Weather risks also affect different businesses to different degrees. Unusual weather conditions may affect the yields for an agricultural business for an entire year or necessitate the replacement of livestock. For construction and transport businesses business interruptions directly caused by weather conditions will be more temporary. Retailing businesses may not be directly affected at all.

The layers of sources of risk for microbusinesses are shown in Figure 2, with expanding layers representing the owner, the workforce (who may also be the household), local geography – both human, including urban development and depopulation of rural areas, and physical, including weather risks and natural disasters, and regional geography over a wide area.

Figure 2. Sources of Risk to Microbusinesses

Insert Figure 2 here

The **location of control** of risk is especially important in insurance, as the insurance of risks which are controllable by the business owner creates moral hazard.

Frequency relates to how often the event may be expected to occur for the business in question and, together with the degree of effects is commonly used in risk heat mapping to identify risks on which the business should focus its risk management and insurance strategies (see, for example, Collopy 2015).

In the context of insurance, however, **frequency** of the event may also affect the take-up of insurance, as potential policyholders will have less experience of either the likely effects or the actual frequency of infrequent events (Giesbert and Steiner 2015).

The **degree of effects** depends on hazard impact and vulnerability (Kaplan and Garrick 1981; Alexander 1993; Wisner *et al* 2003), being a function both of the initial impact of the event and also of the ability of the individual, household or business to absorb the impact. Vulnerability depends on social and economic factors and the likely process of managing risk (Alwang, Siegel and Jorgensen 2001) as well as the nature of the event. Cardona (2001) analyses earthquake risks in relation to socio-economic structures which affect the outcome for those affected and which need to be considered in assessing the vulnerability of any person or enterprise exposed to any particular risk. The degree of effects can therefore be seen as a function of both the hazard (conditional value at risk Jorion 2010) and vulnerability as a result of an event and vulnerability, which is the difficulty of mitigating the loss. The relationship between risk, adaptability and vulnerability is illustrated in Table 1.

Table 1. Risk and Vulnerability

Insert Table 1 here

Vulnerability may be greater for those who are not socialized as part of an affinity group with access to common resources or effective risk sharing structures, which may increase vulnerability for isolated migrants or those left behind by migration.

Predictability is low for wide range of natural disasters, such as tsunamis and earthquakes. It is also a difficulty in weather based insurances for agricultural products, as the actual business risk is not purely a function of the weather. Weather conditions affect business success in agricultural microbusinesses (Pelka, Musshoff and Weber 2015).

However low crop yields as a result of poor weather conditions are partly offset by higher prices if the market is purely local or the poor conditions are widespread. Prediction of the losses incurred due to poor weather is dependent not only on the prediction of the weather but also on the prediction of the relationship between weather and crop yields and on the relationship between crop yield, prices and demand, which depends on factors such as price elasticity of demand, external competition and substitutability. From the economic point of view, the risk of overproduction as a result of good weather conditions in a market with inelastic demand, resulting in lower prices and higher selling and distribution costs, may be as serious as the risk of underproduction as a result of poor weather conditions. The risk of overproduction, however, is not insurable. For larger businesses it might be managed through options contracts but the commercial infrastructure may not be in place to make these available to small farmers.

Information asymmetry is a key issue for microbusinesses seeking insurance. It is in part related to predictability, as the relevant information available to one party must relate to the prediction of future events. It is not, however, the same things as predictability, as it relates to the distribution of relevant information needed to form predictions and not to the theoretical possibility of forming such predictions with perfect information.

Weather based insurance, while easy to understand presents significant problems of information asymmetry, as the insurance provider usually has better access to long term weather forecasts than the insured business owner (Clarke and Grenham 2013).

Mutual Guarantee Institutions (MGIs) or Mutual Guarantee Associations (MGAs) may help to reduce information asymmetry between major financial institutions and microbusinesses (de Gobbi 2003; Gai and Ielasi 2014). MGIs are not insurance institutions but involvement in an MGI might provide microbusinesses with a conduit for information on economic risks and events.

Information asymmetry need not always mean that the insurance provider has more information than the prospective policyholder. Ito and Kono (2010) found that households in India with sick family members were more likely to take up health insurance, except where the head of household was sick, where lack resources made health insurance less affordable. Dalal (2015) also reports the case of Swayam Shikshan Prayog in India where both adverse selection and greater propensity to use health services after taking out insurance led to unexpectedly high claims and ultimately to the termination of the scheme. A lack of ability of the insurer to assess risks and monitor policy holder behaviour may serve as a barrier to the availability of insurance (Gai and Ielasi 2014). This problem may be mitigated by information flows through MGIs.

Policyholder cross-correlation may affect insurers' solvency (Radermacher and Brinkmann 2011) and known widespread cross-correlations may therefore reduce trust in insurers. Njuguna and Arunga (2013) explain risk correlation or covariance as occurring when a significant cross-section of policyholders suffer economic loss from the same risk.

Local disasters may also make business continuity impossible because of the loss of customers or employees, thereby making insurance payouts insufficient to restart in business. The wider the scope of the source of risk, as shown in Figure 1, the greater the cross-correlation between policyholders is likely to be. Policyholders in the same line of business may also have highly cross-correlated risks, possibly making those MGIs which are based on business types (de Gobbi 2003) less attractive vehicles for advertising or organising insurance.

High correlation of insured risks may occur in cases where the insurer pays out on the basis of a general set of conditions, such as a rainfall index (Clarke and Grenham 2013) rather than on the basis of specific loss to the insured person, although the insurer may be better able than the small policyholder to offset these risks by means of commodity price derivatives. The insurer may, however, still be unable to meet heavy local losses without

adequate diversification in other markets or may find that a particular local scheme has become too risky and cease to offer it, as happened in the case of Fonkoze's catastrophe based insurance in Haiti after repeated hurricane losses (Dalal 2015).

Education

Giné and Yang (2008) and Koloma (2015), found that better educated farmers were also more likely to take up insurance, while Akter *et al* (2011) found a similar correlation for households generally. Education may be a key factor affecting microinsurance take-up, as in some places microbusiness owners may tend to be uneducated or illiterate (Ghosh and Guha 2015). Giesbert and Steiner (2015) also found that many uneducated people said themselves that their lack of education and information made it more difficult to understand insurance policies. Giesbert and Steiner's findings also suggest that there may also be a tendency for some policyholders with a low level of education to regard insurance as more of a savings scheme than as a contribution to a mutual fund for disaster recovery. There may also be an interaction between education and necessity entrepreneurship, as educated necessity entrepreneurs in developed countries have been found to make lower returns on their education than either opportunity entrepreneurs or employees (Fossen and Büttner 2013) and this may lead to an enhanced motivation for educated microbusiness owners to exit business ownership and enter other employment, making the microbusiness more transitional and thereby reducing the value of insurance and the probability of even educated business owners taking out insurance.

Financial position

Block, Sandner and Spiegel (2015) found that entrepreneurs who have substantial personal assets may be better placed to survive adverse events than business owners with more modest assets. It is unlikely that business owners have no assets at all, which would mean that there could be no risk of losses. Therefore, it may be anticipated that less wealthy

business owners would always be less able to continue in business after sustaining losses and would therefore be more risk averse. However Giné and Yang (2008) found that wealthier farmers and those with higher incomes were more likely to take up insurance. This may not, however, indicate greater risk aversion but merely greater resources to purchase insurance, especially as Ito and Kono (2010) found that families with sick heads of households and therefore with poorer financial resources were less likely but households with other sick members more likely to take out health insurance. Women may also fail to obtain health insurance either because of household decisions or because of a reluctance on the part of insurers to insure pregnant women (Ahmed and Ramm 2006; Banthia *et al* 2012).

Morduch (1994) also considers the differences in poverty, in the sense that poverty can be either chronic or transitory. Chronic poverty means that the people are constantly in a state of poverty and have few mechanisms to lift themselves out of this. Transitory poverty is the 'failure to find protection against stochastic elements in the environment' (Morduch 1994). This would be where the household suffers a shock that significantly reduces earnings, for example, the bread winner falling sick. If insurance mechanisms can be put into place here they may mitigate these shocks but irregular incomes can make it more difficult to pay insurance premiums which only provide cover against the specific risks insured. The prevalence of income vulnerability makes it difficult to save and invest in insurance or other risk mitigation vehicles.

Financial Risk Aggregation and Microinsurance

The concept of risk mitigation goes far beyond the simple role of insurance of identified perils. It extends to a discipline that focuses on the complex mix of risk and uncertainty. Most of the global concern about risks and uncertainties has tended to focus on the three 'F's food, financial and fuel (Addison, Arndt and Tarp 2011; Ravallion and Chen 2009). However as Bannerjee and Duflo (2011) observe, these concerns may make little

difference to the overall risk that the low income and economically deprived have to deal with. These groups are more vulnerable to shocks as they are more vulnerable to general risks such as poverty, illness and insufficiency (Cohen, McCord and Sebstad 2005; Chantarat *et al* 2013; Collins *et al* 2009).

Governments of developing countries do not have effective economic structures to protect people on low incomes. Much of this group are employed in the informal sectors where there is greater wage vulnerability (International Labour Organization 2010).

The Provision of Microinsurance

The take-up of insurance depends not only on potential demand but also on potential supply, with the availability, understandability and quality of suitable insurance policies being crucial to the customer's decision to insure (see in general Churchill 2006; Churchill and Matul 2012). The concept of insurance is one of financial risk transfer. The basis of insurance requires two key premises a) the law of large numbers and b) negligent adverse selection.

The law of large numbers suggests that the larger the number of mutually independent risks in a risk pool, the lower the variance of mean losses (Berliner, 1982). In other words the existence of a large group of policyholders being covered for similar and disparate risks helps dilute the risk for the insurance company and also enables the charging of more modest premiums. The portfolio of policyholders assumes that here is a normal distribution in the risk profile of the policyholders with little or no cross-correlation. If all policyholders are high risk, that increases the risk exposure of the company portfolio. This creates a situation of adverse selection and if the premium does not reflect this higher risk, the insurance company can find itself not only having a high risk exposure but also potentially exposed to high moral hazard (Stiglitz 1990; Varian 1990; Wydick, 1999), where policy holders may take less care of their property, crops or livestock once it is insured or even intentionally seek to claim

when the grounds for the claim do not exist, for example, naming non-existent persons as policyholders in a group insurance scheme and claiming against these names. In addition, honest and diligent policyholders may be less likely to take out insurance if they do not have trust the solvency of the insurer and the need for insurer solvency may contribute to the development of expensive and poor quality insurance policies (Clarke 2011), while high risk groups may be keen to take out insurance or high risk individuals may even deliberately form groups for group insurance policy purposes, thereby contributing to the collapse of the insurance scheme (Radermacher, Dror and Noble 2006).

Microinsurers may be able to protect themselves to some extent against claims arising from reckless behaviour by participation in public health and loss prevention programmes (Qureshi and Noble 2006), although these may be costly and could create a free rider effect whereby purchase of insurance is not a prerequisite for benefiting from schemes which cost the insurer money.

In addition to the issue of the level of financial education among the insured community, the insurance agents and managers for some microinsurance schemes may themselves lack sophisticated risk assessment and management skills (Garand and Wipf 2006), leading to mispricing of policies and solvency risks.

Microinsurance, although a novel scheme (Mechler, Linnerooth-Bayer and Peppiatt 2006), is subject to more adverse selection and high moral hazard if not properly evaluated. Before considering the additional risks, we look at the models of microinsurance.

Because the low premiums which most microbusiness owners in developing countries can afford and the potentially high cost of verifying and paying claims in remote areas, the marginal surplus per policy for microinsurers is likely to be low. This can reduce the attractiveness of microinsurance for commercial companies and make co-operative schemes less sustainable (Weilant 2015). The attractiveness of microinsurance schemes for insurers

can, however, be improved by increasing both the number of policyholders and the proportion of repeat business, which reduces administrative costs.

Cohen and McCord (2003) highlight four institutional models for providing microinsurance, particularly for fundamental risks.

Community-based model where local communities, microfinance institutions and NGOs and relevant co-operatives develop a mutually funded pool to deal with these risks (Fonteneau and Galland 2006). In some instances these risks can be reinsured in the commercial market especial where the pools are significantly large (as with the Proshika fund in Bangladesh).

Full service model: Commercial insurers provide the normal range of insurance services. Although this requires simplification and large number of policyholders. For example, BancoSol in Bolivia offers health micro insurance through the underwriting offices of Zurich Insurance for less than $5 per month. The policy is simple and no medical examination is required.

Provider model: Banks and other providers of microfinance can directly offer or require insurance contracts. These are usually coupled with credit, for example, to insure against default risk. The Economist (2005) in its Microfinance Survey put it, 'one of the most encouraging trends in microfinance is that the world's largest banks and insurers are becoming interested.' Banks are also moving into micro insurance. For example they either offer microfinance through the medium of mutual benefit organizations or are used as a distribution channel as in Panama. In some cases, microinsurance may be provided as part of a microfinance loan deal, reducing administrative costs (McCord, Buczkowski and Saksena 2006).

Partner-agent model: Commercial or public insurers together with microfinance institutions (MFIs) or non-governmental organizations (NGOs) collaboratively develop the

product (McCord 2006). The insurer absorbs the risk and the MFI/NGO markets the product through its established distribution network. This lowers the cost of distribution and thus promotes affordability.

Recently the growth of **mobile technology** has seen the growth of mobile providers making available micro insurance and finance. And recently the growth of **mobile technology** has seen the growth of mobile providers providing micro insurance and finance. For example, an innovation developed in Kenya by insurance company Union Insurance and Provincial Insurance (UAP) Group, in partnership with seed producers and fertilizer and chemical manufacturers, is the offer of Kilimo Salama, an index based weather insurance policy, with premiums being collected and claims settled using the online M-Pesa system. Farmers pay a 5% premium when they make their purchases and if there is a drought or excessive rain during the growing season they automatically receives a payout up to the limit agreed to their M-Pesa account on their phone.

However the provision of micro insurance does not necessarily alleviate financial aggregation in fact many of the micro businesses may find it difficult to save to pay even a basic premium and the level of cover may be low at best. This may create a drag effect in encouraging profitable outcomes.

MGAs or MGIs, which enable microbusinesses to access finance from banks (de Gobbi 2003) are not insurance vehicles but a system for protecting the providers of finance from risks arising from business failures, which may be caused by market conditions, government regulation or other factors. Here there is a need for risk assessment, either by the financial institutions providing loans or by the MGA itself. There is also the possibility of moral hazard, with weaker businesses accessing finance on the basis of guarantees provided by stronger businesses. There is a further difficulty in the case of MGAs which consist of

members from a single industry or a single locality, leading to a high cross-correlation of risks of insolvency.

Secondly, in many instances there is financial exclusion preventing certain entrepreneurs from accessing banking facilities to enable investments and savings. The accelerating mobile technology, seemingly plays a significant role in mitigating this circumstance. However sporadic or intermittent local knowledge on the part of the insurer can also present difficulties for claims handling, prompt payment of genuine claims and detection of fraudulent claims, which can result in reduced policy effectiveness for genuine claimants and increased costs for both policyholders and insurers (Radermacher and Brinkmann 2011). Claims processing can also be delayed by inadequate administrative resources (McCord and Leftley 2006) and people who have taken out insurance policies may fail to make a claim when an insured event occurs (Churchill and Cohen 2006).

Problems for Microinsurance

Apart from high moral hazard and adverse selection, there are additional risks faced by providers such as cross-correlated risks, undersized risk pools (Jütting 2004; Biener and Eling 2011), cost of transactions (Lineerooth–Bayer *et al* 2009); and lack of effective data (Levin and Reinhard 2007), creating problems of stochasticity and making quantification of loss probabilities difficult. The use of compulsory insurance for microfinance borrowers or of basket insurance policies which bundle different types of insurance together can help to reduce adverse selection but can result in policyholders being manoeuvred into taking out insurance that they do not want or need (Wipf, Liber and Churchill 2006).

Another problem is the growing agglomeration risk arising out of policyholders belonging to an affinity group, for example by being members of a co-operative. Membership of some affinity groups may provide more continuity for insurance providers and be an indication of better and more manageable risks, leading to the offer of incentives to take on

insurance. This may affect outsiders, including vulnerable rural and urban households that may seek insurance but may have to do so at a higher price.

Affinity groups can be exclusive in a sense that certain groups defined by gender, caste or tribe may be excluded from privileges offered to those within the group, leading to enhanced vulnerability for those excluded (Fernandes 2007). Affinity groupings are important for microinsurers, as the costs of distribution are lower and this can impact pricing (Koven *et al* 2012). There is no clear evidence that targeted affinity groups do obtain better insurance rates (Koven, Chandani and Garand 2013) or even better understanding of the products. Koven Chandani and Garand (2013) also observed that not all affinity groups involved in insurance intermediation were effective in enabling consistency in premium collection, collectives did improve consistency.

The high vulnerability of persons who are not socially protected by membership of an affinity group may be aggravated by a lack of access to low cost insurance and by problems which exist for insurance providers. Firstly, the non-affinity-group portfolio may be affected by adverse selection if those who seek insurance are in higher risk categories, while affinity groups which have a propensity to insure may present portfolios of high, medium and low risk policyholders. Secondly, populations which do not identify with strong affinity groups may be mobile and transient, making collection of premiums and renewal of policies difficult and expensive to administer. Thirdly, mobility can make the prediction of risk types and probabilities difficult for both insurers and the insured.

Because microinsurance tends to be seen as a social service rather than as a mainly profit-motivated business, microinsurance providers often receive low premiums and they are faced with the need to provide even higher quality insurance than might be provided in fully profit based insurance markets, as the ability to expedite claims, the avoidance of exclusions and the range of cover are especially valuable for vulnerable groups.

Microinsurance and Risk Aversion

Underinsurance leads to suboptimal decision making and foregone income (Carter *et al* 2007). Elabed and Carter (2013) examined the relationship between behavioural constraints and acquisition of microinsurance. They considered indexed insurance (a relatively new approach), where payments are based on a derived index (e.g. level of rainfall) correlated to individual losses such as loss of assets or working capital. Index insurance does not require claims assessment and therefore enables claims settlement processes to be quicker and more objective. It also reduces adverse selection and moral hazard. Elabed and Carter's (2013) research demonstrated that where there was greater compound risk aversion (where one risk creates a series of other related risks) over certain outcomes, there was a lesser willingness to pay for insurance. This was because of the way insurance was valued.

Andreoni and Sprenger (2012) in their research observed that in poorer areas there was both an overvaluation of outcomes and under valuation of insurance as it involved a premium payment and hence the willingness to pay related to the potential that might be received in claim amounts. Therefore farmers might be have a compounded risk aversion in bad years where they see the premium payments might be seen as a problem more than the potential for systemic risks. As a result this entails financial aggregation (a compounding effect).

Factors affecting vulnerability and ability to insure are briefly summarized in Table 2. High vulnerability and low ability to insure lead to a high risks of irrecoverable business failure as a result of potential aggregate risks, which may include risks which are highly correlated, such as the loss of business assets, environmental damage and dispersal of the local community in the case of natural disasters or civil unrest.

Table 2. Vulnerability and Ability to Insure

Insert Table 2 here

Discussion

The core purpose of this study is to explore the factors which affect the take-up of microinsurance by micro and small businesses in developing countries and the impact on the levels of financial aggregation.

On the demand side, the interaction between business circumstances and risk creates vulnerability to risk. There are also a variety of factors which can affect the business owner's risk appetite, including the reasons for starting in business and experience in business. A necessity entrepreneur is likely to be more risk averse than an opportunity entrepreneur and may also have less in the way of alternative resources to avoid extreme poverty in the event of a business failure. Personal financial resources and business assets can also both contribute to the ability to continue in business after a shock and therefore allow a less risk averse approach.

Personal risk averseness can contribute to the propensity to insure in two ways. An unwillingness to engage in risky business activities can reduce the range and level of risks which require insurance. However a risk averse attitude may also create a propensity to insure at lower levels of risk, with more risk averse entrepreneurs being more inclined to insure against less probable events and more willing to pay higher premiums to limit losses.

While vulnerability can increase the need for insurance, vulnerability resulting from a poor present financial situation can also make it more difficult for the business owner to find the money to pay insurance premium, as is particularly illustrated by the low take-up of health insurance where the head of household is ill, especially compared with the high take-up in cases where other household members are ill. There may therefore sometimes be a

negative relationship between the need for insurance and the demand for insurance as expenditure more immediately necessary to survival is given a higher priority.

Education also affects the demand for insurance, as less well educated people may feel unable to understand insurance contracts and this may contribute to a reluctance to insure. It may also make it more difficult for less well educated people to take out appropriate insurance or to make inquiries about available insurance schemes. Less educated entrepreneurs may also perceive insurance as a savings scheme, rather than a scheme to aggregate and distribute financial risks, which will have an effect on their propensity to insure, as a profitable insurance scheme cannot offer policyholders value for money as a substitute for savings and investments. It is therefore unlikely that anybody who compares insurance outcomes with savings outcomes will be attracted to any sustainable insurance scheme. This can make microinsurance commercially unviable from the outset. However there may be opportunities for microinsurers to develop or support education schemes to increase knowledge of risk, risk management and insurance among people in their target market (Dror, Dalal and Matul 2012). Education programmes could include the use of broadcast mass media and cinema (Bel and Caicedo 2013), as well as more targeted classroom seminar approaches.

In addition, less well educated and less experienced entrepreneurs may have a less developed understanding of the risks which the business faces, leading to underinsurance of the risks to which they are most exposed. Even the more educated and more experienced may still face problems with information asymmetry, where insurance providers may increase the cost of insurance for risks which have become greater or even withdrawing from insurance provision altogether. Moreover, small business owners may lack information about the company or other institution offering the insurance and have insufficient reasons to believe in

the trustworthiness or solvency of the scheme or the efficiency of claims settlement (Churchill and Cohen 2006).

The relationship between education and insurance may affect the long term continuity of insurance schemes as necessity entrepreneurs with a high level of education may also be making a low return on their education and seek opportunities to enter alternative employment, instead of continuing to be self-employed. In order to reduce administrative and marketing costs and offer value for money to policyholders, a sustainable insurance scheme must rely on a high level of repeat business, especially in cases where potential policyholders are difficult to contact and are unfamiliar with insurance. Financial education, including an understanding of how insurance works, is therefore likely to increase the reach of insurance schemes.

It is clear that hazard perception and level of risk aversion are based on the perception and valuation of risk. The undervaluation or overvaluation of the benefits of risk insurance payments can influence microinsurance take up and vitiate financial aggregation, although it is clear that the undervaluation of insurance can overtake the overvaluation and can result in MSMEs not taking up insurance when they need it most.

On the supply side, a great many risks faced by microbusiness owners are unattractive to insurers or essentially uninsurable. Microbusinesses may face threats from corruption, which may reduce the availability of essential government and private sector services or reduce access to markets in which corruption is present. Microbusinesses can also be vulnerable to the effects of other crimes, such as disregard for building regulations, which can also have the effect of nullifying relevant insurance policies. There may be other uninsurable risks arising from domestic disputes and domestic violence, which may be largely beyond the scope of the business itself but still seriously affect business performance and continuity. Disputes with employees and industrial action, which microbusiness owners are less able to

absorb than larger concerns, are also largely uninsurable and smaller employers' negotiating power will be severely reduced in cases where labour is unionized and alternative employment is available.

Insurance may also be unavailable in the case of natural and widespread disasters and, even if it is available, insurance payouts are unlikely to be sufficient to restore the position of the business before the disaster, as customers, employees and business partners are also likely to be affected. These risks may be especially serious for business owners who have been forced to occupy marginal rural land which is prone to flooding or poor weather conditions.

Given the barriers to the development of demand for microinsurance, it is not surprising that microinsurance has tended not to be viewed as a commercially viable profit-making business. Some commercial insurance exists within the full service model, where simplified insurance policies are offered with reduced customer screening, and the provider model, where insurance is offered as part of a microfinance deal. In other cases, microinsurance is offered on the community-based model or the partner-agent model, with involvement from non-commercial institutions, with a view to providing a public service and increasing sustainability. Lack of access to insurance can be a major barrier to economic development, as the lack of available insurance may discourage business start-ups and increase the rate of business failures when adverse events occur. Initiatives to improve access to insurance can therefore contribute to sustainable development. However these initiatives may be subject to problems of moral hazard as well as high administrative costs. In addition, schemes which focus on particular localities or affinity groups may be affected by policyholder risk cross-correlations which could threaten the solvency of the provider and undermine trust in the system. It may also be far more time-consuming and expensive to gather market data and risk assessment information for remote and rural areas, making the provision of appropriate microinsurance for small farmers all the more difficult.

Conclusion

This paper makes two contributions. Firstly, it develops a conceptual paradigm for the analysis of the relationship between vulnerability and risk appetite among micro, small and medium sized business owners in developing countries, perceptions of insurance and propensity to insure. Secondly it examines these relationships in the light of the existing literature on risk, microbusiness and microinsurance and explores how the demand for and supply of microinsurance for small businesses in developing countries impacts the microinsurance market.

The need for insurance arises not merely from the risk of an event occurring but from the vulnerability of the business and its owner to the risk involved. Vulnerability is a function not only of the controllability, frequency and severity of the risk but also of the circumstances of the business itself. However businesses with poorer financial resources, which are consequently more vulnerable to events, are also less able to pay insurance premiums.

In addition to the need for insurance, demand for insurance is also driven by education, the availability of effective information and the degree of correlation and covariance of risks. Microbusinesses and their insurers may both face information asymmetries in relation to the risks involved and in relation to the ability of the insurer to meet claims when they are made. These information asymmetries can to a certain extent be mitigated by using communal information channels, such as those provided by MGIs but the cost of information is likely to be a further factor in reducing the commercial viability of microinsurance.

Commercial provision of microinsurance is limited by the costs involved and the unreliability of repeat business, leaving a need for government or not-for-profit NGO involvement. Insurance contracts may also be simplified to reduce costs, leading to limited

risk screening and adverse selection, as well as potentially poor-value policies which do not directly cover the essential risks.

The take up of microinsurance can be improved by better education and the development of improved information channels for both policyholders and providers, as well as government and other outside funding to subsidize schemes which contribute to long-run sustainable development.

Conceptual Model Implications and Future Research

This conceptually based paper is subject to the limitation that it lacks new empirical evidence and further fieldwork would be welcome to establish the relationship between microinsurance and business survival and the effects of efforts to educate business owners in finance and insurance. Further empirical research on the relationship between risk aversion and insurance among microbusiness owners in urban and rural areas of less developed countries, controlling for business vulnerability and membership of different affinity groups would also be beneficial.

The conceptual model highlights the importance of education in determining risk attitudes. This suggests the need for further research on the relationships between education and personal risk attitudes among microbusiness owners and other people in developing countries and the relationships between personal risk attitudes, business vulnerability and risk appetite. Research on the effectiveness of risk education and on the extent to which risk education may distort perceptions of the probability and effects of dramatic or uncontrollable risks for populations in developing countries is also desirable.

The conceptual model manifests the link between risk appetite and business vulnerability and the need for more research on risk appetite among microbusiness owners and especially the relationship between business vulnerability and risk appetite. While a relationship between necessity entrepreneurship and risk aversion has already been

established in the literature, further indicators of business vulnerability could be used in future research as part of efforts to generate a fuller picture of the determinants of risk appetite.

Further research can also be conducted on microinsurers' perceptions of risk covariance, moral hazard, adverse selection and distribution and administration issues which may affect their willingness to offer insurance. This research should focus as much on the insurers' perceptions and reactions as on the underlying realities, as employees and agents of insurance companies also work within the limitations of their education, knowledge and ability to process information and will be no more able to take perfect decisions based on perfect information than potential policyholders. Systematic studies on information asymmetries between insurers and policyholders would also be worthwhile and, once again, studies should examine perceived as well as real information asymmetries, given the impossibility of different stakeholders having accurate impressions of the extent of each other's knowledge and the likelihood of perceived information asymmetries being a barrier to trust in the market.

References

Addison, A., C. Arndt and F. Tarp (2011), 'The triple crisis and the global aid architecture', *African Development Review,* **23** (4), 461-478.

Ahmed, M., and G. Ramm (2006), 'Meeting the special needs of women and children', in C. Churchill (ed.), *Protecting the Poor: A Microinsurance Compendium,* Volume I, Geneva, Switzerland: International Labour Office and Munich Re Foundation, pp.130-144.

Akter, S., R. Brouwer, P. van Beukering, L. French, E. Silver, S. Choudhury, and S. Aziz (2011), 'Exploring the feasibility of private micro flood insurance provision in Bangladesh', *Disasters,* **35** (2), 287-307.

Alexander, D.E. (1993), *Natural Disasters,* London, UK: Taylor and Francis.

Alwang, J., P.B. Siegel and S.L. Jorgensen (2001), *Vulnerability: A View from Different Disciplines,* Social Protection Discussion Paper Series no. 0115, World Bank, available at ipcc-wg2.gov/njlite_download.php?id=5287 (accessed 3 February 2016).

Andreoni, J., and C. Sprenger (2012), 'Risk preferences are not time preferences', *American Economic Review,* **102** (7), 3357-3376.

Apostolakis, G., G. van Dijk and P. Drakos (2015), 'Microinsurance performance – a systematic narrative literature review', *Corporate Governance,* **15** (1), 146-170.

Association of Certified Fraud Examiners (2014), *Report to the Nations on Occupational Fraud and Abuse: 2014 Global Fraud Study,* Association of Certified Fraud Examiners, available at http://www.acfe.com/rttn/docs/2014-report-to-nations.pdf (accessed 3 February 2016).

Bannerjee, A.V., and E. Duflo (2011), *Poor Economics: A Radical Rethinking of the Way to Fight Global Poverty.* Jackson, TN, USA: PublicAffairs.

Banthia, A., S. Johnson, M.J. McCord and B. Mathews (2006), 'Emerging practices in consumer education on risk management and insurance', in C. Churchill and M. Matul (eds.), *Protecting the Poor: A Microinsurance Compendium,* Volume II, Geneva, Switzerland: International Labour Office and Munich Re Foundation, pp.331-348.

Bel, S., and M.P. Caicedo (2013), *Audiovisual Mass Media Campaigns for Insurance Education: Stages and Lessons,* International Labour Organization Microinsurance Paper no.21, Geneva, Switzerland: International Labour Office, available at http://www.ilo.org/public/english/employment/mifacility/download/mpaper21.pdf (accessed 3 February 2016).

Berliner, B. (1982), *Limits of Insurability of Risks,* Englewood Cliffs, NJ, USA: Prentice-Hall.

Bhattamishra, R., and C.B. Barrett (2010), 'Community-based risk management arrangements: A review', *World Development,* **38** (7), 923-932.

Biener, C., and M. Eling (2011), 'The Performance of Microinsurance Programs: A Data Envelopment Analysis', *Journal of Risk and Insurance,* **78** (1), 83-115.

Blackburn, A.R., M. Hart and T. Wainwright (2013), 'Small business performance: Business, strategy and owner-manager charateristics', *Journal of Small Business and Enterprise Development,* **20** (1), 8-27.

Block, J., and P. Sandner (2009), 'Necessity and opportunity entrepreneurs and their duration in self-employment: Evidence from German micro data', *Journal of Industry, Competition and Trade,* **9** (2), 117-137.

Block, J., P. Sandner and F. Spiegel (2015), 'How do risk attitudes differ within the group of entrepreneurs? The role of motivation and procedural utility', *Journal of Small Business Management,* **53** (1), 183-206.

Broadhurst, R., B. Bouhours and T. Bouhours (2013), 'Business and the risk of crime in China', *British Journal of Criminology,* **53** (2), 276-296.

Cardona O.D. (2001) *Estimación Holística del Riesgo Sísmico Utilizando Sistemas Dinámicos Complejos.* PhD Thesis, Technical University of Catalonia, Barcelona, Spain: Technical University of Catalonia, available at http://www.ipcc-wg2.gov/njlite_download.php?id=6473 (accessed 3 February 2016).

Carter, M.R., P.D. Little, T. Mogues and W. Negatu (2007), 'Poverty traps and natural disasters in Ethiopia and Honduras', *World Development* **35** (5), 835–856.

Chantarat, S., A.G. Mude, C.B. Barrett and M.R. Carter (2013), 'Designing index-based livestock insurance for managing asset risk in Northern Kenya', *Journal of Risk and Insurance,* **80** (1), 205–237.

Chiappori, P.-A. (2000). 'Econometric models of insurance under asymmetric information', in G. Dionne (ed.), *Handbook of Insurance,* New York, NY, USA: Kluwer, pp.365-393.

Churchill, C. (ed.) (2006), *Protecting the Poor: A Microinsurance Compendium,* Volume I, Geneva, Switzerland: International Labour Office and Munich Re Foundation, available at http://www.munichre-foundation.org/dms/MRS/Documents/ProtectingthepoorAmicroinsurancecompendiumFullBook.pdf (accessed 3 February 2016).

Churchill, C. (2007), 'Insuring the low-income market: Challenges and solutions for commercial insurers, *Geneva Papers on Risk and Insurance,* **32** (3), 401–412.

Churchill, C., and M. Cohen (2006), 'Marketing microinsurance', in C. Churchill (ed.), *Protecting the Poor: A Microinsurance Compendium,* Volume I, Geneva, Switzerland: International Labour Office and Munich Re Foundation, pp.174-196.

Churchill, C., and M. Matul (eds.) (2012), *Protecting the Poor: A Microinsurance Compendium,* Volume II, Geneva, Switzerland: International Labour Office and Munich Re Foundation, available at http://www.munichre-foundation.org/dms/MRS/Documents/Microinsurance/2012_MICompendium_VolII_English/MicroinsuranceCompendium_VolII.pdf (accessed 3 February 2016).

Clarke, D.J. (2011), *A Theory of Rational Demand for Index Insurance,* University of Oxford Department of Economics Discussion Paper Series no.572, available at http://www.economics.ox.ac.uk/materials/working_papers/paper572.pdf (accessed 3 February 2016).

Clarke, D.J., and D. Grenham (2013), 'Microinsurance and natural disasters: Challenges and options', *Environmental Science and Policy,* **27** (S1), 89-98.

Cohen, M., and M.J. McCord (2003), *Financial Risk Management Tools for the Poor,* MicroInsurance Centre Briefing Note 6, Appleton, WI, USA: MicroInsurance Centre.

Cohen, M., M.J. McCord J. Sebstad (2005), 'Reducing vulnerability: Demand for and supply of microinsurance in East Africa', *Journal of International Development,* **17** (3), 319–325.

Cohen, M., and J. Sebstad (2005), 'Reducing vulnerability: The demand for microinsurance', *Journal of International Development,* **17** (3), 397-474.

Collins D., J. Morduch, S. Rutherford and O. Ruthven (2009), *Portfolios of the Poor: How the World's Poor Live on $2 a Day,* Princeton, NJ, USA: Princeton University Press.

Collopy, P.D. (2015), 'Managing technical risk', Institute of Electrical and Electronic Engineers Aerospace Conference, Big Sky, MT, USA, 7-14 March, Proceedings, pp.1-6.

Combes, J., and C. Ebeke (2011), 'Remittances and Household Consumption Instability in Developing Countries', *World Development,* **39** (7), 1076-1089.

Coogan, J., E. Lin Forder, J. Madir, N. Seiler and C. Wee (2015), 'Combatting fraud and corruption in international development', *Journal of Financial Crime,* **22** (2), 228-241.

Cook, S. (2009), *Social Protection in East and South East Asia: A Regional Review,* Centre for Social Protection, available at https://www.ids.ac.uk/files/dmfile/socialProtectioninEastandSouthEastAsia.pdf (accessed 3 February 2016).

Dalal, A. (2015), *Learning from Others' Mistakes,* Impact Insurance Paper no.42, Geneva, Switzerland: International Labour Office, available at http://www.impactinsurance.org/sites/default/files/MP42.pdf (accessed 3 February 2016).

Dalziell, E. P., and S.T. McManus (2004), 'Resilience, Vulnerability, Adaptive Capacity: Implications for System Performance', International Forum for Engineering Decision Making, Stoos, Switzerland, 5-9 December.

Dayson, K., P. Vik and A. Ward (2009) *Developing Models for Delivering Insurance through CDFIS-Opportunities and Risks: Final Technical Report,* Salford, UK: Community Finance Solutions, University of Salford.

De Andrade Filho, L. (2008), 'The dynamics of drug-related organised crime and corruption in Brazil from a development perspective', *Journal of Financial Crime,* **15** (1), 49-59.

De Gobbi, M. S. (2003), 'Mutual guarantee associations for small and micro-entrepreneurs: Lessons learned from Europe and Africa', *African Development Review,* **15** (1), 23-34.

Dercon, S., T. Bold and C. Calvo (2008), 'Insurance for the poor?' in Barrientos, A., and Hulme, D. (eds.), *Social Protection for the Poor and Poorest: Risk, Needs and Rights,* Basingstoke, UK: Palgrave Macmillan, pp.47-63.

Dercon, S., M. Kirchberger, J.W. Gunning and J.-P. Platteau (2008), *Literature Review on Microinsurance,* International Labour Organization Microinsurance Paper no. 26, available at http://www.ilo.org/public/english/employment/mifacility/download/litreview.pdf (accessed 3 February 2016).

Dror, I., A. Dalal and M. Matul (2012), 'Emerging practices in consumer education on risk management and insurance', in C. Churchill and M. Matul (eds.), *Protecting the Poor: A Microinsurance Compendium,* Volume II, Geneva, Switzerland: International Labour Office and Munich Re Foundation, pp.286-299.

Economist (2005), *The Hidden Wealth of the Poor.* Economist, available at http://www.economist.com/node/5079324 (accessed 3 February 2016).

Elabed, G., and M.R. Carter (2013), 'Basis risk and compound-risk aversion: Evidence from a WTP experiment in Mali', Agricultural and Applied Economics Association and Canadian Agricultural Economics Society Joint Annual Meeting, Washington, DC, 4

August, available at http://ageconsearch.umn.edu/bitstream/150353/2/Elabed%20Carter.pdf (accessed 3 February 2016).

Eversole, R. (2004), 'Change makers? Women's microenterprises in a Bolivian City', *Gender, Work and Organisation,* **11** (2), 123-142.

Fernandes, S. (2007), 'Barrio women and popular politics in Chávez's Venezuela', *Latin American Politics and Society,* **49** (3), 97-128.

Fiksel, J. (2003), 'Designing Resilient, Sustainable Systems', *Environmental Science and Technology,* **37** (23), 5330–5339.

Fonteneau, B., and B. Galland (2006), 'The community-based model: Mutual health organizations in Africa', in C. Churchill (ed.), *Protecting the Poor: A Microinsurance Compendium,* Volume I, Geneva, Switzerland: International Labour Office and Munich Re Foundation, pp.378-400.

Fossen, F., and T. Büttner (2013), 'The returns to education for opportunity entrepreneurs, necessity entrepreneurs, and paid employees', *Economics of Education Review,* **37** (1), 66-84.

Gai, L, and F. Ielasi (2014), 'Operational drivers affecting credit risk of mutual guarantee institutions', *Journal of Risk Finance,* **15** (3), 275-293.

Garand, D., and J. Wipf (2006), 'Risk and financial management', in C. Churchill (ed.), *Protecting the Poor: A Microinsurance Compendium,* Volume I, Geneva, Switzerland: International Labour Office and Munich Re Foundation, pp.254-269.

Ghosh, C., and S. Guha (2015), 'Determinants of profitability of the microenterprises led by women micro entrepreneurs: Evidence from Mumbai slums', *International Journal of Entrepreneurship and Small Business,* **24** (4), 455-473.

Giesbert, L., and S. Steiner (2015), 'Client perceptions of the value of microinsurance: Evidence from Southern Ghana', *Journal of International Development,* **27** (1), 15-35.

Gilmore, A., D. Carson and A. O'Donnell (2004), 'Small business owner-managers and their attitude to risk', *Marketing Intelligence and Planning,* **22** (3), 349-360.

Giné, X., and D. Yang (2009), 'Insurance, credit, and technology adoption: Field experimental evidence from Malawi', *Journal of Development Economics,* **89** (1), 1-11.

Green, E., C. Blattman, J. Jamison and J. Annan (2015), 'Women's entrepreneurship and intimate partner violence: A cluster randomized trial of microenterprise assistance and partner participation in post-conflict Uganda', *Social Science and Medicine,* **133** (1), 177-188.

Gunduz, M., and O. Önder (2013), 'Corruption and Internal Fraud in the Turkish Construction Industry', *Science and Engineering Ethics,* **19** (2), 505-528.

Gurenko, E. (2004), 'Introduction', in E. Gurenko (ed.), *Catastrophe Risk and Reinsurance: A Country Risk Management Perspective,* London, UK: Risk Books, pp.3-16.

Handley-Schachler, M., and J. Navare (2010), 'Port risk management and public private partnerships: Factors relating to risk allocation and risk sustainability', *World Review of Intermodal Transport Research,* **3** (1-2), 150-166.

Hunt, J. (2010), 'Bribery in health care in Uganda', *Journal of Health Economics,* **29** (5), 699-707.

Ibem, O.E. (2011), 'Challenges of disaster vulnerability reduction in Lagos megacity area, Nigeria', *Disaster Prevention and Management,* **20** (1), 27-40.

Inda-Diaz, E., R. Rodiles-Hernández, E. Naranjo and M. Mendoza-Carranza (2009), 'Subsistence fishing in two communities of the Lacandon Forest, Mexico', *Fisheries Management and Ecology,* **16** (3), 225-234.

International Labour Organization (2010), *Global Wage Report 2010/11: Wage Policies in Times of Crisis.* International Labour Organization, available at http://www.ilo.org/wcmsp5/groups/public/---dgreports/---dcomm/---publ/documents/publication/wcms_145265.pdf (accessed 3 February 2016).

Ionescu, L. (2011), 'The construction of corruption as a global problem', *Contemporary Readings in Law and Social Justice,* **3** (1), 166-171.

Ito, S., and H. Kono (2010), 'Why is the take-up of microinsurance so low? Evidence from a health insurance scheme in India', *Developing Economies,* **48** (1), 74-101.

Izadkhah, Y.O., and M. Hosseini (2005), 'Towards resilient communities in developing countries through education of children for disaster preparedness', *International Journal of Emergency Management,* **2** (3), 138-148.

Jorion, P. (2010), 'Risk Management', *Annual Review of Financial Economics,* **2** (1), 347-365.

Joyette, A. R.T., L.A. Nurse. and R.S. Pulwarty (2015), 'Disaster risk insurance and catastrophe models in risk-prone small Caribbean islands', *Disasters,* **39** (3), 467-492.

Jütting, J.P. (2004), 'Do community-based health insurance schemes improve poor people's access to health care? Evidence from rural Senegal', *World Development,* **32** (2), 273-278.

Kaplan, S., and B.J. Garrick (1981), 'On the quantitative definition of risk', *Risk Analysis,* **1** (1), 11-27.

Kitching J., R. Blackburn, D. Smallbone and S. Dixon (2009), *Business Strategies and Performance during Difficult Economic Conditions,* London, UK: Department of Business, Innovation and Skills, available at http://www.berr.gov.uk/files/file51879.doc (accessed 3 February 2016).

Koloma, Y. (2015), 'Crop microinsurance for maize farmers in Burkina Faso: Access and agriculture performance in the Dandé village', *Strategic Change: Briefings in Entrepreneurial Finance,* **24** (1), 115-129.

Kondo, T. (2007), *Impact of Microfinance on Rural Households in the Philippines: A Case Study from the Special Evaluation Study on the Effects of Microfinance Operations on Poor Households and the Status of Women,* Manila, Philippines: Asian Development Bank.

Koven, R., T. Chandani and D. Garand (2013), *The Business Case for Health Microinsurance in India: The Long and Winding Road to Scale and Sustainability,* Microinsurance Learning and Knowledge Brief 26, MicroInsurance Centre, available at http://www.microinsurancecentre.org/resources/documents/business-case-for-microinsurance/milk-brief-26-the-business-case-for-health-microinsurance-in-india-the-long-and-winding-road-to-scale-and-sustainability.html (accessed 3 February 2016).

Koven, R., M.J. McCord, J. Wipf and E. Zimmerman (2012), *The Business Case for Life Microinsurance in the Philippines: Initial Findings,* Microinsurance Learning and Knowledge Brief 14, MicroInsurance Centre, available at http://www.microinsurancecentre.org/resources/documents/business-case-for-microinsurance/milk-brief-14-the-business-case-for-life-microinsurance-in-the-philippines-initial-findings.html (accessed 3 February 2016).

Ksenia, G. (2008), 'Can corruption and economic crime be controlled in developing countries and if so, is it cost-effective?' *Journal of Financial Crime,* **15** (2), 223-233.

Levin, T., and D. Reinhard (2007), *Microinsurance Aspects in Agriculture,* Munich Re Foundation, available at http://www.microfinancegateway.org/sites/default/files/mfg-en-paper-microinsurance-aspects-in-agriculture-oct-2007.pdf (accessed 3 February 2016).

Li, N., and Y. Chen (2010), 'SMEs logistics outsourcing risk analysis and prevention strategies', Institute of Electrical and Electronics Engineers Second International Conference on Communication Systems, Networks and Applications, Hong Kong, 29 June – 1 July, Proceedings, Volume 2, pp.169-172.

Linnerooth-Bayer, J., K. Warner, C. Bals, P. Hoppe, I. Burton, T. Loster and A. Haas (2009), 'Insurance, developing countries and climate change', *Geneva Papers on Risk and Insurance - Issues and Practice,* **34** (3), 381-400.

Luo, Y., and B. Han (2009), 'Graft and business in emerging economies: An ecological perspective', *Journal of World Business,* **44** (3), 225-237.

Mathee, A., T. Khan, N. Naicker, T. Kootbodien, S. Naidoo and P. Becker (2013), 'Lead exposure in young school children in South African subsistence fishing communities', *Environmental Research,* **126** (1), 179-183.

Matul, M., A. Dalal, O. de Bock and W. Gelade (2013), *Why People Do Not Buy Microinsurance and What We Can Do About It,* International Labour Organization Microinsurance Paper no.20, Geneva, Switzerland: International Labour Office, http://www.ilo.org/public/english/employment/mifacility/download/mpaper20_buy.pdf (accessed 3 February 2016).

Matul, M., C. Tatin-Jaleran and E. Kelly (2011), *Improving Client Value from Microinsurance: Insights from India, Kenya, and the Philippines,* International Labour Organization Microinsurance Paper no.12, Geneva, Switzerland: International Labour Office, available at http://www.ilo.org/public/english/employment/mifacility/download/mpaper12_clientvalue.pdf (accessed 3 February 2016).

McCord, M.J. (2006), 'The partner-agent model: Challenges and opportunities' in C. Churchill (ed.), *Protecting the Poor: A Microinsurance Compendium,* Volume I, Geneva, Switzerland: International Labour Office and Munich Re Foundation, pp.357-377.

McCord, M.J., G. Buczkowski and P. Saksena (2006), 'Premium collection: Minimizing transaction costs and maximizing customer service', in C. Churchill (ed.),

Protecting the Poor: A Microinsurance Compendium, Volume I, Geneva, Switzerland: International Labour Office and Munich Re Foundation, pp.197-215.

McCord, M.J., and R. Leftley (2006), 'Claims processing', in C. Churchill (ed.), *Protecting the Poor: A Microinsurance Compendium,* Volume I, Geneva, Switzerland: International Labour Office and Munich Re Foundation, pp.216-237.

Mechler, R., J. Linnerooth-Bayer and D. Peppiatt (2006), *Microinsurance for Natural Disasters in Developing Countries: Benefits, Limitations and Viability* (Draft for Discussion), Geneva, Switzerland: ProVention Consortium, available at http://www.microfinancegateway.org/sites/default/files/mfg-en-paper-disaster-insurance-for-the-poor-a-review-of-microinsurance-for-natural-disaster-risks-in-developing-countries-draft-1-2006_0.pdf (accessed 3 February 2016).

Miller C.M, S. Gruskin, S.V. Subramanian, D. Rajaraman and J. Heymann (2006), 'Orphan care in Botswana's working households: Growing responsibilities in the absence of adequate support', *American Journal of Public Health,* **96** (8), 1429-1435.

Mmopelwa, G., K. Mosepele, B. Mosepele, N. Moleele and B. Ngwenya (2009), 'Environmental variability and the fishery dynamics of the Okavango delta, Botswana: The case of subsistence fishing', *African Journal of Ecology,* **47** (S1) pp.119-127.

Morduch, J. (1994), 'Poverty and vulnerability', *American Economic Review,* **84** (2), 221-225.

Munich Re Economic Research (2013), *Economic Consequences of Natural Catastrophes: Emerging and Developing Economies Particularly Affected – Insurance Cover is Essential.* Munich Re, available at http://www.munichre.com/site/corporate/get/documents_E690968860/mr/assetpool.shared/Documents/0_Corporate%20Website/6_Media%20Relations/Press%20Releases/2013/2013_10_30_position_paper_en.pdf (accessed 3 February 2016).

Mushkat, M., and R. Mushkat (2012), 'The political economy of corruption in China: The principal-agent dimension', *International Journal of Public Law and Policy,* **2** (3), 263-286.

Njuguna, A.G., and A. Arunga (2013), 'Risk management practices: A survey of micro-insurance service providers in Kenya', *International Journal of Financial Research,* **4** (1), 132-150.

O'Brien, G., P. O'Keefe, J. Rose and B.Wisner (2006), 'Climate change and disaster management', *Disasters,* **30** (1), 64-70.

Pelka, N., O. Musshoff and R. Weber (2015), 'Does weather matter? How rainfall affects credit risk in agricultural microfinance', *Agricultural Finance Review,* **75** (2), 194-212.

Powers, J., B. Magnoni and E. Zimmerman (2011), *Formalizing the Informal Insurance Inherent in Migration,* International Labour Organization Microinsurance Paper no.7, Geneva, Switzerland: International Labour Office, available at http://www.ilo.org/public/english/employment/mifacility/download/mpaper7_migration_en.pdf (accessed 3 February 2016).

Prashad. P., D. Saunders and A. Dalal (2013) *Mobile Phones and Microinsurance,* International Labour Organization Microinsurance Paper no. 26, available at http://www.impactinsurance.org/sites/default/files/MP26%20v3.pdf (accessed 3 February 2016).

Prashad, P., J. Leach, A. Dalal and D. Saunders (2014) 'Mobile phones and microinsurance', *Enterprise Development and Microfinance,* **25** (1), 72–86.

Pujawan, N.I., and H.L. Geraldin (2009), 'House of risk: A model for proactive supply chain risk management', *Business Process Management Journal,* **15** (6), 953-967.

Qureshi, Z., and G. Noble (2006), Loss control', in C. Churchill (ed.), *Protecting the Poor: A Microinsurance Compendium,* Volume I, Geneva, Switzerland: International Labour Office and Munich Re Foundation, pp.307-320.

Radermacher, R., and J. Brinkmann (2011), 'Insurance for the poor? First thoughts about microinsurance business ethics', *Journal of Business Ethics,* **103** (1), 63-76.

Radermacher, R., I. Dror and G. Noble (2006), 'Challenges and strategies to extend health insurance to the poor', in C. Churchill (ed.), *Protecting the Poor: A Microinsurance Compendium,* Volume I, Geneva, Switzerland: International Labour Office and Munich Re Foundation, pp.66-93.

Rafi, M.M., S. Wasiuddin and H.S. Siddiqui (2012), 'Assessment of fire hazard in Pakistan', *Disaster Prevention and Management,* **21** (1), 71-84.

Ravallion, M., and S. Chen (2009), *The Impact of the Global Financial Crisis on the World's Poorest,* Centre for Economic Policy Research, available at http://www.voxeu.org/article/impact-global-financial-crisis-world-s-poorest (accessed 3 February 2016).

Reynolds, P.D., S.M. Camp, W.D. Bygrave, E. Autio and M. Hay (2001), G*lobal Entrepreneurship Monitor: Executive Report 2001,* Business Council for the United Nations, available at http://unpan1.un.org/intradoc/groups/public/documents/un/unpan002481.pdf#page=1andzoom=auto,-99,486 (accessed 3 February 2016).

Rutherford, S. (1999), *The Poor and Their Money: An Essay about Financial Services for Poor People,* Institute for Development Policy and Management Finance Discussion Paper, Finance and Development Series, University of Manchester, available at http://www.jointokyo.org/mfdl/readings/PoorMoney.pdf (accessed 3 February 2016).

Skees, J., P. Hazell and M. Miranda (1999), *New Approaches to Crop Yield Insurance in Developing Countries.* International Food Policy Research Institute, Environment and Production Technology Division Paper no. 55, Washington, DC, USA: International Food Policy Research Institute.

Slovic, P. (1986), 'Informing and educating the public about risk', *Risk Analysis,* **6** (4), 403-415.

Srivastava, N., and R. Shaw (2014), 'Establishing parameters for identification of vulnerable occupations in a disaster scenario in Gujarat, India', *Risk, Hazards and Crisis in Public Policy,* **5** (2), 212-238.

St. Bernard, G. (2003), *Major Trends Affecting Families in Central America and the Caribbean,* United Nations Division of Social Policy and Development, available at http://www.un.org/esa/socdev/family/Publications/mtstbernard.pdf (accessed 3 February 2016).

Stiglitz, J. E. (1990), 'Peer Monitoring and Credit Markets', *World Bank Economic Review,* **4** (3), 351-366.

Stiglitz, J.E., A. Sen and J, Fitoussi (2009), *Measurement of Economic Performance and Social Progress Revisited,* Observatoire Français des Conjonctures Économiques - Centre de Recherche en Économie de Sciences Po, available at http://archives.cerium.ca/IMG/pdf/1-Measurement.pdf (accessed 3 February 2016).

Sutherland, E. (2015), 'Bribery and corruption in telecommunications: the case of Kenya', *Info,* **17** (3), 38-57.

Tsaturyan, S., and P. Bryson (2009), 'Corruption and development: The Armenian case', *International Journal of Economic Policy in Emerging Economies,* **2** (4), 356-371.

Twigg, J. (2004), *Disaster Risk Reduction: Mitigation and Preparedness in Development and Emergency Programming,* Humanitarian Practice Network Good Practice

Review no.9, available at http://www.ifrc.org/PageFiles/95743/B.a.05.%20Disaster%20risk%20reduction_%20Good%20Practice%20Review_HPN.pdf (accessed 3 February 2016).

Varangis, P., J.R. Skees and B.J. Barnett (2002), 'Weather indexes for developing countries', in Dischel, R.S. (ed.), *Climate Risk and the Weather Market,* London: Risk Books, pp.279-294.

Varian, H. R. (1990), 'Monitoring agents with other agents', *Journal of Institutional and Theoretical Economics,* **146** (1), 153-174.

Weilant, M.E. (2015), *Is Health Microinsurance Sustainable? An Analysis of Five South Asian Schemes,* Impact Insurance Paper no.41, Geneva, Switzerland: International Labour Office, available at http://www.impactinsurance.org/sites/default/files/mp41_final.pdf (accessed 3 February 2016).

Wipf, J., D. Liber and C. Churchill (2006), 'Product design and insurance risk management', in C. Churchill (ed.), *Protecting the Poor: A Microinsurance Compendium,* Volume I, Geneva, Switzerland: International Labour Office and Munich Re Foundation, pp.146-173.

Wisner, B., P. Blaikie, T. Cannon and I. Davis (2003), *At Risk: Natural Hazards, People's Vulnerability and Disasters,* 2nd. ed., Abingdon, UK: Routledge.

Wydick, B. (1999), 'Can social cohesion be harnessed to repair market failures? Evidence from group lending in Guatemala', *Economic Journal,* **109** (457), 463-475.

Zeller, M., and L.R. Meyer (eds.) (2002), *The Triangle of Microfinance: Financial Sustainability, Outreach and Impact,* Baltimore, MD: John Hopkins University Press.

Figures and Tables

Figure 1. Conceptual Model for Microinsurance

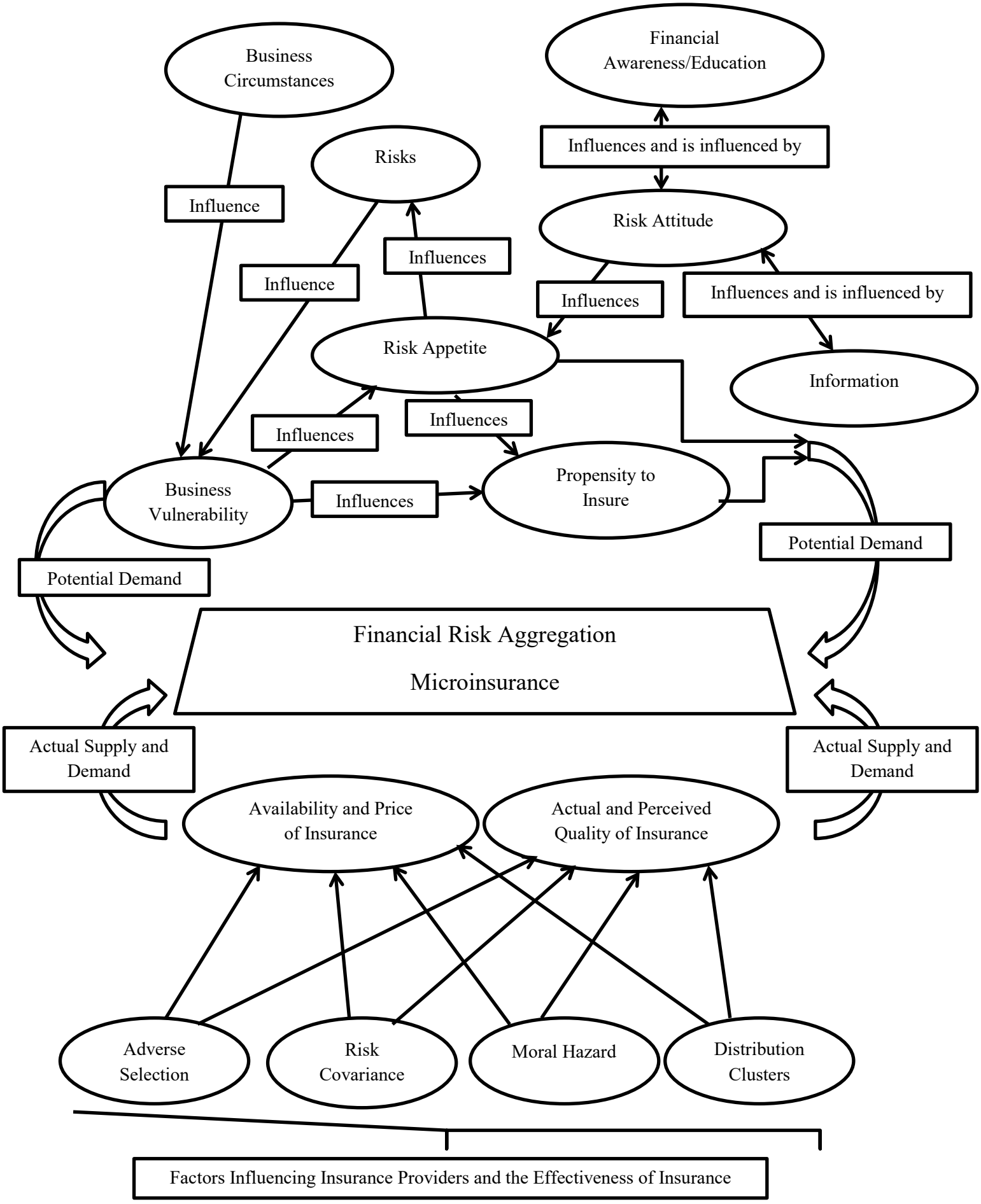

Figure 2. Sources of Risk to Microbusinesses

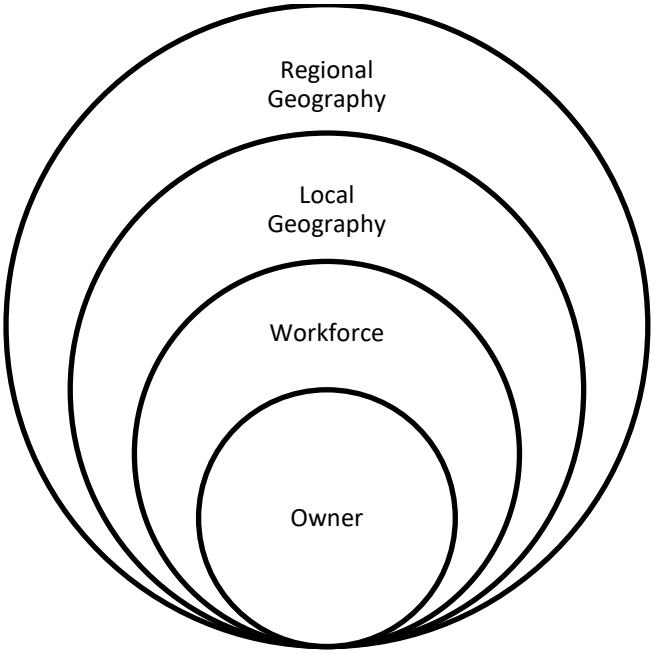

Table 1. Risk and Vulnerability

Risk		Business Adaptability				
		Very High	**High**	**Medium**	**Low**	**Very Low**
	Very Low					
	Low					
	Medium					
	High					
	Very High					

Vulnerability Level		**Description**
	Very High	A very threatening situation. Microinsurance and global reinsurance capacity necessary to increase survivability but other measures are needed to enhance long term sustainability.
	High	The business has a serious vulnerability. Microinsurance capacity is highly desirable to mitigate the effect of risks by enabling the business to recover from adverse events.
	Medium	The risk or outcomes for the business may be manageable but microinsurance capacity would enhance long term prospects and encourage growth.
	Low	The risk may be sustainable for the business over the short term. Development of microinsurance availability would improve longer terms prospects.
	Very Low	The threat of catastrophic loss for this business is remote and insurance may not offer value for money. However risk levels may grow if the nature or scope of the business changes.

Table 2. Vulnerability and Ability to Insure

Low **Ability to Insure**	Risks are low and controllable by the owners, who also have savings or other sources of emergency funding. However business owners have little financial education or information and there is little or no available microinsurance cover. **Medium risk of business failure due to aggregate risks**	High aggregate risks, with major cross-correlated uninsurable risks and little appropriate insurance cover available for any risks. Poor financial education and financial resources. Marginalized population with no access to insurance providers. **High risk of permanent business failure due to aggregate risks**
High	Risks are low and controllable by the owners, who also have savings or sources of emergency funding from family, the state or other agencies. Owners have adequate financial education and insurance is available. However owners who are not risk averse might not seek insurance. **Low risk of business failure due to aggregate risks**	Numerous and substantial but insurable risks with appropriate microinsurance available and good financial education. Major threats to life, essential health or business continuity. **Medium risk of business failure due to aggregate risks**
	Low **Vulnerability** High	