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Risk Management Strategies for Low Income Households:
The Case of Colombia

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Risk Management Strategies for Low Income Households:
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Abstract

Households across the world have to manage their risks by factoring for a host of variables – existing household income and assets, access to formal or informal financial markets/instruments and the feasibility of such products. In this paper I have used the SRM model to investigate decisions made by poor Colombian households in managing their risks. I find that poor households are less likely to use credit to cope with shocks (*ex-post*) given the lack of financial access and households' financial illiteracy. I also find that owning assets provides households with more flexibility in coping with income shocks, and those with fewer means to tackle shocks are more likely to opt for (*ex-ante*) risk mitigation instruments. Poor households tend to remain trapped in poverty as they face a greater likelihood of being vulnerability to shocks when they actually occur. Hence reducing such vulnerabilities are an important piece of the poverty alleviation puzzle that governments can no longer afford to ignore.

JEL Classification codes: D3, D8, H31

"Poverty is not a vice, that's a true saying... But beggary, honoured Sir, beggary is a vice. In poverty you may still retain your innate nobility of soul, but in beggary -- never."

-Fyodor Dostoevsky 1866

I. Introduction

Similar to brokerage firms, insurance companies or casinos; households are also exposed to several uncertain future shocks that they have to assess, manage and cope. However unlike the aforementioned agents, households have fewer instruments to deal with risk. The risks found at the household-level depend on different exogenous factors such as geographical location, socio-political conditions, market labour settings or health circumstances. Some risks are idiosyncratic to individual households such as accidents or unemployment, while other risks affect multiple households simultaneously, such as flooding or epidemic diseases. Thus, characteristics such as the source of the risk, its frequency and severity and correlation with other risks play a relevant role in the household decision-making process (World Bank, 2001).

In order to tackle their vulnerability to risks, households can either rely on public social safety nets, or opt for market-based risk management instruments. The choice of instrument, and hence the capacity of the poor to deal with uncertainty, depends on the characteristics of the risk faced, cost of the instrument and its availability.

Households' risk management strategies also depend on their income fluctuations and wealth endowments. Poor households typically have greater exposure to risk and the portfolio of instruments that they can use to prevent, mitigate and respond to such risks is very limited.

Markets for risk management products for poor households have been rife with failure mainly due to elevated costs of screening and monitoring, or incomplete information. Moreover poor households' vulnerability is accentuated in developing countries where governments fail to provide comprehensive social protection. In

these countries, around the 60% of the population lack appropriate safety net coverage; this figure rises to 80% in the poorest areas of the world[1].

Given the circumstances, the poor have developed innovative self-insurance mechanisms to hedge risks: from asset accumulation, diversification of income sources, to intra-community risk-pooling. These informal strategies might reduce vulnerability in the short term, but their elevated opportunity cost hinder social mobility and poverty reduction in the medium and long run (Sinha and Lipton, 1999).

When faced with the proposition of sliding into extreme poverty (often immediately after a shock) poor households are forced to take decisions that not only impact their future incomes and productive capacities but also have macroeconomic ramifications. Coping mechanisms that involves sacrifice of future human capital such as child labour or gender distortions can carry major effects on labour supply and growth (Basu and Van, 1998 and Humphries, Horrell and Voth 2001). Thus even if a government were to ignore the risk vulnerabilities at the micro level, its implications on the macro front make it tougher for governments to go on ignoring the cost of absentee social assistance.

Colombia has had a weak track record in the provision of social safety nets i.e– non-contributory cash or in kind transfers to the most vulnerable. Social assistance was not included in the social sector reforms of the 1990s, despite the increased spending allocated to other programs such as basic education and infrastructure (World Bank, 2002). Thus social assistance in Colombia remained under-financed compared to the country's needs as well as international standards (Rawlings, 2003). Colombia has instead relied on growth as a substitute for comprehensive social security nets, leaving individuals in the left tail of the income distribution exposed to significant risks.

The World Bank has undertaken two welfare assessments of Colombia. The first one, made a broad poverty profile, acknowledging achievements in living conditions and development indicators (World Bank, 1995). The report stressed the importance

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[1] Retrieved January 3rd 2014 from http://www.worldbank.org/en/news/press-release/2012/04/18/3-out-of-5-people-in-developing-countries-lack-safety-nets

of an integrated social safety net and a coherent poverty strategy in order to protect vulnerable population. It is important to note that this assessment was mainly qualitative, while highlighting the need for a reliable statistical system to conduct monitoring and cost effectiveness evaluation of the poverty reduction programs.

A second assessment was done in 2002 using the Social Risk Management framework (explained in detail in Section 3). This report observed substantial improvement in long-term social indicators and a significant resilience of growth and social development despite the rising violence and insecurity in the country (World Bank, 2002b). In this last exercise, they praised the role of the System for Selecting Beneficiaries of Social Spending (SISBEN, in Spanish), a proxy-means testing instrument assessing living conditions of households in order to target subsidies for health insurance, cash transfers and other subsidies since 1994 (Castañeda, 2005).

However, they also found vulnerability persisting within particular groups (households with unemployed heads, children and displaced population), inadequate social program coverage, as well as rising inequality that eroded potential welfare gains; thereby highlighting symptoms of a flailing social security system.

This report also examined risk management tools adopted by households to manage shocks created by the 1999 crisis [2], and found that households used three strategies namely, i) mobilizing available labour, ii) reducing consumption and iii) depleting physical assets (Rawlings, 2003).

The purpose of this paper is to study the determinants of demand for risk management instruments in low-income households in Colombia. I have analysed people's choice of risk management instruments for different risk types. Based on this analysis, I provide some policy recommendations that include public intervention and market-based reforms.

In the next section I define and examine the interconnected concepts of poverty, vulnerability and risks. In section 2, I delve into main strategies used by the poor to

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[2] For more information of the 1999 Colombia Crisis check Arias (2000)

deal with risk. Section 3 describes the role of governments in enabling comprehensive social risk management. Section 4 provides data sources methodology and empirical findings, followed by section 5 which concludes and gives some policy recommendations.

2. Key Concepts

This section discusses risks, vulnerability and poverty – as an attempt to emphasize their various intersections, and amalgamated forms which pose developmental challenges. These concepts are relevant to this paper as risk, vulnerability, and poverty all play an important role in affecting household welfare choices and outcomes. The section ends with a discussion on risk management undertaken by households facing poverty and scarcity.

2.1 Risk

In this paper, risk has been defined as the "uncertain events that can damage wellbeing" (World Bank, chp 8). Shocks, in a similar manner, are the materialization of risks. Each household faces a different array of risks and impacts of shocks are also dissimilar due to idiosyncratic characteristics of the population.

The debate on risk and its subjective nature in the field of economics became prominent with Frank Knight's book *Risk, Uncertainty, and Profit* in 1921. According to him, risk and uncertainty were wrongly confused and used interchangeably. For him, the main difference between risk and uncertainty was that risk could be objectively measurable by using a priori and statistical probabilities; while the latter was "real uncertainty". Simultaneously John Maynard Keynes, also interested in the topic: in his 1921 *Treatise on Probability,* argued about the existence of subjective probabilities. According to Keynes, the lack of information and general uncertainty about quantifiable stochastic events lead agents to take decisions based on rational expectations (the famous animal spirits). A different opinion was held by Keynes' student, Frank Ramsey, who believed in objective probability and linked it to risk. Ramsey embraced the Bayesian concept of probability, later polished by von Neuman and Morgenstern (Fienberg, 2006) and now widely used in economic theory.

The debate on the subjectivity of risk goes back in time and has its share of supporters and refuters. This paper acknowledges the subjectivity of risk; the likelihood of the materialization of a risk is dependent on a host of external factors and idiosyncratic household conditions.

Risk derives its subjectivity through the variation in its level of occurrence, the likelihood of its occurrence and severity of impact. The World Bank classifies risks by the level they occur (micro, meso and macro) and by the nature of the event (natural, social and environmental, among others). Risks at the micro level affect individuals and households. These are called idiosyncratic risks, since the correlation with other agents is close to zero. Death, illness and aging fall under this category. Meso and macro risk affect communities and countries. These risks, also called covariant, are difficult to insure, since the correlation between individual risk is greater than zero. Examples of these can of risks are unemployment, earthquakes, floods or wars. Finally, risks can be distinguished by severity and frequency. The likelihood of getting a flu is very high (high frequency), but its costs are low (low severity). The contrary happens with a tsunami: it is a very unlikely event (low frequency), but if it happens, could wipe out all assets and lead to death (high severity).

2.3 Poverty and Vulnerability

Poverty alleviation is not only the main goal for national and multilateral agencies around the world[3] but is also the backbone of several academic fields. Pioneer literature on the topic understands poverty as the inability of a household to gather enough resources to satisfy basic needs (Fields, 1994). An expanded definition of poverty includes multidimensional aspects which, apart from the minimum amount required to acquire a predefined basket of goods and services, also includes non-monetary dimensions as the fulfilment of a threshold of literacy, nutrition, and health (Ravallion, 1992). Some academics (Hazell and Haddad 2001, Sen 1999) extend the definition of poverty to even more abstract dimensions by adding difficult-to-quantify elements as freedom, self-esteem and autonomy, to the traditional definitions of poverty (physiological). In this paper people living in poverty are identifed as those

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[3] The United Nations General Assembly in the Resolution 48/183 1993 recognizes that "poverty is a complex and multi-dimensional problem with origins in both the national and international domains, and that its eradication in all countries, in particular in developing countries, has become one of the priority development objectives for the 1990s in order to promote sustainable development."

unable to obtain the amount of money needed per day to acquire this survival bundle[4].

Poverty is a dynamic concept: endogenous and exogenous conditions change over time, resulting in household income and wealth to fluctuate around the poverty line. Thus households are sometimes 'in poverty' when below the minimum level, or 'out of poverty' when above the minimum level; probabilities for both situations being non zero. However, the probability of getting out of poverty is affected by endowments, resulting in poor households that lack endowments to continue languishing in poverty longer than others. Such situations are called poverty traps where households are unable to obtain the resources in order to break out of poverty.

Poverty traps do not exist only at the household level, but also at the national level. Azariadis and Stachurski (2005) make a comprehensive survey of growth theory literature regarding why poor countries do not adopt modern techniques of production despite their efficiency. They find that credit market imperfections hampering high-returns investments, rent-seeking institutions or perverse incentive schemes explain why self-reinforcing traps constrain the implementation of new technologies, thereby diminishing a country's ability to grow out of poverty.

It is important to note that vulnerable to poverty differs from poverty itself, even though vulnerability is an aspect of poverty. Suryahadi and Sumarto (2001) paper explains carefully these subtle differences. Using cross-sectional data from Indonesia they used the consumption variance of the non-poor as a proxy for *vulnerability* after a significant macroeconomic shock. They divide the poor into chronic poverty (those with consumption levels below the poverty line) and transient poverty (above the line). Thus, the high vulnerable group will be composed by the chronic group and a subset of the transient with high variability of consumption. Their results show that though the 1997 crisis doubled the number of poor households, the number of households (not poor by definition but) facing high probability of being poor, increased three times.

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[4] Currently the absolute poverty line is USD 1.25.

Morduch (1994) introduced the concept of stochastic poverty to describe the transitory poverty that is created due to the inability of the household to find protection from random adverse events. Moreover, he states that vulnerability itself is a component of poverty: the lack of access to consumption-smoothing mechanisms is intrinsically detrimental for the poor. Vulnerability not only jeopardises income in upcoming periods but has long-run consequences. It makes individuals risk averse and changes behaviour while deterring profitable activities, and investments in high-risk/return instruments and in asset portfolios that could have reduced the likelihood of remaining in poverty (Dercon, 2007).

To calculate this probability of falling into poverty and average duration of the "poverty spell. Bane and Ellwood (1983) use a hazard model popular in actuarial science. One of the most interesting findings from this work is that even though most households just have short spells under the poverty line threshold, those in poverty at a certain point of time would experience long spells of poverty before escaping from it, reinforcing the concept of poverty traps explained above.

Vulnerability to poverty (at the household level) will be defined for this paper as the likelihood for a household to fall (or remain) in poverty (Perdana, 2005). In simpler terms, it is the probability of income and consumption to vary and fall under certain levels, thereby associating vulnerability with variability (Kamanou and Morduch, 2002). The role of vulnerability to poverty in the debate in development economics is fairly new. Before the 90s, the intersection of economics of uncertainty with economics of poverty was relatively unmapped. This area of study remained unexplored due to the lack of sound statistical information for tracing income and consumption, especially in developing countries.

Detrimental impacts of poverty can be observed by its effect on welfare at several levels: individual, household and society (ILO 2003). For individuals, poverty has negative effects on health, productivity and life expectancy; at the household level it causes deficient schooling, early parenthood and inadequate income. On the broader society level, poverty hinders growth, stability and sustainable development. New lines of research on the effects of poverty on individuals show that poverty impedes cognitive function, a consequence that cannot be explained through

nutrition levels, time available, or work effort. Mani et al (2013) use evidence from sugarcane farmers in India and shoppers in New Jersey to support the hypothesis that being poor means not only surviving with less income, but also with a concurrent shortfall of cognitive resources.

To sum up, we have seen some of the literature that tackles the dynamic concepts of risk, poverty, and how they are interwoven with vulnerability. Risk management instruments provide households with the ability to tackle risky events by reducing vulnerability, and enable them to break out of poverty traps. This is why this paper is important in its contribution in understanding risk management strategies and what can be done about increasing access to such instruments that help reduce vulnerabilities.

2.3 Risk Management in a Scarcity Context

In previous sections I examined the concepts of poverty, risk and associated vulnerabilities. In this section I will discuss methods that low income households adopt to tackle risk and reduce their vulnerability to shocks, especially in the face of scarcity, awareness and access to instruments for managing risks.

Low-income households are more exposed to risk and least protected from it (Hoogeveen et al 2004). Given the lack of public and private markets that provide the means to manage risks for low income households, the poor "self-insure" themselves through elaborate, although informal mechanisms such as asset accumulation, income diversification, and risk pooling contracts.

Households **accumulate assets** depending on which asset the household can afford, is available and is relevant to their cultural context. For instance, in India, poor households invest in cows and gold among other assets. Using randomized control trials, Anangol et al (2013) show that poor households in India invest in cattle despite their low (and sometimes even negative) financial returns because this asset is viewed as a reliable saving instrument that the poor plan to use in case of shocks.

Faced with missing markets for insurance policies for low income households, thus a lack of instruments to hedge risks, households have to rely on other households –

usually members of the same community, ethnic group or origin. Commonly known as **risk pooling** mechanism, the key characteristic of these methods is reciprocity and group self-enforcement. Transfers between households are a common practice in low income countries. Cox et al (2000) show how the share of households receiving transfers varies from 17% in Bulgaria, to 53% in Jamaica. Other example of an informal insurance scheme is the Rotating Savings and Credit Associations (ROSCAs), called Chit funds in South Asia and *natillera* in Colombia. Members of this informal financial scheme contribute to a pot on a regular basis. This amount is auctioned every month and the highest (winning) bid is returned to the pot, where the process starts again. In a survey conducted by Kapoor et al (2011) in India, they found that 56% of the chit fund members joined the scheme for smooth consumption in future emergency needs.

The poor invest in different income yielding assets in order to **diversify income** and risk. Evidence from Africa has revealed that greater nonfarm earnings diversification leads to faster growth in income and consumption in farm household income (Barrett et al 2001). This behaviour, according to the authors, reflects a risk management strategy (ex-ante prevention, and ex-post coping); and a response to incomplete markets (labour, credit, insurance).

However, these informal schemes do not guarantee an adequate protection from risks. Informal mechanisms have crucial flaws, particularly in situations when idiosyncratic risks become covariant. For instance, in episodes of widespread economic distress, risk-pooling schemes do not work properly as the lack of income and the loss of wealth affects all group members simultaneously. In such instances the pool of funds shrinks, the role of social pressure is disturbed, and the guarantee of transfers between individuals breaks down.

The rationale behind this behaviour is found in i) discount rates and ii) risk aversion. Discount rates present differences between individuals with different levels of income: poorer people are more impatient as they reveal preferred current consumption. Carvalho (2010), using evidence from Mexico, shows the difference amid poor and non-poor in their perceptions of inter-temporal trade-offs, with the poor showing a bias towards the present. This is why higher discount rates during

economic crisis lead to less fear of future exclusion from the program and hence, lower compliance with the norms. And the second reason that explains the failure of risk-pooling mechanisms in emergencies is their extremely risk averse behaviour shown by the poor when they are close to the poverty line (Ravallion, 1997). This non-linearity in risk appetite deters the poor to take high-return endeavours and other projects that might benefit them in the long run.

The inability to hedge risks for high-stress scenarios renders informal mechanisms ineffective in terms of their cost and their role as long-term poverty alleviation tools. When poor households are unable to self-insure *before* the occurrence of a risky event, their response to a shock is primarily to cope with its impact (as opposed to mitigating it through the informal mechanisms mentioned above). These households **deplete their assets** to cope with shocks, thereby getting pushed closer to extreme poverty. Other risk management strategies include **increasing their labour supply** by working more hours per day or/and engaging more household members into the economically active population; following considering to migrate to new areas (Lucas, 1987) and finally, to **reduce consumption** until starvation or **engaging criminal activities** such as prostitution or theft (Huang et al 2003).

The adverse effects of shocks are not equally borne within the household, usually distressing the weaker members: women and children. In countries like Ethiopia children in villages are taken out from schools during drought to be sent to towns as servants, while in Egypt children are sent to storehouses to pack vegetables in exchange of food (Narayan et al, 2000). Beegle et al (2005) use a household panel in Tanzania to examine the effects of transitory income shocks to child labour. Their evidence presents a significant rise of the child labour supply after a crop shock. Interestingly, they also found that households with liquid assets were able to offset 80% of the effect on children. The authors recommend, given this scenario, public policies directed to deepen access to financial services in order to achieve a reduction of child labour and a consequent improvement household welfare.

Women and children not only have to increase their labour supply but absorb the effects of income and consumption fluctuations on health. Foster (1995) presents how children in Bangladesh suffered deeper irreversible harm during the 1988

flooding due to famines compared to adults; while Rose (1999) presents the gender case, where girls in India face a higher mortality rate due to an intra-household bias in consumption smoothening.

Last resort risk management strategies, such as consumption reduction (say, in terms of calorie intake) and human capital reduction (by sending children to work instead of school) might have long term effects on productive assets (Sinha and Lipton 1999), exacerbating the poverty traps. Children engaged with work are less likely to go to school (Edmons, 2009) and those missing schooling years lead to a decrease in their expected income (Grootaert and Kambur, 1995).

Before concluding the section, I will also analyse the role of microfinance as a method of risk management for low income households. The role of microfinance, especially microcredit, is widely recognized as an efficient coping strategy even though the evidence of its impact on development indicators is inconclusive. It still remains one of the most important risk management tools used by the poor in case of shocks.

Randomized control trials have been very effective in demystifying the role of microcredit on education, health or women's empowerment (Banerjee et al, 2010). Multiple evidence in different jurisdictions have shown that microcredit only increases the household consumption pattern, but it does not stimulate other socio-economical gauges such as entrepreneurship, gender gaps, savings or investments (Bauchet, 2011). This evidence has made a huge controversy within micro finance institutions who witnessed drastic cuts in their funding by skeptical international donors. There is no final word regarding this debate, since new evidence is needed to scale up their results.

There exists substantial evidence supporting the belief that access to financial services is a valuable asset for the poor, who find these services directly useful in smoothing consumption and prevent them from depleting their high-return financial, physical, human, and social assets (Simkhada et al., 2000 and Zeller and Sharma, 1999). Hence, even though credit and insurance do not provide the full set of benefits promoted by their advocates, financial access can improve welfare of low

income households especially for temporary shocks. Financial products protect the potential loss of assets thereby supporting households through shocks they would have otherwise had difficulty overcoming without resorting to asset depletion

3. Frameworks for Risk Management Policies

The role of government is crucial for ensuring that a country has smooth functioning social risk management infrastructure. Though many governments have realized and may have attempted enhancing social protection, most developing countries today are still unable to adequately reduce exposure to risks, especially for the lower income households. In this section I will elaborate on situations where governments can intervene and build systems for social assistance, as well as discuss some of the instruments that have been used for dealing with idiosyncratic risks. I will end the section by discussing the Social Risk Management framework designed by the World Bank as a method for conducting holistic social assessments and identifying interventions that can be deployed for the same.

3.1 Public Policy and Risk Management

We have seen in section 2.1 that risk occurs at different levels – micro, meso, macro – and poverty has impacts at different levels – individual, household and society. Building on these concepts, we can examine the steps governments can take and have been taking to deal with risks and vulnerabilities at these different levels.

By now we are familiar with the fact that low income households have a limited portfolio of risk management instruments to tackle risks (please refer to Section 2.3). When information is asymmetrical, the cost of managing risk is significant, or there are missing markets, low income households would take choices that are not socially desirable and the cost of coping is eventually borne by taxpayers (Holzmann and Jorgensen 1999). When markets for risk management instruments remain incomplete, government intervention is warranted. At the macro and meso level government have to foster markets that provide risk management instruments even to low income households. This requires aligning incentives of households and firms and intervention in markets to ensure that private household decisions also lead to socially optimal equilibriums.

Governments need to analyse if (informal) markets are adequately covering idiosyncratic (micro level) risks. If so, they should prioritize covariant risks like inflation, unemployment or financial distress through macroeconomic policy; or by providing insurance in case of missing markets for events like terrorist attack or earthquake. Evidence shows, nonetheless, that in poorer countries this is not the case: shocks are too frequent and/or too large to be absorbed by informal mechanisms (Morduch, 1999). In such scenarios, public policy should implement programs to deal with idiosyncratic risks without crowding out private arrangements.

In order to establish complete markets, the government will also have to contribute towards nudging the demand side. This requires the government to enhance households' risk awareness, educate households about the use of risk management instruments and increase their availability by subsidizing them or reducing information asymmetries. At the micro level, the array of potential public policies to tackle idiosyncratic risks is extensive. The following is an analysis of the instruments that the World Development Report (2001) listed as the most relevant for improving the ability of households to manage risk from a public perspective.

Health is one of the main concerns of the poor since it deters their ability to produce. The costs from the medical bills and the opportunity costs of illness (loss in income due to a reduction in the labour supply and productivity) is often greater than what can be afforded. Gertler and Gruber (2002) propose that instead of insuring small and frequent illnesses; an optimal health system in developing countries should cover major health shocks. Therefore, catastrophic health events should be covered publicly without crowding out informal coping mechanisms as savings, asset depleting transfer and credit arrangements.

Developing countries are characterized by highly informal labour markets, where a significant portion of workers do not contribute to any inter-temporal saving schemes. Therefore, formal pension systems remain limited to the upper quintiles of the income distribution, leaving the poor in a vulnerable situation at retirement age. Data from the World Bank shows that in South Asia and Sub-Saharian Africa around 10% of the labour force active members have pension coverage, compared to almost

90% in high-income OECD countries (Pallares-Miralles et al 2012). The Bank's proposal to developing countries is based on a multi-pillar system that aggregates non-contributory cash transfers, pay-as-you-go schemes (contributions from current workers pay the benefits for today's retirees) and individual accounts managed privately.

Informality in labour markets results not only in the lack of pension systems, but few (if any) schemes which cover spells of unemployment. Monitoring individuals earning salaries outside the formal market is expensive, hence, the publicly funded unemployment insurance seen in high-income countries might not be feasible in low-income countries due to inadequate administrative capacity and labour market characteristics (van Ginneken, 2003). To deal with unemployment, multilateral organizations recommend governments to focus on programs of skill enhancement, job search, micro entrepreneurship and workfare programs in joint efforts with the private sector.

Finally, cash transfers have proven to be a highly efficient method to enhance risk management capabilities. As a social assistance program they have seen much success across the world. Cash transfers are means tested (a method to determine eligibility to an assistance program) which result in better targeting and ensuring subsidies reach the intended highly vulnerable population. De Janvry et al (2004) study the effects of conditional cash transfers in Mexico on social risk management. They conclude that cash transfer program effectively protected beneficiaries from short run shocks, and served as flexible safety nets in the absence of other risk management instruments.

Before concluding it is useful to highlight that even with a detailed set of proposed actions based on evidence and theory, decisions regarding public risk management are influenced by the political economy of every country. As any economic agent, governments face budget constraints, and weak institutions, that restrain their capacities to cover all risks faced by their citizens. Theoretically, selecting and designing risk management programs should be done using a cost benefit analysis in a general equilibrium framework. However, in developing countries the information

needed to perform these types of analysis is not only costly but very difficult to obtain.

Thus, the decision-making process to modify standing social safety networks is mostly uninformed, and misguided by political interest. Weak political institutions in these countries permeate public policy. Regulatory capture leads to resources getting diverted towards activities that benefit only particular interest groups with political influence, in other words resources get absorbed by rent seeking activities. Hence, instead of using their limited resources on ex ante risk reduction and mitigation, governments direct their spending on coping with disasters which serves the interests of neither households nor the country.

In developing countries, rent-seeing activities such as lobbying do not encourage competition (Krugger, 1974) but reduces economic growth and threaten innovation (Murphy et al, 1993). Instead of correcting market failures, public interventions in a context of corruption, inadequate and lax legal framework, become government failures that further hinder the possibility of welfare improvements (Krugger, 1990).

To conclude, there is no one-size-fits-all solution from a public policy perspective since every country has a different risk pattern, socioeconomic institutions with a dissimilar mix of public/private providers. Therefore, it is of utmost interest to every country to understand how new programs will complement their existing risk management arrangements in order to select and design the optimal set of policies to suit their conditions (World Bank, 2000).

3.2 Social Risk Management

As seen in the section above, there are several roadblocks to successful implementation of social assistance, and uncovered shocks continue to keep households vulnerable to poverty. Recognizing the relevance of vulnerability in the dynamics of poverty, the World Bank introduced the Social Risk Management (SRM), a framework to reposition the traditional areas of Social Protection (SP) (Holzmann and Jorgensen, 2000).

The SRM framework approaches the concept of vulnerability in a holistic manner. Its two main premises are: i) low-income households are more exposed to risks than mid-to-high income households and ii) they have fewer instruments to manage these risks (Holzmann et al 2003). In the SRM framework different ex-ante and ex-post risk management strategies are classified as prevention, mitigation and coping strategies.

Prevention strategies aim to reduce probability of occurrence. These are mostly macro-policies focused on income security (labour market interventions) and macroeconomic stability. **Mitigation** strategies tackle impact reduction. These ex-ante policies are executed at the household-level to reduce the effect of the shock when it actually occurs. A few examples of these are income diversification, risk-pooling mechanisms and hedging. **Coping** strategies, deal with responses and recovery from shocks. Coping strategies range from depleting assets, borrowing, increasing labour supply or reduction of food intake. Some of these might have irreversible effects on expected income and productive capacities as seen in Section 2.3.

Prevention, mitigation and coping strategies can be further split into informal agreements (such as, intra-community transfers, informal borrowing and self-insurance-, market-based arrangements), formal contracts (such as, lending and insurance); and public arrangements (such as SP, subsidies and public works programs).

The SRM model was adopted after the Asian Financial crisis which added to growing evidence that despite its gains, globalization also came with increased marginalization and social exclusion of sections of the population and left them more vulnerable to shocks. This food and financial crisis revealed that although several different countries had witnessed high growth rates, these were inequitable and counteracted efforts for poverty alleviation.

Before the crisis, multilateral organizations were focused mainly on funding and promoting SP through the instruments explained in section 3.1: i) social assistance, ii) social investment and development funds, ii) labour market interventions (e.g.

unemployment insurance) and iv) pensions and other insurance-type programs. By approaching these individual pillars separately, it became to tackle cross-cutting issues or to analyse the social protection system as a whole. This approach overemphasized the role of the public sector without considering fragile institutions and low tax revenues in developing countries.

The World Bank formulated the SRM after acknowledging that "eliminating the poverty gap through public transfers is beyond the fiscal capacity of most of our client countries". Consequently, SRM seeks a broader range of stakeholders (more inclusive than the one contemplated in the traditional SP) and includes individuals, households, communities, NGOs, market institutions, government and international organizations. SRM focuses on the relevance of strategies rather than the welfare outcomes only. Therefore, it pursues adequate provision of informal, formal and public arrangements to prevent the most vulnerable population from falling into poverty due to natural or man-made shocks.

Given these characteristics, the concept of SRM can be a potent analytic tool-set to evaluate policies on their potential to reduce poverty through risk management. Better protected individuals are more willing to adopt riskier behaviours, in particular those with high long term returns like entrepreneurship, creating a positive spill-over effect over the entire population (Ahmad, Dreze, and Sen, 1991).

3.3 Risk and Vulnerability Assessments
In order to operationalize the SRM framework, the World Bank developed the Risk and Vulnerability Assessments (RVAs). RVAs are diagnostic tool to formulate an appropriate social risk management strategy or a subset of policies that address particular issues in poverty and risk management (Canagarajah et al, 2002).

RVAs analyse the most prevalent shocks threatening welfare losses that affect the socio-demographic groups left most vulnerable to shocks, because of the absence of instruments to manage risk and the identification of the optimal ex-ante/ex-post instruments to cover any gap in their supply. RVAs view poverty as a dynamic process, and include those who are poor at any point in time, as well as those moving in and out from poverty.

The following are kind of questions that the RVAs are intended to answer (Kozel et al, 2008):

- Do households face major risks? What are these risks, and how frequent and severe are they?
- Are certain groups more exposed than others?
- Which populations are at risk of falling into (deeper) poverty?
- What types of ex-ante and ex-post risk management strategies are used by households, at what cost and to what effect?
- What are the welfare implications of existing strategies?
- What role is played by informal institutions, markets, public policy and government programs?
- What are the short run and longer run implications for well-being?
- Do existing public policies adequately deal with the impact of risk?

Ideally, to answer these questions and perform a comprehensive assessment, a panel data with an inventory of risks and shocks is necessary; in addition households' responses to those shocks. However, over time the dynamic nature of poverty, risk and vulnerability, implies that households would have faced and responded to different shocks. One could conduct RVAs with cross-sectional data, as I would do in the quantitative section of this document. Still, studying the inter-temporal variance of income and consumption would be next to impossible as households would have implemented different risk strategies at different time periods (Holzmann et al, 2003).

Since its introduction, the World Bank performed 132 RVAs, 28 of them in Latin-America and the Caribbean (LAC) region between 2000 and 2007, the cited document Kozel et al, 2008). In those RVAs, in some cases in included in a type of analysis done by the Bank called Poverty Assessments, a common set of risk sources: economic volatility, political instability and frequent natural disasters are found. Some of the RVAs conducted in LAC have focused on a particular shock or risk: Argentina's 2002 economic crisis and domestic policy responses (World Bank, 2003b) or households' informal strategies of income diversification in Nicaragua before the Coffee Crisis (Vakis et al, 2004). Most of these RVAs assessments done

in the region approached poverty from a generic macroeconomic perspective, highlighting the need to develop long-term poverty alleviation strategies -Brazil (2003c), Perú (World Bank 2005a), Venezuela and Bolivia (World Bank 2005b). The World Bank has undertaken two assessments in Colombia (please refer to Section 1), and found that though some social indicators have improved, much remains to be done for improving welfare of the poor.

In the next section I will elaborate the survey and data set used for this paper, which allows me to assess the risk management strategies of low income households in a manner similar to SRM.

4. Quantitative Analysis

The main objective of this research paper is to analyse the vulnerability of poor households in Colombia to risks and their lack of preparedness on account of lack of access to financial services, awareness and market failures, how they respond to a predefined portfolio of risks and explore factors that govern such decision making. In particular I want to determine which instruments poor households typically use to respond to risks and what are the determinants for this decision. This paper however, due to lack of appropriate survey data is unable to undertake a comprehensive country-wide RVA as the ones conducted by the World Bank.

4.1 Data Description

For empirical analysis I have used a one-time survey undertaken in 2008 by the Federation of Colombian Insurers, FASECOLDA. This survey contains questions that are not included in the current household survey data (Gran Encuesta Integrada de Hogares-GEIH) by the National Administrative Department of Statistics. The GEIH survey contains risk management information regarding the risk of unemployment, but other risks like health, death, robbery or transit accident are not covered.

Since 1976 FASECOLDA, has been the guild representing all the insurance companies operating in Colombia. Among its functions and responsibilities its mandate is to study the evolution of the insurance business and the priority of promoting insurance penetration and density in Colombia. So far, FASECOLDA has

been doing surveys with insurance companies to study the availability of micro-insurance products from the supply-side. This was the first survey to collect data collection on demand for micro-insurance products from low-income strata risks and the risks they faced and managed, especially the base of the pyramid.

The survey has collected data on the risks that low income households face, their willingness to pay and the reasons that inhibit the purchase of insurance. Another interesting aspect is that the survey also provides information on saving habits of low-income households (Díaz et al, 2009).

Significant income inequality in Colombia implies that a substantial segment of the population falls in the lower deciles of income distribution (Joumard and Vélez Londoño, 2013). The study funded by FASECOLDA interviewed 550 low-income households -strata 1, 2 and 3 out of 6 possible- from the four main cities in the country: Bogotá, Medellín, Barranquilla and Cali. In Colombia, domiciliary public utility services have a cross subsidy system which charges differential rates to the households who live in areas associated to low wealth levels (Medina and Morales, 2007. Strata 1, 2, and 3 are neighbourhoods where low income households reside.

The firm performing the data collection, Yanhass, gathered a sample which was statistically representative for the population in strata 1, 2 and 3, for the four main cities in Colombia. The portfolio of risks included death, sickness, robbery, flooding, earthquake and car accident among others. People were asked four questions regarding risk portfolio:

- Has the risk happened to you?
- Has it happened to someone you know?
- Do you perceive this risk as very probable to occur?
- How recently has this risk happened to you? (up to six months ago)

Table 1

Shock Experience and Risk Perception

	Has happened to you?	Has happened to someone you know?	High perceived probability of occurance	How recently this happened to you?
Theft- Household	16.9%	31.1%	25.3%	6.5%
Unemployment	32.5%	47.0%	22.7%	11.8%
Illness-Income Provider	13.3%	27.7%	21.1%	5.1%
Accident- Home	7.8%	26.0%	20.0%	3.3%
Traffic Injury	13.3%	34.9%	22.5%	2.7%
Death-Burial Costs	14.2%	27.2%	21.5%	2.5%
Death-Loss of Income	7.1%	22.3%	20.0%	1.1%
Flooding-Home	5.1%	18.9%	19.8%	1.8%
Earthquake-Home	1.1%	10.1%	20.0%	0.4%
Theft-Business	9.5%	18.2%	15.1%	1.5%
Theft-Vehicle	7.6%	16.3%	16.5%	0.9%
Accident-Office	11.1%	23.7%	20.4%	2.0%
Traffic Accident- Third Parties	5.0%	14.4%	15.5%	0.4%
Flooding-Business	1.3%	7.0%	15.1%	0.0%
Earthquake-Business	0.4%	5.4%	15.8%	0.0%
Illness-Family Member	11.3%	16.7%	20.5%	3.5%

Table 1 shows the answers to these questions. Unemployment is by far the most prominent threat to low-income households: it has happened to 32.5% of the respondents. This figure rises to 46% of the people within Strata 1. 47% claimed that it happened to someone they know (58% for Strata 1) and it is also very frequent: 12% says that it happened to them in the past six month, 19% for the most poor. The other most damaging shocks are household theft, death (burial costs), traffic accidents and illness (of main earning member of the household or a family member).

From a pre-defined risk portfolio of 16 risks, respondents were asked to select which risk posed the highest threat to them. Table 3 shows that the risk perception (top-of-mind) is centred around two risks: unemployment and thievery. These answers look consistent while filtering by strata, gender and marital status. However, those without children are less concerned about house security and more about income loss.

The survey includes two questions about risk management instruments (RMI). The first one is a prospective inquiry about how the household would deal with a

hypothetical-non-specific shock: "in case of emergency, how would you cover unexpected expenses?". The second is a retrospective question about how the household dealt with a specific shock in the past. The surveyors were supposed to show a card with 16 different types of risk management instruments for both questions.

I have classified these 16 risk management instruments into the five risk strategies elaborated in Section 3.2 above. *Mitigation* aggregates those strategies that involve inter-temporal planning i.e. households make prior arrangements in order to access these emergency funds at the time of a shock i.e. when risk materializes. Here I include dissaving, risk-pooling arrangements, selling and pawning assets (since saving markets for low-income brackets are incomplete, one can assume that they purchase assets in order to pawn/sell them later), raffles, fund raising and ROSCAS.

Second category is composed by *formal lending*, such as lending by commercial banks, employee's funds, cooperative finance institutions and mortgages. Thirdly, *Informal lending* includes unregulated credit markets such as informal money lenders and intra-community loans. The final two mechanisms are the most costly for households because they involve human capital depletion: *consumption reduction* (decreasing food intake, disinvesting in education and conspicuous consumption) and *increasing the labour supply* (since there are cultural and legal reasons to avoid answering whether this includes child labour, one could assume that all household members, including children, increase supply of their labour i.e. children and other household members do more work). It is important to note that the last four strategies – formal lending, informal lending, consumption reduction, labour increase – are categorized as coping arrangements.

Table 2 displays the strategies used (or that would be used) by households by type of shock. The whole sample (550 households) answered the question regarding the hypothetical-non-specific shock in the future (RMI), while for the other specific risks, the number of respondents varies based on the fact whether they faced that specific risk.

Table 2

Coping Strategies by Prospective and Retrospective Shocks

		Sample	Mitigation	Coping Strategies			
				Formal lending	Informal lending	Consumption reduction	Labour Increase
RMI (prospective)		550	31.8%	9.5%	49.5%	6.0%	3.3%
Retrospective	Theft- Household	90	54.4%	4.4%	31.1%	4.4%	5.6%
	Unemployment	178	46.1%	3.4%	41.6%	3.4%	5.6%
	Illness-Income Provider	70	55.7%	4.3%	32.9%	5.7%	1.4%
	Accident- Home	43	62.8%	4.7%	27.9%	4.7%	0.0%
	Traffic Injury -First Party	70	62.9%	4.3%	32.9%	0.0%	0.0%
	Death-Burial Costs	78	55.1%	2.6%	39.7%	1.3%	1.3%
	Death-Loss of Income	38	47.4%	2.6%	47.4%	2.6%	0.0%
	Flooding-Home	26	30.8%	15.4%	50.0%	3.8%	0.0%
	Earthquake-Home	5	40.0%	40.0%	20.0%	0.0%	0.0%
	Theft-Business	23	34.8%	8.7%	47.8%	4.3%	4.3%
	Theft-Vehicle	16	62.5%	31.3%	6.3%	0.0%	0.0%
	Accident- Work	52	67.3%	3.8%	26.9%	1.9%	0.0%
	Traffic Injury - Third Parties	11	45.5%	9.1%	45.5%	0.0%	0.0%
	Flooding-Business	3	66.7%	33.3%	0.0%	0.0%	0.0%
	Earthquake-Business	1	100.0%	0.0%	0.0%	0.0%	0.0%
	Illness-Family Member	60	61.7%	5.0%	31.7%	1.7%	0.0%

I want to highlight the role of informal lending for future risk management: 49.5% of the households expect to access a line of credit for emergency situations. Loans from money lenders and other informal arrangements dominate risk management strategies for hazards like unemployment (42%), death of a household provider (47%) and house flooding (50%). Households are usually less prepared for risky events i.e. they resort to *coping* instead of the ex-ante *mitigation* strategies to limit the impact, of events such as flooding, earthquake and death of a provider. Lastly, to cope with unemployment and major illness of the household provider, households reduce their [food/conspicuous/overall] consumption (3.4% and 5.7%), as well as increasing their labour supply (5.6% and 1.4%). These risks are the ones that deplete the most human capital.

4.2 Estimation

In order to find the determinants for the selection of each RMI for a future non-specific event, I ran probit regressions of the 5 strategies (mitigation, formal lending, informal lending, consumption reduction and labour increase) on a subset of

variables following the procedures described in Cameron and Trivedi (2009). Since the survey is not abundant on demographics, I selected independent variables that are reflective of the economic conditions of households. The binary variables *sex status nokids poor nosisben tminw* represent gender, marital status, if there have children, if respondents live in a strata 1, if they do not receive subsidies trough SISBEN and if they the total monthly income of the household is less than two minimum wages (the survey does not ask exact wages amounts, instead it reports salary brackets, this information in Colombia is sensitive if the pollster is not an official agency). Analogously, *vehicle entrep rent* take the value of one if the household owns assets such as a car/bike, a business and a house.

Table 3

Probit Results - Marginal Effects

| Sample | Mitigation | Coping Strategies | | | |
		Formal lending	Informal lending	Consumption reduction	Labour Increase
sex	-2.75%	3.10%	0.25%	-1.22%	0.17%
age	0.29%	0.63%	-0.52%	-0.21%	0.01%
age2	0.00%	-0.01%	0.00%	0.00%	0.00%
poor	12.81%**	-3.12%	-14.50%***	1.21%	1.42%**
nosisben	-1.27%	6.8%***	-5.46%	0.19%	-0.18%
nokids	12.89%**	-3.45%	-10.16%	0.80%	0.43%
vehicle	5.04%	6.29%	-3.44%	-3.88%*	-
entrep	-16.95%***	0.64%	6.36%	3.28%	3.12%***
rent	-5.76%	-0.64%	4.30%	4.29%**	-1.58%**
status	-5.73%	-1.53%	8.81%*	0.28%	-0.59%
tminw	-4.41%	-1.94%	7.83%	-1.76%	0.06%
°savRMI	2.45%	-2.94%	-8.48%	3.03%*	-12.40%
°debt_t	-1.07%	-0.24%	0.80%	0.09%	-0.03%
°consum	0.87%	-1%**	-0.54%	0.19%	0.04%
°firesale	0.01%	0.00%	-0.01%**	0.00%	0.00%
Prob > chi2	2.76%	0.77%	3.78%	60.16%	1.57%

* if p < 0.10, ** if p < 0.05, and *** if p < 0.01

(°) dy/dx for continious variables is from 0 to COP 100,000

The continuous variables are *savRMI debt_t consum firesale.* The first one is constructed by summing the amount saved by the household for emergencies, *debt_t* is the outstanding debt, *consum* is the monthly consumption expenditure and

the last one, *firesale*, is the estimated amount that the household would receive in case of asset fire sale. All these variables are in Colombian Pesos (COP).

The Walt test for these set of variables is satisfactory at the 10% significance level. Table 5 shows the marginal effects at the means for both the discrete and continuous independent variables. For all the calculations in this paper, I will use significance levels of .1 (*), .05(***) and .01 (***).

From the five Probit regressions ran, in four I found no evidence to reject the null hypothesis that the independent variables, taken together, have some relation to the dependent variable. Only the RMI related to consumption reduction strategy I found no information to show statistical relevance. For the Lagrange multiplier test for these Probit shows that we accept our model with the same level of significance. The null hypothesis of correct model specification is not rejected. The Hosmer-Lemeshow specification test, used to evaluate the goodness of the fit (it resembles a Pearson chi squared test) shows a good fit of the model.

The analysis by individual variables shows interesting results to corroborate prior hypothesis. Not surprisingly, households in Strata 1 are less likely to use credit (formal or informal) arrangements as coping strategies. This reflects the problems in financial services access that the poorest populations face and the lack of awareness from the poor of how to use these instruments. With no collaterals and volatility of income, this segment of the population is deprived from credit which increases their vulnerability Nontheless, the most poor are 13% more likely to select mitigation strategies in the future. This supports the hypothesis that the less instruments to cope you will have at the moment of risk materialization, the higher the level of preparedness: without complete insurance/credit markets households will try to reduce their exposure with risk-pooling arrangements and other mechanisms

Regarding savings the evidence is not conclusive. An increase of COP 100,000 (approximately USD 50) in emergency dedicated savings is associated with an increase in the likelihood of reducing consumption (coping strategy), which is counterintuitive. Savings coefficient for labour supply and in/formal labour are negative but not statistically significant.

The regressions show that the asset fire sale value would decrease the need of informal lending in case of emergency. Higher consumption levels will decrease the odds of using formal banking by 0.01%, which is in line with credit analysis: banks would deny loans to riskier households.

Interestingly, receiving support from the government (63% of the sample) does not have effects on most of the variables, but to the likelihood of using formal lending as a coping mechanism. Other noteworthy results are the effect of asset possession like vehicles or houses. Those with a motorbike or a car are 3.88% less likely to reduce their consumption in case of any shock, while renting a house (instead of owning) increased this probability by 4.3% and reduces the need to increase the labour supply in 1.58%. Households with more assets/endowments are better equipped to manage shocks and sell assets before reducing their food intake or education spending.

Entrepreneurs are less likely to mitigate risk. Specifically, they are almost 17% less likely to use ex ante mitigation schemes. This could be explained by the fact that entrepreneurs own businesses which are inherently risky ventures, and deters them from planning ahead. Having children, institutively, affects the risk management decision making. Those without children mitigate more, as they have less liquidity constraints and limit accessing informal credit sources. On the other hand, parents opt for getting funds from informal sources in case of emergency, regardless of its high cost.

The analysis for the *retrospective* question – which asked how household had dealt with a specific shock in the past – lacks statistical power, thus rendering the results inconclusive. The analysis for the determinants for the selection of each RMI for a pre-defined array of shocks, the results are not conclusive due to the lack of statistical power. As noted in Table 4, the number of interviewees answering questions on the preferred RMI in the *future* is 550, the total sample. But for questions about *past* choices records fewer respondents as they get split amongst the respective risks each one faced; the number of respondents per risk depends on the frequency, not the severity, of the shock. These regressions did not pass the fit

tests, and are not included as they do not meet the rigourous standards of this paper.

Finally, I analyse the relationship between the RMI used in the past for a particular shock, and their answers for which strategy would the household use in case of a future emergency. Using a Pearson's χ^2 for the hypothesis that future selection of RMIs are independent from previously adopted RMIs, I found that within this sample, only for the risks of vehicle theft, flooding and traffic injuries, households take consistent inter-temporal decisions. This means that for the other risks households might change their future risk strategy. One explanation for this behaviour is that households would modify their decisions based on the inadequate performance of their past choice.

This exercise does have some methodological shortcomings: for instance there is theoretical endogeneity between the independent variables e.g. debt and consumption. However the sample size and the approach of the survey limited the scope of the study. Nonetheless, the intention of this work is to generate awareness about the topic, and incentivise private and public agencies to conduct more and larger comprehensive surveys to study household behaviour and its risk preferences.

5. Final Remarks

In this paper I have studied risk management choices in a developing country context through a household level survey in Colombia. Using a similar set of questions that the World Bank uses to conduct its Risk and Vulnerability Assessments and regression analysis, I attempt answering most of these questions with the information available from a private survey.

My results have shown that individuals in Strata 1 are less likely to used microfinance products (such as lending, insurance etc.) to cope with risks. The capacity to manage risk is considerably diminished in poor households due incomplete markets or institutional failures. Incomplete financial products markets reflect the low rates of financial inclusion seen in Colombia, and can be explained by high monitoring costs, ceilings to interest rates and financial illiteracy.

Hence my first recommendation to promote risk management awareness tackles the issue of financial illiteracy. A policy targeting financial access has to comprise of programs that educate low income households of the usage and necessity of these instruments in order to boost the demand as well. Greater understanding of financial products would reduce informational barriers that prevent households from purchasing products that enable households to mitigate risk. Better knowledge of risks and methods to alleviate adverse effects shocks would nudge people to demand such risk management products and lay the foundations for a smoother and complete markets.

Apart from informational barriers, low income households have a smaller portfolio of instruments to deal with short term shocks, and their vulnerability to exogenous shocks is greater than other agents in the income distribution. For the poor, hazardous events are a potential threat to their present and future welfare.

In the absence of hedging tools, the severity of these shocks is augmented, causing severe issues in health, education and nutrition, among other developmental indicators. Even if households are able to cope with these shocks, some of the instruments used permanently diminish expected income and productive capacities, pushing them into inter-generational poverty traps.

Deprived of risk management instruments, poor households have to develop informal mitigation strategies. For this, they use inter-household risk-pooling mechanisms. Private arrangements as ROSCAS are seen all over the world as a complementary safety net used by the poor in the absence on publicly funded programs. However, these continue to remain as informal arrangements/mechanisms.

In order to develop robust and efficient formal mechanisms that both poor and non-poor households can access, while simultaneously constrained by tight fiscal budgets, developing countries should encourage private sector's role in financial sector deepening. Eliminating the interest rate ceiling (now at 29% for microcredit) would encourage big banks to offer loans at affordable rates given the economies of

scale of these institutions. Also, if the government adopts a mostly regulatory role and gives financial institutions the freedom to price products, banks and other formal financial institutions would be more likely to offer products more suitable to manage risk, especially in terms of liquidity, like saving accounts.

Apart from the changes required in financial sector regulation on part of the government, it also needs to re-examine its provision of public safety nets. The Colombian government provides public safety nets through SISBEN which targets poor individuals eligible for programs such as subsidised health, conditional cash transfers, youth training, public works and elderly poor. However, SISBEN has not altered the risk management strategies because most of these programs do not deal with emergencies or unexpected shocks, and instead aim to protect income security.

Finally, in my paper I have found evidence supporting that individuals are saving through non-liquid assets such as vehicles and real estate, and holding these assets as insurance is modifying positively their selection of harmful coping mechanisms such as reduction of consumption or the increase of the labour supply.

In rural areas where the banking sector mostly absent, public programs that subsidise low-income housing projects serve as an alternative saving instrument compared to long term instruments. As seen from my findings, owning a house positively influences risk management decision making, enabling households to use these assets as collateral against borrowing, and even sell in case of extreme shocks.

My results have serious implications for public policy. As mentioned before, there are macroeconomic consequences of poor risk management not only through labour market distortions but also by the fiscal burden borne by the tax payers money that financially assist those individuals pushed to extreme poverty due to a lack of ex ante risk management tools. Hence, the need to approach vulnerability to poverty is of utmost importance. These policy recommendations will be beneficial for any type of risks, making a significant improvement in the welfare of the most vulnerable population.

6. References

Ahmad, E. & Dreze, J. John Hills and Amartya Sen (eds)((1991). Social Security in Developing Countries, Sen Clarendon Press, Oxford, UK, (1991

Anagol, S. and Etang, A. and Karlan, D. (2013), Continued Existence of Cows Disproves Central Tenets of Capitalism?. NBER Working Paper No. (19437

Azariadis, C. and Stachurski, J. (2005). Poverty Traps, Department of Economics - Working Papers Series 913, The University of Melbourne.

Bane, M and Ellwood, D. ((1983). Slipping Into and Out of Poverty: The Dynamics of Spells. National Bureau of Economic Research Working Paper No. 1(199

Bauchet, J. Marshall, C. Starita, L. Thomas, J. & Yalouris, A. (2011). Latest findings from randomized evaluations of microfinance. InAccess to Finance Forum (No. 2)

Banerjee, A. Duflo, E. Glennerster, R. & Kinnan, C. (2013). The miracle of microfinance? Evidence from a randomized evaluation.

Barrett, C. B. Reardon, T. and Webb, P. (2001). Nonfarm income diversification and household livelihood strategies in rural Africa: concepts, dynamics, and policy implications," Food Policy, Elsevier, vol. 26(4).

Barrett, C. B. Reardon, T. and Webb, P. (2001). Nonfarm income diversification and household livelihood strategies in rural Africa: concepts, dynamics, and policy implications. Food Policy, Elsevier, vol. 26(4), pages 315-331.

Beegle, K. Dehejia, R. and Gatti, R. (2006). Child labor and agricultural shocks. Journal of Development Economics, Elsevier, vol. 81(1), pages 80-96, October.

Canagarajah, R. Heitzmann, K. S. & Siegel, P. B. (2002). Guidelines for assessing the sources of risk and vulnerability. WB Social Protection Discussion Paper, (0218).

Castañeda, T. & Fernández, L. (2003). Targeting social spending to the poor with proxy-means testing: Colombia's SISBEN system. World Bank. Washington, DC. Processed.

Carvalho, L. (2010). Poverty and Time Preference. RAND Corporation Publications Department, Working Papers 01/2010; DOI:10.2139/ssrn.1625524

Cox, D. Galasso, M. and Jimenez, E. (2000). Inter-Country Comparisons of Private Transfers." World Bank, Development Research Group, Washington, D.C.

Dercon, S. (2007). Fate and fear: Risk and its consequences in Africa. Journal of African Economics.

Díaz, A. González, A. and Junguito, R. (2008). Microseguros en Colombia. Publicaciones Fasecolda.

De Schutter, O. and Sepúlveda, M. (2012). Underwriting the Poor: a Global Fund for Social Protection. Briefing Note 7, Office of the High Commissioner for Human Rights.

Edmonds, D. (2009). Defining child labour: A review of the definitions of child labour in policy research. International Labour Office, International Programme on the Elimination of Child Labour (IPEC) - Geneva

Fields, Gary S. ((1994). Data for measuring poverty and inequality changes in the developing countries," Journal of Development Economics, Elsevier, vol. 44(1), pages 87-102, June.

Fienber, S, (2006). When Did Bayesian Inference Become Bayesian? International Society for Bayesian Analysis, Number 1, pp. 1-40

Foster, A. (1995). Prices, Credit Markets and Child Growth in Low-Income Rural Areas. Economic Journal, Royal Economic Society, vol. 105(430), pages 551-70.

Ginneken, W. (2003). Extending social security: Policies for developing countries. International Labour Review,142(3), 277-294.

Gertler, P. & Gruber, J. (1997). Insuring consumption against illness (No. w6035). National Bureau of Economic Research.

Green, William (2008). "Econometric Analysis". Sixth Edition. Upper Saddle River, NJ: Pearson Prentice Hall

Grootaert, C. & Kanbur, R. (1995). Child labour: an economic perspective. Int'l Lab. Rev. 134, 187.

Holzmann, R. & Jorgensen, S. (1999). Social protection as social risk management: conceptual underpinnings for the social protection sector strategy paper. Journal of International Development, 11(7), 1005-1027

Holzmann, R. & Jorgensen, S. (2001). Risk and vulnerability: the forward looking role of social protection in a globalizing world. Washington, DC: World Bank.

Holzmann, R. Sherburne-Benz, L. & Tesliuc, E. (2003). Social risk management: The World Bank's approach to social protection in a globalizing world. Washington, DC: World Bank.

Hoogeveen, J. Tesliuc, E. Vakis, R. and Dercon, S. ,A. (2004). Guide to the Analysis of Risk, Vulnerability and Vulnerable Groups. Washington: The World Bank.

Huang, C. Wang, P. and Laing, D. (2004). Crime and Poverty: A Search-Theoretic Approach. International Economic Review, 45(3):909-938.

Lucas, R. (1987). Emigration to South Africa's Mines. The American Economic Review, Vol. 77, No. 3. pp. 313-330.

Kamanou, G. and Morduch, J. (2002). Measuring vulnerability to poverty. WIDER Discussion Papers World Institute for Development Economics (UNUWIDER), No. 2002/58, ISBN 929(1902411

Kapoor, M. Schoar, A. and Buteau, S. (2011). Chit Funds as an Innovative Access to Finance for Low-income Households. Review of Market Integration 3(3) 287–333

Keynes J. (1921). A Treatise on Probability. New York: MacMillan. Ann Intern Med.

Knight, F. (1921). Risk, Uncertainty, and Profit. Library of Economics and Liberty. Retrieved March (19, 2014 from the World Wide Web: http://www.econlib.org/library/Knight/knRUP.html

Kapoor, M. Schoar, A. Rao, P and Buteau, S. (2001). Chit Funds as an Innovative Access to Finance for Low-income Households. Review of Market Integration vol. 3 no. 3 287-333

Kozel, V; Fallavier, P. and Badiani, R. (2008). Risk and Vulnerability Analysis in the World Bank Analytic Work: FY(2000-(2007. Social Protection Discussion Paper Series Titles 0812. World Bank, Washington DC.

Krueger, A. O. (1974). The political economy of the rent-seeking society. The American economic review, 291-303.

Krueger, A. O. (1991). Government failures in development (No. w3340). National Bureau of Economic Research.

International Labour Organization, (2003). Working out of poverty: Report of the Director-General." International Labour Conference, 91st Session. Geneva: International Labour Office

Mani, A. Mullainathan, S. Shafir, E. & Zhao, J. (2013). Poverty impedes cognitive function. Science Magazine, 341, 976-980.

Narayan, D. (2000). Voices of the Poor: Crying Out for Change. Oxford University Press.

Morduch, J. (1994). Poverty and Vulnerability. The American Economic Review, Vol. 84, No. 2,

Morduch, J. (1999). Between the state and the market: Can informal insurance patch the safety net?. The World Bank Research Observer, 14(2), 187-(207.

Murphy, K. M. Shleifer, A. & Vishny, R. W. (1993). Why is rent-seeking so costly to growth?. The American Economic Review, 409-414.

Pallares-Miralles, M. Romero, C. & Whitehouse, E. (2012). International patterns of pension provision II: A worldwide overview of facts and figures.

Pantoja, E. (2002). Microfinance and Disaster Risk Management Experiences and Lessons Learned. draft final report by the ProVention Consortium to the World Bank's Disaster Management Facility, UNDP, and UNCDF, July.

Perdana, A. (2005). Risk Management for the Poor and Vulnerable. CSIS Working Paper Series WPE 093

Rawlings, L. (2003). Colombia: Reforming the Social Safety Net." World Bank, Washington, DC. License: CC BY 3.0 Unported.

Ravallion, M. (1997): Famine and economics, Journal of Economic Literature 35(3), 1(205-1242.

Rose, E. (1999). Consumption Smoothing and Excess Female Mortality in Rural India. Review of Economics and Statistics 81(1): 41–49.

Sadoulet, E. Finan, F. de Janvry, A. & Vakis, R. (2004). Can Conditional Cash Transfer Programs Improve Social Risk Management?. Lessons for Education and Child Labor Outcomes." Social Risk Management Discussion Paper, (04(20).

Sen, A. (1999). Development as Freedom. Oxford: Oxford University Press.

Sinha, S, and Lipton, M. (1999). Damaging Fluctuations, Risk and Poverty: A Review." Background Paper for World Development Report (2000/(2001. Brighton, UK: Sussex University, Poverty Research Unit, Washington, D.C.: The World Bank.

Asep, S. and Sumarto, S ,(2001). The Chronic Poor, The Transient Poor, and the Vulnerable in Indonesia Before and After the Crisis." SMERU Working Paper

World Bank, (2000). World Development Report 2000/2001: Attacking Poverty. Oxford University Press

World Bank. (2001). Social Protection Sector Strategy: From Safety Net to Springboard. Washington, D.C.: The World Bank.

World Bank. (2002a). Colombia: Social Safety Net Assessment" Washington, DC. World Bank. License: CC BY 3.0 Unported."

World Bank. (2002b). Colombia-Poverty Report: Main report". Report No. 24524-CO, Washington, DC: World Bank.

World Bank, (2003a) Social risk management: The World Bank's approach to social protection in a globalizing world." Washington, DC: World Bank.

World Bank, (2003b). Argentina - Crisis and Poverty (2003) Poverty Assessment (No. 26127-AR). Washington, DC: Poverty Reduction and Economic Management, Latin America and the Caribbean Region, The World Bank.

World Bank, (2003c) Brazil - Strategies for Poverty Reduction in Ceara: The Challenge of Inclusive Modernization" (No. 24500-BR). Washington, DC: Brazil Country Management Unit, Latin America and the Caribbean Region, The World Bank.

World Bank, (2005a). Peru - Opportunities for All: Peru Poverty Assessment (No.29825-PE)". Washington, DC: Poverty Reduction and Economic Management Sector Unit, Latin America and the Caribbean Region, The World Bank.

World Bank. (2005b). Bolivia - Poverty Assessment: Establishing the Basis for Pro-Poor Growth (No. 28068-BO). Washington, DC: Poverty Reduction and Economic Management Sector Unit, Latin America and the Caribbean Region, The World Bank; with Contributions From UDAPE Unidad de Análisis de Políticas Sociales y Económicas, and INE-Instituto Nacional de Estadística.

Vakis, R. Kruger, D. and Mason, A. (2004). "Shocks and coffee: lessons from Nicaragua" (Social Protection Discussion Paper No. SP 0415). Washington, DC: Social Protection Unit, Human Development Network, The World Bank.

Zeller, M. & Sharma, M. (2000).The demand for financial services by the rural poor (No. 1). International Food Policy Research Institute (IFPRI).