Background Paper

Literature review: Family formation and fertility as risk coping mechanisms

Julio Cáceres-Delpiano
Carlos III University
Literature Review: Family Formation and Fertility as Risk-Coping Mechanisms.

Julio Cáceres-Delpiano
1 Introduction

Risk is by no means confined to developing areas. “Risk is part of life,” (Fafchamps and Gubert, 2007a). Yet, the mechanisms available to cope with risk, along with the magnitude and the consequences of risk, do vary widely with level of development. Where markets have failed to provide formal instruments such as insurance to manage risk, agents have devised a variety of schemes to cope, including precautionary savings, transfers, and risk pooling (e.g. Townsend, 1994; Morduch, 1995). Though not all of these arrangements (for example, precautionary savings) require interaction with other individuals, such interaction is an important determinant of the cost of risk management strategies: as more individuals become involved in managing risk, whether by sending transfers or by pooling risk, the cost of these strategies should fall. Understanding the determinants of the extent of these interactions is thus critical to understanding how effectively households in the developing world are able to cope with risk.

The following pages review the literature on the role of family as an institution that helps individuals manage risk. Specifically, the paper investigates how two decisions impact risk management: family formation and fertility. In a very stylized model of reality, both decisions determine the size of the family network and, therefore, the gains from pooling risk within this network. The paper is not a comprehensive summary of all articles in the literature. Instead, it focuses on research which presents empirical evidence on the role risk plays in these two demographic decisions. The paper also focuses on studies which show how changes in the risk environment alter the gains from network size, which in turn influences family arrangements and fertility. Finally, the paper reviews empirical evidence about the distribution of gains and losses among household members.

The paper is divided into three sections. Section one presents the literature on family formation and risk management. Section two reviews the role of fertility. Section three reviews the policy implications of the literature review.
2 Family formation as a tool for risk management

2.1 Motivation, Benefits and Strategies

Family formation and marriage are traditionally related to fertility and child nurture. Nevertheless, there are other important advantages. Specifically, marriage enables individuals to pool risk and improves their ability to face uncertain and fluctuating environments. The textbook motivation is clear: individuals confronting incomplete markets and acting alone have a hard time smoothing consumption across different states of nature. Acting together, however, family members can ensure a gain in expected utility by using contingent transfers to trade consumption between good and bad states. Hence, as long as incomes are not perfectly correlated and risk preferences are different, members of families will be better off (Fafchamps and Gubert, 2007b).

Family is only one of many types of partnerships among individuals. The existence of benefits to risk management does not by itself explain why family (and, more specifically, marriage) dominates these other arrangements in developing countries. The previous textbook explanation provides two additional reasons for the relative gains to family formation over other types of contracts. First, the gains from risk pooling (in addition to any other gains from family formation) depend on market conditions. In a hypothetical world with complete markets, there would be different types of insurance that would yield similar gains to the ones associated with marriage. However, adverse selection and moral hazard leave family arrangements as one of the few mechanisms that individuals in low-income countries have to reduce their risk exposure. Information and monitoring problems are less

---

1 Browning et al. (2011) describe four potential gains from marriage beyond risk pooling. First, marriage allows individuals to share public goods such as children or expenditures on housing. Second, family formation enables individuals to gain from the division of labor and therefore exploits comparative advantages and scale economies. Third, families substitute credit markets and allow the coordination of investment activities. Fourth, family formation allows the coordination of childcare.

2 And, therefore, experience a loss in terms of expected utility.

3 Nevertheless, the empirical evidence shows that income correlation is not significant in explaining the link between households.
serious among family members, a characteristic which distinguishes these relationships from other market arrangements.\footnote{While earlier papers have pointed out a tradeoff between the information advantages associated with family (and extended family) and the provision of complete insurance due to the small size of the group, recent findings reveal that a considerable degree of insurance could be reached even among small groups. (Angelucci et al., 2012)} Within the family there is a degree of trust and a level of information which alleviate key problems\footnote{These problems are asymmetries of information and cost of monitoring.} in the provision of insurance by markets (Kotlikoff and Spivak, 1981). Additionally, the relationships between individuals in a family can be used as social collateral to enforce insurance payments (Ambrus et al., 2010).

Second, the textbook explanation suggests that the benefits from risk pooling are directly related to the actual risks faced by families and to the correlation of income sources. Much of the evidence about risk as a motivation for family formation comes from rural areas in developing countries where agriculture, a relatively risky activity,\footnote{Rosenzweig (1988) explains three of the factors that make agriculture a risky activity. First, land is immobile and heterogeneous. Second, environmental (rainfall) factors vary across production cycles and across space. Finally, these environmental factors are “spatially” correlated. These factors mean that income from agriculture varies over time and is imperfectly correlated across production units but simultaneously more correlated among individuals who live close to each other.} is one of the major resource-generating activities. Family and extended family are especially relevant for households in this type of environment, which is often characterized by missing markets, correlated shocks, and informal institutions of contract enforcement (Angelucci et al., 2010). These characteristics are present to different degrees because market coverage is even more limited in the poorest segments of the population. Risk considerations are then unevenly concentrated among the most vulnerable.

The formalization of reality presented above\footnote{Individuals with only one consumption good and utilities are state independent.} predicts perfect risk sharing or efficient insurance. These suggest that, holding aggregate consumption (income) constant, the consumption of any one family member is independent of idiosyncratic shocks, such as a health problem, faced by any member of the family. Testing for efficient insurance across household members is difficult because consumption cannot always be allocated to each
family member. Empirical testing for co-insurance has been done at the level of the village (Townsend, 1994; Ravallion and Chaudhuri, 1997) and at the level of the extended family (Altonji et al., 1992, Angelucci et al., 2012) with mixed results. Townsend (1994) reported evidence consistent with perfect risk sharing based on the co-movement of the consumption levels of households in each village. However, Ravallion and Chaudhuri (1997) later checked the robustness of Townsend’s results to a change in specification and to measurement error in consumption, and found changes in consumption to be sensitive to changes in household income.\(^8\)

Similarly, recent studies using data at the individual level do not find evidence supporting full risk sharing. Using data on adult nutrition in Ethiopia, Dercon and Krishnan (2000) find that poorer households are not fully able to share risk. Moreover, women in these households bear the burden of adverse shocks. For Ghana, Doss (2001) finds that transitory incomes earned by different members of the household have different effects on household expenditure patterns, which suggests that household members do not engage in full risk pooling with each other. These results hold across a variety of commodities. Geroni (2011), studying the impact of illness events measured as deteriorations in physical functioning abilities, observes a significant reduction in individual and household earnings after such events. Nevertheless, the effects on household earnings are smaller than at the individual level, suggesting that other household members respond to illness by increasing their labor supply. The overall reductions in earnings indicate that the household’s ability to generate income is compromised and that illness can potentially have an impact on consumption. However, Geroni (2011) finds that the effects on total nonmedical and food expenditures are very small and statistically insignificant.

Though the empirical evidence has not supported a full risk-sharing hypothesis, a

\(^8\) Recent papers also testing for efficient risk sharing are Chaipori, Townsend, and Schulhofer (2008) and Chiappori, Townsend, and Yamada (2008).
considerable number of studies point out the importance of risk considerations in family formation decisions. Specifically, Rosenzweig and Stark (1989) use longitudinal data from villages in South Indian to show that risk considerations play an important role in defining the “marriage market” of a family’s children. They show that the practice of marrying daughters to distant and dispersed households, yet still somehow related, is consistent with use of a risk-coping mechanism by families. Thus, the practice is a manifestation of implicit inter-household contractual arrangements designed to moderate income risks and enable consumption smoothing in an environment characterized by information costs and spatially covariant risks. Specifically, Rosenzweig and Stark (1989) show that, consistent with consideration of risk: i) there is positive sorting in marriage; ii) marriage (with migration) contributes significantly to a reduction in the variability of household food consumption; iii) farm households afflicted with more variable profits tend to engage in longer-distance marriage (with migration); and iv) the potential gains from marriage are inversely related to the household’s wealth.

Mobarak, Kuhn, and Peters (2011) not only report evidence consistent with a consideration of risk in family formation decisions but also observe the higher risk exposure of a segment of the population (i.e. those facing liquidity constraints). Specifically, Mobarak, Kuhn, and Peters (2011) find that the construction of a flood protection embankment in rural Bangladesh, which reduced the flood risk and extended the crop-growing season, changed marital arrangements among households who were protected by the embankment in relationship to those who were not. Using information before (1982-1986) and after (1989-1996) construction of the embankment, the authors find that households affected by the construction became less likely to marry biological relatives, which is itself a risky practice. The channel singled out as a potential explanation for these results is based on the existence

---

9 Details of the consequences of marrying a close relative can be found in the article.
of liquidity constraints which affect some household who then use marriage of biological relatives as a form of credit to meet up-front dowry demands. The wealth shock associated with the extended growing season facilitated by the embankment relaxed this need for taking an adverse biological risk. In fact, the effect found in the article is concentrated among girls, which is in line with the direction of dowry demands.

The findings of Rosenzweig and Stark (1989) and Mobarak, Kuhn, and Peters (2011) suggest not only that risk considerations are central (at least for part of the population) to decisions about family formation but also that risk has a potential cost for families in terms of search in the marriage market. In fact, the evidence presented in these studies reveals that risk considerations confine families’ search for potential spouses to a limited geography and to close relatives. This constraint faced by families in the marriage market is conditional on particular market failures. Specifically, the search among close relatives as explained by Mobarak, Kuhn, and Peters (2011) replaces a missing credit market for families to afford the transfers associated with dowries.

As presented in Rosenzweig and Stark (1989), family formation as a mechanism to manage risk is an ex ante decision, that is, a decision made before the realization of a specific state of the world. The gain in efficiency from this ex ante decision is related to the ability of family members to insure each other against idiosyncratic shocks and select a level of consumption that is independent of these distresses. Hoogeveen et al. (2011), in contrast, show that marriage is also an ex post mechanism to cope with risk. Specifically, Hoogeveen et al. (2011) find that in Zimbabwe after a negative shock to livestock wealth, the marriage rate of daughters increases. These empirical results are consistent with the hypothesis that households use unmarried daughters as assets that can be cashed in during times of adversity.

Evidence on the specific strategies that households use to minimize household income variability has stressed the role of both transfers between family members (including
extended family) and production diversification. Rosenzweig (1993) uses longitudinal data from a national probability sample of rural households in India to confirm previous findings about the returns to women as “insurance capital.” But the findings also reveal that inter-household financial transfers play a significant role in consumption smoothing. First, these transfers appear to be more responsive to a household’s fluctuations in earnings than loans. Second, this responsiveness is significantly augmented in households with more informal connections to other households, which arise due to the marriages of sons who stay in the parental household and of daughters who migrate.

Implicit in Rosenzweig and Stark (1989) and Rosenzweig (1993) is the role of production diversification and, specifically, the role of geographic diversification of production across the extended family. Kochar (1995) stresses the diversification of production between household and market production. He argues that even in the absence of credit markets, a “well-functioning labor market” would enable families in economies like India’s to protect themselves from idiosyncratic crop shocks. Specifically, families facing a production shock could smooth the fluctuation in resources with an increase in number of hours allocated in the labor market. Nevertheless, the degree of insurance that the labor market provides the families with depends on the correct functioning of this market. In particular, as the author mentions, a labor market segmented by gender can induce the household’s vulnerability (to income fluctuations) to be a function of its demographic composition. Indeed, Kochar (1995) shows that credit and labor markets can effectively protect households from crop income shocks and sickness episodes but this degree of protection is a function of the households’ gender composition. Kochar’s results confirm that households with more male labor endowment have a higher degree of ability to smooth crop shocks in comparison to other households whose labor endowment is relatively more female
intensive. Finally, Kochar shows that households that are relatively disadvantaged in the labor market are not able to compensate income fluctuations through the credit market.

Consistent with a geographical diversification of household production, Halliday (2006), for El Salvador, not only finds that adverse agricultural shocks, in the form of harvest and livestock losses, increase the likelihood that family members migrate to the United States, but also that these households experience an increase in remittances (40% to 60%). However, Halliday’s findings reveal that other types of shocks such as an earthquake, are associated with a reduction in the likelihood that a household member migrates. The author shows that the earthquake inhibited migration to the United States at all wealth levels. This last finding is interpreted as evidence against the hypothesis that liquidity constraints explain why some household members do not migrate. As Halliday (2006) suggests, the variation in the impact of these different types of shocks are related to imperfections in the labor market, which supports Kochar (1995).

As the literature has shown (but out of the scope of this review), risk not only has a cost in terms of the fluctuation of consumption, but also – for individuals facing liquidity constraints – can lead to an excess accumulation of liquid assets and the adoption of less-productive investment strategies. In this context, risk-sharing mechanisms between risk-averse agents both improve welfare and also permit investment in higher-risk/higher-return activities. Angelucci et al. (2010, 2012) studying the impact of a conditional cash transfer provide evidence about the role of extended family on families’ human capital decisions. Using household panel data from the Progresa program in rural Mexico, and the definition of inter- and intra- generational family links in the same village based on the information contained in the surnames of heads and spouses, the authors show that Progresa increases secondary enrolment only among households which belong to a family network.

---

10 Mexico, as a former Spanish colony, follows the Spanish naming convention. Individuals have two surnames, a paternal one (family name) placed after the given name and a maternal one placed after the family name.
Nevertheless, the authors do not find an equal increase among eligible but isolated households. The mechanism explaining the importance of extended family for household educational investment decisions is the redistribution of resources within the family network from eligible households that receive de facto unconditional cash transfers from Progresa (with children attending practically universal primary school), towards eligible ones with children on the margin of enrolling in secondary school.

Angelucci et al. (2012) show that extended family not only allows individuals to smooth consumption but also confers an efficiency gain in terms of investment since the extended family relaxes liquidity constraints. In particular, Angelucci et al. (2012) show that households defined as “connected” – with first-degree relatives in the village – pool resources within an extended family but not with households defined as “isolated” (without first-degree relatives in the village). The findings also reveal that the connected households share risk with each other and that the same positive income shock has different impacts on households, depending on whether or not the household is connected or isolated. Specifically, connected households invest more in their children’s human capital, a high-return investment, but less in poultry, a low-return investment. Nevertheless, households will gain by pooling resources – and so overcome liquidity constraints – only when incomes are sufficiently high.

2.2 Marriage, Divorce, and Risk Exposure

Marriage is a risky venture. The benefits of family formation (marriage) are uncertain (Weiss, 1997): at the moment that a marriage takes place, spouses have limited information about the magnitude of their gains from marriage. Time is required to reveal the benefits, such as how well the spouses match (the search literature calls this “match quality”). The distribution of benefits is not clear ex ante and depends on changing market conditions (McElroy and Horney, 1981).
Exploitation of gains from the division of labor or from scale economies (generated with small initial disparities in investment or learning by doing) and reductions in household risk exposure through product diversification introduce differences in the level of investment in *marriage-specific capital*. Furthermore, marriage is perhaps the classic example of an incomplete contract: its terms can never be fully specified *ex ante* or enforced *ex post*. For example, Bloch and Rao (2002) document for India that marital violence is used to extract resources from the wife’s parents. Specifically, they find that violence is not only correlated with lower levels of dowry but also directly related to the wife’s family wealth, which is interpreted by the authors as a strategic reaction of the husbands to extract more resources from the wife’s parents.

Furthermore, though marriage has the potential to reduce the risk exposure of all family members, the cost of marriage and divorce might be unevenly distributed among family members. Even if a divorce does not actually occur, the potential gains from risk pooling are diminished when individuals attach a positive probability to divorce. As Doss (2001) explains, when family members attach a positive probability to the breakup of the family or when some individuals expect fewer benefits from risk sharing, these individuals may give priority to individual over family strategies. In particular, these individual strategies used by individuals to smooth income may involve risk sharing with individuals from other households. This type of private strategy, as opposed to a household strategy, might be responsible for the rejection of the risk-pooling hypothesis found in the literature. In sum, while marriage has the potential to reduce risk, the possibility of divorce can introduce more uncertainty.

Research, particularly in developed countries, has addressed the economic impact of divorce on families. Recent studies point out that divorce not only affects the level of family income but is also associated with higher dispersion in family income. Using longitudinal
data from the PSID and a dynamic model with individual fixed effects, Page and Stevens (2004) find that in the year following a divorce, family income falls by 41 percent and family food consumption falls by 18 percent. Six or more years later, the family income of the average child whose parent remains unmarried is 45 percent lower than it would have been if the divorce had not occurred. Two other studies have tried an instrumental variables approach to study the impact of divorce on family income. Bedard and Deschênes (2005) show that once the negative selection into divorce is accounted for, ever-divorced women live in households with incomes that are on average similar to those of never-divorced women. However, new evidence suggests that the small or even near-zero impact of divorce on mean income hides sizeable effects on the tails of the income distribution. Using the same instrument for divorce as Bedard and Deschênes (2005) (sex of the first-born child) but a Quantile Treatment Effect methodology, Ananat and Michaels (2008) find that divorce widens the distribution of income. While some women are successful in generating income through child support, welfare, combining households, and increased labor supply after divorce, other mothers are “markedly” unsuccessful. Their results suggest that the destabilization of first marriages may have caused some of the stagnation in poverty rates of women with children over the last several decades.

Divorce also seems to have an effect on crime. Even though there is extensive literature for the United States that has linked family disruption with factors related to crime, in many cases it is difficult to distinguish correlation from causation. For example, it is a well-known fact that single-headed households, and especially those of young black mothers, are concentrated in disadvantaged neighborhoods with higher crime rates and poverty, low rates of employment, and poor educational facilities (Wilson, 1987). All of these factors are positively related to engagement in a criminal career. Kelly (2000), using data from U.S. metropolitan counties in 1991, finds very different patterns of behavior associated with
property and violent crime.\textsuperscript{11} His first finding reveals that, for poverty and inequality, both types of crime are positively influenced by the percentage of female-headed families. However, violent crime is much more sensitive, with an elasticity of 1.6 versus 0.7 for property crime. The second major finding is that, while property crime is largely unaffected by inequality but significantly influenced by poverty, violent crime is less sensitive to poverty but strongly affected by inequality. In general, Kelly’s findings are in line with arguments made in the criminology and sociology literature.

Consistent with the results of Kelly (2000), Cáceres-Delpiano and Giolito (2012) analyze data from the U.S. and find that a reform easing divorce (unilateral divorce) caused an increase in violent crime rates of approximately 9 percent during the period 1965-1996. Using age at the time of the reform as an additional source of variation, the findings suggest that young adult cohorts, who were children at the time of the reform, were particularly affected. Cáceres-Delpiano and Giolito (2012), again consistent with Kelly (2000), show evidence that a potential channel behind the findings is an increase in poverty and inequality among mothers who were “surprised” by the reform.

Fewer studies about the impact of divorce, and specifically its impact on the risk faced by individuals, are found for developing countries. This is explained, in part, by the fact that divorce is less common in these countries (Weiss (1997) calls them “societies locked in a low aggregate divorce.”). Beyond the stigma that is associated with the end of a traditional family structure in many of these developing countries, low divorce rates might be an outcome (not necessarily efficient) related to the risk faced by individuals. Risk sharing requires that an individual reduces his or her consumption in either some future period or in

\textsuperscript{11} Kelly (2000) has concerns about endogeneity, which are focused on the variable measuring police activity. This last variable is instrumentalized by per capita income, the share of non-police expenditure by local government in total county income, and the percentage of voters that voted against the Democrat candidate in the 1988 presidential election. Additionally, a potential correlation of the rest of the variables considered and the error term, is checked by running all possible specifications that result from the different combinations of the covariates in the model. The impact of income inequality on violent crime is robust across all potential specifications.
some possible states of the world. However, the ability to commit to such risk sharing may not be guaranteed (Browning et al., 2011). In particular, if a more attractive option exists outside of marriage in a given state of the world and a state conditional transfer cannot be enforced, a gain in terms of risk reduction would necessarily materialize. However, individuals and families can take costly actions to ensure compliance with these contingent transfers by reducing the marriage outside option. For example, if the marriage outside option is directly related to the education (or human capital) of each household member, the parents of these individuals could invest less human capital in order to ensure a gain in terms of risk reduction.

That individuals take costly actions prior to family formation (Iyigun and Walsh, 2006) in response to marriage market (Lafortune, 2011) and economic conditions has been studied recently. Marriage of daughters at young ages, for example, is often strongly related to the economic circumstances of a family. Ambrus and Field (2008) document in Bangladesh that earlier marriage of a daughter removes the economic burden on the household since the earlier the marriage, the lower are the dowries paid by the bride’s family to obtain a higher-status husband. In particular, families opting for earlier marriage are likely to be those that are not able to afford a better quality husband or those that care least about the bride’s welfare. Therefore, more human capital is associated with a higher price a girl has to pay for a spouse in a context in which social norms require that husbands have higher education levels than wives. Thus, parents impose a direct cost on daughters through the reduction in years of education that results from an earlier marriage. Ambrus and Field (2008) find for Bangladesh that for each additional year that marriage is delayed there is an increase of 0.22 years of schooling and a 5.6 percent increase in literacy. A delay in marriage is also associated with an increase in the use of preventive health services. Jensen and Thornton (2003) show, as well, that for women marrying earlier there is a reduction in
education and less influence on decisions taken within the household. These women start child rearing earlier, and are also more likely to experience domestic violence.

Hess (2004) shows that economic factors such as risk sharing are an important element of both the decision to get married and also the decision to stay married. In Hess’s model, economic considerations (risk sharing) interact with a couple’s match quality (love). The model stresses the interaction between the duration of the match quality (“love”) and the timing of the resolution of income uncertainty. These two elements define not only the individuals who get married but simultaneously the duration for which they stay married. Specifically, Hess’s model predicts that when “love” is transitory (a “short-lived phenomenon”) or the resolution of uncertainty happens in the future, then couples which are good economic matches actually stay married longer. This takes place because, in this case, the costs of being married to a poor match are expected to increase in the future. Though Hess’s model does not attempt to explain low divorce rates in developing countries, or their interaction with risk-sharing considerations, this last prediction is consistent with the observation that when risk considerations are more important, (as we expect in developing countries), in relative terms to other factors such as match quality (love) we would observe long-lasting matches due to the selection that takes place of the couples who are getting married.

In societies in which women’s formal legal rights are weak and in which divorce is stigmatized, bargaining is likely to favor the man once the woman commits herself to marriage. Ambrus, Field, and Torero (2010) examine trends in dowry levels in Bangladesh. They find that institutional features of marriage contracts act as “prenuptial agreements” and have important effects on dowries. Specifically, they show that contingent transfers upon divorce (from husband to wife) reduce the benefits of exiting the marriage. Ambrus et al. (2010) also formalize the idea that a component of the dowries acts as compensation to the
groom for the cost of this contingent transfer. Thus, dowries also provide insurance. Their empirical findings reveal, consistent with the model, that legal changes increasing (decreasing) contingent transfers upon divorce imply an increase (decrease) in the equilibrium level of dowries\textsuperscript{12}.

In rural Pakistan, Jacoby and Mansuri (2010) document the custom of families to exchange brides (a daughter for a daughter-in-law) as a mechanism to deter or mitigate ex post mistreatment or abuse on the part of the husband (“mutual threat across the marriages”). Jacoby and Mansuri (2010) show that among the households following this custom (watta-satta), which is a third of the rural households in Pakistan, wives have substantially and significantly lower probabilities of marital rupture, domestic abuse, and major depressive episodes compared to other families not following the custom. Studying Taiwan, Zhang and Chan (1999) find evidence suggesting that dowries might act as insurance and increase the welfare of women: “it [dowries] can be interpreted as a form of premortem inheritance, by which altruistic parents can ensure their daughters’ wellbeing.” (Zhang and Chang (1999) at pp.787-88) In the model presented in Zhang and Chan (1999), dowries increase daughters’ ex post bargaining power and, therefore, increase their control of household resources. Specifically using as a proxy for wife’s welfare the help of the husband in household chores, the authors find evidence that an increase in dowries is associated with an increase in the likelihood that a husband will participate in household chores. Nevertheless, the impact of bride price on this last probability is negligible.

Though the gender division of work and the vertical integration of male children and their families into the parents’ household might reduce ex ante the risk exposure of the whole household, this gender division can also generate permanent gender differences. Additionally, an ex post adverse event can result in gender differences in investment. Maccini and Yang

\textsuperscript{12} Specifically, two amendments to religious personal laws governing divorce are used. The legal change that took place in 1961 strengthened these barriers while a 1974 reform reduced the cost of these barriers by providing an alternative mechanism allowing husbands to internalize the cost of divorce.
(2009) use data from Indonesia to study the impact of weather shocks that occur at the very beginning of life for individuals born between 1953 and 1974 on their long-term wellbeing, including adult health, education, and socioeconomic outcomes. The findings reveal a significant impact of the shocks on women’s’ outcomes, but not on those of men. In particular, weather shocks which happened during the first year of life have permanent consequences. Specifically, the impact of rainfall in the years after the birth year, relative to this last one, is not found to be statistically significant. The authors also find no effect of rainfall in the years prior to the birth year. This last finding permits them to rule out the possibility that their results are driven by in utero shocks rather than shocks experienced in infancy. These results are in line with Dercon and Krishnan (2000), who find not only that poor households do not engage in complete risk sharing, but also that women in these households bear the burden of adverse shocks.

3 Fertility (Children) As a Risk-Coping Mechanism

3.1 Motivation, Benefits, and Strategies

Fertility’s role as a risk-coping mechanism results naturally from the motivation of family formation. If two individuals can potentially profit from trading in different states of nature, it seems reasonable that these gains might increase with the number of family members. Moreover, there is uncertainty in future periods, which children can help reduce by enabling families to transfer resources across periods and states of the world.

Appelbaum and Katz (1991) formalize this intuition in a static context. The relationship between risk and fertility is modeled in a stylized portfolio model. Parents choose the number of children by maximizing an expected utility function that depends on per capita consumption in the family. Adding children to the household increases the household’s sources of income which, like those of the adults, are uncertain (though their
dispersion might differ). Parents do not perceive a direct utility from children in the model, but adding children has the potential of reducing consumption dispersion by making it is less likely that all of a household’s income sources are adversely affected in a given period. In determining the optimal number of children, parents weigh the gains of reduced uncertainty that results from an increase in the number of children and the losses in terms of consumption (income) per capita. Considering individuals with decreasing risk aversion, the model has the important prediction that changes in income or uncertainty might either increase or reduce the demand for children depending on the source of these variations. First, for an increase in the average parents’ income, the model predicts an unambiguous reduction in the number of children. Nevertheless, an increase in the average income coming from children has an ambiguous effect. On one hand, an increase in the average income coming from children raises average consumption. On the other, given decreasing risk aversion, the benefits in terms of insurance fall. Second, the impact of an increase in the uncertainty of parents’ income will increase the demand for children while an increase in the uncertainty of children’s income will produce ambiguous effects. Though an increase in the dispersion of parent’s income increases the gains from children as a risk-coping mechanism, the increase in the dispersion of children’s income has two opposite effects. For families who already have children, an increase in the dispersion makes them worse off, increasing the incentive for more children. Nevertheless, this increase in dispersion makes children a less attractive asset.

A particular type of risk which captured attention early in the literature and to which fertility has been linked as a risk-coping mechanism is old age (in) security. Children are used both as an insurance mechanism for old-age support and also as a way to transfer resources between periods. Children are costly in the first years of their lives but can generate resources for the rest of the household members in the future. Though not testing an old age security hypothesis, Fan (2010) finds evidence suggesting that children are a source of
resources for the elderly. Studying the impact of a farm pension plan program in Taiwan, Fan (2010) finds that each additional dollar in pension produces a reduction in the range of 30 to 39 cents in transfers received by the elderly. Consistent with this last finding, the authors also show that pensions reduce the likelihood that a recipient’s child makes a transfer to her/his parents. Finally, the results reveal that the pension reform increases the recipients’ and their children’s consumption, which is interpreted as direct evidence of an improvement in the wellbeing of pensioners’ offspring.

Whether old age security is an important consideration in fertility decisions, given the predictions of Appelbaum and Katz (1991), depends on the degree to which parents are uncertain about their ability to be self-supporting in old age and suspicious about the reliability or effectiveness of means of support besides their own children. Actually, Nugent (1985) suggests eight elements that he sees as necessary and sufficient conditions for the old-age security motive to be important when making fertility decisions: (1) underdeveloped capital markets; (2) uncertainty about the accumulation of assets necessary for old age and disability; (3) the absence or inefficiency of private or public old-age and disability insurance programs; (4) confidence in the loyalty of children to their parents; (5) the absence of well-developed labor markets for women and children; (6) underdeveloped markets for the goods and services that elderly people consume; (7) the absence of a spouse who is of considerably younger age; and (8) the perception of old age as an appreciable portion of the life cycle.

With the exception of the final condition, the factors enumerated by Nugent (1985) suggest the potential importance of old age security as a motivation for fertility decisions in less-developed countries, specifically in rural areas. Old age security may also be an important factor in fertility decisions in countries in the middle stage of development that are experiencing a demographic transition in which gains in life expectancy (mortality reduction) outpace market development.
Though old age security is likely an important consideration in fertility decisions when Nugent (1985)’s conditions are present, empirical proof of a direct relationship between parents’ perception of risk at old age and fertility is not straightforward. Parents can make choices about the quality of children (for example, investment in education or other forms of human capital), gender composition, and child spacing which, as well as fertility, can provide some return (insurance) in old age. In fact, some of these factors, such as child investment, have been shown to be negatively correlated with family size (Cáceres-Delpiano, 2006, 2012). Hence, the direction of the effect on fertility of a reform, such as the introduction of a pension system that would reduce the perceived risk at old age, cannot be determined \textit{a priori} (Nugent, 1985). Childs (2001), for example, shows that a perception of risk in old age could actually be associated with a reduction in fertility when gender specialization in caregiving activities is present. Studying two Tibetan villages, Childs (2001) shows a significantly lower level of fertility among households in which the practice that one daughter becomes a nun is more common, which according the authors is a strategy used by families to keep female labor within the household and to insure care giving services in old age. Actually, according to the author’s calculations this practice prevents almost twenty percent of the women from marrying. In this case, female specialization in old age care has the consequence that old age insecurity is related to a reduction of fertility rather than to an increase in household size.

Much of the literature testing the old age security hypothesis has used cross-sectional differences in social security systems to learn about the relationship between old age security and fertility. A review of earlier literature on this subject can be found in Nugent (1985). Nugent (1985) reports that the heterogeneity in the findings of these studies can be explained by differences in data sets, measures of the relevant variables, and the methods used. The most important difference for Nugent (1985), however, is the relevance of old age security as
a motivation for fertility in each of these studies. In particular, old age motivations are most likely to be important in studies using data from rural areas in developing countries.

Among the studies testing old-age security indirectly, which are reviewed in more detail in Nugent (1985), is De Vany and Sanchez (1979). De Vany and Sanchez (1979) reveal that in Mexico the incompleteness of the land market, the existence of excess demand for land, and the insecurity of land ownership mean that the existence of children in the household has a benefit in terms of “land-retention” and frees parents to “remain on land all time.”

Cain (1981) compares three villages in Maharashtra and Andhra Pradesh States of India with one village in Bangladesh and finds that fertility rates remained high among families living in villages with relatively risky environments, worse credit sources, and weaker relationships with extended family. The costs were not evenly distributed among the villages’ members. Cain (1981)’s results show that women living in Bangladesh are particularly affected in relationship to those living in Indian villages. Local Islamic traditions in Bangladesh constrain women when coping with risk by preventing them from taking part in the labor market and by making women more dependent on the support of children, particularly during widowhood. Consistent with this hypothesis, Cain finds that widows without surviving sons were more likely to sell their land.

Nugent and Gillaspy (1983) and Sanchez (1984) study the impact of differences in “old-age” benefits and an expansion of disability benefits in social security on fertility in Mexico and in rural areas of the United States, respectively. Nugent and Gillaspy (1983) use “old-age” coverage differences among workers involved in sugarcane cultivation and differences in the cultivation of sugarcane across communities in Mexico to find that those counties that were associated with greater security in old age are those areas that experienced a reduction in fertility between 1960 and 1970. Sanchez (1984) also finds a negative
relationship between changes in fertility and the proxy for a change in Social Security coverage in the United States.

Kotlikoff and Spivak (1981) present an additional way in which family size (fertility) is used as a risk-coping mechanism. The source of insecurity identified in the paper is uncertainty about the date of death. That is, individuals face the risk of running out of resources if they live longer than expected or ending up with an involuntary bequest by dying before expected. In other words, an excess of consumption early in life coupled with living longer than expected will mean relative poverty later in life. On the other hand, reduced consumption early in life involves the risk of dying before exhausting lifetime resources. By increasing the number of individuals in a family, those family members that might outlive the other members not only profit from the bequests of other members (their parents) but also from a joint consumption plan that internalizes others members’ bequests. Parents and children exchange an implicit promise “to be a bequest recipient” for implicit commitment of caring for parents in old age in the case of living too long. Although a child may survive their parents, children can gain by sharing consumption resources with their parents.

Related to fertility’s role as a risk-coping mechanism is families’ use of the gender composition of their children to cope with risk. As described above, in some societies girls are an asset in the marriage market which enables families to pool risk across extended family members (this is locational diversification of risk). Alternatively, boys have been shown to be directly related to production activities. Rosenzweig (1988) for India, reports two facts that are consistent with the importance of gender composition as a mechanism to reduce risk exposure and its interaction with labor division within the household. First, male members tend to live with their parents forming vertically integrated households. Second, migration of males is an uncommon phenomenon. Rosenzweig and Wolpin (1985) explain

13 Nevertheless, as shown by Kotlikoff and Spivak (1981), the optimal solution for a single person without an annuity market is leaving an excess bequest at the time of dying.
this type of family structure in a context of low male migration as the rational choice of families seeking to reduce potential losses from adverse weather events. When land is heterogeneous and land-specific knowledge is created through farming experience, fathers and children have incentives to farm the family land together, with the children benefiting from the experience of their elders and gaining their own experience on the family land. The (male) children should inherit the family land at the death of the household head; otherwise, the sale of their land to someone outside the family would result in a capital loss for the family. Indeed, Rosenzweig and Wolpin (1985) show that families which were intergenerationally extended and so more likely to hold more land-specific experience were less likely to sell their land. Providing more evidence of the role of gender composition in coping with risk, Kochar (1995) points out that besides the importance of credit and labor markets for insuring individuals against idiosyncratic crop and health shocks, the insurance role of these markets is dependent on the gender composition of the household measured by the male labor endowment Kochar (1995)’s results reveal that the degree to which the households are able to smooth crop shocks is positively related to their male labor endowment.

3.2 Fertility and Risk Exposure

Though fertility, as well as marriage, may help families cope with risk, fertility decisions may also increase risk exposure, at least for some individuals in the household.

Becker’s Quantity & Quality model predicts a tradeoff between number of children and amount of resources allocated to children. Although Rosenzweig and Wolpin (1980) find a negative impact of the number of births on child education in India, thirty years later new evidence is less supportive of a tradeoff between family size and child quality (Becker and Lewis, 1973; Becker and Tomes, 1976). Specifically, Black et al. (2005) use multiple births
as a source of variation in family size and administrative data from Norway and find no impact of number of siblings on educational attainment.\textsuperscript{14} Angrist et al. (2010),\textsuperscript{15} also using multiple births in Israel (for some of the samples) as a source of variation in family size and census data matched with administrative data, do not find evidence of a quantity-quality tradeoff across samples.

Angrist et al. (2010) suggest four factors explaining this “absence of a causal link” between fertility and long-term outcomes. (Angrist et al., 2010 at pp.814-816) First, parents might make use of perfect capital markets to support child investment, independent of current resource constraints. Second, parents facing a shift in family size adjust “on margins other than quality inputs” or adjust “marginally irrelevant inputs.” That is, parents who experience an increase in the number of children over a desired quantity will first reduce investment in those inputs with lower return on final child well-being and therefore minimize the final impact on children. Third, welfare and public spending help families that are exposed to an unexpected increase in family size. Finally, the case may be that there are benefits associated with family size due to social interaction.

Empirically, and consistent with these hypotheses, Cáceres-Delpiano (2006) and Conley and Glauber (2006), for the United States, estimate a negative and significant impact of number of children on the probability of attending a private school. Also studying the United States, Cáceres-Delpiano (2004) finds a positive impact on the probability that a child would share a bedroom. Both school type and bedroom sharing are probably investment margins with a lower return on child wellbeing than completed years of education. In fact, Cáceres-Delpiano (2006) does not find an impact on the probability of repeating a grade or total years of education, which are margins closer to final well-being. Finally, consistent with

\textsuperscript{14} Also included in the analysis is the impact on earnings, employment status, and teen pregnancy. Consistent with the results for educational attainment, the authors find little evidence of a negative impact on these variables.

\textsuperscript{15} Other outcome variables in the analysis, beyond educational attainment, are labor status, earnings, marital status, and fertility.
the idea of public funds helping individuals stressed because of a shock in fertility, Cáceres-Delpiano and Simonsen (2012) find that, for the United States, an increase in family size increases the likelihood of participation in welfare and the use of Medicaid.

Moreover, implicit in the previous hypotheses, is the active role of other household members (parents) to “buffer” an expected change in fertility. Empirically, nevertheless, the impact of family size on other members of the household has focused primarily on its impact on mother’s labor force participation. To the best of my knowledge, Cáceres-Delpiano and Simonsen (2012) and Kruk (2011) are among the few studies focusing on other dimensions and other household members. Specifically, Cáceres-Delpiano and Simonsen (2012), using U.S. Census data and the National Health Interview Survey, investigate the effect of family size on a variety of health risk factors, and demonstrate that additional children increase the likelihood of high blood pressure among mothers as well as the propensity to smoke and the risk of obesity, among other outcomes.

Cáceres-Delpiano (2012), using Demographic Health Survey (DHS) data for 43 developing countries and the event of multiple births at different parities as a source of variation in family size, provides evidence of the impact of family size not only on child outcomes but also on other members of the household. Using data from developing countries, Cáceres-Delpiano (2012) is able to study a sample of families for whom family-planning policies should have a higher return since they have fewer child-investment

16 By analyzing children’s rather than adults’ outcomes as in Black et al. (2005) or Angrist et al. (2010), Caceres-Delpiano (2012) estimates the short-run impact of an unexpected increase in the number of children. Black et al. (2005) study the impact of an increase in the number of siblings on a sample of children who were at least 25 years old in the year 2000. Angrist et al. (2010) use a sample of individuals (born after 1954) from the Israeli census data for the years 1995 and 1983 that is linked using parents and siblings from the population registry.

17 This suggested higher return in developing countries goes beyond an increase in child investment. At the macro level, a reduction in fertility in a context of fixed capital and a decreasing return to labor will increase labor productivity. Also, a transition to regimes with lower fertility and lower mortality implies a demographic change with a higher proportion of the population in ages with higher saving rates (Schultz, 2007).
These families are more likely to face an incomplete capital market and they lack the support of welfare programs. All of these factors increase the likelihood that a shock in family size not only impacts child well-being, but also makes the other family members the only alternative to buffer these potential shocks. In fact, a hypothesis based on fewer degrees of freedom in developing countries when facing a shock in fertility is consistent with earlier evidence for India supporting a tradeoff (Rosenzweig and Wolpin, 1980) versus the latest evidence using data for developed countries such as Israel (Agrist et al., 2010), Norway (Black et al., 2005) or the United States (Cáceres-Delpiano, 2006).

Finally, exploiting disparity in levels of development among the countries in the sample, Cáceres-Delpiano (2012) provides evidence of heterogeneity in the impact of fertility across different levels of development. By focusing the analysis on less-developed countries, the author is able to study a sample not only of families for whom family-planning policies should have a higher return, but also of families with fewer child-investment alternatives. Cáceres-Delpiano (2012) finds evidence that a shock in fertility has a cost for the family as a whole. First, he observes that an increase in family size is associated with an upturn in the incidence of unstable family arrangements, measured by an increase in the likelihood of the mother holding a non-traditional role (being the head of the household or not being the spouse of the household head), a decrease in the likelihood of being married, and a decrease in the likelihood that the mother’s spouse (partner) lives in the same household. For child outcomes, findings reveal that the occurrence of more children in a family decreases the

---

18 In developing countries, families have lower levels of income (wealth), so the marginal utility of income is high and families work long hours for low wages. Since the marginal utility of wealth is high in developing countries, parents are not “able” to cut back on work to raise children, at least in earlier parities, so children get little time and, relative to smaller families, get fewer market-derived goods. For example, families just above starvation will have both parents working full-time. As such, a new child is essentially a negative wealth shock so the marginal utility of wealth must rise. However, since families cannot work more, they can only consume less, that is, “feed” each person less. This will not only lower child “quality” but will also decrease the amount of resources allocated to other members in the household. In a developed country, parents have some leisure. If leisure and child-rearing are close substitutes, then an extra child might lead parents to substitute leisure for child-rearing. If time and goods are substitutes in child production, they might substitute goods for child-rearing time, which, to some extent, might mitigate the effects on adult consumption and perhaps on adult labor.
likelihood of a completed vaccination schedule, increases the odds of child mortality, and reduces the probability of attending school. Cáceres-Delpiano (2012) also observes a reduction in the likelihood of children living in the same household as their mother. The analysis by a country’s level of development reveals an important degree of heterogeneity. The impact on outcomes measuring family arrangements and child wellbeing is driven by countries with a lower level of income.

Finally, fertility is not a deterministic variable fully controlled by parents and cannot be set with absolute certainty. Individuals control the probability of conception to some degree, with total fertility being a random variable. In a model with these characteristics Michael and Willis (1973)\(^\text{19}\) show that a shift in fertility is predicted to produce an increase in the expected mean and an increase in the dispersion of the expected fertility. This rise in uncertainty in expected fertility increases the return associated with the use of contraceptives as a mechanism for reducing uncertainty.\(^\text{20}\) For any \textit{ex ante} desired fertility, then, parents will be more likely to use contraceptives as a product of an unexpected shock in fertility. Second, parents will be more likely to change to contraceptive alternatives with a lower marginal\(^\text{21}\)

\(^{19}\text{Michael and Willis (1973) develop a model with these characteristics. By using Michael and Willis (1973)’s notation, the probability of conception at a specific moment can be represented as } p_t = \beta c_t(1 - e_f^t) \text{, with } \beta \text{ the “intrinsic fecundity,” which is defined as the probability of conception from a single unprotected act of coition at a random point during the menstrual cycle, } c_t \text{ the frequency of coition during the cycle, and } e_f^t \text{ the reduction in probability of conception associated with the } j \text{ contraceptive alternative. This expression points out the three channels through which individuals can alter their probability of conception: frequency of coition, use of contraceptives and the type of contraceptive used. Michael and Willis (1973) set the problem in two steps. First, families select the distribution of family size that maximizes individuals’ life utility. Second, individuals select the contraception alternative that allows them to reach the desired conception probability at the lowest cost. An essential feature of the process is that the mean and dispersion of children are jointly determined by the choice of conception probability. Moreover, in Michael and Willis (1973)’s model, for the nature of the process, mean fertility and its dispersion are positively correlated for low values of fertility. “Thus the greater the expected fertility, the greater is the uncertainty about the actual fertility, or greater is the expected deviation between the mean and actual fertility.” Families then care about not only the average number of children but also their dispersion. This dispersion can be considered a risk factor which can also affect child quality.}\n
\(^{20}\text{The use of contraceptives not only captures the impact on foregone utility in adults but also constitutes a first-line investment to prevent the spread of a shock in family size onto other children by not only reducing the chance of an additional child but also by reducing the uncertainty of family size.}\n
\(^{21}\text{In Michael and Willis (1973)’s model, parental benefit from the use of a contraceptive choice comes by reaching “optimal” fertility in the sense that expected utility is maximized and parents are able to reduce the uncertainty in expected fertility, since “optimal” fertility is below “desired fertility” in a context of perfect and costless fertility control. Regarding cost size, parents face not only costs in money and time, but also forgo
cost (such as sterilization), everything else being constant, because more potential births will need to be prevented. Consistent with Michael and Willis’s model, Cáceres-Delpiano (2012) finds an impact of fertility on mother’s contraceptive behavior. Specifically, it is found that an increase in the number of children raises the amount of time between intercourse, increases the use of contraceptives and, for some samples, increases the odds of female sterilization. The analysis by level of development shows that at all levels of development, mothers vary their contraceptive behavior. Nevertheless, at higher levels of development, the use of contraceptive alternatives such as sterilization is preferred, while in regions with a lower level of development, the alternatives used are spacing of intercourse, abstinence, and withdrawal.

4 Policy implications.

The evidence presented above supports the idea that risk considerations are part of family formation and fertility decisions. However, the evidence also suggests possible areas for intervention. Strengthening markets and developing a welfare system (pension, health coverage, social assistance, etc.) would complement the action of individuals and families. The role of markets is crucial. Markets (or the lack thereof) not only define the magnitude (nature) of risk faced by individuals but also determine the availability of instruments to cope with risk.

A less-diversified production structure centered on agriculture is a near-universal feature of the countries for which we have collected empirical evidence. In such a setting, pleasure, health and cultural or religious principles when they select a specific contraceptive alternative (Michael and Willis, 1973). Then in order to maximize their expected utility, parents select a specific mean fertility and the contraceptive alternative with the lowest associated cost that allows them to reach that expected fertility. Since contraceptive options differ in their marginal and fixed cost, those options with a relatively low marginal cost (in relation to the fixed cost) will be the ones preferred by those parents who want to reach a lower expected fertility or, in other words, avoid a greater number of potential births. The distinction between fixed and variable (marginal) costs in the model is based on the fact that the first one is not related to the degree of use of a specific contraceptive choice. While the cost of information about a specific contraceptive alternative fits as a fixed cost in the model, cultural or religious pressure when using a specific contraceptive or a decrease in pleasure can be seen as a variable cost.
risk will certainly be related to variation in the returns of crops, to microclimatic variations, to pests, and to environmental disasters. Thus, a more diversified production structure with a lower dependence on subsistence agriculture will partially reduce a household’s exposure to fluctuations in resources coming from agriculture. Conditional on the importance of agriculture in poorer areas, innovations designed to reduce the effects of fluctuations in prices such as more and better information for farmers about markets (and credit products), development and financing of infrastructure for storage, distribution, and protection of products, and the coordination and promotion of these innovations should reduce negative fluctuations in income from agriculture.

Additionally, the development of credit and labor markets, the supply of financial instruments, and the development assistance system have important roles to play in whether or not and in how individuals (and families) reduce their exposure to risk. Credit markets, the supply of financial instruments, and support systems enable not only *ex post* but also *ex ante* efficiency gains. Nevertheless, the evidence also points out the key role of the labor market as an *ex post* management instrument for families, particularly in the absence of other instruments.

Markets also determine the mechanisms that families have to cope with risk. As mentioned throughout this review, the role that family and family size (fertility) play as mechanisms to reduce individual exposure to risk is conditional on certain market failures. Without market failures and with a larger supply of mechanisms to manage risk, the use of family to reduce risk exposure is less likely. Thus, we would expect that more innovations designed to reduce risk in a particular activity (for example, agriculture) or a greater supply of market instruments designed to cope with risk would be negatively related to the gains from family formation and fertility in the reduction of risk. Therefore, development of alternative mechanisms to cope with risk will reduce the rate of families formed or family
size chosen because of risk considerations. This reduction in family formation or fertility due to risk considerations can potentially improve the level of wellbeing of individuals since family formation and fertility as strategies to reduce risk are not free of costs. Markets and innovations designed to reduce risk potentially constitute a less-expensive alternative for individuals. Since costs are not evenly distributed within the household due to the traditional role of women as a "marriage asset" or due to biological constraints associated with fertility, these innovations are potentially associated with an increase in the relative welfare of mothers and wives.

Nevertheless, it is still an empirical question whether or not alternative mechanisms to decrease risk exposure will reduce the incentives associated with family formation. Though innovations and the development of markets may reduce the benefits associated with family formation and fertility as mechanisms to protect individuals against risk, they could also result in a change in the value of marriage. Specifically, a change in pre-marital investment measured in terms of human capital could alter the future relative weight of the family members in household decisions and, therefore, change the value of marriage for some individuals. In fact, the literature reviewed reveals development might induce a change in pre-marital investment measured by years of education. An essential means of ensuring a potential gain in terms of efficiency (ex ante) associated with a reduction of risk exposure is the possibility that individuals can commit to a particular contingent transfer. If a commitment mechanism does not exist, the efficiency gains will not materialize. In particular, a greater option outside marriage in a given state of the world for any of the household members and the inability to secure a transfer in that particular state make it unlikely that a specific gain in terms of reduction of risk will materialize. However, individuals and families can take costly actions to ensure compliance with these contingent transfers or even reduce the marriage outside option for some of their members. If the
marriage outside option is directly related to the education (or human capital in general) of each household member, parents could invest less in human capital to ensure a gain in terms of risk reduction. Therefore, the development of markets can induce a change in the accumulation of human capital prior to family formation, which can occur due to the reduction in the cost to commit to contingent transfers associated with other risk management alternatives (over marriage) and to the direct impact of markets on the capacity of families to afford specific transfers that ensure commitment (dowries, for example). Thus, a wider choice of risk management instruments will yield a benefit in terms of a reduction in the costs to ensure these efficiency gains without sacrificing human capital accumulation. In fact, the evidence presented in some of the papers in this literature review reveals that women’s education can constitute a liability in the marriage market not only by restricting marriage markets to those potential spouses with more education but also due to larger transfers (i.e. dowries).

Trying to ensure a level of commitment or a level of welfare within marriage might require substantial transfers of resources between households. Households which cannot provide this transfer of resources might adjust on other margins. For example, individuals (or the families who determine the marriage market for their children) can adjust the quality of the match or limit the search among households that can provide a credit market based on family ties. The development of a credit market that enables transfers beyond family ties would enlarge the universe of potential matches and so increase the potential gains from marriage, specifically for credit-constrained families.

Although dowries are a frequent topic in the literature, their role as a tool of risk management is still not stressed. Indeed, dowries have a function beyond establishing a market price in the marriage market. They also have an insurance role for families by ensuring a certain level of welfare for a woman within marriage, as shown in Ambrus (2010).
However, dowry transfers may be possible only for those families which are not limited in their access to credit and do not face a liquidity squeeze. In fact, this is the channel that explains the results of Mobarak, Kuhn, and Peters (2011) in which those families which are not able to afford dowry transfers limit their marriage market to close relatives who provide a credit market within the family.

The evidence summarized shows that there is room for improving individual and household wellbeing through the development of markets and of an assistance system which complements the risk management activities already undertaken by families and individuals. Gains in efficiency and welfare for families will result not only from a reduction in the magnitude of fluctuations in income, but also from the development of these instruments. Nevertheless, the evidence also points out the need to involve families in these initiatives. First, as mentioned in Rosenzweig (1993), more traditional households are more likely to show greater resistance to change. Innovations – likely due to their impact on returns to experience, levels of risk, and assessment of the levels of risk faced by individuals and families – may constitute a threat to traditional household structure. Second, knowledge about the role of the family and the specific mechanisms families use in risk management helps determine the impact of and the population affected by different policies such as conditional cash transfers or other poverty alleviation initiatives (Angelucci et al., 2010, 2012). For example, a reform of a pension system that improves old age security would benefit not only the individuals who would use the system directly but also their families (Fan, 2010). Similarly, policies enabling families to reach their desired family size both increase investment in children and improve the wellbeing of all members of the household (Caceres-Delpiano, 2012 and Cáceres-Delpiano and Simonsen, 2012).

Third, knowledge about the sources of variation in household income, as well as about the role each member of the household plays in risk management, is necessary to
determine which individuals should be protected because of their greater exposure to these variations. For example, in a traditional agrarian economy in which men specialize in farming, a negative shock to the family’s resources will result in a reduction in the level of investment in all other household members (i.e. mothers and their children, specifically girls) before investment in the man because the main source of household resources is agriculture, which is the man’s responsibility. The protection of income sources in the short term creates a poverty trap to the extent that there are no policies to safeguard the individuals (women and children) who are exposed to these fluctuations, especially when returns to investment are greatest (for example, in early childhood).

The effect of risk on families is not independent of the development of markets and the assistance system. Still, as shown in Cáceres-Delpiano (2012) an unexpected increase in family size affects families across all development levels, with the worst impact occurring in countries with lower levels of development. Cáceres-Delpiano and Simonsen (2012) analyze an unexpected increase in family size in the U.S. and find that families experiencing such an increase use more welfare assistance programs such as Medicaid. These findings might explain why an unexpected increase in family size does not produce a negative impact on educational attainment in more developed countries such as Norway, Israel, and the United States.

The evidence suggests a particular need to understand and recognize the role of women in family formation decisions, in fertility, and in childcare. The development of markets and welfare systems has the power to improve the welfare of all individuals by providing access to instruments of risk management that are less expensive than marriage. But reducing the costs of commitment or improving a potential match in the marriage market often requires a change in the traditional role of women. For example, a reduction in the costs of commitment can be associated with an improvement in the levels of education of mothers,
which may also benefit the welfare of their children. Nevertheless, increased levels of education among women can be seen as a threat in a traditional society. Under a collective model of the household, the education of each household member increases not only the level of income of all household members, but also the weight of each individual in household decision making. Thus, an increase in a mother’s education will increase her weight in her household’s decisions. This increase will result in a resource allocation more favorable to those goods that mothers prefer (children, for example) and more favorable in terms of their risk exposure (Browning et al., 2011). However, this improvement in the relative position of women can be blocked in the absence of a change in the role assigned to them. Although access to the labor market has been recognized as a factor that insures families against income fluctuations, a segmented labor market could aggravate the situation of families if their risk exposure is a function of their demographic composition (for example, number of women in the household). Similarly, in a society in which dowries are directly related to levels of female education and the credit market is limited, a more educated woman is an additional cost for the family despite the potential gains associated with higher education in the future.

Finally, a reduction in the costs of commitment or of marriage will change family arrangements and the marriage markets that individuals face. While it is an empirical question whether or not these changes will affect the dissolution rate in the market (i.e. the divorce rate), a positive effect on this rate might generate greater resistance to certain reforms, despite the potential welfare gain for individuals. Also, in the hypothetical case of a higher rate of dissolution of marriage, specific institutions protecting potentially vulnerable individuals from the breakup of traditional family structures would be necessary.
References


