Household Responses to Adverse Income Shocks in Latin America

Alejandro Gaviria*

Abstract

This paper uses a new data set to study household responses to adverse income shocks in seven Latin American countries. The results show (i) that households respond to income shocks mainly by increasing their labor force participation, selling assets, and cutting on human capital investments, (ii) that poor households are most likely to be affected by adverse income shocks, and (iii) that lower-middle class households are more likely to cut back human capital investments and move abroad when faced with an adverse income shock. Taken together, these results offer ample justification for publicly funded safety nets targeted at the poor.

Key words: social safety nets, targeting of public programs, coping strategies.

JEL Classification: D10, H31, O54

Introduction

Macroeconomic volatility is a fact of life in Latin America, and a puzzling one at that. While booms and busts come and go, analysts keep changing their theories and their prescriptions. But if there is little agreement about the causes of volatility, there is growing consensus about its effects. During crises, poverty and inequality surge, and educational, health and nutritional indicators deteriorate, especially among the poor. Additionally, the deterioration is often permanent in that it is not easily reverted when income levels rise again[1].

This paper uses a new data set to study household responses to adverse income shocks in seven Latin American countries. Our main goal is to study the extent to which households respond to adverse income shocks by cutting back human capital investments, selling productive physical assets or reacting in any other way that can adversely affect future outcomes. In addition, we investigate the extent to which adverse income shocks affect households from different socioeconomic strata, as well as the difference between rich and poor households in their responses to crisis. By doing this, we hope to provide some clues as to why crises can permanently affect social indicators, and ultimately to shed some light on policies aimed at reducing the deleterious effects of crises.

The data set used in this paper was especially designed to measure household responses to crises. This data set uses a series of retrospective questions about socioeconomic outcomes before and during the crisis of 1999 in order to circumvent the lack of longitudinal data that has hindered most previous attempts to investigate the effects of an economic downturn on the fortunes of households. The data, however, has only qualitative information. It reveals, for example, whether or not a given household experienced an income drop, but it does not reveal the magnitude of the drop. This problem notwithstanding, the data at hand provides a unique glimpse of household responses to adverse income shocks.

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[1] See, for example, Lustig (2000).

We find that households respond to adverse income shocks mainly by selling assets and disinvesting in human capital. Presumably, both strategies are inefficient in that households would have acted differently if they had access to traditional smoothing mechanisms. Moreover, both strategies may have large negative effects upon the life prospects of those involved. We also find that poorer households are not only more liable to experience adverse income shocks during crisis, but also more likely to respond by disinvesting in human capital. Taken together, these results offer ample justification for publicly funded safety nets targeted at the poor.

I. Motivation

Crises are times of turmoil for households. During crises some households reduce their consumption or sell luxury goods, while others move abroad or cut back on their human capital investments. While some of these adjustments are of little consequence, others may have sizable long-term effects upon the socioeconomic outcomes of those involved. Thus, those who dropped out of school due to an income shock substantially reduce their socioeconomic prospects. Also, those who leave their countries often have to cope with the sudden depreciation of a large part of their human capital.

Figure 1 summarizes the main lines of inquiry of this paper. First, it studies the various ways in which families react to adverse income shocks, focusing on a few prominent "coping" strategies: increases in labor force participation, sales of physical assets and moving abroad. And second, it studies the extent to which adverse income shocks are associated with welfare losses, focusing on the role of savings and credit in shielding households from temporary drops in their current incomes.

Our analysis will shed light on the three important issues: (i) the relative importance of the different household strategies under consideration (section 3), (ii) the role of savings and credit in protecting households from steep consumption drops (section 4), and (iii) the differences among socioeconomic groups in the way they cope with income shocks (section 5). As mentioned above, our analysis seeks to

understand household behavior during crises and ultimately to guide the design of safety nets and public assistance programs, in general.

There have been several recent studies looking at household responses to income shocks during economic downturns. Cunningham and Malloney (2000) use longitudinal data to study the changing fortunes of a group of Mexican families before, during and after the crisis of 1994-95, concluding that poorer families were better able to cope with the crisis owing mainly to their greater ability to increase their labor supply in the face of an income shock. Gaviria (2000), for his part, uses a dataset similar to the one used in this paper to study who suffered the most during the Colombian crisis of 1999, concluding that the poor were not only most likely to lose income and reduce consumption, but also appear to have less flexibility to respond to income shocks. It remains unclear, however, whether the seemingly opposite conclusions of these studies are due to differences between the countries and situations under consideration or to differences in the data and the methodologies used[2].

In more general terms, Lustig (2000) argues vehemently that economic downturns often cause poor households to disinvest and reduce their assets, including their human capital. In her view, crises do have negative long-term consequences upon the fortunes of the poor, which gives ample justification to publicly funded safety nets aimed at shielding poor (and perhaps middle class households as well) from adverse income shocks. The relevance of these policies, as well as the validity of the facts that justify them, is the main topic of this paper[3].

II. Data Description

This paper uses a new set of surveys to study household responses to income shocks in Latin America. These surveys were designed spe-

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[2] One could argue, for example, that whereas richer families are less likely to be affected by adverse income shocks, the ones who are affected usually lose a higher fraction of their income. This will render the two studies consistent with each other.

[3] See Gill and Ulahi (2000) for a conceptual discussion of policy making and economic insecurity and World Bank (2000) for thorough analysis of the facts and theories of economic insecurity.

cifically for this purpose by a team of researchers from the Inter-American Development Bank[4], and were carried out during the first semester of 2000 in seven Latin American countries: Colombia, Ecuador, Guatemala, Honduras, Nicaragua, Paraguay and Venezuela. Samples are representative of the urban populations of the countries under analysis, and comprise approximately 1000 households in each country.

Table 1 presents a few descriptive statistics of the countries under analysis. PPP adjusted GDP per head is very low in these countries, much lower than in the average Latin American country with the exceptions of Colombia and Venezuela. Inequality is very high in all countries with the exception of Venezuela. And more relevant for the purpose of this paper, the economic downturn that affected most Latin American countries in 1999 (the year of the survey) was especially accentuated in most of the countries considered and especially in those from the Andean region.

By and large, the survey includes three types of questions. The first type refers to the specific nature of the income shocks endured by the households (e.g., whether a member lost his job or a family business went bankrupt). The second refers to the reactions of the households to the purported income shocks (e.g., whether a member entered the labor market or physical assets were sold). The third refers to socio-economic characteristics of the households (e.g., schooling of the household head and dwelling characteristics).

We assume throughout that a household experienced an income shock if at least one of the following events took place: (i) a member lost his job, (ii) a member experienced a drop in his earnings, (iii) a family business went bankrupt, and (iv) a family business experienced a substantial drop in its revenue. Table 2 shows that almost 45% of the households reported the occurrence of at least one of these events in 1999: 30% reported that at least one member was laid off during 1999

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[4] The survey was designed for Eduardo Lora of the research Department and Gilberto Moncada of the Poverty Unit. The question has two main shortcomings: almost all questions are qualitative and the information about household attributes is limited. Moreover, all questions were asked at the household level.

and 15% that they owned a business that had to shut down during the same period.

We assume that a household experienced a drop in consumption if each one of the following events took place: (i) a household member stopped buying non-essential goods, (ii) tried to buy cheaper or lower quality goods, (iii) reduced its spending on entertainment, and (iv) postponed the acquisition of durable goods. Although this definition is quite restrictive and may well leave out some households that did experience consumption drops, laxer definitions yielded unreasonably large fractions of households experiencing consumption losses, which may reflect the willingness of people to complain indiscriminately in times of crisis. Despite the stringent conditions, 28% of the households interviewed experienced a consumption loss according to our definition.

Table 2 also shows the incidence of the household responses under consideration. More than one fifth of the households reported that at least one member entered the labor market and a similar percentage reported that the household head increased the number of hours worked. More than 10% reported that one or more members had to drop out of school and a similar fraction reported that they sold assets to protect their incomes. Finally, five percent of the households reported that at least one member moved abroad during 1999.

Table 3 shows that there are sizable cross national differences in the variables under analysis. Income shocks affected over half of households in Ecuador and Venezuela and 20% of households in Honduras. Consumption falls affected 60% of households in Ecuador and only 10% in Honduras. The fraction of households reporting that at least one member entered the labor market was the highest in Ecuador, as was the fraction of households reporting that at least one member had to drop out of school. Honduras had the largest fraction of households reporting more hours worked by primary earner, Colombia the largest fraction reporting the sale of assets, and Ecuador the largest fraction reporting the emigration abroad of at least one of its members.

In general, the extent of household reactions is positively correlated to the extent of income shocks at the national level. All in all, coun-

tries where a larger fraction of households report losing income are also countries where a larger fraction of households report an increase in their labor force participation (or having members who dropped out of school). Also, the fraction of households reporting consumption drops and the growth rates of GDP in 1999 are negatively correlated at the national level: the correlation coefficient is above 0.5 and significant at the standard levels. Although the subsequent analysis will not use cross-country differences, focusing mainly on the relationship between income shocks and household reactions at the household level, it is comforting to notice that cross-country differences show consistent patterns of variation.

Are the rich less vulnerable?

The data at hand permits an examination of how the probabilities of losing income and reducing consumption vary with the socioeconomic status of a household. Since households that lost income are more likely to appear in the lower ends of the income distribution, this probability will be, by construction, higher among the poorest households. It would be erroneous, however, to conclude from this result that poor households are more likely to experience income losses, as this association is merely mechanical. To circumvent this problem, indicators of socioeconomic status that less depend of short-term fluctuations of household income should be used. Various indicators have been proposed in the literature, ranging from the education of the household head to the mean income of the neighborhood of residence.

In this paper, we use an alternative indicator based on household possessions of durable goods and dwelling characteristics. Specifically, we use the information listed on note 5 to rank households according to their socioeconomic status and to construct quintiles of socioeconomic status[5]. Our approach involves three main steps. First, we use principal components to compute a weighted average of the relevant household attributes, then we rank all households on the basis of this average, and last we use the ranking to compute quintiles of socioeco-

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5   The household assets and dwelling characteristics used to measure socioeconomic status were: access to drinkable water and sewage systems, and possessions of telephone, color tv, washing machine, refrigerator, personal computer, car, and a second house or apartment.

nomic status[6]. The quintiles can be interpreted as reflecting the long-term position of the households in terms of socioeconomic status—an interpretation supported by the fact that the average schooling of the household head increases monotonically as one moves from the lower to the upper quintiles[7].

Figure 2 shows that the probability of losing income is lower in the upper quintiles than in the lower ones, and that the differences between poor and middle class households are in general non significant[8]. The same figure shows that a similar pattern holds for the probability of reducing consumption, which underlines the fact that rich households tend to be less vulnerable. The higher vulnerability of the poor is exacerbated by the fact that income downturns can have a more devastating effect on those living close to subsistence levels[9].

Various mechanisms can explain the relatively higher vulnerability of poorer households. Poor unskilled workers not only tend to work in more volatile sectors (construction is a case in point), but are also disproportionately represented in the informal sector, which is also more responsive to macroeconomic fluctuations. In addition, unskilled workers are often the first to be laid-off when firms adjust their production in the face of an economic downturn.

A few recent studies have suggested that the higher probability of poor households to lose income is offset by its higher ability to in-

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[6] Principal components are often used to approximate socioeconomic status in the absence of reliable income data. Filmer and Pritchett (1998) show that durable goods and housing attributes are observed with much more precision than consumption expenditures, and that indicators of socioeconomic status based on these variables are much less sensitive to temporary disturbances on household welfare than similar indicators based on consumption data.

[7] Mean schooling of the head is 4.7 in the first quintile, 6.4 in the second, 7.5 in the third, 9.3 in he fourth and 11.5 in the fifth.

[8] Country fixed-effects were removed prior to the calculation of the inter-quintile differences.

[9] According to the Colombian household survey for June of 2000, the annual income per capita of an urban household located in the 80th percentile is around US$ 7000 dollars, meaning some households of the top quintiles ("rich") in Colombia can be poor by O.E.C.D. standards. The same applies for the other countries under analysis.

crease their labor supply in bad times[10]. Even if this is true, and we will return to this point in section 5, it is also true that the rich are more likely to have savings, which allows them to protect their consumption levels. In this respect, figure 3 shows that the fraction of households that report to have savings increases geometrically across quintiles of socioeconomic status. Summing, the available evidence clearly indicates that rich and middle-income households are less vulnerable, which allows us to answer affirmatively the question posed above[11].

On a related point, unreported results show that the schooling of the head does not appear to have an effect on vulnerability beyond its effect on the socioeconomic status of the household, which runs counter to the idea that education not only increases the level of income, but reduces the volatility of income as well. Households whose heads are older than 60 or younger than 25 are less likely to lose income and reduce consumption (the relevant probabilities are at least five percentage points lower in both cases), which suggests that families tend to be more vulnerable precisely when they are making the key human capital investments.

III. Main Results

In this section, we study the correlations between the probability of losing income and that of engaging in the various coping strategies listed in figure 1. We first examine these correlations at an aggregate level and then do the same at the household level. Although we will refrain from making strong causality claims, we will argue that the magnitude of the correlations is illustrative about the magnitude of households responses to adverse income shocks.

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[10]   See, for example, Cunningham and Malloney (2000) for the case of Mexico.

[11]   There is a sense in which rich and middle class households are more vulnerable than poor households: they are more likely to be victimized. The probability of being a victim of a crime in the six months previous to the survey is about 11 percent for first three quintiles and about 14% for the last two. (see Gaviria and Pages, 2001 for a comprehensive study of victimization in Latin America).

Figure 4 plots the fraction of households that lost income in a given quintile of a given country against the fraction of households that engage in each one of the strategies under consideration (quintile numbers are shown in the graph to ease interpretation). Overall, we have 35 five observations: five quintiles and seven countries. The idea is to use the variation across countries and quintiles to assess the importance of the five strategies under analysis. Although these correlations may be driven by unobserved country attributes (or by unobserved differences between rich and poor households), they provide a useful first pass to the data.

As shown, the probability of losing income is strongly associated with the probability that a household member will enter the labor market: an increase of 10 percentage points in the first is associated with an increase of almost 3 points in the second (a 13% increase over the mean value). The evidence indicates, then, that labor supply at the household level appears to be negatively related to household income—a result usually referred to in the literature as the hypothesis of the added worker.

The connection between the probability of losing income and the probability that a household member will drop out of school is even stronger: an increase of 10 percentage points in the first is related to an increase of more 3 points in the second (a 26% jump over the mean value). Moreover, the fluctuations of the first account for over 60 percent of the fluctuations of the second, pointing to the fact that reductions of household income have much to do with the decisions of cutting back in human capital investments. Indeed, reducing these investments appears to be a disturbing consequence of adverse income shocks, confirming the conjectures mentioned in section 1.

Unlike the previous cases, the evidence show that, at least in the aggregate, working longer hours is not associated with the occurrence of adverse income shocks. If anything, the opposite is true. On average, the lower the fraction of households losing income, the higher the fraction of households in which the primary earner worked longer hours than before. It must be pointed out, however, that this result is likely to be driven by unobserved country characteristics. In Honduras, for example, the very high fraction of households reporting that

108

the head worked longer hours than he used to contrasts with the very small fraction of households reporting that at least one member experienced substantial income losses.

The probabilities of selling household assets and moving abroad are also positively associated with the probability of losing income. An increase of 10 percentage points in the latter is associated with an increase of one point and one quarter of point in these magnitudes. In both cases, however, the points are less tightly clustered than in the previous figures, suggesting that other forces, which may have little to do with the propensity of losing income, play an important role in explaining these outcomes.

As mentioned above, the previous analysis should be interpreted with caution because the results may be driven by unobserved characteristics, not only of countries but of households as well. In what follows, we intend to control as thoroughly as possible for the different sources of unobserved heterogeneity, seeking to better isolate the responses of households to income disturbances.

The analysis is based on the following model

$$R_{iqc} = \alpha S_{iqc} + X_{iqc}\beta + \lambda_c + \gamma_q + \varepsilon_{iqc} \qquad (1)$$

where R is a dummy variable showing whether household i who belongs to quintile q and lives in country c engage in the coping strategy under consideration; S is another dummy showing whether the same household experiences an adverse income shock; X is a vector of household attributes, including the age and education of the head; γ and λ are quintile and country fixed effects, respectively; and ε is an error term. We focus mainly on the value of the parameter α, which measures the propensity of households to engage in the strategy under consideration in the face of an adverse income shock: the higher this value, the higher the propensity.

We use a Probit model to estimate Equation (1). Alternative estimation methods yield almost identical results. We estimate equation (1) for each one of the five households strategies under consideration: increases in participation and hours, dropping out of school, sale of

assets and moving abroad, and present the results of several alternative specifications in each case. We report marginal effects evaluated at mean values.

Table 4 presents the estimation results for increases in labor force participation and dropping out of school, the first two strategies under scrutiny. As shown, households that lost income were much more likely to have had a member entering the labor market. The coefficient is smaller than that implied by figure 4 but still substantial: an increase of 10 percentage points in the probability of losing income is associated with an increase of 1.5 percentage points in the probability of having a member joining the labor force. Moreover, this probability goes down as either the education or the age of the household head go up. All else being equal, each year of education is associated with a reduction in the probability in question of half of a percentage point.

The previous results remain almost unaltered if quintile effects are added to the specification: the value of α is the same in both cases, as are the coefficients attached to the age variables. The same is not true, however, for the education of the head, whose coefficient goes down and loses significance after quintile effects are introduced, suggesting that education affects the probability of joining the labor force mostly through its effect upon the socioeconomic status of a household.

Table 4 also shows that the probability of having a member leaving school is affected by the probability of losing income: a ten-percentage-point increase in the former is associated with a one-percentage-point increase in the latter. Moreover, the probability in question is related to the age and education of the household head in predictable ways: households who have older and more educated heads are less likely to have a member dropping out of school. As in the previous case, these results are roughly similar after adding quintile effects to the specification. But unlike the previous case, the education of the head appears to have an effect on the probability of having a member leaving school that is independent of its effect upon the socioeconomic status of the household. This suggests that children of less educated parents are more likely to drop out of school even after the effect of parental education on income levels and income volatility is discounted.

Figure 5 shows that the fraction of households reporting that at least one member left school during 1999 decreases as one moves from poorer to richer households[12]. The same figure also shows that inter-quintile differences are substantially smaller once we control for the greater propensity of poor households to both lose income and cut back consumption levels. According to the figure, 30% of the differences between the top and bottom quintiles in the probabilities of scaling back human capital investments in a given year can be explained by differences in vulnerability. Presumably, an even larger percentage would be explained if we had controlled for inter-quintile differences in the value of α[13].

The previous results show that differences in vulnerability explain (i) the bulk of the differences across countries in the fractions of households reporting that at least one member left school, (ii) a large fraction of the differences across quintiles of the same probability, and (iii) a sizable fraction of the intra-quintile differences among households of the probability in question. When taken together, this evidence provides ample justification for policies aimed at preventing households from responding to adverse income shocks by cutting back their investment in human capital. Such policies will not only have important implications in terms of equity, but also in terms of efficiency.

Table 5 examines the association between vulnerability and the other household strategies under consideration. The first two columns show that there exists a positive correlation between the probability of losing income and the probability that the household head will work longer hours than previously, which indicates that households heads do respond to adverse income shocks by expanding their labor supply—a result that clearly contradicts the evidence presented in figure 4. This

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[12] This result may be bias, the fact that we do not control for the number of children in a household: poorer households have more children which raises the probability that at least one of them will drop out at any time. Unfortunately, the survey does not contain information about household size.

[13] If we allow to differ among quintiles, differences in vulnerability explain as much as 70% of inter-quintile differences in the probability of having a member leaving school (see section 5).

contradiction underlines the perils of using differences among countries to study household reactions, especially when institutional and other factors that affect the relationships under analysis can not be adequately controlled for.

Table 5 also shows that the propensity to expand one's labor supply diminishes with age and increases with education. The difference between older and younger workers is striking: those under 25 are almost three times as likely to increase hours as those over 60. The differences between educated and uneducated workers are smaller but still substantial: those with at least a year of college are twice as likely to work more than those with at most primary education.

The intermediate columns of table 5 indicate that households respond to adverse income shocks by selling physical assets. These disinvestments appear to be considerable, at least in light of the large difference in the probability of selling assets between households that lost income and households that did not: 9.2 percentage points (or 90%). Finally, the right-most columns of table 5 indicate that households also respond to shocks by emigrating abroad. Here the difference in the relevant probabilities between household that lost income and households that did not is almost 1.5 percentage points—a 25 percent difference with respect to the average propensity to move abroad[14].

All in all, the results of tables 4 and 5 indicate that, to a greater or lesser extent, households resort to all the strategies under consideration to alleviate the short-term effects of adverse income shocks. We can use estimated values of a divided by the mean prevalence of the strategy in question to gauge the relative importance of the different strategies. The idea is to use a "normalized" difference between households who lost income and households who did not in the probability to engage in a strategy in order to assess the importance of the strategy. After doing this, we find that the most "important" strategies are: selling assets, reducing human capital investments and increasing labor

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[14] Households that report having at least one member victimized were two percentage points more likely to move abroad that households that report the contrary. Crime is as much a "push factor" as the loss of income.

force participation[15]. The remaining strategies, expanding one's labor supply and migrating abroad, are still important, but much less common. This ranking suggests that the most common strategies used by households entail actions that, regardless of their short-term effectiveness, have deleterious effects that long outlive the shocks that triggered them.

IV. Income Losses and Consumption Drops

In times of crisis, many households reduce consumption, not only because their disposable income goes down, but also because they adjust downwardly their income prospects. In this section, we study the interplay between consumption drops and income losses, focusing on the effects of the availability of savings and credit in preventing the translation of adverse income shocks into consumption drops.

It is worth noting that the probability of losing income explains more than 60% of the variation across countries and quintiles in the probabilities of reducing consumption, suggesting that income and consumption shocks are highly correlated. This result indicates either that many households lack the resources and means to protect themselves against adverse income shocks (e.g., they do not have savings and do not have access to credit) or that they foresee that adverse shocks will permanently affect their income prospects (e.g., laid-off workers predict that their employability has decreased and entrepreneurs predict that the competitiveness of their businesses has permanently suffered).

The analysis of this section is based on the following model:

$$C_{iqc} = \phi_1 R_{iqc} + \phi_2 SAV_{iqc} + \phi_3 CRED_{iqc} + X_{iqc}\beta + \lambda_c + \gamma_q + \varepsilon_{iqc} \qquad (2)$$

where subscripts have the same interpretations as before; C is a dummy variable showing whether the household in question reduced its consumption; and R, SAV and CRED are also dummies, showing whether

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[15] Ideally, we should compare the elasticities of the relevant probabilities with respect to the changes in household income but that can not be obtained on the basis of the data at hand, which contains only qualitative information.

the same household lost income, had savings and received credit during 1999, respectively. We use a Probit model to estimate equation (2) and report marginal effects evaluated at mean values.

Table 6 shows, not surprisingly, that households which lost income are much more likely to reduce their consumption levels than households that did not: the probability of cutting back consumption is at least 10 percentage points higher in the former than in the latter. There are two alternative ways to interpret this result. One can argue that income losses often translate into consumption drops by either of the two mechanisms mentioned above. But one can argue alternatively that consumption drops are by no means limited to those households who did experience income losses.

Table 6 also shows that household who had savings were much less likely to reduce their consumption than households who did not. The size of the effect is quite large and does not depend on whether we control for the education of the head or the socioeconomic status of the household. In contrast, households who received credit are marginally more likely to reduce their consumption, which may be a reflection of the fact that the most affected households are more likely to ask for credit in order to ameliorate the effect of the crisis (i.e., there is reverse causality).

The age of the head appears to be consistently related to the probability of reducing consumption levels even after controlling for whether or not a household lost income. Households whose head is either younger than 25 or older than 60 are less likely to report that they adjust their consumption level downward, which may be linked to the fact that these household are less likely to have children living at home. Finally, the education of the head has only a marginal negative effect on the probability of reducing consumption, and this effect is transmitted mostly through the socioeconomic status of the household (i.e., more educated heads live in richer households which are in turn less likely to reduce consumption).

V. Do rich and poor households behave differently in times of crisis?

The rich are different from the poor, and not only because they have got more money. Rich and poor households, in particular, respond differently in the face of adverse income shocks. The rich, for example, can often avoid extreme responses such as emigrating or cutting back on human capital investments, as they not only have better access to income-smoothing mechanisms, but also are better able to endure an income drop—if only because they are not fighting for survival.

The analysis of this section is based on the following model:

$$R_{iqc} = \alpha S_{iqc} + \sum_{j=2}^{5} \alpha_j (S_{iqc} \times q_j) + X_{iqc}\beta + \lambda_c + \gamma_q + \varepsilon_{iqc} \qquad (3)$$

where q_j is a dummy variable showing whether household *i* belongs to quintile *j* (the first quintile is the baseline group), α measures the mean propensity of a household from the first quintile to engage in S, and $\alpha + \alpha_j$ measures the same propensity for the jth quintile. The rest of the variables and parameters are the same as before. We use a Probit model to estimate equation (3) and report marginal effects.

Figure 6 plots the values α, $\alpha + \alpha_2$, $\alpha + \alpha_3$, $\alpha + \alpha_4$, and $\alpha + \alpha_5$ against the corresponding quintiles. Mean propensities for all households, taken from tables 4 and 5, are also shown for comparative purposes. Only those differences that are statistically significant are referred to in the discussion that follows.

Figure 6 shows that households from the upper quintiles are less likely to respond to an adverse income shock by increasing their labor supply, which may be explained by two factors. First, relatively richer households usually have other means to deal with income shocks (they are more likely to have savings, to own liquid assets and to have access to credit). And second, richer households usually have less flexibility to increase their labor force participation, if only because two-earner household are more common among rich and middle class households than among poorer ones[16].

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[16] In Latin America, female labor force participation is 36.7 in the bottom 30% of the income distribution, and 60.9 in the top 10% (IADB, 1998 p. 57).

In the same vein, figure 6 shows that households from the second quintile are especially prone to respond to an income shock by cutting back human capital investments. The large difference between the first and second quintile suggests that the poorest households do not have more to lose from an adverse income shock. Presumably the most disadvantaged households stopped investing in human capital well before the crisis hit, while those in the intermediate quintiles are still investing, perhaps through great effort, which puts them in a more precarious position.

This result, if confirmed by further research, could have wide-ranging policy implications. Cash transfers conditional on children going to school are increasingly perceived as the most effective way to prevent households from disinvesting in human capital in times of crisis. The largest of these programs, *Progresa* in Mexico and *Familias en acción* in Colombia, are targeted at very poor households living in rural areas. The previous results suggest, however, that this might be not the best course of action, at least not when considering efficiency. Indeed, relaxing the thresholds of participation, so as to include not only the poorest of the poor, could increase the effectiveness of such programs in terms of insuring school attendance.

Turning back to figure 6, we also find that the propensity of household heads to respond to an adverse income shock by working longer hours is higher among households from the third and fourth quintiles (the differences are not very large and are marginally significant). Although the data offers no clues as to why this is so, one may argue that many poor people, especially in the informal sector, work too many hours already that they have less flexibility in expanding their labor supply. The richest workers, for their part, labor mainly in the formal sector, where employment contracts are more rigid and expanding one's labor supply is more difficult.

In reference to selling physical assets, no substantial differences among quintiles are apparent. Unreported results show, however, that while the poor are more likely to sell household appliances, the rich are more likely to sell vehicles and real estate. For emigration, in contrast, there are some large differences among quintiles: poorer households, especially those from the second quintile, are more likely to

move abroad in the face of an adverse income shock. The reasons are again not clear at all, but one can argue that the poor need a smaller push to leave their countries, if only because they have much less to lose.

Conclusions

This paper studies household responses to adverse income shocks in times of crisis. It is shown, first, that households respond to income shocks mainly by increasing their labor force participation, by selling assets, and by disinvesting in human capital. It is also shown that poor households are most likely to be affected by adverse income shocks. Finally it is shown that poor (but not the poorest) households are more prone to cut back human capital investments and emigrate abroad in the face of an adverse income shock.

These results suggest that adverse income shocks can have deleterious effects on human capital accumulation, especially among poorer households. If we consider both the greater likelihood of poor households to experience income shocks as well as their greater propensity to cut back human capital investments, we can conclude that poor households are four times as likely as rich households to stop investing in human capital when faced with aggregated shocks. This may explain why macroeconomic crises usually cause irreversibly surges in inequality and why school attendance among the poor plunges during crises.

This paper has two main policy implications. First, it reinforces the case for publicly funded safety nets. In light of the evidence, safety nets appear to have ample justification, not only on equity grounds but on efficiency grounds as well. And second, it shows that assistance programs aimed at keeping children in school should not be targeted exclusively at the poorest of the poor. In light of the evidence, such programs could be more effective if the targeted population also included low-middle class households.

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Table 1.   Country Variables.

Country	GDP per head	Gini	Growth rate 1999
Nicaragua	1441	0.565	3.7%
Guatemala	2292	0.557	3.6%
Honduras	1321	0.528	-1.9%
Paraguay	1939	0.569	0.5%
Ecuador	2941	0.560	-7.3%
Venezuela	6108	0.470	-7.2%
Colombia	3788	0.576	-4.3%
Latin America	**3715**	**0.528**	**0.7%**

GDP per head is taken from World Bank Development Indicators (1998).
Gini coefficients are taken from Szekely and Hilgert (2000).
Growth Rates are Taken from IMF Financial Statistics (2000).

Table 2.   Sample Means of Main Variables.

Household lost income in 1999	44.5%
Household member lost job during 1999	30.7%
Household business went broke during 1999	15.4%
Household reduced consumption in 1999	28.2%
Household entered the labor market in 1999	21.9%
Household member left school in 1999	11.5%
Household head increased hours worked in 1999	24.6%
Household sold physical assets in 1999	10.1%
Household member emigrated in 1999	5.3%

Table 3.   Vulnerability and Household Responses by Country.

Pais	Loss of Income	Fall in Consumption	Increase in Participation	Dropping Out	Increased in Hours Worked	Asset Sale	Migration Abroad
Nicaragua	48.4%	14.4%	23.7%	12.8%	22.4%	6.6%	8.3%
Guatemala	35.7%	26.4%	17.6%	7.9%	26.5%	4.5%	2.8%
Honduras	21.5%	9.5%	24.8%	7.5%	37.1%	9.1%	8.4%
Paraguay	48.3%	35.6%	23.7%	12.6%	21.2%	12.6%	4.8%
Ecuador	67.6%	59.4%	32.2%	18.6%	27.6%	13.7%	9.5%
Venezuela	52.8%	29.1%	20.9%	14.8%	24.9%	7.1%	2.7%
Colombia	38.6%	24.4%	12.1%	7.3%	15.4%	15.7%	1.6%

Table 4.　　Vulnerability, Labor Force Participation and Dropping Out of School.

	Participation		Dropping out	
Household lost income	0.159	0.155	0.091	0.089
	(15.80)**	(15.42)**	(12.34)**	(12.04)**
Schooling of the head	-0.005	-0.002	-0.006	-0.004
	(4.89)**	(1.69)	(6.69)**	(4.10)**
Head older than 60	-0.104	-0.098	-0.047	-0.044
	(7.01)**	(6.56)**	(4.32)**	(4.02)**
Head younger than 25	0.059	0.057	0.031	0.030
	(3.38)**	(3.24)**	(2.46)*	(2.35)*
Country fixed effects	Yes	Yes	Yes	Yes
Quintile fixed-effects	No	Yes	No	Yes
Pseudo R^2	0.066	0.070	0.066	0.067
Observations	7204	7197	7229	7222

Absolute value of z-statistics in parentheses.
*Significant at 5% level; **Significant at 1% level.

Table 5.　　Vulnerability and other strategies.

	More hours by head		Sale o assets		Migration abroad	
Household lost income	0.104	0.105	0.094	0.092	0.013	0.014
	(9.26)**	(9.37)**	(13.63)**	(13.32)**	(2.67)**	(2.93)**
Schooling of the head	0.011	0.010	0.001	0.003	0.001	<0.000
	(8.83)**	(6.74)**	(1.52)	(3.56)**	(2.14)*	(0.44)
Head older than 60	-0.116	-0.120	-0.039	-0.035	0.010	0.007
	(6.50)**	(6.66)**	(3.86)**	(3.41)**	(1.51)	(1.12)
Head younger than 25	0.078	0.080	0.022	0.018	0.017	0.018
	(4.07)**	(4.14)**	(1.82)	(1.49)	(2.03)*	(2.22)*
Country fixed efects	Yes	Yes	Yes	Yes	Yes	Yes
Quintile fixed-effects	No	Yes	No	Yes	No	Yes
Pseudo R^2	0.053	0.053	0.074	0.080	0.053	0.063
Observations	6364	6357	7200	7193	7203	7196

Absolute value of z-statistics in parentheses. *Significant at 5% level; **Significant at 1% level.

120

Table 6.   Consumption Drops and Income Losses.

	(1)	**(2)**	**(3)**
Household lost income	0.132	0.129	0.127
	(11.85)**	(11.55)**	(11.37)**
House had savings	-0.089	-0.083	-0.074
	(7.1 1)**	(6.40)**	(5.58)**
Household got credit in 1999	0.018	0.017	0.022
	(1.25)	(1.22)	(1.52)
Schooling of the head		-0.003	-0.001
		(2.14)*	(0.40)
Head older than 60		-0.057	-0.051
		(3.67)**	(3.27)**
Head younger than 25		-0.047	-0.050
		(2.20)*	(2.34)*
Country fixed effects	Yes	Yes	Yes
Quintile fixed-effects	No	No	Yes
Pseudo R^2	0.116	0.119	0.120
Observations	7143	7142	7135

Absolute value of z-statistics in parentheses.
* significant at 5% level; ** significant at 1 % level.

Figure 1.   Main lines of inquiry of the paper.
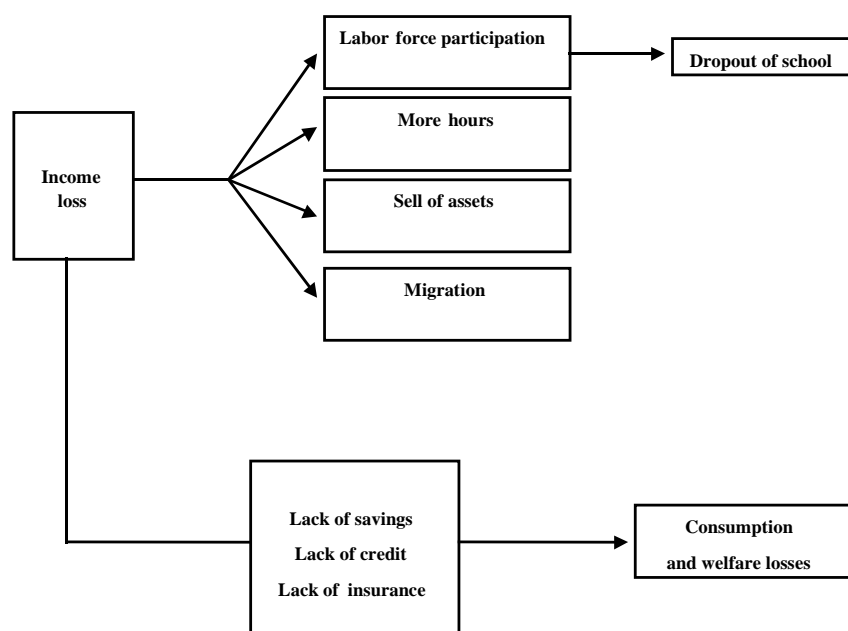
Figure 2.   Fraction of households who lost income and reduced consumption.
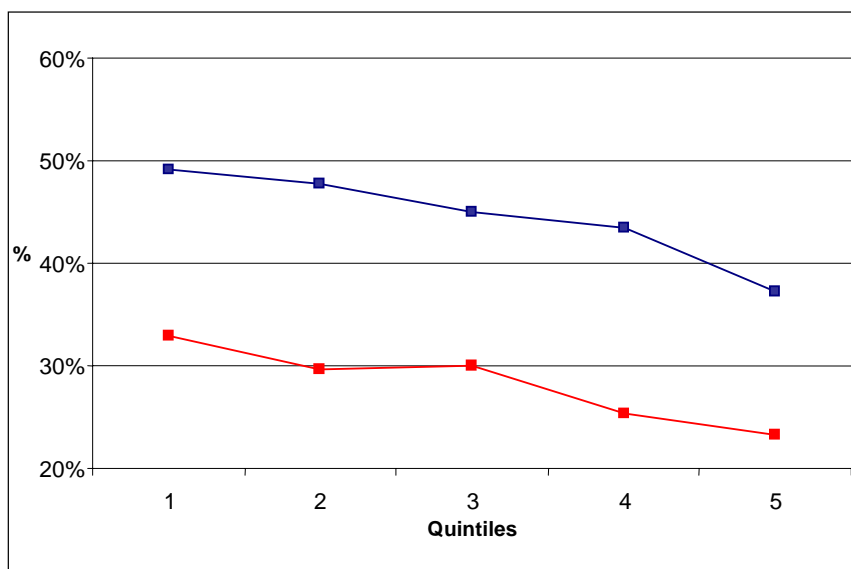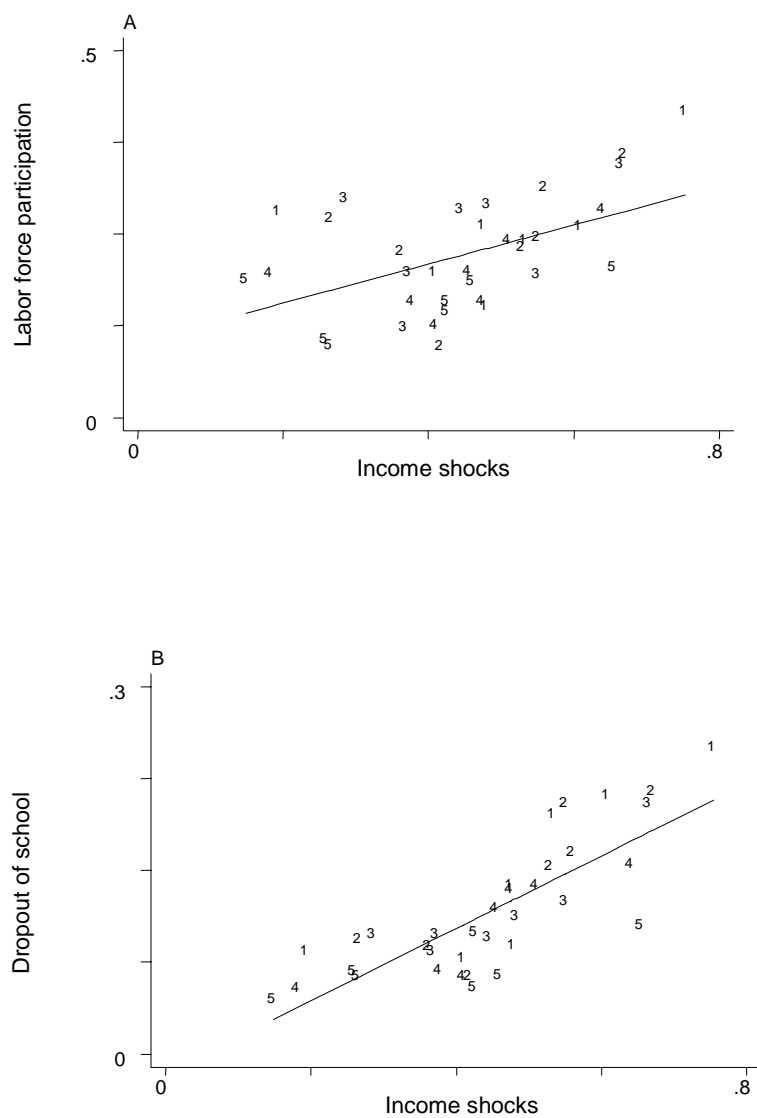

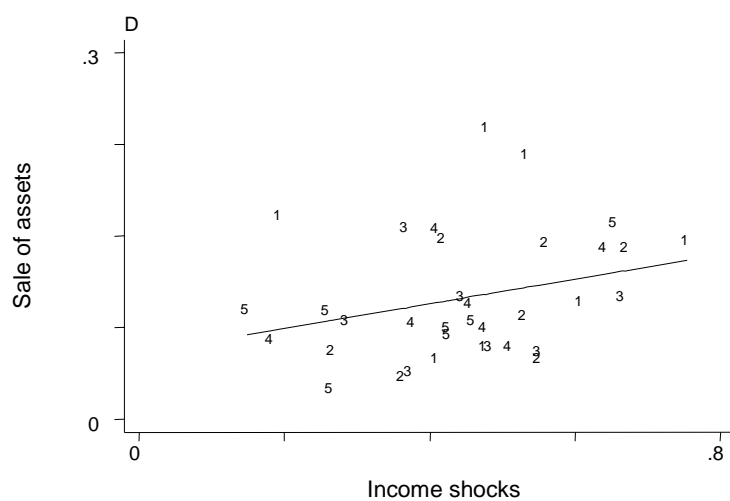Figure 3.   Fraction of households with liquid savings.
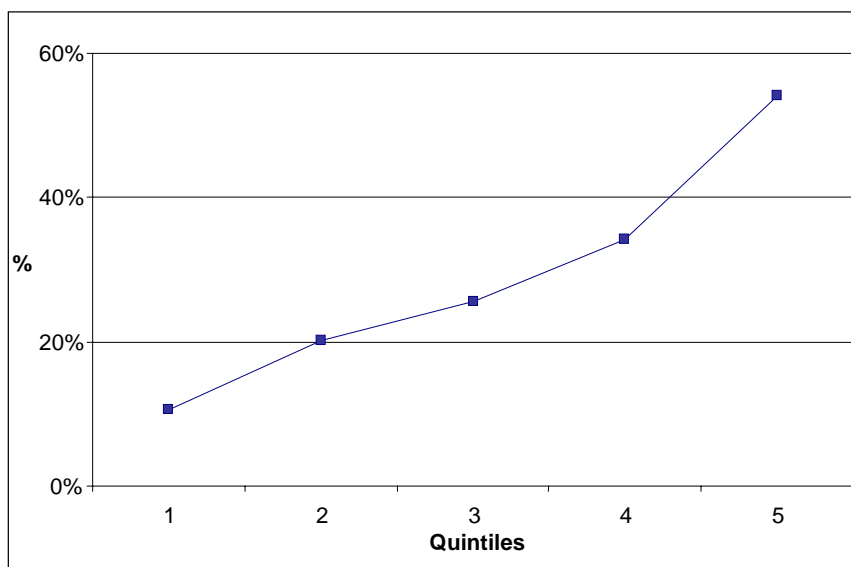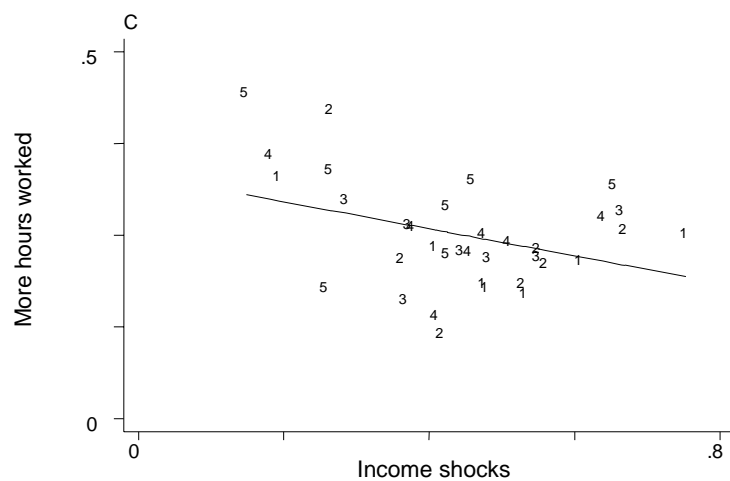
Figure 4.   Household responses by country and by quintile.
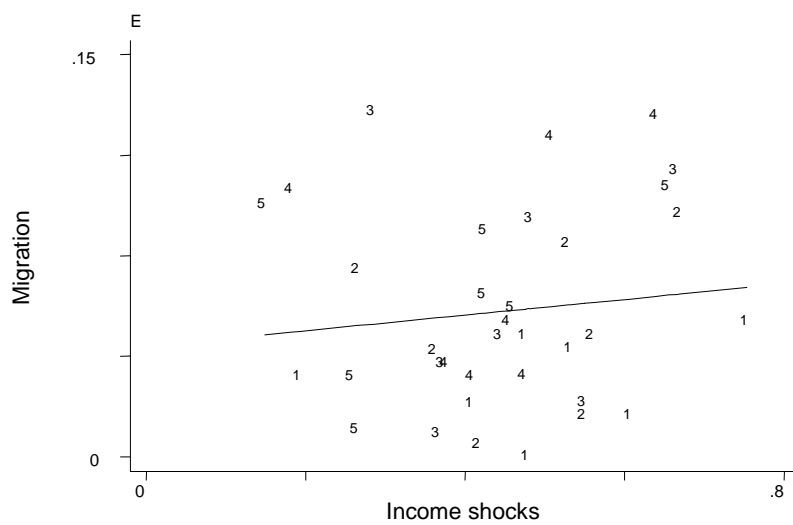
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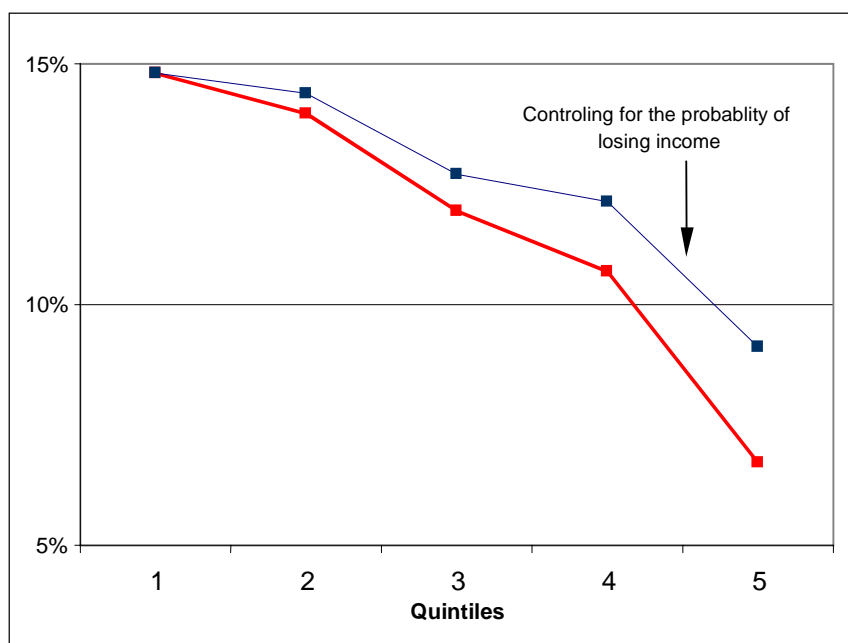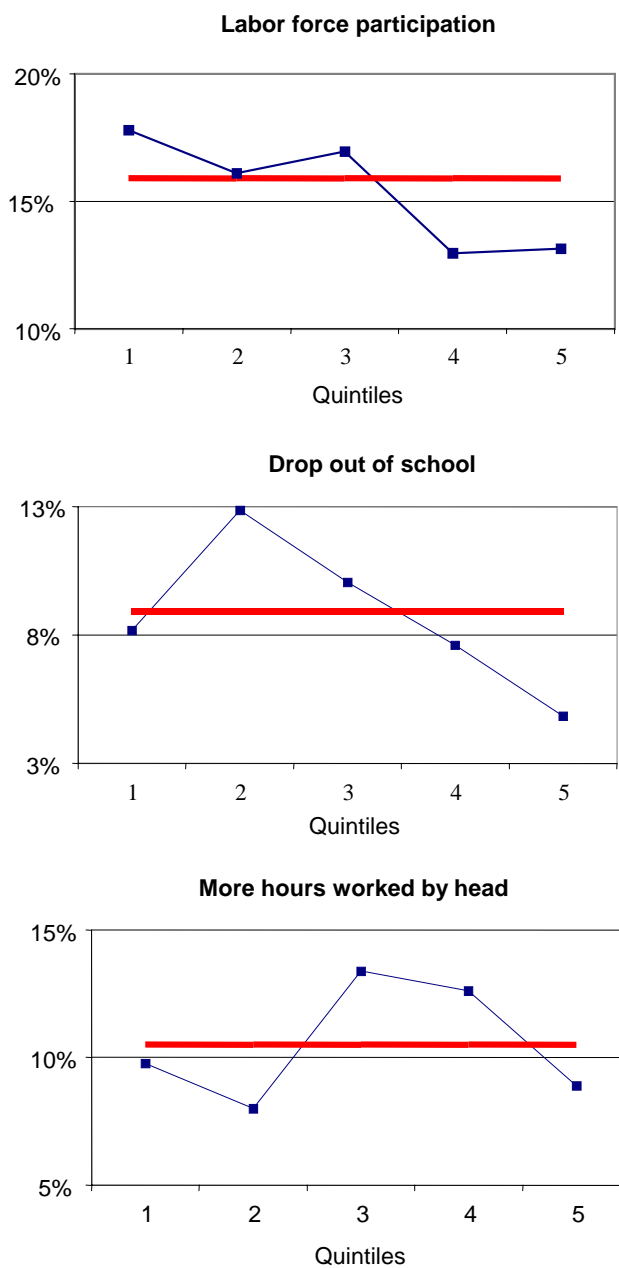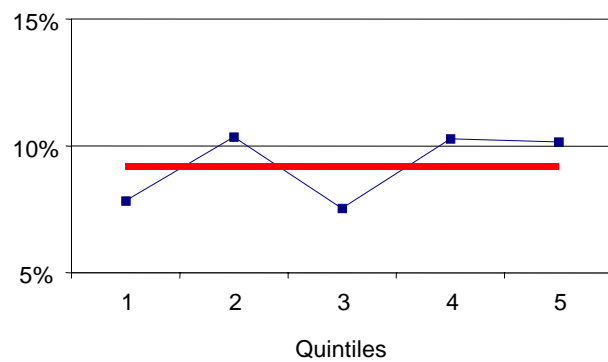Figure 5.   Dropping out of school by quintiles.

125

Figure 6.   Differences in responses to income shocks by across
             quintiles.

Labor force participation

Drop out of school

More hours worked by head

126

Sale of assets

Quintiles

Migration

Quintiles