Chapter 4
The incidence of shocks. vulnerability for socioeconomic reasons. and potential effects on the evolution of income and expenditure

Rafael J. Santos[1]

→ In 2014, the members of the Santander Morales family were unsure about the resettlement process of Gramalote as the authorities, at that time, had not established where the new town would be situated.

4.1. Introduction

→ The economic activity of rural and urban households is full of uncertainty. Part of this uncertainty is due to events that are difficult to anticipate and have repercussions on the wellbeing of the household. It is not easy to forget images in the media of people affected by the rainy season of 2010-2011. It is also not easy to forget the drought that affected people, animals, and crops in 2015-2016. However, the climatic shocks, despite being ever more serious. are only one of the many shocks that affect households. Shocks including those relating to employment, production, and health also affect the paths that households take.

As ELCA has an exhaustive unit on the different events or problems that affect households, it is a unique survey that allows the effects of different types of shocks on economic wellbeing to be studied.

This chapter uses the module shocks on ELCA to answer the following questions: How vulnerable are Colombian households to shocks? What are the most frequent shocks per area (urban or rural) and

1. I would like to thank Adriana Camacho and Nicolás Santos for their help and comments.

region? How does household vulnerability change according to the initial level of wealth? What is the effect of some of these shocks -those that have greater potential to limit productive capacities- on welfare measures such as change of income and change in expenditure? What do simple descriptive statistics tell us about the effects of the dry season in 2015-2016?

The first part of this chapter explains the way in which the events and problems reported in ELCA under different categories of shocks (health, family, employment, housing and assets, production, and violence and disasters) and it also examines the impact of these shocks on different ELCA regions. The second part concentrates on household's vulnerability according to their original wealth tertile. The third part studies the effects welfare measures have (change in income and change in expenditure) on employment shocks in urban zones, on production shocks in rural zones, and on droughts in both zones. The last part concludes.

4.2. The impact of shocks

ELCA contains a questionnaire on events and problems that have destabilized the household during the three years prior to the survey. These events can be thought of as shocks that have an effect on the household. The urban questionnaire registers 17 types of shocks; the rural questionnaire registers 19 types of shocks. The two additional shocks in the rural questionnaire correspond to losses of

As ELCA has an exhaustive unit on the different events or problems that affect households, it is a unique survey that allows the effects of different types of shocks on economic wellbeing to be studied. .

→ There are ever less families in the La Palestina shelter for the victims of Gramalote. Some are already living in their houses in the new town.

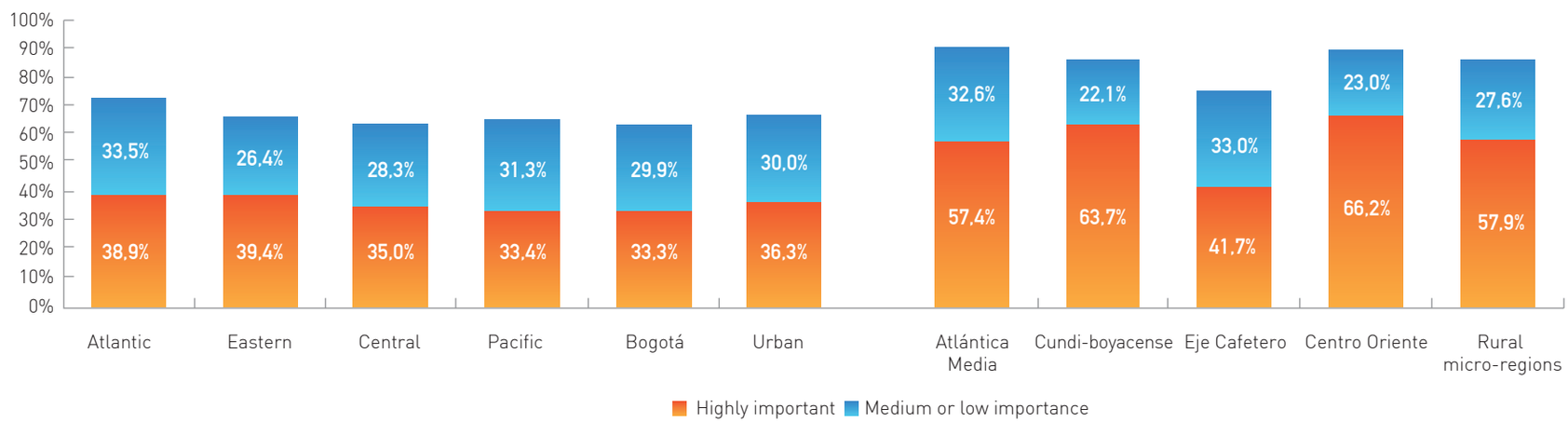
crops and animals. The questionnaire on events and problems also enquires as to the economic importance of the shock, measures the household took to confront the problem, and the number of times each problem occurred in the last four years between 2013 and 2016. The shocks were aggregated into seven categories: health, family, employment, housing and assets, production, and violence and disasters.[2] The components of each category as well as the impact (percentage of households affected) of each is presented in the appendix. This section analyses the impact of shocks by region.

Graph 4.1 shows the percentage of households that reported at least one shock per region. The first six bars correspond to the urban ELCA and the following five correspond to the rural ELCA. Each bar represents a percentage of households with at least one shock and each bar is, in turn, divided in two: the percentage of households that reported at least one highly important shock and the percentage of households that reported at least one moderately or slightly important shock. For example, in the Atlantic region, 72.4% of households reported a shock: in this region 39% of households reported to have been affected by a highly important economic shock. and 33.5% of households reported to have been affected by a moderately or slightly important shock.

In the urban zones, the Atlantic region is the area where the highest percentage of households report to have been affected by a shock. In the other regions, the percentage of households affected is around 65%. When focusing on the percentage of households that report a highly important shock, the Atlantic region once again stands out, accompanied by the Eastern region. For these two

Graph 4.1.

Percentage of households that have reported at least one shock of economic importance



Source: ELCA 2016

2. This classification is the same as the one used by Cadena and Quintero (2014) in the chapter that describes ELCA' shocks in 2013.

regions,. around 39% of households have reported a highly important shock. For other regions, the corresponding percentage oscillates around 34%. The Atlantic region, which stands out due to the impact of shocks, is also the poorest region of all ELCA urban regions. This is shown in Chapter 5, which deals with the subject of poverty.

For ELCA rural micro-regions. the probability of reporting a shock is 19.2 percentage points higher than in the urban regions. Similarly, rural homes are 22% more likely to report a highly important shock. This translates into high levels of impact: in the rural micro-regions, approximately four out of every five houses reported a shock and three out of every five reported a highly important economic shock. Unlike in urban areas, in the rural micro-regions, households have a considerably higher probability of having a highly important economic shock. In conclusion, rural ELCA households are more vulnerable to shocks and also the shocks tend to affect household's economic stability to a higher degree.

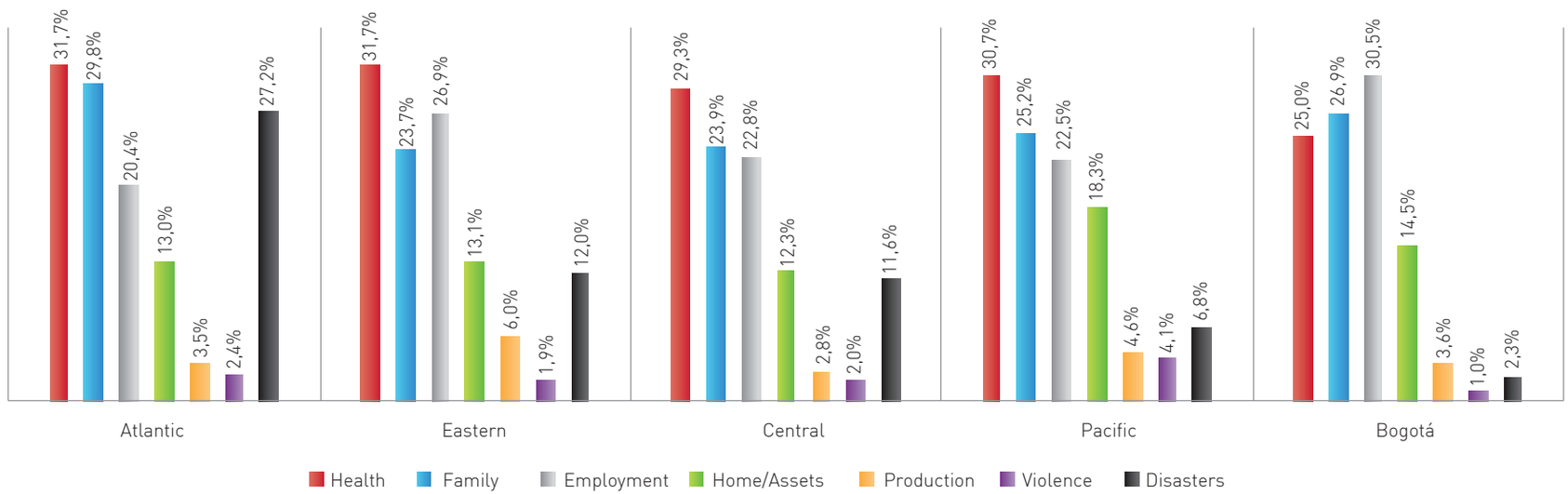
If we compare the micro-regions, the Atlántica Media and Centro Orriente are approximately four percentage points above average when observing the percentage of households that report at least one shock, without taking into consideration its importance. However, restricting the analysis to highly important shocks, the Centro Oriente is the most affected region as 66.2% is impacted. The Atlántica Media and Centro Oriente regions, which are the two rural micro-regions most affected by the shocks, are also the poorest regions in terms of expenditure per capita.

In summary, Graph 4.1 shows a panorama in which the rural households are much more vulnerable than the urban ones. A simple reason for this is that the rural households are, on average, poorer. Another related reason is that these households have less access to public services such as access to running water, which can, for example, mitigate the effects of the shocks of disasters. When the poor tend to be more vulnerable to shocks we refer to a negative socioeconomic gradient. The results that have been presented up until now suggest such a gradient. Not only are the rural areas the most vulnerable; also, the regions that are found to be above the average of those affected in both rural and urban zones tend to the poorest regions. This negative gradient seems intuitive. A low socio-economic dwelling is more vulnerable to climatic shocks due to the materials it is made from. The socio-economic gradient, in terms of the vulnerability to shocks, can also reflect other gradients such as the positive health gradient. On average, the poorest members of society tend to have poorer health, and, as such, they are more likely to become ill and report health shocks.

→ Mildred Leal Becerra (center) is with her children Donny, Camila, and María Guadalupe (above) in the house in which they live in Villas del Rosario, which is close to Cúcuta. They are waiting to be given their new house in Nuevo Gramalote.

What types of shocks affect ELCA's households? Graph 4.2 shows the percentage of households that report each one of the shocks that are included in each of our seven categories in ELCA's urban regions. Three types of shocks stand out due to their frequency: health, family, and employment shocks. Across urban regions, more or less 30% of households reported health shocks. Similarly, around 25% of households in each urban zone reported shocks in the family structure (including deaths, but mainly welcoming family members). Between 20% and 31% of households reported employment shocks. This type of shock records job loss, and it is particularly incisive in Bogotá: 30.5% of households in this region reported an employment shock. In other words, 30% of all households in Bogotá reported that a member had lost their job between 2013 and 2016. Within these three types of shocks,

Graph 4.2.
Type of shock by urban region



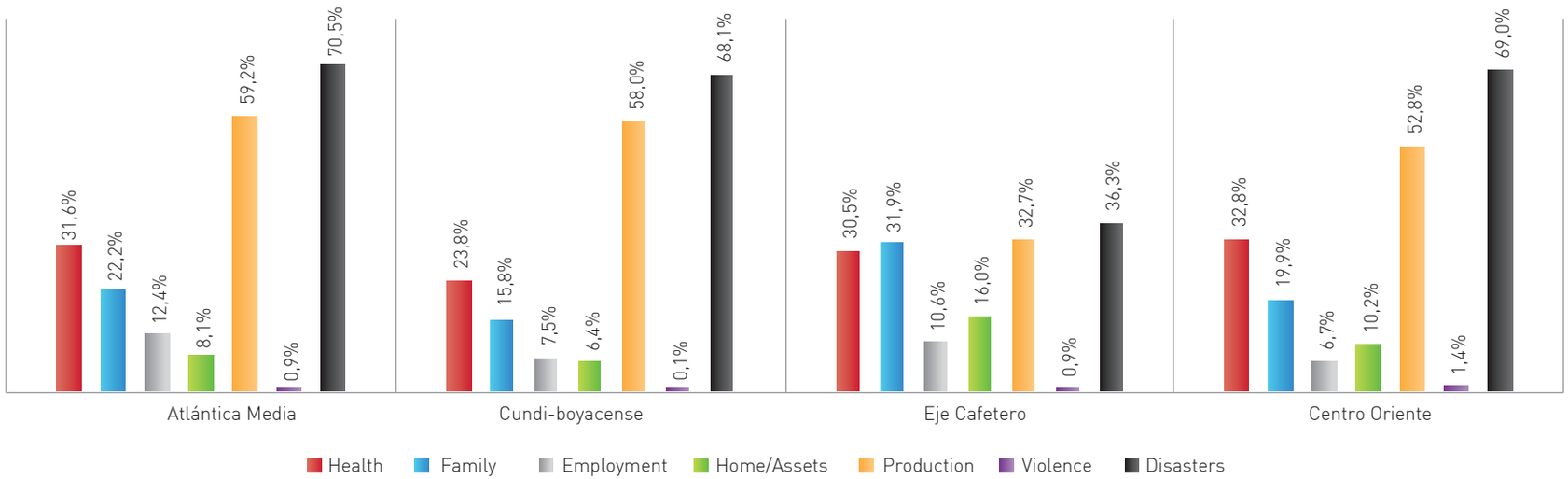
Source: ELCA 2016

those relating to employment are the ones that have the most potential to affect a household's capability to generate income. Health shocks include any shock that led to any member of the household not being able to carry out their daily activities. Within a period of three years, it is usual for one of the members of the household to not be able to work without this necessarily affecting the household's productive capacity. Family shocks -the most important component being the welcoming a family member- can be either positive or negative. Losing a job is, however, synonymous with loss of income.

In terms of the main shocks by region, it is worthwhile highlighting the distinctive nature of the Atlantic region, which was the hardest hit by the droughts. In this region, 27.2% of urban households reported to have been affected by natural disasters while in other regions this percentage was never above 12 percentage points.

Graph 4.3 is a parallel graph to 4.2, which shows the impact of shocks by rural micro-region. The message is clear: the events that most destabilize rural homes are production shocks (mainly loss of crops and animals) and natural disasters. Similar to employment in urban zones, production shocks in rural zones have the capacity to worsen households' capability to generate income. The Atlantic region is, again, the hardest hit by both production shocks and by natural disasters. In every

GRAPH 4.3.
TYPE OF SHOCK BY RURAL REGION



Source: ELCA 2016

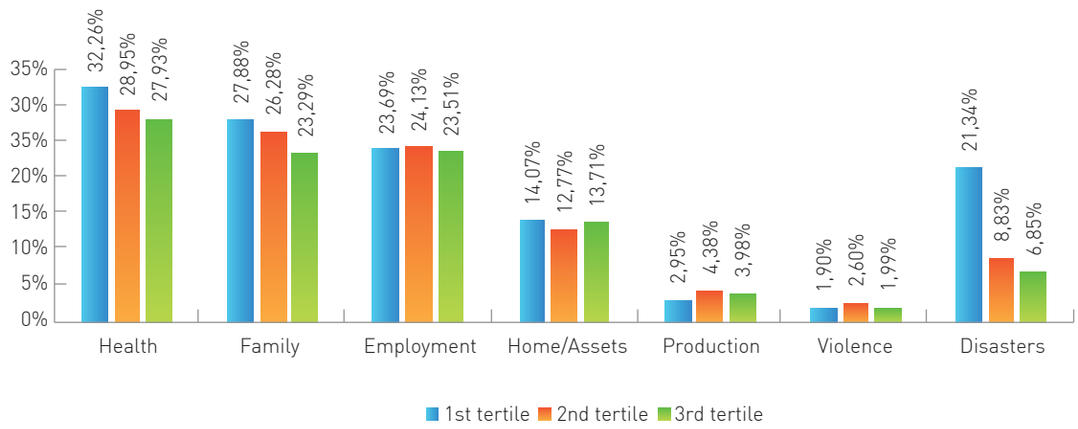
micro-region, except the Eje Cafetero, production shocks affect 53% or more of households, and the disasters affect 69% or more of households. Conversely, the Eje Cafetero region does not present the same pattern as the other micro-regions as no shock has an impact higher than 37%. The Eje Cafetero is the region that has the highest coverage of public services such as access to running water and sewage. It is also the richest micro-region of all the micro-regions that were considered. Perhaps it is not a coincidence that it behaves more like an urban zone.

4.3. A NEGATIVE SOCIO-ECONOMIC GRADIENT?

This section seeks to look at if there is a negative socio-economic gradient and the prevalence of shocks. In other words, what is the relationship between the prevalence of each one of the shocks (aggregate categories) and the 2013 household wealth tertile. The wealth tertile is calculated using principal component analysis, which uses the following elements: public services, housing materials, size of household, and assets held.

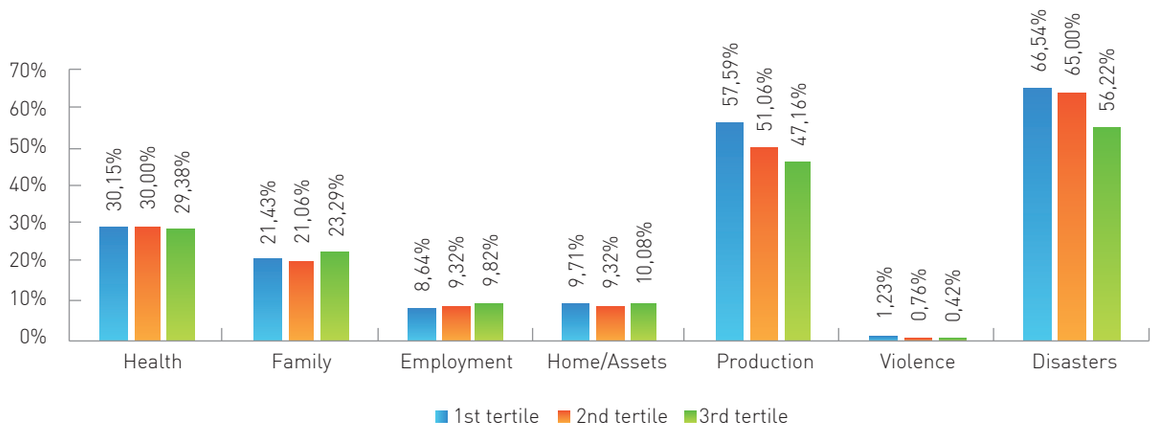
A negative socio-economic gradient happens when the impact of a shock reduces as the wealth tertile increases. Enquiring as to whether there is a negative socio-economic gradient is important as, if it is more probable that the poorest people will experience shocks, transitioning out of poverty is more difficult.

Graph 4.4.
Urban Households: Shocks between 2013-2016 and wealth tertile in 2013



Source: ELCA 2016

Graph 4.5.
Rural Households: Shocks between 2013-2016 and wealth tertile in 2013



Source: ELCA 2016

Graph 4.4 shows how the impact of our seven aggregate shocks varies according to the 2013 household wealth tertile for the urban ELCA regions. For some of the higher impacting shocks (health, family, and disasters) it is observed that as the wealth tertile increases, the probability of observing a health shock is lower. The following is observed when moving from 1st wealth tertile to 3rd wealth tertile: the probability of suffering a health shock is reduced in 4.3 percentage point, the probability of observing a shock that affects the family structure is reduced by 4.6 percentage points, and a disaster shock is drastically reduced by 14.5 percentage points. The only exception to this is employment shock, which does not vary much depending on wealth tertile.

Graph 4.5 repeats the previous exercise for rural micro-regions. The message, however, remains the same: for the higher impact shocks (production and disasters), the negative gradient according to wealth level is rather pronounced. A household in the 1st wealth tertile has a probability that is 10.4 percentage points higher of facing higher-impact shocks than a household in the 3rd wealth tertile. Analogously, a household in the 1st wealth tertile is 10.3 percentage points more likely to confront a disaster shock.

Graphs 4.4 and 4.5 show that shocks affect the poorest households the most. Within this context, it is a possibility that economic shocks -some random- can perpetuate inequality. To complete the previous analysis, the graphs that are equivalent to the previous two are presented, but only taking into a count the most important economic shocks

→ Inés María Álvarez says that she has never been able to get over the death of her only son who was murdered in mysterious circumstances. She lives on the small income she earns from the La Esperanza pool hall and store in Chinú (Córdoba).

are taken into account. As the categories of shock include various events, high economic importance is assigned to a category if at least one of its components is highly economically important.

Graph 4.6 shows the percentage of homes that report a highly important economic shock in urban regions according to the 2013 wealth tertile. To reiterate, for the main shocks (health, family, disasters, and this time also employment) the richest homes are less vulnerable to facing highly important economic shocks.

Graph 4.7 is equivalent to graph 4.6; however, it centers on ELCA's rural micro-regions. To reiterate, as the income tertile increases, the probability of reporting an economically important production shock falls by 8.6 percentage points, and the probability of reporting an economically important disaster shock falls by 8.5 percentage points.

In summary, for the most prominent shocks, the percentage of households that reported a shock or a highly important economic shock is reduced as the richness of the household increases. This

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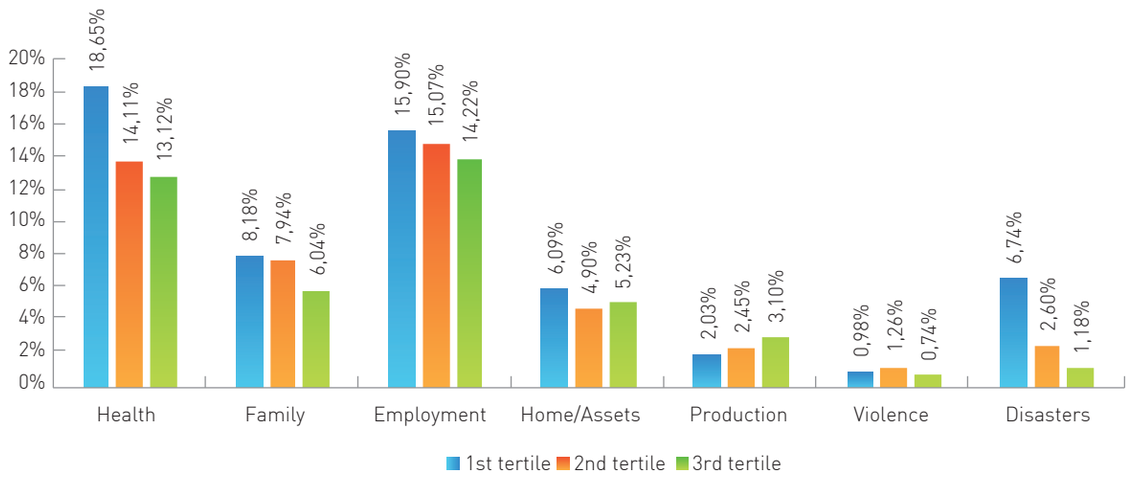
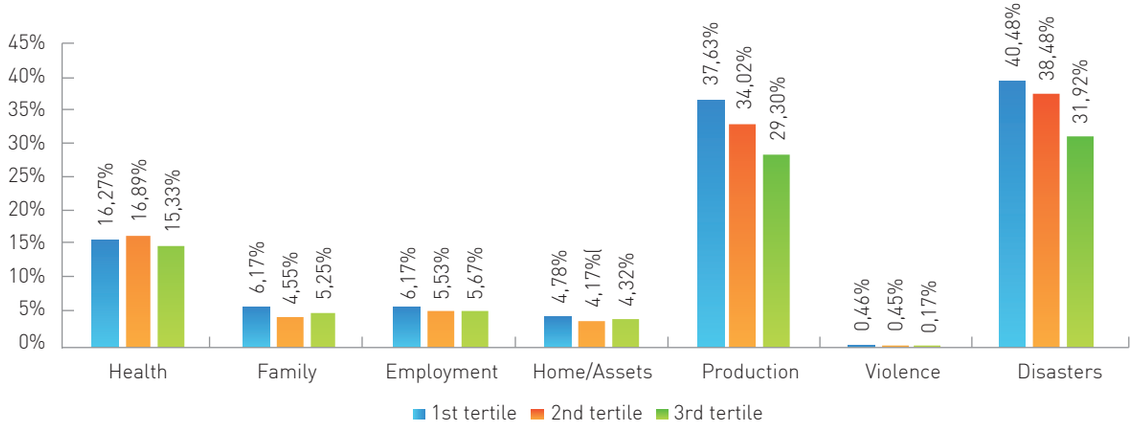
Graph 4.6.
Urban Households: Highly important economic shocks by wealth tertile



Source: ELCA 2013, 2016

Graph 4.7.
Rural Households: Highly important economic shocks by wealth tertile



Source: ELCA 2013, 2016

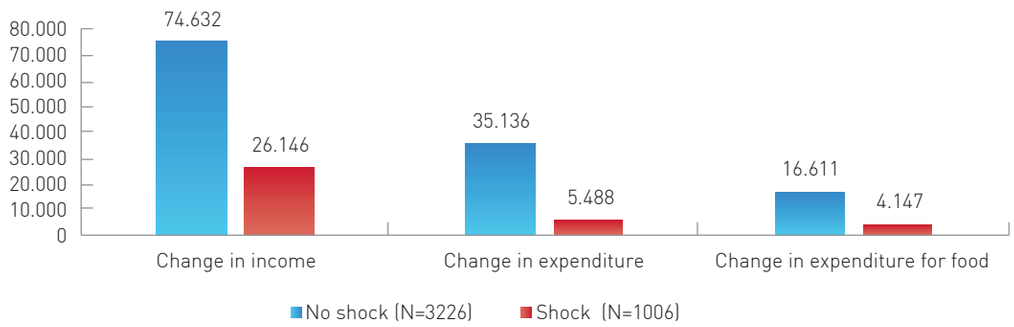
shows the existence of a negative socio-economic gradient. The following sections enquires as to the consequences of some of these shocks on the evolution of income and household consumer spending. If these shocks reduce the welfare measures, and given the results presented in this section, they can be thought of as shocks that perpetuate poverty.

4.4. Shocks to the capacity to generate income, droughts, and changes in wellbeing

The following section focuses on the shocks that have the high potential to change the household´s capacity to generate income: the employment shock in urban areas and the production shock (which mainly includes plagues, loss of crops, and death of animals) in rural areas. The drought shock is also analyzed, which is the main event in the natural disasters aggregate. By limiting the analysis to these three shocks, we can see how their occurrence affects income, consumption spending, and the household expenditure.

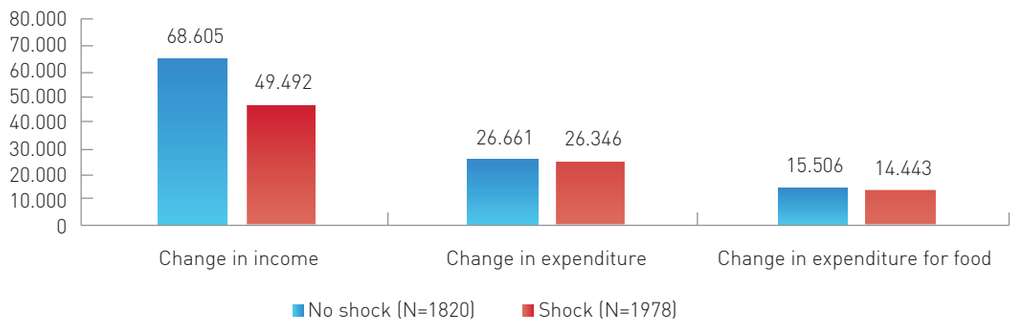
To do this, the change of income is estimated based on the direct monthly income from ELCA 2013 and 2016 household unit. Due to the construction, the sample is restricted to the 2016 households which can also be found in 2013. The change in income is calculated per capita (by household member) and in real values of 2016. In terms of expenditure, we carried out an analogous exercise using consumer spending and the expenditure on food that was directly reported in the household unit.

Graph 4.8.
Urban Areas: Employment shocks and changes in income and expenditure



Source: ELCA 2013, 2016

Graph 4.9.
Rural Areas: Employment shocks and changes in income and expenditure



Source: ELCA 2013, 2016

4.4.1. Shocks to the ability to generate income

This analysis begins by investigating how any member of the household losing their job affects the income and consumption paths of urban homes. Graph 4.8 shows how income and expenditure changes for households that have and have not suffered an employment shock.

The blue bars represent the change in the variables of interest (the change of income, the change in expenditure, and the change in the cost in food). On average, for an urban home that does not suffer an employment shock, income increases by $75.000 pesos while expenditure increases by $35.000 pesos and expenditure on food by $17.000 pesos. With a household with at least one employment shock (red bars), income increases by $26.000 pesos, expenditure by $5.500 pesos, and expenditure on food by $4.000 pesos. If the difference in outcome variables is only attributed to the shock having occurred, the employment shock, therefore, substantially reduces households' income and expenses. In other words, the change in income for the households affected by the employment shock is one third of the change in income for the non-affected houses. In turn, the change in expenditure is just one seventh and the change in expenditure on food is one quarter. The loss of employment in urban areas substantially reduces households´ welfare.

→ A fungus killed Octavio Ballesteros and his family's passion fruit crops in Buenavista (Boyacá). However, he recovered and now grows gulupa while he finds a way to combat this fungus.

Graph 4.9 undertakes the same analysis but for rural micro-regions and focuses on the production shock. There is an important contrast between the production shock and the employment shock. The production shock slows down the changes in income: the change in income for rural households that have suffered a shock is $ 20.000 pesos less than for the households that have not suffered a shock. However, unlike the employment shock, the change in expenditure and the expenditure on food is practically the same for both affected and non-affected households.

A question immediately arises as a result of graph 4.9: in rural zones, although households cannot reduce income for everything, it seems that they have mechanisms to reduce their consumption if faced with production shocks. There are diverse mechanisms: formal and informal loans, dissaving, adjustments in the labor supply, and formal or informal insurance arrangements. The question that remains is which of these mechanisms explains the apparent reduction of consumption in rural areas.

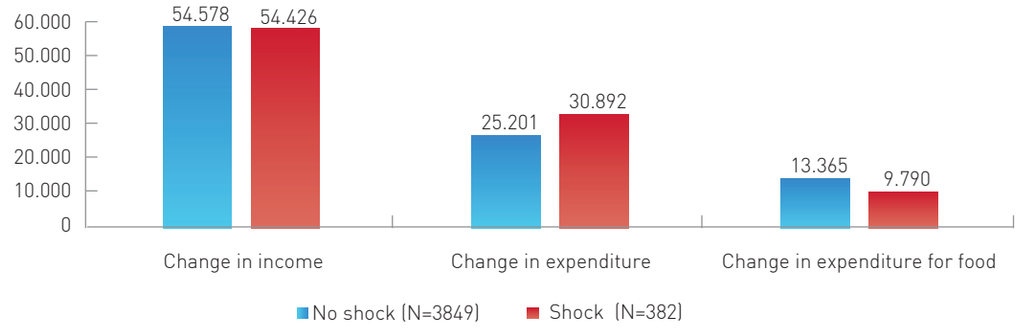
Although the events and problems module asks households about the main actions they took to deal with the problem, this information was not used as the aggregation of shocks in categories means that for each aggregate shock, there are different mitigation strategies. Perhaps more importantly, the mitigation strategies depend on the households´ own characteristics, and this exaggerates selection biases.

4.4.2. Climatic shocks

Between the two first ELCA rounds, Colombia was affected by the worst rainy season in recent history. The main events recorded in the shocks unit 2013 were landslides, floods, and mudslides. La Niña had negative causal effects on household's consumption (Brando & Santos, 2015). The climate was also volatile between 2013 and 2016, but this time the rainy season gave way to one of the worst droughts that the country has seen. In this subsection, using descriptive statistics, we attempt an approximation of the effects of wellbeing during the drought season.

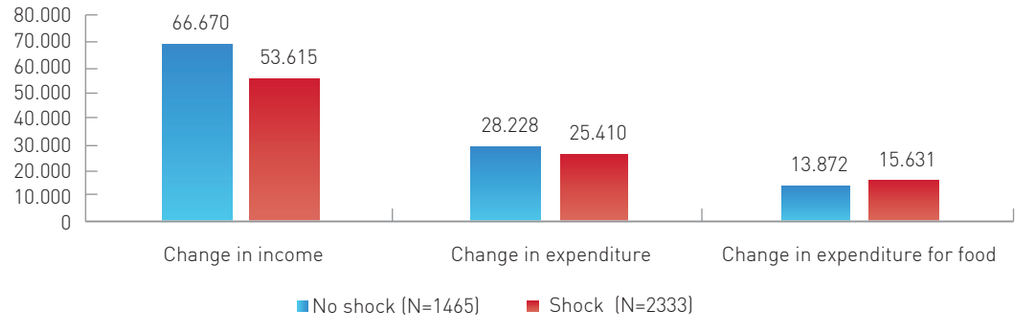
→ José Fernando Mejía has spent 33 years working in Fabricato. She has survived staffing cuts and production plant closures in which he worked for more than twenty years. Today he is recovering from shoulder surgery because of an accident he had at work. He dreams of retiring from this company.

Graph 4.10.
Urban Areas: Droughts and changes in income and expenditure



Source: ELCA 2013, 2016

Graph 4.11.
Rural Areas: Droughts and changes in income and expenditure



Source: ELCA 2013, 2016

→ Abigail Solano, who is 78 years-old, suffers from Parkinson's disease and has been bedridden for more than four years. Ever since 2013 her only request has been that "God remembers" her. Her husband Tomás Calderón died in 2015 and now her daughter Nubia Calderón looks after her.

Graph 4.10 shows the changes in income and expenditure for urban households that have and have not suffered the shock of drought. For the households that have suffered from drought, the change in income is practically the same as for the homes that have not suffered from drought. This is not surprising as droughts should not affect the capabilities of production in urban areas. Although there are differences in the change in expenditure and expenditure on food. it can be seen that these differences are not significant. However, it is important to highlight that the drop in expenditure is consistent with the effect of drought on the price of food.

As expected, given the importance of climate shocks for agricultural activity, Graph 4.11 shows that the households that reported droughts had a growth in income that was $13,055 pesos lower than the increase in the income of households that did not. Once again, there are far fewer differences in consumer spending. The households affected face a $2,818 pesos reduction in spending compared to the households that are not affected. However, spending on food increased by $1,759 pesos.

These simple statistics leave us with a perhaps unexpected message: droughts do not seem to have a large effect on rural homes' consumer spending. Investigating if this is a causal effect is the task of future research.

4.5. Conclusions

In this chapter, we have presented simple statistics that describe a part of ELCA 2016 unit on shocks. One of this chapter's principal messages is that there is a negative socio-economic gradient for the impact of shocks: poorer households are more vulnerable to shocks that can perpetuate poverty. In urban zones, employment shocks firstly affect poor households to a greater extent. Additionally, employment shocks reduce household wellbeing. As such, policies that generate employment stability have the potential to lift people out of poverty traps.

It is important to emphasize that when the consequences of some of these shocks are analyzed, more questions are left unanswered for future research than are answered in this chapter. Although employment shocks in urban zones substantially slow down the increase in consumer spending and household income, in rural zones, production shocks reduce income but have marginal effects on expenditure. What explains the non-changing of consumption with regards to productive shocks in rural zones? What mechanisms to reduce consumption do rural households use to keep their consumer spending unaltered? This question once again returned when the drought shocks were analyzed. Although the drought shock is more of a concern in rural zones, it only has moderate effects on consumption.

It is to be expected that with objective measurements -such as rainfall measurements to capture exposure to droughts and empirical strategies that allow causal results to be uncovered- we can say more about the validity of the results that are presented in this chapter. If the results sustain, we would expect that they can be explained by using cross-sectional information from the different ELCA chapters.

→ Yeira María Betancourt is twenty-five years-old and works as an auxiliary nurse in a hospital in Montería (Córdoba). When ELCA began she was studying, and now with her income she helps to support her parents Teobaldo and María Teresa.

Appendix

Table A1.
Aggregate categories for shocks

Urban Zone		Impact (% of households)
Health	Member of the family accident or illness	29.84%
Family	Death of the head of the household or spouse	1.71%
	Death of other member(s) of the household	3.52%
	Separation of spouses	7.96%
	Arrival or reception of family member in the household	16.38%
Employment	Head of household loses job	13.74%
	Spouse loses job	5.21%
	Other member loses job	7.39%
Housing/ Assets	They had to leave their regular place of residence	8.09%
	Loss of housing	0.45%
	Loss of or reduced remittances	1.83%
	Theft. fire. or destruction of household goods	6.09%
Production	Bankruptcy(ies) and/ or closure(s) of family business(es)	3.62%
Violence	They were victims of violence	2.43%
Disasters	They suffered floods. landslides. mudslides. etc.	2.39%
	They suffered tremors or earthquakes	3.42%
	They suffered droughts	9.67%

(Continue...)

Table A1.

Aggregate categories for shocks *(...Continuation).*

Rural Zone		Impact (% of households)
Health	Member of the family accident or illness	29.69%
Family	Death of the head of the household of spouse	2.27%
	Death of other member(s) of the household	3.82%
	Separation of spouses	4.30%
	Arrival or reception of family member in the household	13.79%
Employment	Head of household loses job	6.04%
	Spouse loses job	1.52%
	Other member loses job	2.83%
Housing/ Assets	They had to leave their regular place of residence	4.67%
	Loss of farm. parcel. or land	0.81%
	Loss of or reduced remittances	2.32%
	Theft. fire. or destruction of household goods	3.28%
Production	Bankruptcy(ies) and/ or closure(s) of family business(es)	1.79%
	Infestations or loss of crops	39.54%
	Loss of or death of animals	23.67%
Violence	They were victims of violence	0.83%
Disasters	They suffered floods. landslides. mudslides. etc.	3.59%
	They suffered tremors or earthquakes	3.66%
	They suffered droughts	60.51%

Source: ELCA 2016

References

Brando. J. F., & Santos, R. J. (July 16, 2015). La Niña Y Los Niños: Effects of an Unexpected Winter on Early Life Human Capital and Family Responses *Documento CEDE* No. 2015-25. Retrieved from https://ssrn.com/abstract=2631736 or http://dx.doi.org/10.2139/ssrn.2631736

Cadena. M., & Quintero, C. (2014). Vulnerabilidad a choques y mecanismos de reacción. In *Colombia en Movimientos 2010-2013*. Bogotá: Ediciones Uniandes.

→ In the Palacios Campo house in Barrancabermeja, 35 people share one bathroom: children, adults, and grandparents.

→ The Betancourt Álvarez family live in the Santa Fe neighborhood in Montería (Córdoba). They live from the help of their oldest children and from Teobaldo Betancourt's work as a guard or printer. His son Jhefferson, who is fourteen years-old, is in the photo.