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Chapter

Persistence of Chronic Childhood Undernutrition in Ecuador during a Period of Economic Growth: Exploring the Contributing Factors to This Paradox

Margarita Manosalvas

Abstract

Between 2004 and 2014 the rate of reduction of chronic childhood undernutrition (CCU) prevalence in Ecuador was about 0.2% per year, while since 1999 it was reduced to an average higher than 0.83% per year. In the same period, Ecuador experienced an economic growth of more than 4% of GDP per year on average. Commonly, child undernutrition has been assumed as the effect of a combination of a set of factors related to deprivation situations. Therefore, we are facing a paradox. The objective of this investigation is to explore this paradox. To accomplish this aim, a mixed research strategy is presented: the children’s undernutrition key indicators are compared using the Surveys of Living Conditions (SLC) for the years 1999, 2006, and 2014. Changes and continuities in the relevant indicators are identified, in the next phase; the analysis of those indicators is deepened with qualitative research. Results are integrated and a plausible explanation is constructed.

Keywords: chronic childhood undernutrition, eating habits, economic growth

1. Introduction

Between 2004 and 2014, chronic childhood undernutrition (CCU) in Ecuador decreased at a rate of two-tenths per year, while since 1999 it has been reducing to an average of more than eight-tenths per year. Since 2006, not only is it evident that the reduction of the CCU slowed down but also this is a period in which the Gross Domestic Product (GDP) of the country grew to more than 4% on an annual average. It was also a period in which the National Government increased its investment in programs aimed at reducing this public health problem. If we assume that childhood undernutrition is the result of a set of physical, social, and environmental factors associated with situations of deprivation, then we are facing a paradox. The objective of this research is to identify the factors behind this paradox. Why is chronic child undernutrition reduced at a slower rate in a period of economic growth? For this,
a mixed research strategy is proposed: the key indicators are compared using the Surveys of Living Conditions (SLC) for the years 1999, 2006, and 2014. Changes and continuities are identified in the relevant variables of the CCU, then, these relevant variables are explored in greater depth with qualitative research techniques. Results are integrated and a plausible explanation is constructed. The results of this research provide elements for a better understanding of the persistence of the CCU in Ecuador.

The document includes five sections: the first presents the CCU as a public problem and its indicators in the global and regional context. The second briefly presents the theoretical framework of the studies on undernutrition and the theoretical propositions on which this study is based to analyze the slowdown in the decrease of the CCU. The third part explains the mixed method followed as a research strategy for this analysis. In the fourth the results are exposed and, finally, in the fifth section, the discussion of the main findings is presented.

2. Chronic childhood undernutrition (CCU) as a public problem

According to the Global Nutrition Report, in 2015 there were 164 million stunted children in the world, this is the most commonly used indicator to determine the incidence of chronic childhood undernutrition (CCU). It is considered that 45% of all deaths of children under five are related to some type of undernutrition ([1], pp. 4).

Undernutrition in the first 1000 days from conception, entails a “waste of human potential” [2]. In these crucial days, the body is forming rapidly fundamental components for brain development and the future growth of each person. Damage caused by undernutrition in this first stage of life tends to be irreversible. Studies show that school performance of malnourished children is less than its potential under normal conditions; undernutrition leads to a lower physical and cognitive capacity in adult life. Boys and girls who suffered undernutrition in childhood are more likely to be overweight and develop chronic cardiovascular diseases, diabetes and cancer, and even mental health problems. When the girls who suffer from undernutrition are mothers probably their children will also suffer from it [2–5].

There are several types of undernutrition: underweight (low weight for age) or acute malnutrition (low weight for height), reflects changes in the short term as a result of recent disease or insufficiencies; the CCU (low height-for-age) reflects a situation of deprivation of long term that is not determined genetically but which can be transmitted intergenerationally. A longitudinal study of the Multicentre Growth Reference Study Group, which included boys and girls of various ethnic groups in various countries, has shown children’s same growth potential regardless of their ethnicity [7].

The way to measure the prevalence of CCU is through “anthropometry.” Using protocols and surveys, the height of children under 5 years of age in a population group is measured; the value of the size is called “Z score”; through the analysis of variance, the Z scores are compared with respect to the international standard reference named “growth curves.” Two standard deviations from the reference value are used as the cutoff point. The values that are below this limit indicate that the child is undernourished. The first reference curve for growth was established by the National Center for Health Statistics of the United States (NCHS) in 1978, from then countries have used this parameter to define the prevalence of chronic child undernutrition,

1 See Ref. [6].
understood as “low height for age.” In 2006, WHO updated the referential growth curve by establishing new parameters for measurement\(^2\) ([6], pp. 942–943). Although there are still countries using the NCHS curves of 1978. The data presented below are calculated according to the WHO standard of 2006.

According to UNICEF, the prevalence of undernutrition in the world went from close to 40% in 1990 to 23.2% in 2015, as shown in the following graph (Figure 1).

This represents an average annual reduction of 0.66% points. The regions that stand above the world average prevalence of chronic child undernutrition are South Asia, reaching a prevalence of 37%, and Sub-Saharan Africa with a prevalence of 35% ([2], p. 181). More than three-quarters of children with chronic child undernutrition worldwide are located in these two regions. The regions that are further away from the world average are Latin America and the Caribbean with 11%, and North America with 2% (Figure 2) [8].

The chronic child undernutrition rate in Latin America and the Caribbean shows a sustained reduction over time. In 1990 the prevalence was around 25% and for the

\(^2\) In April 2006, the World Health Organization (WHO) published new standards to assess the growth and development of children from birth to 5 years of age. These standards are based on primary data collected through the Multicentre Growth Reference Study (MGRS). The MGRS was a population study conducted between 1997 and 2003 in Brazil, Ghana, India, Norway, Oman, and the USA. The study combined a longitudinal follow-up from birth to 24 months with a cross-sectional component of children aged 18–71 months. The WHO Child Growth Standards (WHO Standards) adopt a fundamentally prescriptive approach designed to describe how children up to age 5 should grow regardless of their genetic inheritance and where they are born.
year 2015 it was reduced to 11.3%, with this, the prevalence of the region is less than half of the world average (Figure 3).

However, this continues to be a public problem in several countries, as there are still around 6 million children under 5 years of age with stunted growth. This indicator would be a reflection of social inequalities in the most unequal region of the planet ([9], p. 5).

Taking into account the heterogeneity of the region, the prevalence by sub-regions was analyzed. Central America has a higher prevalence, reaching about 16%, although its rate of variation on average is higher during the period analyzed, it is
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Caribbean Central America South America Latin America and the Caribbean

<table>
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<td>11.80</td>
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<td>10.10</td>
<td>0.34</td>
<td>11.30</td>
<td>0.42</td>
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Source: [11].

Table 1. Chronic malnutrition rate by subregion in Latin America and the Caribbean [10].
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<th>GDP per cápita</th>
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<tr>
<td>Irán 4.862</td>
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Table 2.
Latest available CCU prevalence for all countries with GDP per capita is similar to Ecuador.
followed by South America with 10%, and the Caribbean with 5.2%, as can be seen in the following table (Table 1).

In turn, within the subregions, there is heterogeneity in the prevalence of chronic child undernutrition between countries. On one hand, there are countries such as Chile (2%) and Costa Rica (6%) with low prevalence, where undernutrition is not pondered as a public problem, and other countries such as Guatemala (49%) and Ecuador (24%) where the prevalence is more than twice that of the region ([12], p. 111; [1], pp. 126–130; [13], p. 15).

By 2015, Ecuador showed a CCU prevalence far from those countries with a similar GDP per capita (Table 2).

Although the prevalence of 24% places Ecuador on a similar trajectory to that followed by the indicator worldwide, the phenomenon that motivates this research is that the speed at which the CCU had been reducing until 2004 has slowed down precisely in a period of economic growth.

3. Review of the literature and theoretical framework of the research

The literature on undernutrition, especially that oriented to policy recommendations, usually follows an explanatory scheme of infant undernutrition that identifies three levels in the analysis of the causality of the CCU: immediate causes in the child’s organism (or micro), underlying causes at the household level (or meso) and basic causes at the socio-economic (or macro) level (Figure 4).

Since the mid-twentieth century, studies on child undernutrition have identified it as a cause and, at the same time, as an effect of poverty: that is, while its immediate manifestations are caused by deprivations associated with poverty, the effects of the undernutrition in the long term seem to perpetuate a condition of poverty. Now, following a chronological order at the individual level, it is accepted that the CCU is a result of poverty or of the conditions of deprivation in the household in which the first

![Figure 4. The causal theoretical model of undernutrition. Source: adapted from UNICEF [16, 17] and from [18].](image-url)
years of life are developed. It follows that economic growth and its distribution in the segments with the lowest incomes have the potential to reduce the incidence of CCU. There is abundant evidence on the relationship between nutritional outcomes and income [2, 9, 14, 15]. “It has also been observed that the countries with the greatest reductions in poverty and/or indigence rates have shown the greatest reductions in the CCU rate,” whether or not they have programs aimed at improving the growth of boys and girls [14]. According to Headey and others [15] a key factor to explain the sustained nutritional change is the “general economic progress,” because it allows more funds to be allocated for food consumption, health, and other items relevant to the nutritional status of the members of the family, especially those younger. However, there are also cases in countries where, even with low economic growth, they have been able to reduce the CCU. Bangladesh is one of these cases, according to the study by Headey and others, the factors that influenced this result were related to the expansion of the economic sectors in which the less favored classes participate (agriculture and manufacturing), they also identified as an effective factor (which had an effect on the problem) the rapid expansion of education since the 1990s, when a policy of subsidies to secondary education was initiated, especially education for women, in fact for 2011 the Demographic and Health Survey (DHS, 2016) found that among mothers and fathers under 25 years of age, mothers had on average one year more education than fathers ([11] in [15]). The authors also considered the development of sanitation infrastructure within their explanatory model. The proportion of villages without sanitation services has decreased from 25.2% in 1997 to 4.8% in 2011. However, improvements in sanitation in Bangladesh have been implemented from a CLTS (Community-led Total Sanitation) approach. It focuses on the change of behavior and not only on large investments in infrastructure. Behavior change, through education, takes more time and requires sustained policies in the long term, this means policies that continue beyond the agendas of governments in office. If these are factors that explain the reduction of the CCU in contexts of low growth or zero growth, then what would be the factors that explain the slowing in the reduction CCU in a context of growth?

While, there has been an inverse correlation between the prevalence of the CCU and economic growth, that is, greater economic growth lower prevalence of the CCU, this correlation is neither clear nor automatic. In this regard FAO has concluded that:

> There are several key elements in the process that link economic growth, [...] and GDP per capita, with the reduction of undernourishment and undernutrition. First, economic growth must extend to people with a high level of poverty. To reduce poverty and hunger, growth must generate demand for goods controlled by the poor. Second, poor households must use part of the increase in their income to improve their intake of food energy, and other nutrients, as well as to make private investments in health, sanitation facilities, and education. The participation of women is essential to carry out these spending models. Third, a large part of the additional public revenues generated by economic growth should be used to make public sector investments in social protection systems or safety, nutrition, health, and education networks in order to increase the human capital of the poor [...] invest in public goods and services that promote growth in the sectors where the poor work, such as the agriculture sector [...] To ensure the effectiveness and sustainability of these three key elements, good governance at the national level is also fundamental ([11], p. 21).

A hypothesis derived from this conclusion would be then: economic growth does not translate into improvements in the nutritional status of the child population if
such growth does not generate demand for goods controlled by the poor, in other words, when growth does not generate income opportunities for families with less resources. The slowing of the indicator of the CCU could also be related to the practices and habits of consumption of the households, by not allocating the increase in their income to improve the quality of their diet, their state of health, or their sanitary conditions. The persistence of the CCU in growth contexts could also be a result of the lack of investment by governments in social protection systems, in direct measures on nutrition, health, and education of the population.

Thus, understanding why the rate of reduction of the CCU is dormant in a period of economic growth, is a complex task, on the one hand, the explanatory factors could be associated with changes in the variables of the causal model (Figure 4) or could be associated to specific conditions of the growth context (derived hypothesis). The factors with the greatest explanatory potential would be those that (i) being part of the causal model of the CCU, (ii) show significant variations in the period analyzed with respect to the previous one and that in turn (iii) are part of the derived hypothesis.

3.1 The causes of CCU in studies on undernutrition in Ecuador

The first national study on the nutritional status of the Ecuadorian population dates from 1959. This determined three central problems: protein-energy undernutrition, that is, the population did not consume the proteins and calories considered necessary for adequate nutrition, endemic goiter, and anemia. Subsequent studies, of lesser scope, focused on determining the prevalence of chronic, acute undernutrition and anemia, in different population groups. In 1988 the Diagnosis of the Nutritional Food Situation of the Ecuadorian Population (DANS) was published. This study had a national scope and constituted a starting point for contemporary analyzes on undernutrition in Ecuador.

The DANS identified the areas of greatest territorial concentration of the CCU and included three types of variables as part of the explanatory model of nutritional status: the social insertion of the head of household (income, occupation, schooling), the degree of risk of housing (overcrowding, water supply, sanitation, floor material and location of the kitchen, garbage collection), and data on childhood morbidity acute undernutrition (diarrheal, respiratory, measles and vaccines).

According to the measurement of this study, 49.4% of children under the age of 5 in the country (623,241 children) suffered from chronic undernutrition; 37.5% suffered from global undernutrition, low weight-for-age, or under-weight (473,108 children) and 4% had low weight-for-height or wasting (50,465 children). It was found that the problem was greater in the Andean rural areas, in this region the CCU affected the children immediately after birth (30% in children from 0 to 6) and it increased to more than double among the 48 and 60 months involving an incidence of undernutrition “from the mother’s womb.” Likewise, when analyzing the prevalence of CCU in relation to “social insertion,” it is noted that “nutritional problems affect socially and economically depressed population groups that do not have access to an income that allows them to satisfy their basic needs,” among these, the purchase of food, the availability of basic services and adequate housing conditions. Hence, the study concludes that “the food and nutritional problem is only one of the characteristics of the condition of poverty” ([19], p. 13). Since then, the phenomenon of undernutrition has been identified in rural areas and with populations categorized as poor.

The DANS also concluded that “the housing risk indicator” has a “highly significant” relationship with undernutrition as well as the level of education of the mother, implying that “an improvement in the level of education of the mother would
significantly influence the nutritional status of the child.” The study mentions that the reduction of chronic undernutrition “requires long and medium-term interventions ... that permanently and substantially modify the living conditions” of the population, as demonstrated by the experience of other countries [19].

Regarding the consumption of food, the study showed that on average and nationally, the children of that time consumed 15.5 g of protein of animal origin, which added to vegetable proteins (15.0 g), indicating protein sufficiency. However, a protein-energy deficiency was observed in the scattered areas of the Sierra and the Coast, in contrast to the urban areas where a caloric deficiency accompanied by a protein surplus appears.

From 1987 until 2004, the Center for Population and Social Development Studies (Cepar) carried out the Demographic and Maternal and Child Health Survey (Endemain). The Endemain of 2004 was a study with national, urban, and rural representation, by regions and provinces, this study found that, at the national level, 23.2% of children under 5 years of age suffered from chronic undernutrition, and within this group, 5.9% had “severe chronic undernutrition” that is, they presented an even greater delay in growth. In the rural area, undernutrition was 30.7%. The indicator in the Sierra (32%), was almost 10 points more than in the Amazon (22.7%) and double that in the coast (15.7%). The Endemain analyzed the distribution of the incidence of the CCU by cities and found that in Quito it was higher (30.2%) than in any other urban area of the Sierra (19.3%). In Tungurahua, Bolívar, Cañar, and Chimborazo, more than 40% of children under the age of five had chronic undernutrition. The CCU increased its incidence from 12 months of age and was higher in children with low weight and short stature at birth, children whose birth had occurred up to 47 months after the previous delivery had a prevalence of 28%, and as the order increased from birth the probability of suffering from CCU increased, for example in the group of firstborn children, the prevalence was 19% while in those who were born seventh or more the prevalence was 41%.

This survey incorporated a component that collected perceptions about food security. It was determined that 16% of the households interviewed stated that they had difficulties feeding their members, in a greater percentage of rural households, among these, the coastal region households expressed greater insufficiency than those in the Andes. It was also found that 28% of households had difficulty paying food expenses, in rural households this problem is exacerbated. The strategy to solve the difficulties of access to food is to lend products from the neighborhood stores (66%), this custom is widespread in all regions especially in the Amazon (81%) and in rural households (71%). Another measure is to stop buying some products (64%) and borrow money from family and friends (62%) (these categories are not exclusive). In view of the difficulties of access, 40% of the households surveyed would have resorted to both credit in stores and to suppress the variety of products they consumed. The Endemain 2004, presented descriptive statistical information, of quantitative and categorical variables on the CCU, but does not elaborate on causal models with this information.

Later, in 2007, the World Bank commissioned the elaboration of a profile of the CCU of Ecuador. This study states that in 1986 (using the DANS data and the new [7] tables) the prevalence of CCU was 34%; using the data from the Survey of Living Conditions (SLC) of 1998, a prevalence of 26.4% was calculated, and; using data from the Endemain 2004 [20], a 23.1% prevalence rate was calculated for that year; with these data it was calculated that an annual reduction of six tenths (0.6) had occurred from 1986 to 2004.

[3] These prevalences are calculated with the 1970 reference curves, while the prevalences of the table drawn up by Fernando Carrasco are calculated, using the same database but based on the WHO 2006 curves.
That study uses a method of multivariate regression analysis, that is, to establish the contribution of different factors (independent variables = following the theoretical causal model) to the CCU indicator (Z score or standard deviation from normal value of height-for-age). This model focused on risk factors or more significant factors at the household level: the size of the home, the number of women over 14 years in the home, age, stature, and the expectation of the mother regarding the stature of their children. It was identified as determinant condition of the resources available for the household (measured by per capita and assets), although it is said that this is the “long road” to change and that “other more direct strategies are required to improve nutritional conditions” ([21], p. 30). At the community level (the macro-level factors), it was determined that children in rural areas and in areas of higher altitude, have lower probabilities of growing than those in urban areas and low-lying areas. And that “likely that investment in improving rural sanitation provides positive benefits in nutritional status” ([21], p. 31).

To avoid problems of endogeneity, the model did not include variables related to the behaviors that affect nutritional outcomes. But in additional analysis, they found that breastfeeding, pre and postnatal care, attention during childbirth, and birth control, all impact the nutritional outcomes of children.

When analyzing the data on food consumption, the study concluded that the CCU is related to “the lack of capacity to buy food” and that the main difference in food consumption between households with children with low height for age and children with adequate height is the “percentage of participation of meat in total consumption,” which in the second group is higher ([21], pp. 50–64).

In summary, since 1986, several studies have provided increasingly refined explanations about the causes of CCU. Among the immediate or individual-level factors causally related to CCU are low weight at birth, presence of diseases, and birth order. Among the underlying causes are age, height and education of the mother, the mother’s expectation regarding the height of her child, breastfeeding practices, the socioeconomic status of the household, the size of the household, the number of children under 5 years of age and women over 14 in the home, the conditions and building materials of the house, per capita food consumption, diet composition, access to health services, access to safe drinking water, and availability of sewage. Among the basic factors are economic inequality, segregation by area, isolation by altitude, ethnic discrimination, poverty, relative prices, and economic shocks ([21], p. 16; [21], pp. 27–39; [22], pp. 217–22; [23], pp. 1–10; [24], p. 361; [25], pp. 3–6).

Finally, in contrast to these studies, this research does not seek to explain the causes of the CCU but is focused on exploring the factors contributing to the slowdown of the CCU prevalence reduction in Ecuador during a period of economic growth. The methodology followed is explained below.

4. Method, data collection and analysis

A mixed, explanatory and sequential method was designed in four phases (Figure 5). Since the objective of this research was to explain the slowdown in the reduction of chronic child undernutrition in the period 2004–2014, indicators were identified for the factors that, according to the multilevel causal model and the studies carried out in the country on the CCU, appear more related to the prevalence in 2004. These values are compared with the same indicators for 2014 to identify changes and continuities. However, since some of these variables have effects in the medium and long term, it was
necessary to move the analysis back to the previous period for which there is available data on the same indicators. In this case, the Life Conditions Surveys of 1998, 2006, and 2014 were used. Descriptive statistics analysis was carried out for the comparison of indicators, no predictive models or regressions were elaborated since the explanation lies in the observation of variations in the relevant indicators from one period to another. Once the factors that experienced the greatest changes between 2004 and 2014 were identified. In base, to these changes, some hypotheses were constructed. These hypotheses were explored by qualitative inquiry techniques. The qualitative component provided more specific information about the variables identified as relevant in the model and about new variables with explanatory potential. The data were analyzed and interpreted and thus the hypothesis that constitutes the main conclusion of this study was constructed.

A mixed-method was chosen because, often, quantitative causal studies identify the variables that are significantly (positively or negatively) related to the occurrence of a phenomenon but do not offer an explanation of how they occur. These cause-effect relationships in a given context do not allow identifying other factors than those included in the model. Qualitative research helped to obtain a more comprehensive view of the phenomenon by illustrating how certain conditions (macro, meso, and micro) are combined to obtain a result, as well as adding emerging factors observed during the investigation and not included in the theoretical model. The combination (or triangulation) of methods and techniques is considered a necessary research strategy for the field of social sciences, because on the one hand, it allows the study to be provided with a more complete, deep, and broad contextual sense, thus increasing its internal validity. At the same time, the twofold sources of data allow to build conditions for generalization and therefore to extend its external validity ([27], pp. 538–539).

5. Results

In Ecuador, there are measurements of the prevalence of CCU from the 1986 DANS Survey, and the last one can be obtained from the 2014 ECV. Due to the change in the standards of the growth curves, the update of prevalence figures prior to 2006
has generated certain confusion and a lack of continuity in the analysis of trends. Since serial measurements are not available from the same source, to make the figures comparable, it is necessary to make sure that all the data are calculated based on the same parameter and follow the same calculation methodology. In order to have comparable historical indicators of prevalence, for this research, data from different sources were recalculated in different years, using the [7] standard as the only reference parameter, as can be seen in the following table (Table 3).

It can be seen that for the period 1986–2014, the CCU has been reduced by 17.1 points, that is, on average, 6 tenths (0.61) per year. However, the trend of this reduction over the years has not been uniform, as shown in the following figure (Figure 6).

The slope of the curve clearly shows two periods: the first between 1986 and 2004 in which the rate of reduction was close to 0.83 per year, if this trend had been maintained, the CCU in 2014 would have presented a prevalence of 17.8%. But as of 2004, a point of inflection is observed in which the CCU is reduced by an average of only 2 tenths per year, that is, 2.1 points in 10 years.

Curiously, these years (2004–2014) correspond to a period of economic growth for Ecuador. As of 2004, the country went through a period of economic recovery, going from a GDP of about 36.5 billion to one of 100 billion dollars in 2014, with a GDP per capita of USD 6273 [34], this classifies it as a medium–high income country according to the parameters used by the World Bank. The annual growth rate has been 4.8% on average during that decade. For years with a GDP of less than 3000 USD, the reduction in the CCU is more prominent than for years in the GDP per capita is higher, in later years the reduction of the CCU becomes almost imperceptible.

Anchored to this growth, public sector spending and investment increased considerably, from 21% in 2006 to almost 35% of GDP in 2014 [35]. Recall that in the derived hypothesis, a necessary condition for growth to translate into improvements in the nutritional status of the population is for the State to invest “in social protection systems or safety, nutrition, health, and education networks in order to increase the human capital of the poor.” “During the analyzed period, more than 50% of the total social spending was allocated to the education sector” (around 5% of GDP); to the health sector was allocated the 25%, and the rest in social protection programs [28, 29, 35].

In his analysis of social spending in Ecuador for the period 2006–2012, Naranjo has noticed that although there were adjustments in the parameters of operation of

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<td>0</td>
<td>0.26</td>
<td></td>
</tr>
</tbody>
</table>

Table 3.
social policies as an increase in the amounts of benefits, in the coverage of care, and improvement in the infrastructures and equipment of social services, there was still no evidence of “structural changes” in social programs. Certainly, a large amount of resources was allocated to investments related to social policy, however, Naranjo questions whether these resources come from non-permanent sources of public income, therefore future financing and the sustainability of the changes were unclear ([36], pp. 77–78).

In the derived hypothesis, it is stated that for economic growth to favor adequate access to food both in quantity (food energy) and in quality (diversity, nutrient content, and safety); this growth would have to include the poor, that is, generate employment and demand for the goods produced by the poor.

In a study conducted in 2011, Ponce found that the growth experienced since 2001 would have been a “pro-poor growth,” meaning that “the growth levels of the poorest deciles (were) greater than the growth levels of the richest deciles”, unlike the type of growth that was observed for the decade of the 1990s-concentrated in the segments with the highest income [37].

Indeed, between 2004 and 2014, the indicator of poverty by income showed a reduction of fifteen points, going from 44.6 to 22.5%. Since the beginning of the new century, while the per capita GDP and poverty growth indicators show an inverse relationship with similar slopes, the prevalence of CCU remains almost constant (Figure 7).

A study by the National Institute for Statistics and Census [39] ensured that, from 2006, the main factor behind the reduction of poverty by consumption was the increase in the income of the quintiles with fewer resources, by way of labor income, as can be seen below (Table 4).

Regarding socioeconomic mobility, the study indicates that, despite the fact that there is a high level of persistence, of 100% of the poor in 2006, 41% moved towards vulnerability or middle class. Specifically, 26% of people who were categorized as poor in 2006, became “vulnerable” in 2014 and 15% came to be considered “middle
Of 100% of the population recognized as “vulnerable” in 2006, 27% became middle class. During this period, poverty reduction has been explained, in part (43%), by the real growth of household consumption ([39], p. 21). This growth in turn would be explained by greater access to employment, which for the lowest income quintiles in this period shifted “towards jobs in the sectors of greater value in

---

4 Although it was also found that from 100% of vulnerable people in 2006, 7% became poor in 2014, and of the 100% of the middle-class population, 7% became poor and 12% became poor vulnerable “(INEC, 2016, p. 30).
the economy, particularly trade and construction in urban areas, and agro-export in rural areas” [40].

Although productive activity grew in general, the services sector had the highest growth: 55.4% of GDP. The sectors in which the population with fewer resources works, grew in a smaller proportion: agriculture grew by 6.5% and manufacturing by 11% [41]. Agriculture was the least dynamic sector of the economy during this period between 2007 and 2014, 253,281 jobs were lost. The crops destined for export (banana, coffee, cocoa and flowers, aquaculture and shrimp fishing and forestry) were the ones that contributed most to the growth of the sector. Peasant family agriculture was not a priority in the public policies of this period ([42], pp. 25–26).

It would seem that the situation of people categorized as poor changed during the period of analysis when increasing their income, this allowed them to move towards the higher segments. These changes leave doubts about the type of participation of the poor in growth because although the social policies oriented to these segments improved their infrastructure and coverage (e.g., monetary transfers, public health services and education, etc.) there is no evidence of significant growth in the sectors of the economy in which the less favored sectors participate.

When analyzing the effects of the social policies of the so-called “post-neoliberal” governments in Latin America, Perez-Sainz (2018) found that, in general, these advanced in redistributive terms, by increasing the benefits financed by taxes, generating a package of basic social rights, but less progress was made in generating sufficient formal employment for the poorest and in opening opportunities for the accumulation of small owners, that is, there were no significant advances in the distributive sphere of the means of production ([43], p. 69). According to official figures, 57% of the reduction in poverty during this period would be explained by the “redistribution effect” ([39], p. 21).

6. Comparison of relevant variables

The relevant variables were identified according to the causal theoretical model and the previous studies on the CCU in Ecuador. The behavior of these variables was compared between the group of children with a low height for age and the group of children with the expected height for age. Due to the information available, not all the variables could be operationalized in indicators for the different periods. After overcoming several difficulties to homogenize the information and make it comparative, the following variables were selected (Table 5).

7. Data analysis

For the next group of variables, it was possible to make comparisons between the group of children with CCU and children without CCU and within each group.

---

5 Hunger and malnutrition have usually been explained as problems of food availability (food stocks according to global production and market dynamics) and/or access. The access can be physical or economic. Physical access is associated with availability while economic access depends on the purchasing power of the household and the level of food prices that could depend, in turn, on physical access (Thomson and Metz, 1998). A household’s ability to spend on food is often considered a good indicator of home access (Babu and Sanyal, 2009, p. 9).
Surveys of Living Conditions (SLC) were the source for those three years 1999, 2006, and 2014, which include measures of childhood stunting (Table 6).

By comparing these data it is possible to conclude the following:

For the group with CCU, the frequency of children with low birth weight increases by 0.9 points for the year 2014 in relation to the previous periods, for the group without CCU this indicator worsens by 2.1 percentage points between 1999 and 2006. It would seem that the presence of this factor has worsened for the group without CCU during the period analyzed.

The presence of diseases such as diarrhea and influenza decreases significantly between 2006 and 2014, both for the CCU group and for the other group, so this individual or micro-level factor could not be identified as a causal variable associated with the slowdown in the decrease of the CCU. The same could be said of the frequency with which children attend routine health checkups, as an indicator of access to health services, this indicator improves a lot for the period between 1999 and 2006, especially for the group with CCU. Therefore, it could not be identified as a causal variable associated with the slowdown in the reduction of the CCU.

With respect to the persons in charge of caring for children, the frequency between the options remains stable in the three moments analyzed and in the two observation groups, except for the last option in which, the group with CCU increases the frequency with which children attend a children's center, while for 1999 only 3.2% of children with IND went to a childcare center, for 2006 this frequency rises to 8.1% and remains stable until 2014 (7.8%).

The way in which the homes of children with CCU are supplied with water seems to have improved substantially between 2006 and 2014, since 67.2% receive water from the public network, almost 20 points more than in 1999 (Table 7).

Table 6.
Definition of variables and indicators.
In general, housing conditions that, since the first studies on the CCU in Ecuador were identified as a causal variable, seem to have improved especially for the population group categorized as poor, the improvement is greater in terms of the supply of water from the public network and to adequate sanitation.

With regard to the poverty-for-consumption variable, it can be seen that for the year 1999, only 21% of the children identified as stunted were within the group identified as “not poor.” In 2006, this indicator rose to 32.7% and by 2014 almost half of the children with CCU (46%) belonged to families categorized as “not poor” (Table 8).

These data lead us to think that the CCU has stopped becoming a problem of economic access to food, a problem that has been distinctive in social groups having...
Persistence of Chronic Childhood Undernutrition in Ecuador during a Period of Economic...

DOI: http://dx.doi.org/10.5772/intechopen.104896

8. Territorial distribution of the CCU

In order to advance in the definition of specific territories for qualitative research, the distribution of prevalence’s by provinces was analyzed, since this is the level at which the SLC allows the data to be disaggregated. The results were compared and the territories in which the CCU has decreased above and below the national average for the three periods analyzed were identified. These territories were chosen as case studies (Table 9).

It is observed that the provinces in which there was a greater reduction of the CCU, between 2006 and 2014, were the provinces identified as critical, for their high prevalence, Cotopaxi and Chimborazo for example, although they still have high prevalence, they decreased 10 and 8 points respectively, Imbabura decreased almost 11 points, in all three cases the biggest change occurred in the rural sector. On the other hand, Carchi, Esmeraldas, and Pichincha raise their prevalence between 5 and 2 points, but when looking at the indicator disaggregated by area of residence, it is observed that in Carchi the prevalence increases 9 points in the urban area while in the rural area it remains constant. On the contrary, in Pichincha, the prevalence increases by 10 points in the rural area and more than two points in the urban area.

Table 7.

<table>
<thead>
<tr>
<th>Year</th>
<th>Children population &lt; 5 years</th>
<th>Chronic child undernutrition prevalence</th>
<th>Total</th>
<th>Poor</th>
<th>%</th>
<th>Nonpoor</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>1999</td>
<td>1280860</td>
<td>32.20%</td>
<td>412436</td>
<td>325825</td>
<td>79%</td>
<td>86611</td>
<td>21%</td>
</tr>
<tr>
<td>2006</td>
<td>1406536</td>
<td>26.10%</td>
<td>367106</td>
<td>245961</td>
<td>67%</td>
<td>121145</td>
<td>33%</td>
</tr>
<tr>
<td>2014</td>
<td>1556339</td>
<td>24%</td>
<td>373521</td>
<td>201702</td>
<td>54%</td>
<td>171820</td>
<td>46%</td>
</tr>
</tbody>
</table>

Source: Data of SLC [28, 29, 31] processed by Fernando Carrasco [33] in Table 6.

Table 8.
Population with CCU according to poverty by consumption.

fewer resources, and that now this problem has permeated the segments of the population with higher income.
In Esmeraldas and Guayas prevalence rise in the urban area. While some territories improved radically (Imbabura, Cotopaxi) others worsened (Pichincha) or improved very little (Tungurahua).

With these results, two rural parishes of Pichincha and one in Chimborazo were selected as study cases, where the changes in prevalence are greater.

Surveys that collect information on household spending patterns with a focus on food, calorie consumption, consumption of major products, and socioeconomic characteristics are useful for assessing access to food over time, estimating quantities of food consumed, the composition of the diet, and the availability of nutrients at the individual and household levels ([45], p. 9).

With the information from the National Survey of Income and Expenses of the Ecuadorian Households—ENIGHUR, the consumption of food of the households for the years 2003–2004 and 2011–2012 was analyzed since this information is available only for those two periods. The foods are grouped by class. Consumption is divided

<table>
<thead>
<tr>
<th>Province</th>
<th>Total</th>
<th>Urban</th>
<th>Rural</th>
</tr>
</thead>
<tbody>
<tr>
<td>Azuay</td>
<td>37.7</td>
<td>31.5</td>
<td>28.7</td>
</tr>
<tr>
<td>Bolívar</td>
<td>47.8</td>
<td>40.1</td>
<td>23.7</td>
</tr>
<tr>
<td>Cañar</td>
<td>35.1</td>
<td>30.6</td>
<td>21.1</td>
</tr>
<tr>
<td>Carchi</td>
<td>30.4</td>
<td>35.1</td>
<td>25.7</td>
</tr>
<tr>
<td>Cotopaxi</td>
<td>43.7</td>
<td>33.7</td>
<td>29.8</td>
</tr>
<tr>
<td>Chimborazo</td>
<td>52.8</td>
<td>44.9</td>
<td>31.6</td>
</tr>
<tr>
<td>El Oro</td>
<td>15.1</td>
<td>13.7</td>
<td>13.8</td>
</tr>
<tr>
<td>Esmeraldas</td>
<td>19.5</td>
<td>21.5</td>
<td>16.7</td>
</tr>
<tr>
<td>Guayas</td>
<td>17.4</td>
<td>16.6</td>
<td>14.7</td>
</tr>
<tr>
<td>Imbabura</td>
<td>40.8</td>
<td>29.9</td>
<td>30.9</td>
</tr>
<tr>
<td>Loja</td>
<td>34.7</td>
<td>27.2</td>
<td>19.7</td>
</tr>
<tr>
<td>Los Ríos</td>
<td>22.8</td>
<td>18.5</td>
<td>23.5</td>
</tr>
<tr>
<td>Manabi</td>
<td>25.2</td>
<td>19.0</td>
<td>24.5</td>
</tr>
<tr>
<td>Morona Santiago</td>
<td>43.6</td>
<td>28.1</td>
<td>48.0</td>
</tr>
<tr>
<td>Napo</td>
<td>29.8</td>
<td>13.7</td>
<td>35.5</td>
</tr>
<tr>
<td>Pastaza</td>
<td>35.1</td>
<td>21.4</td>
<td>41.7</td>
</tr>
<tr>
<td>Pichincha</td>
<td>22.6</td>
<td>26.2</td>
<td>25.2</td>
</tr>
<tr>
<td>Tungurahua</td>
<td>35.6</td>
<td>33.1</td>
<td>21.4</td>
</tr>
<tr>
<td>Zamora Chinchipe</td>
<td>30.1</td>
<td>21.5</td>
<td>33.8</td>
</tr>
<tr>
<td>Galápagos</td>
<td>17.0</td>
<td>19.7</td>
<td>8.3</td>
</tr>
<tr>
<td>Sucumbíos</td>
<td>25.4</td>
<td>16.1</td>
<td>30.4</td>
</tr>
<tr>
<td>Orellana</td>
<td>26.6</td>
<td>18.2</td>
<td>32.1</td>
</tr>
<tr>
<td>Santo Domingo de los Tsachilas</td>
<td>16.2</td>
<td>15.4</td>
<td>19.9</td>
</tr>
<tr>
<td>Santa Elena</td>
<td>40.2</td>
<td>39.4</td>
<td>47.1</td>
</tr>
</tbody>
</table>

Source: SLC [28, 29, 31]. Elaboration: Fernando Carrasco [33].

Table 9. Prevalence of the CCU by provinces of Ecuador.
For the 2003–2004 period, it can be observed that the largest share of food expenditure in households categorized in quintile 1 is allocated to bread and cereals, that is, to carbohydrate sources. The second item in participation is the meats, and in third place are the vegetables. For Quintile 2, the relationship between meat and cereals is inverted and the share of non-alcoholic beverages increases, as does the share of mineral waters, soft drinks, and fruit juices. In quintile 5, the share of meat is similar to that of the intermediate quintiles (20.8%), but the participation of bread and cereals is lower, as is the participation of the group of dairy products and eggs. In this quintile, the participation of fruits rises. The share of "sugar, jam, honey, chocolate and sweets" is much lower than the share of the same food group in quintile 1. In this quintile, the share of soft drinks and mineral waters, soft drinks, and fruit juices are greater than in the lower quintiles. The participation of vegetables is similar in all quintiles, although it drops more than one point in quintile 5.

The following analysis is presented for the years 2011–2012 (Table 11).

For the years 2011–2012, the participation of bread and cereals in the consumption of all the quintiles increased. In quintile 1 the participation of the meat is slightly reduced. In this quintile and in the 2, the participation of dairy products and eggs decreases, and the participation of the group of oils and fats increases, as does that of sugars and sweets. In quintile 5 the participation of meat and fruit falls, and the...
participation of sweets and sugars, non-alcoholic beverages and mineral waters, soft drinks, and processed fruit juices increases significantly. These last two items went up for all the quintiles.

In summary, there is a growing trend in the participation of bread and cereals (mainly rice), lower consumption of meats, dairy products, and eggs while the consumption of sugars and processed and processed beverages increases.

This analysis shows us the participation of food groups in the diet and, although indirectly, it offers us information about the changes in the consumption of certain food groups, for example, the greater participation of sugars, fats, and processed beverages suggest some elements consider as a hypothesis that consumption habits and practices are moving towards food groups with lower nutritional value.

In order to test this hypothesis, quantitative information was complemented with qualitative research.

### 8.1 Results of qualitative research

Once the case studies for qualitative research have been identified (San Martín de Porres and Recinto Solaya de Mindo, province of Pichincha, and the San Pablo de Gramapamba community in Chimborazo) as well as the categories on which to
deepen the qualitative inquiry (changes in the practices and habits of food consumption in the last decade 2004–2014 with respect to the previous one) a specific methodology was designed to obtain qualitative information. “Memories workshops” (80 people participating) were organized and on-site interviews were conducted (20 people interviewed). The information obtained in all three cases was systematized coded and categorized to identify similarities and differences in food consumption habits and practices.

The most striking finding of the qualitative component was that no radical differences were observed regarding feeding practices and habits between the information collected in cases in which the CCU increased considerably and the case in which the CCU decreased.

Among the main conclusions of qualitative research is the perception that the last decade was a time of modernization. As evidence of this, it is mentioned that the coverage of electricity in households increased and with it the use of electrical appliances, and of communication technologies. It improved the road network and with it increased the physical access to new foods, in addition to the fresh local foods that were traditionally consumed, the neighborhood small stores of the community were supplied with processed products such as yogurts, fried foods, and sweets. The participation of this type of food increased in the diet, especially among the youngest ones. Even the school breakfast given in the public schools of these communities consists of processed foods.

This change is also observed in the behavior of parents who now have more income that allows them to buy processed foods which they send as lunch for school. This was observed in all the cases analyzed, even in rural areas where families have access to some small agricultural products. The purchase of processed foods is identified as an expression of the new purchasing power of families. Among traditional products, rice is still consumed as the main ingredient for lunch.

Perhaps the perception of a more radical change is observed in the Gramapamba Community, where it is reported that during the 90s and early 2000s, the diet included tubers such as melloco, oca, and mashua; and at least 7 varieties of potatoes, in addition to legumes such as beans (tender and dried) lupine, white corn and green peas; cereals such as quinoa, barley, chilli (variety of barley), rye, maize and wheat; and other native foods such as chimuila, murunga, and Cape gooseberries. As for meats, the consumption of guinea pig, beef, sheep, goat, pig, chicken, and rabbit was mentioned, they were of generalized consumption.

It is recalled that the preparation of traditional foods was a labor that took a long time and required a lot of work on the part of the women (for example cleaning, roasting, and grinding the barley in stone to do the machica). Foods such as chiguilo (a dish made with potatoes and wrapped with corn leaves), barley rice, llapingachos, and drinks such as chawar mishki (drink extracted from penco) that were part of the ordinary diet are mentioned. Now young people have stopped using the machica to find it unpleasant to taste compared to other foods of lower nutritional quality. The same happens with dishes made with mashua. These food preferences have affected the production of food in the community. The daily consumption of rice and sweets and fried snacks, cookies, potato chips, and soft-sweetened drinks, especially preferred by children, has increased. These are products that are also available at schools. With regard to newborns, breast milk continues to be the main source of food, and in recent years new foods have been incorporated since the seventh month, according to the recommendations of the health professionals.
The practice of credit in the neighborhood small stores is mentioned when money is not available to buy food. The products available in these pantries are mainly processed foods, since fresh foods are sold in local markets where there is no possibility of credit to buy.

Among the emerging factors with explanatory potential arose internal migration, in the case of Gramapamba, a rural parish of Guamote in Chimborazo, it was estimated that at least one-third of the members of the community have emerged in the last decade to settle definitively or temporarily in other central cities or with more job offers. The Solaya and San Martin de Porres, grounds are rather territories receptors,

<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Breakfast</strong></td>
<td></td>
</tr>
<tr>
<td>For men going to work: Rice, peanut sauce, onion, bread, milk, coffee.</td>
<td>Juice, chopped fruit with yogurt, cocoa with bread sometimes with cheese.</td>
</tr>
<tr>
<td>For other members of the family: herbal tea with bread, cocoa, sometimes bread with cheese, Green banana with coffee and cheese Machica (barley toasted flour with muscovado) and water. Milk and bread with cheese</td>
<td>Oatmeal drink. Muscovado beverage or black coffee, and bread.</td>
</tr>
<tr>
<td><strong>Lunch</strong></td>
<td></td>
</tr>
<tr>
<td>Regular: Noodle soup, legumes soup, locros (thick potato soup), and vegetables soups. Rice with egg and maduro (fried ripe banana), when possible with beef or sausage. Rice with lentils, beans, roasted peanuts, and so on. Second plate: cow, pig and chicken eat, spaghetti, rice, potato, tortillas with salad, cow tripe, yucca with peanuts, meats. On special occasions: first plate: morocho (crushed white corn), chicken leg's broth, barley rice, chuchuca (crushed yellow corn), locros (thick soup of bean, pumpkin, quinoa), cream soups (bean, corn), sancocho (chunky soup with green banana, yuca and meat or fish).</td>
<td>Noodle or green banana soups. Rice with egg, can tuna fish, can sardines. Grains stews, potatoes, legumes. French fries. White corn, and other legumes. Instant soups. Seasoning cubes. Salads: Pea, carrot, corn, beetroot with carrot, tomato, onion, mayonnaise, tomato sauce, and herbs. Other ingredients: beans, onion, garlic, carrot, celery, coriander, noodle, salt rice, and tomatoes. On special occasions: chicken, baked or fried pig. Going to a restaurant.</td>
</tr>
<tr>
<td><strong>Dinner</strong></td>
<td></td>
</tr>
<tr>
<td>Same as at lunch (two plates, soup and rice with side dishes). Coffee with bread. Fruit or cereal thick beverages (milk with banana, wheat, quinoa, or cereal flour)</td>
<td>Same as at lunch (one plate). Coffee or milk with bread.</td>
</tr>
<tr>
<td><strong>Snacks</strong></td>
<td></td>
</tr>
<tr>
<td>Roasted corn</td>
<td>Processed fruit juices</td>
</tr>
<tr>
<td>Toasted beans</td>
<td>Green fried banana</td>
</tr>
<tr>
<td>Banana with bread</td>
<td>French fries</td>
</tr>
<tr>
<td>Geese with honey—milk</td>
<td>Biscuits</td>
</tr>
<tr>
<td>Sweet potato</td>
<td>Yogurt</td>
</tr>
<tr>
<td>Lupine and toasted corn</td>
<td>Milk</td>
</tr>
<tr>
<td>Chapo (machaca-barley toasted flour with muscovado and milk or water)</td>
<td>Bananas</td>
</tr>
<tr>
<td>Muscovado with cheese.</td>
<td></td>
</tr>
</tbody>
</table>

Table 12.
Foods that are part of the diet in the periods selected for the study.
perhaps because of their proximity to centers with greater economic dynamism, the first near the center of Mindo which in recent years experienced a boom in the tourism sector and the second in the borders of the Metropolitan District of Quito, receives immigrant population from other provinces, many come from Chimborazo and Cotopaxi.

Below, is a summary of the foods that were mentioned as part of the diet of the people interviewed for the two periods analyzed (Table 12).

In-depth interviews also included perceptions about the role of women in family care, the idea of modernization also appears associated with the emergence of conflicts in gender relations; In recent years, women have more frequently linked to salaried work (formal and non-formal), which would have caused a vacuum of care within the family, the traditional role within the home, assigned to women in patriarchal societies blurs, however, have not changed towards a more equitable redistribution of care tasks between men and women, in several cases, the multiple burdens of tasks for women that should divide their day between family care and work outside the home are evident. Another aspect that was mentioned, repeatedly, was the increase in teenage pregnancies, which in most cases must face alone and without adequate preparation, in the care of their children.

8.2 Quantitative analysis of emerging variables

The variables of internal migration and female employment were analyzed to explore their potential as explanatory factors.

Regarding internal migration, the data on place of birth and place of residence disaggregated by province for the 2010 census are presented below (Figure 8).

Provinces identified with major changes in the prevalence of CCU observed that while Pichincha province is the largest population receiver internally, other provinces such as Imbabura, Cotopaxi, Bolivar, and Chimborazo which had significant reductions in the CCU, have traditionally been ejectors. Certainly, this finding is not sufficient to say that the improvement in indicators of CCU in the provinces identified as an ejector, is due to the exodus of its population, however, this is a factor to consider in further inquiries. The immigration toward two central provinces is an indicator of the lack of employment opportunities and social mobility in the provinces of the interior of the country and, even more so, in the rural sector.

Regarding the connection of women to the labor market in recent years, female employment rates for 2007 and 2014 were compared, according to the type of employment (formal/informal) and according to quintiles of the population, obtaining the following results (Table 13).

Between 2007 and 2014, more than 390 thousand women joined the labor market, the rate of growth of female employment was higher than the average rate of growth of the population in this period (1.6), therefore this incorporation was important, and it could have an impact on the structure of the families, as well as on the quantity and quality of the care available at the household level. Another relevant issue here is that the largest increase was in the formal labor market, probably due to the employment regulations that were implemented during this period. Regarding the distribution of new jobs by quintile of the population, the data are the following (Table 14).

It is observed that for 2014, the segment belonging to quintile 4 increased considerably its share in the female employment distribution, while quintiles 2 and 3 had lower growth rates.
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DOI: http://dx.doi.org/10.5772/intechopen.104896

**ECUADOR: POPULATION RECEIVING PROVINCES AND POPULATION EXPULSORS**
(In thousands)
2010: census

<table>
<thead>
<tr>
<th>Province</th>
<th>2007</th>
<th>2014</th>
<th>Difference</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pichincha</td>
<td>455.6</td>
<td>631.1</td>
<td>175.5</td>
</tr>
<tr>
<td>Guayaquil</td>
<td>403.3</td>
<td>569.5</td>
<td>166.2</td>
</tr>
<tr>
<td>El Oro</td>
<td>36.4</td>
<td>28.3</td>
<td>-8.1</td>
</tr>
<tr>
<td>Santa Elena</td>
<td>12.3</td>
<td>11.8</td>
<td>-0.5</td>
</tr>
<tr>
<td>Pastaza</td>
<td>11.2</td>
<td>11.8</td>
<td>0.6</td>
</tr>
<tr>
<td>Galápagos</td>
<td>4.7</td>
<td>-3.7</td>
<td>-8.4</td>
</tr>
<tr>
<td>Napo</td>
<td>-4.9</td>
<td>-15.2</td>
<td>-10.3</td>
</tr>
<tr>
<td>Cañar</td>
<td>-28.2</td>
<td>-39.9</td>
<td>-11.7</td>
</tr>
<tr>
<td>Azuay</td>
<td>-48.9</td>
<td>-84.2</td>
<td>-35.3</td>
</tr>
<tr>
<td>Tungurahua</td>
<td>-97.1</td>
<td>-100.5</td>
<td>-3.4</td>
</tr>
<tr>
<td>Imbabura</td>
<td>-117.2</td>
<td>-144.5</td>
<td>-27.3</td>
</tr>
<tr>
<td>Los Ríos</td>
<td>-198.6</td>
<td>-198.6</td>
<td>0.0</td>
</tr>
</tbody>
</table>

ECUADOR: Population receiving provinces and population expulsors (in thousands). Source: [48].

<table>
<thead>
<tr>
<th>Year</th>
<th>Female formal employment</th>
<th>Female informal employment</th>
<th>NACIONAL</th>
</tr>
</thead>
<tbody>
<tr>
<td>2007</td>
<td>946 003</td>
<td>1 095 398</td>
<td>2 351 800</td>
</tr>
<tr>
<td>2014</td>
<td>1 317 283</td>
<td>1 132 817</td>
<td>2 742 189</td>
</tr>
</tbody>
</table>

Source: [49].

**Table 13.**
Employed female population, by type of employment.

<table>
<thead>
<tr>
<th>Quintile</th>
<th>2007</th>
<th>2014</th>
<th>Difference</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Quintile 1</td>
<td>419,790</td>
<td>473,871</td>
<td>54,081</td>
<td>13%</td>
</tr>
<tr>
<td>Quintile 2</td>
<td>417,382</td>
<td>464,740</td>
<td>47,358</td>
<td>11%</td>
</tr>
<tr>
<td>Quintile 3</td>
<td>476,463</td>
<td>530,538</td>
<td>54,075</td>
<td>11%</td>
</tr>
<tr>
<td>Quintile 4</td>
<td>513,306</td>
<td>653,442</td>
<td>140,336</td>
<td>27%</td>
</tr>
<tr>
<td>Quintile 5</td>
<td>525,058</td>
<td>619,598</td>
<td>94,540</td>
<td>18%</td>
</tr>
<tr>
<td>National</td>
<td>2,351,800</td>
<td>2,742,189</td>
<td>390,390</td>
<td>17%</td>
</tr>
</tbody>
</table>

Source: [49].

**Table 14.**
Occupied feminine population, per quintiles.

27
9. Discussion

As we saw in the figures presented at the beginning of this study, Ecuador shows a prevalence of CCU very distant from other countries in the region that had a similar per capita GDP in 2015. Although the prevalence of 24% places the country on a trajectory similar to that followed by the indicator worldwide, the phenomenon that motivated this research was the slowdown in the reduction of the CCU within a context of economic growth between 2004 and 2014.

As the quantitative data collected shows this was a period of socioeconomic mobility in which 41% of the population considered as poor moved to higher strata. 26% stopped being poor and became “vulnerable” and 15% became part of the “middle class.” This decrease has been explained both by the growth of household purchasing power via salaries and by redistributive measures from the State. Although there is a generalized growth in employment, including the first quintiles, there is no evidence to suggest that this growth has had a positive impact on the sectors of the economy in which, for the most part, the population with the lowest income, namely small-scale agriculture, which in addition participates in manufacture.

According to the statistics prepared for this study, the tendency of the prevalence of the CCU clearly shows two periods: the first between 1986 and 2004 in which the rate of reduction was about 0.83 per year, and another that goes from 2004 to 2014 in which it is observed a point of inflection in which the CCU is reduced by an average of only 2 tenths per year, that is, 2.1 points in 10 years. This occurs in a period in which GDP per capita rises and poverty decreases.

Many studies have suggested, an inverse correlation between the prevalence of CCU and economic growth, but this correlation is neither direct nor automatic. As we see in the global and national literature review, on the one hand, some of the causal factors of CCU could change its trajectory and influence the prevalence of CCU. On the other hand, and following the FAO literature, it is likely that growth does not translate into improvements in the nutritional status of the child population if such growth does not generate income opportunities for families with fewer resources; if the households do not allocate the increase of their income to improve the quality of their diet, their state of health or their sanitary conditions; and/or if governments do not allocate the fruits of growth to improve their social protection systems, to implement direct measures on nutrition, health and education of the population. These three conditions make up what we have called here a derived hypothesis.

Since there are many possibilities to explain the slowdown, this research selected as factors with greater explanatory potential those that i) forming part of the causal model of the CCU, ii) show significant variations in the period analyzed with respect to the previous one and that its once iii) they are part of the derived hypothesis.

To identify the main causal factors of the CCU in Ecuador, the conclusions of the historical studies were reviewed. The 1988 DANS identified three types of variables as part of the explanatory model: the socioeconomic level of the family, the state of the home, and data on infant morbidity. In the territorial distribution of the problem, was found to be concentrated in rural areas of the Andes. Since that first study, the CCU was identified as a feature of poverty. Later studies included other causal factors; those help us to figure out a causal model. However, the availability of data is a constraint that prevents building an exhaustive model.

Considering a non-exhaustive causal model, the indicators for which there is information available in the SLC of the analyzed period were compared. Thus, at the micro-level, it is observed that the low birth weight and the presence of childhood
diseases such as diarrhea and flu do not have significant variations for the different groups analyzed, therefore, these factors do not seem to be related to the slowdown of the CCU. The same applies to the indicator of access to health services.

Regarding the caring indicator, it is observed that the trend follows an expected pattern throughout the period, except that, for the group with CCU, the frequency with which children attend a children’s center increases, while in 1999, only 3.2% of children with CCU went to a child care center. In 2006, this frequency rises to 8.1% and remains stable until 2014 (7.8%).

As the figures show, the water supply and the sanitation indicator have substantially improved the analyzed period, which allows for discarding these as factors associated with the slowdown. In general terms, housing conditions seem to have improved especially for the population group categorized as poor.

The data of SLC shows significant variations in the poverty by consumption, given that for the year 1999, only 20% of the children identified with a low height for age, were within the group identified as “not poor,” while for 2014 almost half of the children with CCU (47.6%) belonged to this stratum. This allows us to conclude that the CCU is no longer associated with the problems of economic access to food. This significant variation allows us to raise a hypothesis about the slowdown. It is that the CCU has ceased to be a problem of economic access to food and has moved to the upper strata in which the CCU can be explained mainly by the quality of the diet.

Analysis of the territorial distribution shows that the provinces where there was a greater reduction in CCU, between 2006 and 2014, were the provinces historically identified as critical for their high prevalence of CCU: Cotopaxi and Chimborazo decreased by 10 and 8 points respectively, Imbabura decreased almost 11 points, in the three cases the biggest change occurred in the rural sector. In Carchi the prevalence increases by 9 points in the urban area, in Pichincha it rises by 10 points in the rural area. In Esmeraldas and Guayas prevalence rise in the urban area.

To test the second proposition of the derived hypothesis according to which growth translates into improvements in nutritional status if households allocate the increase in their income to improve the quality of their diet, an analysis of the changes in participation was made by food groups in total food consumption, and by quintiles for the years 2003–2004 and 2011–2012, for which there is information available, it is observed that the participation of sources of carbohydrates, sugars and processed beverages increases, as well Protein sources fall, especially in quintile 1 and 2. Indirectly, this information allows us to identify changes in consumption habits and the quality of the diet. To investigate these factors in-depth, qualitative research was carried out. The selection of cases was made based on the findings of the territorial distribution analysis. The qualitative research shows us the perception on the part of the participants about changes in their feeding practices. There is a widespread perception of modernization, change, and economic growth in the last decade. The incorporation into the salaried market even in rural areas has allowed a greater purchasing power for families. But that increase in income goes to buying other processed foods and less fresh, traditional, or natural foods.

Among the emerging categories, the variable of internal migration emerged, from the provinces of the interior to the central provinces where employment opportunities were expanded in recent years. Pichincha, where the CCU increased 10 points in the rural sector, is the main receiving province of the country, while the provinces that have traditionally been critical for the CCU are expellers. However, the data corresponds to the 2010 Census and the level of disaggregation is not sufficient to relate the increase or decrease of the CCU in a territory with the migration of its population.
The second emergent category, the significant connection of women to the labor market in recent years, could have impacted the structure of families, as well as the quantity and quality of care available within households. Although female employment did not grow equitably in all quintiles, it is clear that women in quintiles 1 and 2 contributed to the increase in family income through wages.

Thus, the slowdown in the reduction of the CCU could be explained by the confluence of the following factors: during the period analyzed, many households that until 2006 were identified as poor, became a segment of “vulnerable” or middle-class families, their consumption habits changed, but not necessarily towards an improvement in the nutritional status of the family, the opportunities concentrated in salaried work in certain sectors of the economy, the mobility of the population and the crisis of care could be behind the inconvertibility of new income in better eating habits and feeding practices. In this case, the increase in GDP does not meant, necessarily, different dietary habits for the community in one decade.

This study was exploratory, trying to observe and identify those factors contributing to the slowing down of CCU reduction during an economic growth period in Ecuador, certainly, the study has its own limitations, it would be noteworthy to continue investigating why and how irregular income growth distribution may lead to unexpected results of CCU, and also how and how the background culture of targeted families plays a role guiding the feeding practices in contexts of social and economic change.

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Author details

Margarita Manosalvas
Facultad Latinoamericana de Ciencias Sociales, Sede, Ecuador

*Address all correspondence to: mmanosalvas@flacso.edu.ec
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