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What are the determinants of chronic and transient poverty in El Salvador?

Werner Peña[1]

[1] Economist-Researcher at Central-American Institute of Fiscal Studies

Email: werner.pena@icefi.org

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Abstract

This study seeks to analyse the determinants of chronic and transient poverty in El Salvador. To carry out this analysis, two un-intended panel data were constructed using the main Salvadoran household survey, one for the period 2008-2009 and 2009-2010. This paper finds that approximately one out three households are in chronic poverty and one out of four are in transient poverty in the periods analysed. On the one hand, chronic poverty can extend across generations, perpetuating the vicious cycle of poverty. On the other hand, the levels of transient poverty show that an important percentage of Salvadoran households are economically vulnerable to risks that have the capacity of making them fall into poverty. In this paper, the proposed determinants of chronic and transient poverty were grouped in five categories: demographic characteristics, access to economic resources, educational characteristics, labour characteristics and residence characteristics. The econometric models – multinomial logit models and simultaneous quantile regressions – show that the determinants tend to differ for transient and chronic poverty, but this difference mainly arises from the level of impact of the proposed determinants. Thus, different policies are needed to address each kind of poverty. The paper ends by presenting some conclusions and public policy recommendations.

Keywords

Chronic poverty, transient poverty, poverty transitions, un-intended panel data, multinomial logit, quantile regression.

JEL Codes

I32, P36, P46

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1. Introduction

The situation of being in poverty can be experienced by households with different intensities over time, some of them can be trapped in poverty while others can move in or out from it from time to time. This characteristic allows for differentiation between chronic poverty and transient poverty. Chronic poverty means living in poverty for long time periods, raising the possibility of poverty transmission across generations. On the other side, being transient poor means being vulnerable to risks that have the power of making households fall into poverty. Thus, to better understand poverty, it is important to analyse the characteristics and determinants of chronic and transient poverty.

To carry out this exercise, this paper presents the case of El Salvador. El Salvador is a Central American country that has remarkably reduced poverty since the beginning of the 90s. Poverty – measured with the national poverty line – felt from 59.70% in 1991 to 31.90% in 2014 (MINEC-DIGESTYC, various years). In spite of this reduction, many households have been left behind, remaining in poverty for long periods of time. Other households have benefited from this reduction of poverty but only from a limited period of time. Those households are the chronic and transient poor of El Salvador. The analysis will be based on the construction of two un-intended panel data at household level using the main Salvadoran household survey, one for the period 2008-2009 and another for the period 2009-2010.

The main justification for this analysis is that understanding the determinants of chronic and transient poverty is invaluable knowledge for public policy. Studies in Latin America have found that the determinants of chronic and transient poverty tend to differ (see, for instance, Stampini et al, 2015 and Vakis et al, 2016). In this regard, the principal hypothesis of this paper is that in El Salvador the determinants of chronic and transient poverty are different and therefore different public policies are needed.

With the aim to develop the analysis mentioned above, this paper is organised in four sections. The first section starts by defining what will be considered as chronic and transient poverty and presents the main approaches to measure them. The second section presents the data used in this work, including how the un-intended panel data for the period 2008-2009 and 2009-2010 are constructed, and how the problem of attrition will be treated. The third section presents the main results of the paper. First, poverty transition matrices for both panels are presented together with a summary of descriptive statistics for Salvadoran households in chronic and transient poverty. The next step is to present the results of the multinomial logit model and the simultaneous quantile regressions, which are the techniques used to measure the direction and the strength of the relationship between chronic and transient poverty and their proposed determinants. This study ends with some conclusions and public policy recommendations for the specific case of El Salvador.

2. The measurement of chronic and transient poverty

Firstly, the measurement of chronic and transient poverty requires a poverty line definition that allows for the distinction of poor from non-poor over time. The next step is to accurately define chronic and transient poor. In other words, proceed with the identification and aggregation issues (Sen, 1981). For the identification issue, it is possible to identify two common alternative approaches[1]. The first is known as the counting or spells approach. Basically, it suggests that the chronically poor should be identified as those individuals that remain in poverty during a determined period or proportion of time. The second approach, called permanent income, proposes, in very simple terms, that the poor should be categorized as those individuals who have an average income below the poverty line during a given period (Foster and Santos, 2012). These two approaches will be described in detail in the following paragraphs.

The counting or spells approach identifies the chronic poor as those individuals that are poor for a determined period or proportion of time, while the transient poor are those who are not non-poor for the complete period, but also do not fall under the criterion of chronic poverty. The underlying assumption of this approach is that there is no substitutability of resources across periods, ie the income is fully used in one period and there is no transfer to the next period. As argued by Aaberge and Mogstad (2007), this assumption has some flaws. First, there is empirical evidence which suggests that individuals make income transfers across periods with the purpose of smoothing their consumption. In addition, this approach is not capable of reflecting the depth of poverty experienced by those in chronic and transient poverty.

Following Foster (2009) and Foster and Santos (2012), under the spells approach, the identification issue can be expressed as the number of periods t that the individual is in poverty $y_{it} < z$. The duration of poverty will be given by T. Later, a threshold must be set to separate those in chronic poverty from those in transient poverty. Let the threshold for chronic poverty be represented by φ, therefore when proportion (or number of time) T is in this range [φ,1] the individual is in chronic poverty. This implicitly states that when the proportion is between (0, φ), the individual is catalogued as a transient poor. The simplest aggregation method is the head count ratio, but adjusted by time (Foster and Santos, 2012), or simply put, the sum of all chronic (transient) poor divided by the total population of reference.

The second approach – permanent income – rests on inter-temporal choice theory. The main foundation of this theory is based on individuals who choose to maximise their inter-temporal choices through transfers across periods (Aaberge and Mogstad, 2007). This approach measures chronic poverty by averaging the income of individuals during the period of analysis, and then comparing this average with the poverty line. Those

[1] For other recent approaches to measure chronic and transient poverty see Baulch (2011a).

individuals whose permanent income is below the poverty line are deemed to be chronic poor[2].

Regardless of the advantages of this approach, its classic version has been also criticised. The main criticism is directed on the assumption that income transfers across periods come without any transfer costs. Under the permanent income approach, the identification issue can be expressed as $\mu(y_i) < z$, meaning that the mean income $\mu(y_i)$ of the individual i is below the poverty line z during the period of analysis. The aggregation issue can be addressed by using the Foster-Greer-Thorbecke index, just as Foster and Santos (2012) explains.

This paper will use the spells approach to differentiate chronic and transient poverty. As mentioned, the main assumption of this approach is that there is no substitutability of resources across periods, which can be a strong assumption to incorporate. However, the use of two panel data with just two years reduces, to a degree, the impact of the assumption on the results. Additionally, it also makes it difficult to apply the inter-temporal approach, which normally requires more than two waves (Baulch, 2011a). Despite the disadvantages discussed above, the spells approach is an easy way to estimate and understand what will be considered chronic and transient poverty when only two rounds of panel data are available.

3. The data

The analysis of chronic and transient poverty in El Salvador ideally requires the use of longitudinal data sets. However, this type of information is scarce in the country, regardless of the efforts made by the government[3] and some private institutions[4] to produce it. To this extent, this paper is based on the construction of an un-intended panel data based on the household surveys. Two panel data sets will be constructed: one for 2008-2009 and another for 2009-2010. The construction of two independent panel data sets will provide robustness to the results, given that this removes, to a certain extent, the bias that possible shocks or distortions that could have affected a specific period can produce.

[2] In order to identify the transient poor using this approach Duncan and Rodgers (1991 cited in Foster and Santos, 2012) estimates a fixed-earnings model in which the intercept is the permanent income and the error term represents the transient component of poverty.

[3] The government of El Salvador has recently conducted (2013) the first round of the survey "Longitudinal Survey of Social Protection" which is a panel dataset with national representativeness that contains socio-economic information of Salvadoran households (Tablas, 2014). The second round is expected to be developed in the upcoming years.

[4] The University of Ohio and FUSADES have conducted a unique panel data survey for the rural areas of El Salvador. The panel was conducted from 1995 to 2001 and it consists of four rounds (González-Vega et al, 2004).

3.1. The construction of two un-intended panel data for El Salvador

The methodology adopted to construct the un-intended panel data at the household level is the one implemented by Gindling et al (2010) and Beneke de Sanfeliú et al (2015). This procedure relies on the fact that the master sample of the main household survey of El Salvador (EHPM[5]) is maintained by the General Direction of Statistic and Censuses (DIGESTYC, by its Spanish acronyms) up to five years. For the period 2008-2012 the master sample contains 1908 Primary Sample Units (PSUs), which contain, on average, three census areas[6]. The sample and the PSUs for conducting the EHPM in every year are obtained from this master sample. For instance, the PSUs used to conduct the EHPMs for each year in the period 2008-2012 comes from the master sample of the 2008-2012 period (MINEC-DIGESTYC, n.d.). One interesting feature of the sample process is that a part of the PSUs are maintained for two consecutive years. According to Beneke de Sanfeliú et al (2015), there are two main advantages of doing this: i) it improves the comparability of indicators from year to year, and ii) it reduces the costs of household location. This characteristic is the key element for the construction of the un-intended panel data.

The database for the EHPM contains the variables that identify the PSUs and the number of each dwelling within each PSUs. This feature allows for the identification of those dwellings that "participated" in the sample for two consecutive years. The variables used to identify the dwellings are presented below:

i. Department: Administratively speaking, El Salvador is divided into 14 departments (provinces)

ii. Segment: identifies the PSUs (the number of the segment is not repeated within each department)

iii. List: Number assigned to each dwelling within every PSUs (the number of each dwelling is not repeated within each PSUs).

With these variables, it is possible to create an unique identifier for each dwelling in the EHPM databases for 2008, 2009 and 2010. Accordingly, the first step to create the panel is to compare the identifiers created in the data-base of 2008 and 2009 for the panel 2008-2009 and the identifiers of the data-base of 2009 and 2010 for the panel 2009-2010. The repeated dwellings are set apart. The second step uses these dwellings and takes into account the possibility that the households living in each dwelling can change from year to year. Therefore, the procedure continues by comparing the characteristic of the household head in each repeated dwelling in each year. Following Beneke de Sanfeliú et al (2015), five characteristics of the household head will be compared:

[5] The survey is conducted every year, and it has national, departmental, regional and area representativeness.

[6] At the same time, these census areas contain between 51 to 150 dwellings. In the master sample these dwellings are listed with a unique number.

i. Living in the same dwelling
ii. Same sex
iii. Same month of birth
iv. Same year of birth
v. Same age (summing one to the age in the previous year)

Once the five characteristics are compared, the matched observations are set apart and the same characteristics are searched in the remaining observations, except the year of birth (second round of search). In a third round of search, the age variable is disregarded and the year of birth is added. In the fourth round of search, the variable of month of birth is disregarded and the age is added again. Finally, the fifth round of search will only take into account the month of birth and sex. This procedure allows for the creation of an identifier for the repeated dwellings, with the same household heads, in two consecutive years. The next step was to apply the same steps taken for the household heads, to the members of the households[7]. The final criteria for searching was to take into account the possibility of change in the household head from one year to the other. Thus, this step assumes that the spouse in year t became the household head in year $t+1$ and vice-versa, then the five previously mentioned characteristics are compared between these observations. Finally, the identification process for the household members is repeated for the households that have changed household head.

Table 2.1 shows the number of households identified per each method for each panel data. In addition, Appendices 1 and 2 present the comparison of the mean of the distribution for certain socio-economic indicators for households in each panel data, and households in the corresponding total sample of the EHPM for each year. In general, the mean tests conducted do not reject the null hypotheses and this can serve as a starting point to consider that longitudinal data can, arguably, be regarded as representative at the national level.

Table 2. 1. Number of households identified per each method, panel 2008-2009 and panel 2009-2010

Method	Identifiers	2008-2009	2009-2010
1	Dwelling, sex, month of birth, year of birth, age	2,324	2,818
2	Dwelling, sex, month of birth, age	17	20
3	Dwelling, sex, month of birth, year of birth	19	48
4	Dwelling, sex, year of birth, age	310	365
5	Month of birth and sex	2,471	2,956
6	Dwelling, sex, month of birth, year of birth, age (spouse 2008/2009- head2009/2010)	204	225
7	Dwelling, sex, month of birth, year of birth, age (head2008/2009-spouse 2009/2010)	157	218
	Total number of households	5,502	6,650
	Total number of households in total sample	20,361	21,166
	% of total sample	27.0%	31.4%

Source: Author´s own estimation based on MINEC-DIGESYCT (various years)

[7] However, this step is not needed to construct the household panels to be used in this paper and it was just used for comparison motives.

It is important to mention that this particular exercise of creating the un-intended panel data has an important set of limitations, the main ones are listed below:

i. The level of attrition is high. In the panel 2008-2009 it reaches 73% and in the panel 2009-2010 it is about 69%

ii. The tails of the two distributions (sample of EHPM and panels) were not compared and this could erode the assertion of national representativeness, to some extent.

In spite of these limitations, the analysis using the un-intended panel data provides a reasonable alternative to be used in the absence of a proper panel data with national representativeness (Beneke de Sanfeliú et al, 2015).

3.2. Treatment of attrition in the two un-intended panel data

The main problem with attrition is when "members who drop out of a panel differ systematically from those who stay in it, then the dataset of continuing members is no longer representative of the original population" (Baulch and Quisumbing, 2011, p. 1). As presented, the level of attrition for the panel 2008-2009 is 73%, while in the panel 2009-2010 is 69%. These are high levels of attrition for conventional panel data. However, regarding this fact, Baulch (2011a, p. 5) argues that "what really matters is not the magnitude of attrition but whether the probability of attrition is systematically related to certain household or community characteristics".

In the same line, Baulch (2011a) claims that panel data studies based on the Income Dynamics of the US have shown that attrition rates above 50% do not have a serious bias effect on results. Nonetheless, the author warns that this does not mean that the attrition issue should be overlooked. In fact, it has to be treated in order to find a way to correct the possible bias that it can cause. Thus, the first step to deal with attrition is to assess whether or not it is random, and if it happens to be non-random, to then try to correct the bias.

To assess whether attrition is random or not, this paper will follow the procedure proposed in Baulch and Quisumbing (2011). This methodology relies on variables that must be observed for households that *attrit* and households that remain in the survey, and these variables must also have a correlation with the probability of attrition. The authors argue that there are two main strategies to test whether attrition is random or not: i) Attrition probit models and ii) Pooling tests models. Both procedures are intended to test if the variables proposed and expected to be correlated with attrition are significant or not. These two test will be used in this paper for the two sets of panel data. The first test has, as its dependent variable, a dichotomous variable that takes the value of one if the households attrits from the panel and zero otherwise. The pooled test will have as a

dependent variable the logarithm of household real income in the year t. The independent variables used for both methods are presented in Table 2.2[8].

Table 2. 2. Variables to be used in attrition probit and pooled test

Attrition probit (a)	Pooled test
•Dummy for female household head (head-woman) •Years of education of the household head (head-years-educ) •% of household members with less than 16 years of age (% members 0-15) •% of household members with more than 59 years of age (% members 60+) •dependency ratio of the household (dependency ratio) •Age (head-age) and age square of the household head (head-age2) •Household size (household-size)* •Household receive asset income (assets)* •Area of residence (rural) •Region of residence (five regions) •Household real income (log of household-real income) •Dummy variable for the quality of the survey (quality)	•Same variables in attrition probit (except household real income, which is the dependent variable) •Attrition dummy •Interaction terms between attrition dummy and other explanatory variables

(a) the variable name is in brackets.

** Variables that, following Baulch and Quisumbing (2011), are used in the restricted probit model to estimate the inverse probability weights (see next paragraphs). Source: Authors' own elaboration based on Baulch and Quisumbing (2011).*

Table 2.3 presents the attrition probit model for panel 2008-2009 and panel 2009-2010. The probit model for panel 2008-2009 contains six significant variables while the probit for 2009-2010 has seven significant variables. As can be seen, the attrition is related to demographic variables as well as to the quality of the interview, which reduces the probability of attrition and is significant at 1%. One thing to bear in mind is that the pseudo r-square is relatively low for this kind of model. To test whether or not the attrition is random the next step is to conduct a Wald Test of joint significance. This is presented in Table 2.4.

[8] The independent variables were selected based on Baulch4 and Quisumbing (2011) and arguably are related to the probability of attrition.

Table 2. 3. Attrition probit models for panel 2008-2009 and panel 2009-2010

Variables	(1) Atrittion-probit 2008-2009	(2) Atrittion-probit 2009-2010
head-woman	0.0602**	0.0398*
	(0.0241)	(0.0231)
head-years-educ	-0.00598*	-0.00790**
	(0.00351)	(0.00327)
% members 0-15	-0.173**	-0.168**
	(0.0826)	(0.0669)
% members 60+	0.0599	-0.00813
	(0.0611)	(0.0538)
dependency ratio	-0.00854	0.00193
	(0.0186)	(0.0151)
head-age	-0.00708***	-0.00593***
	(0.000994)	(0.000962)
head-age2	0.000160***	0.000204***
	(0.0000337)	(0.0000369)
household-size	-0.00563	0.00202
	(0.00711)	(0.00732)
assets	-0.0642	-0.116
	(0.0828)	(0.0725)
log (household-real income)	0.00166	-0.0390**
	(0.0194)	(0.0177)
quality	-0.380***	-0.404***
	(0.0505)	(0.0476)
rural	-0.0375	-0.0137
	(0.0567)	(0.0530)
region2	0.0416	-0.0296
	(0.0686)	(0.0692)
region3	-0.0281	0.0421
	(0.0850)	(0.0720)
region4	0.00446	-0.0234
	(0.0629)	(0.0638)
region5	0.0393	0.0693
	(0.0764)	(0.0749)
Constant	1.187***	1.366***
	(0.145)	(0.121)
Observations	16,674	20,361
N	16674	20361
Ll	-10433	-12672
chi2	213.2	230.6
df_m	16	16
r2_p	0.00840	0.00854

Robust standard errors in parentheses

**** p<0.01, ** p<0.05, * p<0.1*

Source: Author´s own estimations based on MINEC-DIGESTYC (various years).

The Wald test shows that the variables in the two probit models are jointly significant and therefore there are some specific household characteristics that are correlated with the attrition process, indicating that attrition is not random for both panels. The second test is the pooled test which is conducted using clustered regression[9],[10]. To test whether or not attrition is random, a test of joint significance for the interaction terms (see Table 2.2) has to be conducted. The test for both panels is presented in Table 2.5. For the panel 2008-2009, the test does not reject the null-hypothesis of no joint significance, which means that attrition can be considered random[11]. The test for panel 2009-2010 rejects the null-hypothesis and therefore the attrition follows a non-random process.

Table 2. 4. Wald test of joint significance for attrition probits

Variables	(1) Atrittion-probit 2008-2009	(2) Atrittion-probit 2009-2010
chi2	213.16	230.55
Prob > chi2	0.0000	0.0000

Source: Author´s own estimation based on MINEC-DIGESTYC (various years).

Table 2. 5. Joint significant tests for pooled regressions

Variables	(1) Pooled test 2008-2009	(2) Pooled test 2009-2010
F (16, 294)	1.27	2.34
Prob > F	0.2168	0.0028

Source: Author´s own estimation based on MINEC-DIGESTYC (various years).

Once the attrition has been proved to be non-random, the next step is to find a methodology to correct the bias it can cause. This paper will apply the inverse probability weights used in Baulch and Quisumbing (2011). This methodology requires the estimation of the attrition probit described by equation 2.1 (which is the model presented in Table 2.3[12]) and equation 2.2, which is the restricted attrition probit[13].

$$A = X_{it}\gamma + \alpha_{it}\delta + v_i \quad (2.1) \quad ; \quad A = X_{it}\gamma + \varphi_i \quad (2.2)$$

Where A is the attrition probability, X_{it} are the household variables, α_{it} are the auxiliary variables correlated with attrition, v_i is the error term and γ and δ are the set of parameter for each kind of variables. To construct the inverse probability weights the final step is to estimate the ratio of the predicted values of equation 2.1 and 2.2:

$$w_i = \frac{P^r}{P^u} \qquad (2.3)$$

[9] Clustered at the level of PSUs.
[10] Due to space constraints, the results of these regressions for both panels are not presented in this paper.
[11] Nonetheless, this paper gives more weight to the results of the attrition probit.
[12] The only change is that the dependent variable will be 1 if the household remains in the panel.
[13] As said, the restricted attrition probit does not include the auxiliary variables that are deemed to be correlated with attrition.

Where w_i is the inverse probability weight for each observation, P^r are the predicted probabilities of the restricted model and P^u the predicted probabilities for the unrestricted model. The rationale behind the inverse probability weights is to give more weight to those households that share similar characteristics with households that *attrit* from the panel. The descriptive statistics of the inverse probability weights to be used to reweight the observations of each panel with the aim of correcting for attrition bias are presented in Table 2.6.

Table 2. 6. Inverse probability weights

Variables	(1) Pooled test 2008-2009	(2) Pooled test 2009-2010
Mean	1.023113	1.025185
Minimum	.7344198	.6609841
Maximum	2.593159	2.847194

Source: Author´s own estimation based on MINEC-DIGESTYC (various years).

4. Chronic and transient poverty in El Salvador

Tables 3.1 and 3.2 present the poverty status of households for the panel 2008-2009 and the panel 2009-2010, respectively. Both tables present the poverty transitions with the inverse probability weight[14]. The transitions matrix for panel 2008-2009 shows that 30.65% of the households remained in poverty in both years, ie they are chronic poor. Similar results are observed for the panel 2009-2010, as the percentage of households in chronic poverty remained close to 30%.

Table 3. 1. Poverty transition matrix 2008-2009 (%)

No inverse probability weight					**Inverse probability weight**				
		Poverty status in 2009					**Poverty status in 2009**		
Poverty status in 2008	Class.	Poor	Non-poor	Total	**Poverty status in 2008**	Class.	Poor	Non-poor	Total
	Poor	30.47	13.98	44.45		Poor	30.65	14.03	44.68
	Non-poor	12.19	43.36	55.55		Non-poor	12.18	43.14	55.32
	Total	42.66	57.34	100.0		Total	42.83	57.17	100.0

Source: Author´s own estimations based on MINEC-DIGECTYC (various years).

The households in transient poverty can be divided in two groups: households making a positive transition – moving out from poverty – and households making a negative transition and falling into poverty. The first group represented 14.03% in panel 2008-2009 and 13.34% in panel 2009-2010. The second group represented 12.18% of households in the first panel and 11.78% in the second. Overall, households in transient poverty

[14] In what follows, the analysis will be based on data weighted with the inverse probabilities.

represent 24.8% and 25.12% in panel 2008-2009 and panel 2009-2010, respectively. This means that chronic and transient poverty amount to 55.45% of the households in the first panel and 55.08% in the second panel.

Table 3. 2. Poverty transition matrix 2009-2010 (%)

No inverse probability weight					Inverse probability weight				
	Poverty status in 2010					Poverty status in 2010			
Poverty status in 2009	Class.	Poor	Non-poor	Total	**Poverty status in 2009**	Class.	Poor	Non-poor	Total
	Poor	28.72	12.87	41.59		Poor	29.96	13.34	43.30
	Non-poor	11.93	46.48	58.41		Non-poor	11.78	44.93	56.70
	Total	40.65	59.35	100.0		Total	41.74	58.26	100.0

Source: Author's own estimations based on MINEC-DIGECTYC (various years).

4.1. Descriptive statistics

Tables 3.3 and 3.4 present the main characteristics of chronic, transient and non-poor households in both baseline years (2008 for panel 2008-2009 and 2009 for panel 2009-2010)[15]. In the demographic characteristics, it is possible to observe that the percentage of children living in chronic poor households is more than 10 percentage points higher than in transient poor households. This causes the dependency ratio to be far larger in chronic poor households. For instance, in 2008 there were 1.26 dependants for each person in a productive age, compared to the 0.9 registered for non-poor households and 0.91 for transient poor households. The size of the households tends to be larger in households that suffer chronic poverty; on average, they have approximately 1.5 additional members than non-poor households in both baseline years.

The access to economic resources shows that chronic poor households earn on average US$122 and US$121.05 less than transient poor households in the year 2008 and 2009, respectively. At the same time, households in transient poverty earn approximately half of the monthly income earned by non-poor households in both baselines. Remittances and asset incomes are more concentrated in non-poor households for each period. Approximately 30% of non-poor households received remittances compared to the 16% of chronic poor households. The gap is almost the same between transient poor and chronic poor households, since around 27% of the transient poor receive remittances. In addition, around 3% of non-poor households receive asset incomes, this percentage is more than double compared to that registered for households in chronic poverty. Finally, the inverse relationship is observed when government transfers are monitored. In 2008 about 5% of

[15] The rationale for using the baseline years is that "current household characteristics $[t+1]$ could be affected by the same process that brought about poverty transitions" (Quisumbing, 2011, p. 36), therefore this procedure allows to avoid endogeneity bias that can arise if the characteristics in year $t+1$ are analysed.

the households in chronic poverty received government transfers compared to 1.79% of those in transient poverty and 0.4% in non-poor households. Additionally, 2009 shows the same trend: 11% of households in chronic poverty received government transfers. Meanwhile, 3.66% and 1.43% of the transient poor and non-poor received public transfers, respectively.

The educational characteristics show important differences. In both baselines years, the non-poor households have household heads that, on average, have more than 6.5 years of education, which is about twice of that reported in households in chronic poverty (between 3.45 and 3.8 years of education). The percentage of illiterate adults is higher in chronic poor households than in transient poor households, considering that in the former approximately one out of three adults are illiterate, while in latter about one out of five adults are illiterate for the two baselines. In addition, the chronic poor households have more adults with less than seven years of education, as approximately 70% of the adults in each baseline have less than seven years of education. This shows a stark difference with non-poor households, in which about 58% of the adults have seven or more years of education.

Regarding labour features, in both baselines the percentage of unemployed adults and working in the agricultural sector in chronic poor households were more than double than those registered for non-poor households. However, the differences between chronic and transient poor households are not that evident when the percentage of adults working as wage earners or employers is analysed. In fact, in both types of households, approximately one out of three working adults were classified as wage earner or employer.

Finally, the access to services and the area of residence are also presented. As can be observed, the access to services for chronic poor households is lower than for transient and non-poor households in both baselines. The major differences are related to the access to drinking water and electricity. For example, in 2009 the access to drinking water and electricity was 20.8 and 14.69 percentage points (respectively) lower in chronic poor households compared to non-poor households. Moreover, the percentage of chronic and transient poor households living in rural areas is quite similar.

Table 3. 3 Households characteristics by poverty classification, year 2008 (Panel 2008-2009)

2008	General		Non-poor		Transient poor		Chronic poor	
	Mean	SD	Mean	SD	Mean	SD	Mean	SD
Demographic characteristics								
% of household members less than 16 years old	30.70%	24.32%	22.88%	22.51%	30.82%	23.78%	41.60%	23.00%
% of household members 16 to 59 years old	55.21%	26.92%	62.29%	28.63%	53.84%	26.39%	46.39%	21.56%
% of household members more than 59 years old	14.10%	27.30%	14.83%	28.36%	15.34%	28.18%	12.01%	24.80%
dependency ratio	90.57%	90.97%	64.66%	74.12%	91.50%	90.27%	126.24%	100.44%
age of household head	47.57	16.56	47.80	15.75	48.65	17.34	46.33	16.91
% of households with a woman household head	32.97%	47.01%	31.40%	46.42%	37.22%	48.36%	31.53%	46.48%
household size	4.23	2.15	3.66	1.87	4.26	2.15	5.00	2.27
Access to economic resources								
real monthly household income	443.30	487.46	678.76	635.18	330.41	232.86	208.37	130.35
% of households that receive remittances	25.34%	43.50%	30.08%	45.87%	27.48%	44.66%	16.82%	37.42%
% of households that receive asset incomes	2.10%	14.36%	3.28%	17.82%	1.38%	11.66%	1.07%	10.28%
% of households that receive government transfers	2.20%	14.68%	0.44%	6.63%	1.79%	13.25%	5.04%	21.89%
Educational characteristics								
years of education of the household head	5.30	4.83	7.22	5.34	4.40	4.14	3.38	3.46
% illiteracy in adults	19.23%	30.82%	11.92%	25.99%	21.03%	31.43%	27.99%	33.92%
% of adults with 0 to 6 years of education	57.28%	39.20%	42.69%	39.35%	61.88%	36.99%	73.90%	32.72%
% of adults between 7 and 9 years of education	18.00%	27.46%	17.61%	27.66%	19.86%	28.26%	16.97%	26.40%
% of adults with more than 9 years of education	24.71%	34.58%	39.71%	39.46%	18.26%	28.62%	9.13%	20.36%
Labour characteristics								
% of adults unemployed	3.51%	12.38%	2.04%	9.00%	3.88%	13.06%	5.26%	15.29%
% of adults working as wage earner or employer	33.94%	33.08%	42.83%	34.70%	28.81%	30.19%	25.80%	29.96%
% of adults working in the agricultural sector	11.67%	21.55%	7.65%	19.08%	12.16%	21.67%	16.92%	23.48%
Access to services								
% of households with access to drinking water	64.65%	47.81%	75.90%	42.78%	59.47%	49.11%	53.24%	49.91%
% of households with access to sewage	94.86%	22.08%	97.96%	14.13%	94.87%	22.08%	90.49%	29.34%
% of households with access to electricity	89.60%	30.53%	95.95%	19.72%	89.22%	31.03%	80.97%	39.26%
Residence characteristics								
% of households living in rural areas	40.49%	49.09%	32.40%	46.81%	45.33%	49.80%	47.74%	49.96%

Source: Author´s own estimations based on MINEC-DIGECTYC (various years).

Table 3. 4. Households characteristics by poverty classification, year 2009 (Panel 2009-2010)

2009	General		Non-poor		Transient poor		Chronic poor	
	Mean	SD	Mean	SD	Mean	SD	Mean	SD
Demographic characteristics								
% of household members less than 16 years old	24.29%	23.00%	18.11%	20.90%	24.02%	22.63%	33.79%	23.12%
% of household members 16 to 59 years old	55.44%	26.77%	61.55%	28.74%	54.24%	26.43%	47.29%	21.10%
% of household members more than 59 years old	14.71%	27.79%	15.96%	29.36%	16.50%	28.78%	11.34%	23.99%
dependency ratio	76.07%	82.03%	56.00%	68.26%	77.95%	84.43%	104.61%	89.90%
age of household head	47.88	16.71	48.71	16.20	49.08	17.66	45.64	16.44
% of households with a woman household head	33.65%	47.25%	34.05%	47.39%	35.70%	47.93%	31.33%	46.40%
household size	4.17	2.10	3.68	1.84	4.15	2.19	4.90	2.18
Access to economic resources								
real monthly household income	427.80	457.11	644.55	576.80	316.83	241.47	195.78	123.11
% of households that receive remittances	25.15%	43.39%	29.89%	45.79%	27.11%	44.47%	16.41%	37.04%
% of households that receive asset incomes	2.28%	14.92%	3.09%	17.30%	2.21%	14.71%	1.12%	10.55%
% of households that receive government transfers	4.88%	21.55%	1.43%	11.88%	3.66%	18.78%	11.08%	31.39%
Educational characteristics								
years of education of the household head	5.10	4.75	6.68	5.27	4.26	4.09	3.45	3.54
% illiteracy in adults	19.64%	31.05%	12.88%	26.33%	22.04%	32.27%	27.75%	34.18%
% of adults with 0 to 6 years of education	57.79%	38.76%	45.44%	39.24%	62.81%	36.58%	72.11%	33.64%
% of adults between 7 and 9 years of education	18.00%	27.17%	17.42%	26.76%	18.81%	27.66%	18.19%	27.34%
% of adults with more than 9 years of education	24.21%	33.86%	37.14%	38.13%	18.38%	28.96%	9.70%	21.32%
Labour characteristics								
% of adults unemployed	4.20%	13.65%	2.69%	10.71%	5.57%	16.20%	5.33%	14.95%
% of adults working as wage earner or employer	30.15%	31.29%	38.58%	33.59%	25.77%	28.36%	21.18%	26.44%
% of adults working in the agricultural sector	14.81%	23.48%	10.95%	22.12%	14.94%	23.95%	20.47%	23.92%
Access to services								
% of households with access to drinking water	67.34%	46.90%	76.30%	42.53%	65.40%	47.58%	55.55%	49.70%
% of households with access to sewage	94.64%	22.52%	97.74%	14.87%	94.62%	22.58%	90.03%	29.97%
% of households with access to electricity	89.32%	30.88%	95.23%	21.31%	89.18%	31.08%	80.58%	39.57%
Residence characteristics								
% of households living in rural areas	45.41%	49.79%	39.01%	48.79%	49.88%	50.02%	51.26%	50.00%

Source: Author´s own estimations based on MINEC-DIGECTYC (various years).

4.2. Determinants of chronic and transient poverty in El Salvador: Multinomial logit model

The multinomial logit model has been chosen to assess the determinants of chronic and transient poverty. This technique allows to model the dynamic association of different socio-economic characteristics and the different poverty statuses considered[16]. Multinomial-logit models have as a dependent variable a categorical-nominal one, which does not comprise of a hierarchical order among its categories (Williams, 2016). The multinomial-logit can be expressed by equation 3.1 and 3.2 (StataCorp, 2013, p. 5).

$$P(y = m) = \frac{e^{X\beta^m}}{1 + \sum_{h=2}^{m} e^{X\beta^h}} \qquad (3.1)$$

$$P(y = 1) = \frac{1}{1 + \sum_{h=2}^{m} e^{X\beta^h}} \qquad (3.2)$$

Where $P(y = m)$ is the probability for each category, β is a vector of parameters and X is a vector of independent variables. Following Bhatta and Sharma (2011), this paper will base its analysis on the relative risk ratios (RRR) resulting from the multinomial logit model. The RRRs "show how the predicted odds favouring an outcome (compared with the base outcome, being non-poor [or other category]) are multiplied per unit increase in the value of the associated variable, when we control for other variables in the model" (Bhatta and Sharma, 2011, p. 123). Based on expressions 3.1 and 3.2, the relative risk ratios are mathematically defined in the following terms (StataCorp, 2013, p. 5):

$$\frac{P(y = m)}{P(y = 1)} = e^{X\beta^m} \qquad (3.3)$$

$$e^{\beta_i^m} = \frac{e^{\beta_i^m x_1 + \cdots + \beta_i^m (x_i + 1) + \cdots + \beta_k^m x_k}}{e^{\beta_i^m x_1 + \cdots + \beta_i^m x_i + \cdots + \beta_k^m x_k}} \qquad (3.4)$$

Where equation 3.3 is the relative risk ratio and expression 3.4 is "the relative-risk ratio for a one-unit change in the corresponding variable (risk is measured as the risk of the outcome relative to the base outcome)" (StataCorp, 2013, p. 5).

The multinomial logit models and their RRRs for the panel 2008-2009 and panel 2009-2010[17] are presented in Table 3.5[18]. The reference category will be non-poor[19]. All the

[16] Regardless of the advantages and the simplicity of multinomial logit models, Baulch (2011) claims that it faces three main criticisms: i) it reduces continuous variables that reflect household wellbeing to discrete categories; ii) the assumption of independence of irrelevant alternatives (IIA) might be too strong; and iii) it does not recognise the order behind poverty transitions categories.
[17] The models were ran using the inverse probability weights and clustered to the PSUs.
[18] The specification test for both panels are presented in Appendices 3 to 6. Both models fit well with the data and the majority of the variables show as significant, just as the Wald test corroborates. In general, the panels comply with the IIA assumption (Small-Hsiao test) (see Appendix 5) and there is no need for combining alternatives (see appendix 6).

explanatory variables are set to their baseline value. When interpreting the RRR coefficients it is important to bear in mind that an "RRR value greater than one indicates a positive association between the explanatory variable and the outcome under consideration, while an RRR smaller than one represents a negative relationship" (Bhatta and Sharma, 2011, p. 123).

The proposed determinants are grouped in five categories. The determinants were chosen from Baulch (2011). Table 3.5 presents interesting results. First, the demographic variables clearly show that the percentage of individuals with less than 16 years of age and the dependency ratio have a positive and strong relationship with the odds of being in chronic and transient poverty in both panels. However, the intensity of this relationship varies depending on which category of poverty is considered. For instance, the RRR estimated for the percentage of children and the dependency ratio for chronically poor are bigger than for those in transient poverty, which suggests that these variables increase the odds of being in chronic poverty, more than they increase the odds of suffering from transient poverty. On the other hand, the percentage of individuals with more than 59 years of age reduces the odds of being in chronic and transient poverty. In this line, Peña and Rivera (2016) have estimated that self-employed individuals continue to receive self-employment labour income after the 60 years of age, given the size of the informal sector and the low coverage of the pension system. Another interesting result is that for both panels, the variable representing households with a woman as a head of household reduces the odds of being either chronic or transient poor, and this effect is stronger in chronic poor households.

Regarding the access to economic resources, it is possible to observe that the real income reduces the odds of being in chronic and transient poverty for both panels and this reduction is bigger for chronic poor households. The remittances variable shows the same picture for both panels. For households that receive asset incomes the odds of being in chronic and transient poverty are reduced. However, in the 2008-2009 panel, the difference between the RRRs of chronic and transient poor households seems not to be significant. In the panel 2009-2010, this variable is only significant for households in chronic poverty. The dichotomous variable of receiving government transfers increases the odds of being either chronic or transient poor. This positive relationship is stronger in chronic poor households. This might be related to the fact that government transfers are not enough – in amount and coverage – to help the vast majority of households that receive cash transfers move out of poverty. In fact, Tejerina and Muñoz (2015) have reached a similar conclusion.

The educational characteristics show that the more years of education the household head has, the lesser the odds of being in chronic and transient poverty are. The percentage of illiterate adults in the household is not significant in both panels and the percentage of adults with more than ten years of education appears to be only significant for chronic poor

[19] Therefore, even when not mentioned, the odds to be presented are relative to be non-poor.

households, reducing the odds of being in chronic poverty. It is very probable that a significant part of the adults with more than ten years of education in transient poor households may have only completed high school, or started but did not complete university or other higher education courses. This, combined with the fact that the returns to education have reduced in the past decade[20], can be an explanation for the null impact of the percentage of adults with more than ten years of education in transient poor households. However, further research on this is required.

Regarding labour characteristics, the percentage of unemployed adults within the household has a positive relationship with the odds of being in chronic and transient poverty. In the 2008-2009 panel, this relationship is stronger for chronically poor households, however, in the panel 2009-2010 this variable is only significant for transient poor households. When the percentage of adults working as wage earners or employers is higher in a household, the odds of being in chronic and transient poverty tends to be lower, and there is no significant difference between the RRR estimated for chronic and that estimated for transient poor households. Finally, the RRRs for the variable of the percentage of adults working in the agricultural sector is not significant for the 2008-2009 panel. Nonetheless, in the panel 2009-2010 these RRRs are significant and negatively associated with the odds of being chronic and transient poor. These results are counterintuitive, given that these variables commonly tend to be positively associated with the odds of being in poverty.

[20] The UNPD (2013) has estimated that the returns to education at the high school and university levels have been reduced, on average, by 28.7 percentage points and 43 percentage points, respectively, in the period 2000/2011-2012.

Table 3. 5. Multinomial logit for panel 2008-2009 and panel 2009-2010

Variables	Panel 2008-2009		Panel 2009-2010	
	Chronic poor	Transient poor	Chronic poor	Transient poor
	RRR	RRR	RRR	RRR
Demographic characteristics				
% members 0-15	497.33***	18.65***	38.09***	5.18***
	(182.271)	(5.844)	(11.499)	(1.245)
% members 60+	0.05***	0.16***	0.02***	0.12***
	(0.016)	(0.043)	(0.006)	(0.026)
dependency ratio	1.38***	1.19**	1.87***	1.45***
	(0.109)	(0.086)	(0.154)	(0.115)
head-age	1.04***	1.02***	1.02***	1.02***
	(0.005)	(0.004)	(0.004)	(0.004)
head-age2	1.00	1.00*	1.00	1.00
	(0.000)	(0.000)	(0.000)	(0.000)
head-woman	0.44***	0.82**	0.41***	0.66***
	(0.053)	(0.078)	(0.042)	(0.052)
Access to economic resources				
log (household-real income)	0.04***	0.16***	0.03***	0.13***
	(0.004)	(0.016)	(0.003)	(0.011)
remittances	0.38***	0.66***	0.47***	0.83**
	(0.047)	(0.068)	(0.049)	(0.066)
assets	0.49**	0.47***	0.32***	0.72
	(0.173)	(0.129)	(0.111)	(0.159)
government transfers	3.50***	2.60***	4.45***	1.86**
	(1.400)	(0.841)	(1.371)	(0.556)
Educational characteristics				
head years of education	0.86***	0.92***	0.87***	0.93***
	(0.016)	(0.014)	(0.013)	(0.012)
% illiterate adults	0.83	0.88	0.99	0.95
	(0.177)	(0.155)	(0.185)	(0.150)
% adults 10+ years of education	0.55***	0.78	0.64**	0.83
	(0.098)	(0.119)	(0.113)	(0.127)
Labour characteristics				
% adults unemployed	6.44***	3.83***	1.12	2.01**
	(3.083)	(1.602)	(0.415)	(0.629)
% adults wage earner or employer	0.44***	0.44***	0.42***	0.55***
	(0.059)	(0.061)	(0.074)	(0.075)
% of adults working in agriculture	1.32	1.10	0.55**	0.51***
	(0.353)	(0.266)	(0.135)	(0.093)

Variables	Panel 2008-2009		Panel 2009-2010	
	Chronic poor	Transient poor	Chronic poor	Transient poor
	RRR	RRR	RRR	RRR
Residence characteristics				
rural	0.24***	0.58***	0.16***	0.47***
	(0.026)	(0.056)	(0.018)	(0.043)
metropolitan area of San Salvador (SS)	0.92	1.06	0.71**	0.99
	(0.125)	(0.117)	(0.096)	(0.112)
Constant	13563559.95***	14,109.08***	200065388.92***	81,504.11***
	(8318117.733)	(7,906.356)	(1.177e+08)	(41,266.224)
Observations	5,429	5,429	6,564	6,564
N	5429	5429	6564	6564
Ll	-3898	-3898	-4717	-4717
chi2	3112	3112	3184	3184
df_m	36	36	36	36
r2_p	0.333	0.333	0.327	0.327

Robust standard errors in parentheses

**** p<0.01, ** p<0.05, * p<0.1*

Source: Author's own estimation based on MINEC-DIGECTYC (various years).

Another result that seems to be counterintuitive is the RRR for the variable "rural", which is a dichotomous variable for households living in the rural areas. It is significant and it decreases the odds of being in chronic and transient poverty for both panels. This even contradicts the percentages shown in Table 3.3 and 3.4, in which the percentage of households living in the rural area is higher as one moves from non-poor to chronic poor households. Finally, the variable Metropolitan Area of San Salvador (MASS)[21] is only significant for the chronic poor in the 2009-2010 panel, and it reduces the odds of being in chronic poverty during that period.

Following Quisumbing (2011), this paper has estimated simultaneous quantile regressions and interquantile regressions – which are presented in the next section – in order to delve into the analysis of the determinants of chronic and transient poverty. It will also help in assessing whether or not the uncommon results encountered are valid, particularly those related to the rural area.

4.3. Determinants of chronic and transient poverty in El Salvador: Simultaneous and interquantile regressions

This section presents the results of the simultaneous quantile regression and interquantile regressions to deepen the analysis of the determinants of chronic and transient poverty in El Salvador. The main advantage of this analysis is that it facilitates the understanding of how the responsiveness of the dependent variable to independent variables changes at different points of the distribution of the (logarithm of) real household income. The regression will be calibrated at the quantiles of the dependent variable corresponding to the mean of the dependent variable for each poverty classification (Baulch and Hoang Dat, 2011).

The simultaneous quantile regression and interquantile regression are an extension of the quantile regression technique, which "models the relationship between X and the conditional quantiles of Y given X=x" (Chen, 2005, p. 1). Mathematically speaking, the estimators in a quantile regression minimise the following objective function for each quantile q (Baum, 2013, p. 6):

$$Q(\beta_q) = \sum_{i:y_{i>x_i'}}^{N} q\left|y_i - x_i'\beta_q\right| + \sum_{i:y_{i<x_i'}}^{N} (1-q)\left|y_i - x_i'\beta_q\right| \qquad (3.5)$$

Where, $Q(\beta_q)$ is the objective function, q is the quantile, y_i is the actual value of the dependent variable, x_i' is the vector of independent variables and β_q is the vector of the estimated parameters for the quantile q. The quantile regression and the simultaneous

[21] The MASS refers to the 14 urban municipalities, including the capital of El Salvador, which hold aboiut one third of the total population of El Salvador.

quantile regression produce the same coefficients, however, the simultaneous quantile regression "obtains an estimate of the entire variance–covariance matrix of the estimators by bootstrapping"[22] (StataCorp, 2013a, p. 16). On the other hand, the interquantile regression is simply the difference between the coefficient of two quantile regressions and it permits to observe whether or not the difference in the coefficient for a pair of poverty categories is significant.

The results of the simultaneous quantile regression and the interquantile regression are presented in Tables 3.6 and 3.7[23]. The independent variables used were the same as the ones used in the multinomial logit models for the year t of each panel, while the dependent variable is the logarithm of real household income in the year $t + 1$. The following list indicates the variables that show the same impact on the dependent variable, in the multinomial logit, and the simultaneous quantile regressions[24] (when significant for at least one classification of poverty) for both panels. These are: the percentage of members with less than 16 years of age (negative), remittances (positive), assets (positive), government transfers (negative), years of education of the household head (positive), percentage of adults with more than ten years of education (positive), percentage of adults working as wage earners or employer (positive) and the MASS (positive). These results reinforce the findings in the multinomial logit model for both panels.

The variables that show a different impact on the simultaneous quantile regression are interesting on their own. First, the percentage of household members that are older than 60 years of age shows a negative sign in the simultaneous quantile regression for both panels, meaning that as this percentage increases, the household real income decreases for the three categories of poverty. The dependency ratio shows a positive sign, contradicting the results of the multinomial logit and the mean comparison between the three categories presented in Tables 3.3 and 3.4. In this regard, the results of the multinomial logit seem more reliable. The age of the household head in the multinomial logit increases the odds of being in chronic and transient poverty, while age squared did not have a significant influence. In the simultaneous quantile regression, the variable age is positive and the age square is negative, meaning that real household income is reduced as the household head becomes older. In this case, the results can be arguably similar for both techniques, given that the multinomial regression might be capturing the combined effect of age and age squared.

[22] This advantage allows for the arbitrary categories, set to divide the different poverty situations, be avoided, to some extent (Quisumbing, 2011).
[23] bootstrapped standard errors were obtained through 1000 replications. In addition, the "linktests" for model specification are presented in appendix 7 and 8.
[24] The regressions have the same impact when the RRR is greater than one and the sign in the quantile regression is negative and when the RRR is lower than one and the sign in the quantile regression is positive.

Table 3. 6. Simultaneous quantile regression and interquantile regressions, panel 2008-2009

Variables	Panel 2008-2009					
	Chronic poor	Transient poor	Non-poor	Chronic-transient	Chronic-non-poor	Transient-non-poor
	SQR-Coeff	SQR-Coeff	SQR-Coeff	IQR-Coeff	IQR-Coeff	IQR-Coeff
Demographic characteristics						
% members 0-15	0.133	0.073	0.034	-0.060	-0.098	-0.038
	(0.085)	(0.084)	(0.087)	(0.075)	(0.099)	(0.087)
% members 60+	-0.691***	-0.727***	-0.534***	-0.036	0.157*	0.193**
	(0.070)	(0.081)	(0.086)	(0.071)	(0.092)	(0.083)
dependency ratio	0.020	0.024	0.010	0.004	-0.010	-0.014
	(0.020)	(0.020)	(0.018)	(0.018)	(0.023)	(0.020)
head-age	0.012***	0.015***	0.014***	0.002*	0.002	-0.000
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
head-age2	-0.000***	-0.000***	-0.000***	-0.000	-0.000	-0.000
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
head-woman	-0.225***	-0.201***	-0.176***	0.023	0.049	0.026
	(0.030)	(0.026)	(0.028)	(0.025)	(0.034)	(0.027)
Access to economic resources						
remittances	0.212***	0.178***	0.131***	-0.034	-0.081**	-0.046
	(0.028)	(0.030)	(0.030)	(0.026)	(0.034)	(0.029)
assets	0.193	0.204***	0.057	0.011	-0.136	-0.147*
	(0.150)	(0.079)	(0.088)	(0.116)	(0.144)	(0.085)
government transfers	-0.314**	-0.176**	-0.244**	0.138	0.070	-0.068
	(0.141)	(0.084)	(0.104)	(0.112)	(0.142)	(0.099)
Educational characteristics						
head years of education	0.022***	0.021***	0.018***	-0.002	-0.004	-0.002
	(0.005)	(0.004)	(0.004)	(0.004)	(0.005)	(0.004)
% illiterate adult	-0.312***	-0.373***	-0.318***	-0.061	-0.006	0.055
	(0.054)	(0.053)	(0.054)	(0.045)	(0.059)	(0.051)
% adults 10+ years of education	0.546***	0.545***	0.696***	-0.001	0.150**	0.151***
	(0.052)	(0.047)	(0.049)	(0.043)	(0.061)	(0.049)
Labour characteristics						
% adults unemployed	0.035	-0.042	-0.041	-0.077	-0.076	0.000
	(0.091)	(0.101)	(0.120)	(0.087)	(0.124)	(0.112)
% adults wage earner or employer	0.291***	0.267***	0.277***	-0.024	-0.013	0.011
	(0.040)	(0.040)	(0.044)	(0.034)	(0.048)	(0.043)
% of adult working in agriculture	-0.552***	-0.465***	-0.349***	0.086	0.202***	0.116*
	(0.059)	(0.062)	(0.073)	(0.054)	(0.074)	(0.070)

Variables	Chronic poor	Transient poor	Panel 2008-2009 Non-poor	Chronic-transient	Chronic non-poor	Transient non-poor
	SQR-Coeff	SQR-Coeff	SQR-Coeff	IQR-Coeff	IQR-Coeff	IQR-Coeff
Residence characteristics						
rural	-0.219***	-0.203***	-0.168***	0.016	0.051	0.035
	(0.030)	(0.026)	(0.030)	(0.024)	(0.033)	(0.028)
metropolitan area of SS	0.094***	0.086***	0.056*	-0.008	-0.038	-0.030
	(0.031)	(0.031)	(0.031)	(0.028)	(0.035)	(0.031)
Constant	5.436045***	4.958692***	5.436045***	.288801***	0.766154***	0.477353***
	(0.0797774)	(0.0777208)	(0.0797774)	(0.0717917)	(0.0928861)	(0.0754994)
Observations	5429	5429	5429	5429	5429	5429
N	5429	5429	5429	5429	5429	5429
r2_p	0.2225	0.2228	0.2245	0.2225/0.2228	0.2225/0.2245	0.2228/0.2245

Bootstrap standard errors in parentheses

**** p<0.01, ** p<0.05, * p<0.1*

Source: Author's own estimation based on MINEC-DIGECTYC (various years).

Table 3. 7. Simultaneous quantile regression and interquantile regressions, panel 2009-2010

Variables	Chronic poor	Transient poor	Non-poor	Chronic-transient	Chronic non-poor	Transient non-poor
	Panel 2009-2010					
	SQR-Coeff	SQR-Coeff	SQR-Coeff	IQR-Coeff	IQR-Coeff	IQR-Coeff
Demographic characteristics						
% members 0-15	0.104	0.030	-0.174**	-0.074	-0.278***	-0.204***
	(0.081)	(0.073)	(0.076)	(0.069)	(0.092)	(0.078)
% members 60+	-0.685***	-0.684***	-0.709***	0.001	-0.024	-0.025
	(0.092)	(0.061)	(0.067)	(0.073)	(0.093)	(0.066)
dependency ratio	0.041*	0.034*	0.075***	-0.007	0.034	0.040*
	(0.021)	(0.020)	(0.022)	(0.018)	(0.025)	(0.021)
head-age	0.012***	0.013***	0.015***	0.001	0.003**	0.002**
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
head-age2	-0.000***	-0.000***	-0.000***	0.000	-0.000	-0.000**
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
head-woman	-0.153***	-0.149***	-0.140***	0.004	0.013	0.009
	(0.028)	(0.024)	(0.024)	(0.022)	(0.030)	(0.024)
Access to economic resources						
remittances	0.259***	0.258***	0.221***	-0.001	-0.037	-0.036
	(0.028)	(0.024)	(0.024)	(0.023)	(0.032)	(0.025)
assets	-0.048	-0.050	0.080	-0.002	0.127	0.129
	(0.093)	(0.081)	(0.089)	(0.078)	(0.105)	(0.086)
government transfers	-0.129**	-0.109***	-0.222***	0.020	-0.093	-0.113**
	(0.065)	(0.038)	(0.050)	(0.049)	(0.065)	(0.045)
Educational characteristics						
head years of education	0.023***	0.021***	0.020***	-0.003	-0.004	-0.001
	(0.005)	(0.004)	(0.003)	(0.004)	(0.004)	(0.004)
% illiterate adult	-0.322***	-0.338***	-0.331***	-0.016	-0.009	0.007
	(0.050)	(0.043)	(0.040)	(0.042)	(0.050)	(0.042)
% adults 10+ years of education	0.529***	0.572***	0.545***	0.043	0.015	-0.028
	(0.048)	(0.043)	(0.048)	(0.038)	(0.054)	(0.046)
Labour characteristics						
% adults unemployed	-0.017	-0.029	-0.020	-0.012	-0.003	0.009
	(0.082)	(0.098)	(0.078)	(0.081)	(0.093)	(0.091)
% adults wage earner or employer	0.292***	0.290***	0.288***	-0.002	-0.004	-0.002
	(0.041)	(0.040)	(0.038)	(0.034)	(0.046)	(0.040)
% of adults working in agriculture	-0.447***	-0.319***	-0.332***	0.128**	0.115	-0.012
	(0.066)	(0.052)	(0.061)	(0.052)	(0.071)	(0.059)

Variables	Chronic poor	Transient poor	Panel 2009-2010 Non-poor	Chronic-transient	Chronic non-poor	Transient non-poor
	SQR-Coeff	SQR-Coeff	SQR-Coeff	IQR-Coeff	IQR-Coeff	IQR-Coeff
Residence characteristics						
rural	-0.162***	-0.196***	-0.165***	-0.034	-0.004	0.030
	(0.030)	(0.027)	(0.027)	(0.024)	(0.035)	(0.028)
metropolitan area of SS	0.125***	0.081***	0.005	-0.044*	-0.120***	-0.076**
	(0.032)	(0.030)	(0.029)	(0.025)	(0.034)	(0.031)
Constant	4.613608 ***	4.926397***	5.418858***	0.3127895***	.3127895***	0.4924611***
	(.080317)	(0 .0652831)	(0 .0561293)	(0.0613366)	(.0613366)	(0.0605613)
Observations	6564	6564	6564	6564	6564	6564
N	6564	6564	6564	6564	6564	6564
r2_p	0.2046	0.2116	0.2126	0.2046/0.2116	0.2046/ 0.2116	0.2116/0.2126

Bootstrap standard errors in parentheses

**** p<0.01, ** p<0.05, * p<0.1*

Source: Author's own estimation based on MINEC-DIGECTYC (various years)

The results for the woman as household head showed a negative impact in the simultaneous quantile regression, while for the multinomial regression the impact was positive. The results for both techniques are not conclusive since in Tables 3.3 and 3.4, the percentage of woman as household head seems to be higher for transient poor households than for non-poor and chronic poor households. As mentioned before, further studies are needed in this case. Likewise, the percentage of adults working in the agricultural sector and households living in the rural area have the expected signs in the quantile regressions for both panels and three categories of poverty. This is opposed to the negative and significant relationship of these variables in relation to the probabilities of being chronic and transient poor in the multinomial logit model. Looking at the results in Tables 3.3 and 3.4, the results of the quantile regressions seem to be more reliable, as they confirm what was found by the mean of the three groups for these indicators where compared.

The interquantile regressions show that the majority of variables do not present a distinctive significant impact for the three different classifications of poverty presented. However, for some variables the impact differs. For instance, the percentage of household members younger than 16 years of age is only significant for the non-poor households in the 2009-2010 panel. On the other hand, the variable for the percentage of household members older than 60 years of age is statistically different between chronic and transient poor households and non-poor households, indicating that its effects are more important for the former classifications. By the same token, in the 2008-2009 panel, the impact of the remittances is stronger for chronic poor households with respect to non-poor households, and the impact of asset incomes is only significant for transient poor households. In the panel 2009-2010 the negative impact of government transfers is more evident for non-poor households compared to transient poor households.

The 2008-2009 panel also shows that the impact of the percentage of adults with more than ten years of education is statistically different and higher for non-poor households than for chronic and transient poor households. For both panels the variable of the percentage of adults working in the agricultural sector is statistically different across poverty classifications. In the 2008-2009 panel, the negative impact of this variable is more important for chronic and transient poor households compared to non-poor households, while in the panel 2009-2010 the impact of this variable is superior in chronic poor households when compared to transient poor households. Finally, in the 2009-2010 panel, the impact of living in the MASS is only significant for the chronic and the transient poor households, and between these two categories, its impact is more important in chronic poor households.

5. Conclusions and recommendations

The socio-economic characteristics of chronic and transient poor households were grouped in five categories. The demographic characteristics suggest that – on average – chronic poor households have a higher proportion of members with less than 16 years of age compared to transient and non-poor households, which causes the dependency ratio to be far larger in chronic poor households. In addition, the multinomial logit models show that a high percentage of members with less than 16 years of age increases the odds of being chronic and transient poor in the same way as the dependency ratio does. These results call the attention on the main human development cash transfer programme in El Salvador called "Comunidades Solidarias", as the cash transfer is given in a fixed amount to poor households, no matter the quantity of children they have. In order to better fight against chronic poverty, transfers might be given based on the number of children, as is done in other Latin American countries.

Regarding the access to economic resources, both the multinomial logit model and the simultaneous quantile regression show that remittances are an important source of income for households that allow them to avoid chronic and transient poverty. The possession of assets is very scarce for transient poor households and is even more scarce in chronic poor units. An interesting finding is that receiving government transfers increases the odds of being in chronic and transient poverty. This might be related to the size of the monthly cash transfer of Comunidades Solidarias. The amount of the transfers only represents 5.9% of the urban poverty line and 8.44% of the rural poverty line in 2010.

These findings call attention for at least three kinds of policies. First, the implementation of programmes that provide opportunities and incentives for poor households to accumulate assets – such as physical and financial assets – is a critical effort in the fight against chronic poverty. Moser (2006) outlines some policies in this regard. Second, it is important to increase the amount and coverage of the cash transfer provided by Comunidades Solidarias. By now the evidence shows that even though the transfers are a good tool to increase the welfare of poor households, the programme is not helping households escape from poverty, at least in the short run[25]. In addition, the exit strategy of Comunidades Solidarias can and should be reviewed. Currently, the exit strategy is mainly based on age limits, and households close to exiting the programme will most likely require further assistance to fully escape from poverty. Third, for transient poor households, the design of an emergency cash transfers schemes might help overcome the impacts of short run shocks, and prevent the depletion of their assets which can cause them to fall into (chronic) poverty.

The educational characteristics show that human capital accumulation through education is an important determinant to reduce the odds of being in chronic and

[25] However, this paper acknowledge that the focus of these programmes is to reduce poverty in the medium and long term.

transient poverty. Human capital accumulation through education also increases real household income. However, the accumulation of human capital is very low in chronic poor households. For instance, in the baseline of panel the 2008-2009, only 9.13% of the adults in chronic poor households have more than 9 years of education; the vast majority of adults have 6 years of education or less (73.90%). This points out the necessity to invest more in the education of chronic and transient poor households. In this regard, programmes aimed at incentivising and retaining children and adolescents in school can help households improve the labour prospects of their youngest members.

The percentage of adults working as wage earners and employers significantly reduces the odds of being chronic and transient poverty, and increases real household income. On the other hand, the higher the percentage of adults unemployed in the household, the higher the odds of suffering from chronic and transient poverty become. These two facts suggest the necessity of policies aimed at increasing levels of formal employment, which holds an important capacity to bring households out of poverty.

The multinomial logit shows contradictory results for the percentage of adults working in the agricultural sector and households living in the rural areas. For these two variables the models predict that they impact negatively on the odds of being in chronic and transient poverty. This is different from what the mean comparison shows and from results found in other studies. However, the simultaneous quantile regressions show the expected impact for both variables, as they reduce the real household income for chronic and transient poor households in both panels. Thus, to better fight against chronic poverty, public policy has to take into account the historic gaps between rural and urban areas.

The hypothesis that the determinants of chronic and transient poverty differ has been confirmed. Although the interquantile regressions showed some difference in the impact of some variables, the main difference is that the impact of the proposed determinants tends to increase more the odds of being in chronic poverty.

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Appendices

Appendix 1. Characteristics comparison: sample for households EHPM vs households in panel data 2008-2009

	Panel 2008-2009					
	EHPM 2008	Panel 2008	Median test (Ho: dif=0) (P-values)	EHPM2009	Panel 2009	Median test (Ho: dif=0) (P-values)
Proportion of households according to the sex of household head						
Male	66.7%	67.8%	0.1322	66.2%	66.8%	0.3848
Female	33.3%	32.2%	0.1322	33.8%	33.2%	0.3848
Proportions of households according their area of residence						
Urban	59.8%	58.5%	0.0845	55.0%	56.8%	0.0163
Rural	40.2%	41.5%	0.0845	45.0%	43.2%	0.0163
Proportions of households according their department of residence						
Ahuachapán	6.5%	6.5%	0.9997	5.8%	6.4%	0.0617
Santa Ana	8.5%	8.8%	0.5106	9.3%	8.8%	0.2565
Sonsonate	8.2%	8.3%	0.7772	7.3%	8.3%	0.0122
Chalatenango	4.2%	4.3%	0.5822	3.9%	4.3%	0.1159
La Libertad	11.7%	10.5%	0.0158	10.7%	10.5%	0.663
San Salvador	21.6%	20.9%	0.2854	19.1%	20.9%	0.0038
Cuscatlán	4.2%	4.4%	0.6359	4.5%	4.4%	0.6953
La Paz	6.6%	6.7%	0.6649	6.0%	6.7%	0.0404
Cabañas	5.1%	5.6%	0.1753	6.6%	5.6%	0.0068
San Vicente	4.1%	4.3%	0.5047	3.8%	4.3%	0.0695
Usulutan	5.1%	5.0%	0.7036	4.5%	5.0%	0.1107
San Miguel	5.0%	4.7%	0.427	5.8%	4.7%	0.0026
Morazán	4.3%	5.1%	0.0131	6.2%	5.1%	0.0022
La Unión	5.1%	5.0%	0.769	6.7%	5.0%	0
Average monthly income per household						
Household income	443.0861	443.0656	0.9981	428.9582	449.7911	0.0075
Proportions of households in poverty						
Extreme poverty	14.7%	14.9%	0.6666	14.2%	14.3%	0.8155
Relative poverty	29.5%	29.5%	0.9611	28.2%	28.4%	0.8491
Not in poverty	55.8%	55.6%	0.7927	57.6%	57.3%	0.7354
Proportions of households that receive remittances						
Recipient	24.7%	25.8%	0.1069	23.8%	23.0%	0.1804
Non-recipient	75.3%	74.2%	0.1069	76.2%	77.0%	0.1804
Proportion of households according to the years of education of the household head						
0 to 6 years	66.4%	67.6%	0.0924	68.0%	67.7%	0.6396
7 to 9 years	14.8%	14.0%	0.1514	14.1%	14.1%	0.9829
More than 9 years	18.8%	18.4%	0.462	17.9%	18.2%	0.5821

	Panel 2008-2009					
	EHPM 2008	Panel 2008	Median test (Ho: dif=0) (P-values)	EHPM2009	Panel 2009	Median test (Ho: dif=0) (P-values)
Proportion of household with access to drinking water						
Access	64.2%	64.5%	0.6792	65.9%	68.0%	0.0027
No Access	35.8%	35.5%	0.6792	34.1%	32.0%	0.0027
Proportion of household with access to sewage						
Access	94.2%	94.8%	0.1015	93.8%	95.5%	0
No Access	5.8%	5.2%	0.1015	6.2%	4.5%	0
Proportion of households with access to electricity						
Access	88.4%	89.4%	0.0407	88.3%	90.5%	0
No Access	11.6%	10.6%	0.0407	11.7%	9.5%	0

Source: Author´s elaboration based on MINEC-DIGESTYC (various years).

Appendix 2. Characteristics comparison: sample for households EHPM vs households in panel data 2009-2010

Panel 2009-2010

	EHPM2009	Panel 2009	Median test (Ho: dif=0) (P-value)	EHPM 2010	Panel 2010	Median test (Ho: dif=0) (P-value)
Proportion of households according to the sex of household head						
Male	66.2%	67.0%	0.2293	65.9%	66.8%	0.1813
Female	33.8%	33.0%	0.2293	34.1%	33.2%	0.1813
Proportions of households according their area of residence						
Urban	55.0%	55.1%	0.8421	54.7%	55.0%	0.6705
Rural	45.0%	44.9%	0.8421	45.3%	45.0%	0.6705
Proportions of households according their department of residence						
Ahuachapán	5.8%	6.3%	0.082	5.6%	6.3%	0.0313
Santa Ana	9.3%	9.5%	0.6665	9.4%	9.5%	0.9523
Sonsonate	7.3%	6.6%	0.0488	7.3%	6.6%	0.0676
Chalatenango	3.9%	4.4%	0.0449	3.9%	4.4%	0.0538
La Libertad	10.7%	11.1%	0.2867	10.6%	11.1%	0.2133
San Salvador	19.1%	18.3%	0.1544	18.8%	18.3%	0.4571
Cuscatlán	4.5%	4.3%	0.5791	4.4%	4.3%	0.7662
La Paz	6.0%	5.9%	0.8555	6.1%	5.9%	0.5208
Cabañas	6.6%	6.2%	0.2459	6.6%	6.2%	0.1857
San Vicente	3.8%	3.5%	0.339	3.9%	3.5%	0.2271
Usulután	4.5%	4.2%	0.4014	4.5%	4.2%	0.2655
San Miguel	5.8%	6.2%	0.2374	5.8%	6.2%	0.2373
Morazán	6.2%	6.7%	0.1831	6.3%	6.7%	0.2538
La Unión	6.7%	6.7%	0.9929	6.8%	6.7%	0.7528
Average monthly income per household						
Household income	428.9582	445.7419	0.0178	424.1815	441.3374	0.0058
Proportions of households in poverty						
Extreme poverty	14.2%	13.5%	0.1829	12.8%	13.0%	0.7729
Relative poverty	28.2%	28.1%	0.8047	27.4%	27.7%	0.679
Not in poverty	57.6%	58.4%	0.2455	59.8%	59.4%	0.5664
Proportions of households that receive remittances						
Recipient	23.8%	25.8%	0.0014	23.9%	25.2%	0.0395
Non-recipient	76.2%	74.2%	0.0014	76.1%	74.8%	0.0395
Proportion of households according to the years of education of the household head						
0 to 6 years	68.0%	67.3%	0.27	67.1%	67.3%	0.8119
7 to 9 years	14.1%	14.5%	0.4953	14.9%	14.6%	0.5778
More than 9 years	17.9%	18.3%	0.4702	18.0%	18.1%	0.8225
Proportion of household with access to drinking water						
Access	65.9%	68.0%	0.0018	66.6%	69.8%	0
No Access	34.1%	32.1%	0.0018	33.4%	30.2%	0

Panel 2009-2010						
	EHPM2009	Panel 2009	Median test (Ho: dif=0) (P-value)	EHPM 2010	Panel 2010	Median test (Ho: dif=0) (P-value)
Proportion of household with access to sewage						
Access	93.8%	94.8%	0.0036	94.2%	96.7%	0.00
No Access	6.2%	5.2%	0.0036	5.8%	3.3%	0.00
Proportion of households with access to electricity						
Access	88.3%	89.6%	0.0064	89.1%	90.4%	0.00
No Access	11.7%	10.4%	0.0064	10.9%	9.6%	0.00

Source: Author´s elaboration based on MINEC-DIGESTYC (various years).

Appendix 3. Fit statistics for multinomial logit panel 2008-2009 and panel 2009-2010

(Count R2 and Adj Count R2 not calculated if pweight used)

Test	Panel 2008-2009	Panel 2009-2010	Test	Panel 2008-2009	Panel 2009-2010
Log-Lik Intercept Only:	-5840.206	-7007.097	Log-Lik Full Model:	-3898.024	-4717.334
D(5391):	7796.047	9434.669	LR(36):	3884.364	4579.525
			Prob > LR:	0	0
McFadden's R2:	0.333	0.327	McFadden's Adj R2:	0.326	0.321
ML (Cox-Snell) R2:	0.511	0.502	Cragg-Uhler (Nagelkerke) R2:	0.578	0.57
Count R2:	.		Adj Count R2:	.	
AIC:	1.45	1.449	AIC*n:	7872.047	9510.669
BIC:	-38563.912	-47924.665	BIC':	-3574.782	-4263.108
BIC used by Stata:	8122.829	9768.664	AIC used by Stata:	7872.047	9510.669

Source: author´s estimation based on MINEC-DIGESTYC (various years).

Appendix 4. Wald test for multinomial logit panel 2008-2009 and panel 2009-2010 (a)

Variable	Panel 2008-2009			Panel 2009-2010		
	chi2	df	P>chi2	chi2	df	P>chi2
% members 0-15	303.863	2	0	148.149	2	0
% members 60+	93.323	2	0	254.906	2	0
dependency ratio	16.836	2	0	57.188	2	0
head-age	62.983	2	0	27.582	2	0
head-age2	3.605	2	0.165	1.191	2	0.551
head-woman	52.963	2	0	75.904	2	0
log (household-real income)	975.842	2	0	1174.667	2	0
remittances	61.325	2	0	52.663	2	0
assets	9.413	2	0.009	10.842	2	0.004
government transfers	11.261	2	0.004	48.046	2	0
head years of education	68.298	2	0	91.02	2	0
% illiterate adults	0.759	2	0.684	0.146	2	0.93
% adults 10+ years of educ	11.272	2	0.004	6.527	2	0.038
% adults unemployed	15.338	2	0	7.36	2	0.025
% adults wage earner or employer	48.434	2	0	28.024	2	0
% of adults working in agriculture	1.227	2	0.541	13.917	2	0.001
rural	182.038	2	0	250.74	2	0
metropolitan area of SS	1.269	2	0.53	7.403	2	0.025

(a) Ho: All coefficients associated with given variable(s) are 0. Source: author´s own estimation based on MINEC-DIGESTYC (various years).

Appendix 5. Small-Hsiao test for the Independence of irrelevant alternatives for multinomial logit panel 2008-2009 and panel 2009-2010 (a)

	Panel 2008-2009						Panel 2009-2010					
Omitted	**lnL(full)**	**lnL(omit)**	**chi2**	**Df**	**P>chi2**	**evidence**	**lnL(full)**	**lnL(omit)**	**chi2**	**df**	**P>chi2**	**evidence**
Chronic	-916.2	-909.6	13.2	19	0.8	for Ho	-1161.9	-1161.2	1.5	19	1.0	for Ho
Transient	-512.6	-493.1	39.0	19	0.0	against Ho	-629.9	-622.9	14.0	19	0.8	for Ho
Non-poor	-866.0	-858.8	14.4	19	0.8	for Ho	-1015.5	-1004.5	22.0	19	0.3	for Ho

(a) Ho: Odds (Outcome-J Vs Outcome-K) are independent of other alternatives. Source: author´s own estimation based on MINEC-DIGESTYC (various years).

Appendix 6. Wald test for combining alternatives for multinomial logit panel 2008-2009 and panel 2009-2010 (a)

	Panel 2008-2009			Panel 2009-2010		
Alternatives	tested chi2	df	P>chi2	tested chi2	df	P>chi2
0-1	806.272	18	0	846.118	18	0
0-2	2461.9	18	0	2497.294	18	0
1-2	840.946	18	0	1151.744	18	0

(a) Ho: All coefficients except intercepts associated with a given pair of alternatives are 0 (ie, alternatives can be combined). Source: author´s own estimation based on MINEC-DIGESTYC (various years).

Appendix 7. Specification test for the simultaneous quantile regression and interquantile regressions, panel 2008-2009

Specification test	**Simultaneous quantile regression**		**Interquantile regression: Chronic-transient**		**Interquantile regression: Chronic-Non-poor**		**Interquantile regression: Transient-non-poor**	
	Coef.	P>t	Coef.	P>t	Coef.	P>t	Coef.	P>t
_hat	0.4430279	0.18	7.182388	0.025	2.057926	0.241	2.396845	0.062
_hatsq	0.0494181	0.11	-8.200944	0.06	0.2494643	0.88	-0.6245563	0.391
_cons	2.017232	0.02	-0.3777103	0.511	0.0166107	0.971	-0.4971944	0.38

Source: author´s estimation based on MINEC-DIGESTYC (various years).

Appendix 8. Specification test for the simultaneous quantile regression and interquantile regressions, panel 2009-2010

Specification test	**Simultaneous quantile regression**		**Interquantile regression: Chronic-transient**		**Interquantile regression: Chronic-Non-poor**		**Interquantile regression: Transient-non-poor**	
	Coef.	P>t	Coef.	P>t	Coef.	P>t	Coef.	P>t
_hat	1.31984	0	9.082654	0.007	-2.457334	0.091	-2.82168	0.216
_hatsq	-0.0342708	0.14	-9.92655	0.044	2.047106	0.024	3.663193	0.1
_cons	-0.2360499	0.72	-0.7757907	0.157	1.712932	0.003	1.576774	0.006

Source: author´s estimation based on MINEC-DIGESTYC (various years).