Targeted versus Universal Public Policies in Nicaragua: Assessing the Effects on Growth and Inequality Using Micro-Data

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30 May 2004

Abstract

The present paper deals with the effect of public policies on growth and inequality in Nicaragua.

Traditionally, the literature has approached the problem of the relationship between growth and inequality by analyzing cross-country data (Persson and Tabellini (1994), Banerjee and Duflo (2003)). On the contrary, we use micro-data.

We exploit information from three Living Standard Measurement Surveys carried out in 1993, 1998 and 2001. The last two rounds constitute a longitudinal data set, while the first is a cross-section of different households. Nevertheless, the whole information set is used in order to explain the dynamics of consumption. In a second step, the model is used to asses the effect of different policies. In developing countries, a similar framework is commonly applied to the analysis of vulnerability and anti-poverty policies (Datt, Simler,Mukherjee and Dava (2000)). We apply it to the analysis of household consumption dynamics and its effects on growth and inequality.

We simulate different policies. First, we study the effect of a government supported program of increase in human capital, measured by education. Second, we consider an infrastructural policy which proxies an improvement in market

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integration. In all cases, we consider both a universal policy, which benefits all Nicaraguan families, and an intervention targeted to the poor only.

The contribution of the paper is twofold. First, the medium term effects of different public policies on Nicaraguan families welfare is evaluated. Second, the analysis allows introducing a non-standard econometric technique which exploits all available information from panel surveys and other unpaired cross-sections. The availability of short longitudinal data sets and previous cross-sections is not an isolated case in developing countries in which household surveys are carried out. Rather than using data from panel families only, we exploit information from previous cross-sections in order to improve the efficiency of the econometric estimation (Breusch, Mizon and Schmidt (1989), Hausman and Taylor (1981)).

JEL Classification Numbers: O12, C33

Keywords: Distribution, Growth, Panel Data, Poverty Reduction Policies.

Preliminary. Comments Welcome.

1 Introduction

The relationship between growth and inequality has been widely investigated by a series of articles in the traditional literature (among many Persson and Tabellini (1994), Knack and Keefer (1997), Partridge (1997)).

The main idea underpinning this approach is the assessment of the causal relationship in *one* particular direction, from inequality to growth ($G \rightarrow \dot{Y}$)[1], i.e. how income distribution affects the *change* in income.

This literature intended to proceed forward with respect to Kuznets' idea of the analysis of the effect of the level of income on income distribution ($Y \rightarrow G$) as expalined in Aghion, Caroli and Garcia-Penalosa (1999).

In the present paper we follow a third way. We are not directly interested in answering a broad -though very interesting- question on the more suitable redistribution policies in promoting growth, or, viceversa, why some policies[2] can harm growth more than others. We think that this approach tends to treat all countries as black boxes with different endowments, and leads to the vague policy recommendation to reduce inequality to promote growth.

In alternative, it is possible to exploit household survey data, both in panel and cross section, to overcome the main theoretical and empirical shortcomings of this literature.

The paper is organized as follows: in the next section we stress the main empirical problems undermining the "traditional" macro approach. In section 4, an alternative approach based on micro-data is proposed. Section 5 and 6 present econometric model and data. Section 7 describes the policies on which our simulations are based. Simulations and results are presented in Section 8. Eventually, Section 9 concludes and provides some policy recommendations.

2 Estimating the Relationship Between Growth and Income Distribution

In the traditional approach, "political economy" and "wealth effect" considerations are the theoretical justifications for the causal relationship between growth and income distribution (Banerjee and Duflo (2003)).

[1]Hereafter we use the letter G -Gini Coefficient- with reference to a generic measure of income inequality.

[2]They could be on human capital or physical capital, regulatory policies, patent legislation, property rights protection, legal enforcement, etc.

An excellent review of the literature by Aghion, Caroli and Garcia-Penalosa (1999) enlightens the implications that the new theories of endogenous growth can bring in the debate when we abandon the traditional Solow context.

These investigations find theoretical arguments and counterarguments for the positive or negative relationship between growth and income distribution[3]. However, they cannot overcome the main empirical open issues implied by the traditional approach of cross-section and/or time series econometric analysis of cross-country data (Forbes (2000)), namely:

- endogeneity;
- reverse causality;
- measurement error.

2.1 Endogeneity and Reverse Causation

The argument behind this point is the following: if there is a negative relationship between income distribution and growth and, on the other hand, a reduction of inequality through growth, it is possible to start a virtuous cycle allowing for more growth and equality in the future, *via* the channel low inequality, high growth, lower inequality and so on[4].

A contemporaneous time regression would be inadequate to solve this problem and the estimated coefficients would be biased. This problem of endogeneity has been addressed by regressing the growth rates over 10-20 years on the initial levels of inequality (see Persson and Tabellini (1994)). The drawback is that a lot of precious data have to be averaged out, loosing degrees of freedom in the estimation. Furthermore, this approach does not allow investigating dynamic relationships through the introduction of the lagged dependent variable.

2.2 Measurement Error

The use of a cross country database may allow investigating the *common* effect of inequality on growth. However, this approach ignores the effect of country specific

[3]The literature has been converging toward an agreement on the a *negative* relationship, but the "outliers" are not so few, see for example Gilles Saint-Paul and Thierry Verdier (1993), Benabou (1996), Oded Galor and Daniel Tsiddon (1997)

[4]The opposite vicious case will show up only if both the inequality→growth and growth→inequality were exactly reversed.

characteristics. The problem can be addressed by using panel data in order to account for fixed or random effects.

In any case, unfortunately, serious measurement error problems arise when different countries are considered, as consistent and comparable cross-country data are difficult to collect. Random measurement error could generate an attenuation bias, reducing the significance of the results. More serious systematic measurement errors lead to positive or negative bias; if the inequality-growth relationship is weak, this bias can even change the sign of the coefficients. The problem of systematic error is due to the fact that there are different ways in which different countries report about inequality[5] or other crucial variables like schooling and income. Definitions and measurement procedures may even change within the same country across time. The implications on the regression results are not innocuous.

3 The Micro-Data Methodology

We look at the problem from a different perspective, trying to proceed through a micro-foundation of our macro-growth problem, where both "growth" ($\dot{Y}$) and inequality (G) are explained by a third factor, the *individual pattern of consumption of the heterogeneous families.*

Rather than imposing the relationship:

$$Growth = G(Inequality) \tag{1}$$

we argue that the structure of the problem is the following:

$$\begin{aligned} C_i &= C(X_i) \;\; i = 1, ...N & (2) \\ Growth &= G(C_1, C_2, ...C_N) & (3) \\ Inequality &= I(C_1, C_2, ...C_N) & (4) \end{aligned}$$

The behavior/reaction function of the single family (the micro-structure of the system) can provide more useful information about which policies are able to affect distribution and growth.

[5]Forbes (2000) mentions this example: if some less unequal countries tend to report less inequality and to grow more slowly with respect to comparable -in terms of inequality- countries, they will generate a negative bias in cross country estimates of the impact of inequality on growth.

4 The Econometric Model and Methodology

[6]

We exploit information on household consumption and characteristics relative to three points in time. For the last two, observations are referred to the same families, so that we can estimate the following model:

$$C_{it} = \alpha + \beta X_{it} + [\phi(i) + u(it)] \tag{5}$$

where $\phi(i)$ represents the household specific effect, which could be either fixed or random.

Data from the first period can be used to increase the efficiency of the estimation, with a technique which varies according to the relationship between household observed and unobservable characteristics, i.e. to the fact that the former are correlated or uncorrelated with the latter.

4.1 Uncorrelated case

If the observed X are uncorrelated with the unobservable household specific effect, both fixed and random effect techniques provide consistent estimates of the coefficients in equation 5. However, random effect estimation is more efficient. Random effect estimation account for the fact that the errors for paired observations are correlated with one another. Proper weights are applied. When we add observations from the first period, we need to correct for the fact that these are not correlated with paired observations and are characterized by different variance. Hence, they need to be weighted differently. Overall, the two sets of data need to be weighted further in order to account for heteroskedasticity[7].

4.2 Correlated Case

In case of correlation between household effect and observed characteristics, fixed effect regression techniques need to be used and the process of integration with data from the first period is more complicated.

Estimating the model using the paired observations by applying OLS to the changes of the variables gets consistent estimates for all the parameters, assuming the

[6]We are thankful and deeply indebted with Michael P. Murray for helping us shed light on estimation problems.

[7]This is just like the Prais-Winsten solution to adding the first observation after partial differencing observations 2 through T to correct for first order autoregressive disturbances.

explanatory variables are not fixed across households. Estimating the model from the paired observations by OLS obtains biased estimates of the coefficients. The difference between these two sets of estimates is a consistent estimate of the OLS bias for each coefficient, which we can put in a matrix $\widehat{bias}$. Now suppose that the covariance between the X_{it} and the omitted variables is the same in your two samples of households[8]. Subtracting $X\widehat{bias}$ from consumption C for the singly observed households purges it (asymptotically) of the OLS biasing correlation between explanatory and omitted variables.

OLS applied to the unpaired observations ($Y - X \times \widehat{bias}$) yields new consistent estimates of β. The question is now how to best combine the two consistent estimates of β. The changes in the paired observations (observations free of bias by the differencing) and the ($Y - X \times \widehat{bias}$) observations need to be combined in a Feasible GLS procedure which recognizes that: a) the observations on changes have a different variance than the ($Y - X \times \widehat{bias}$) observations; b) there is probably a correlation between the disturbances in the paired observations and the $X \times \widehat{bias}$ piece of the unpaired observations.

We estimate preliminarily our model through random effect techniques, under the assumption of no correlation between unobservable and observed household characteristics. We believe that this is the correct model from the theoretical point of view because, especially in the context of Nicaragua, the structure of each family can change substantially in the three year interval which separates our paired observations. Even more so, given that unit of observation in the sample design of the survey was the house (or vivienda).

5 The Data

We use data from three Living Standard Measurement Surveys carried out in Nicaragua in 1993, 1998 and 2001, which collected information on demographic characteristics, assets, economic activities, income and consumption. The LSMS from 1998 and 2001 should provide a panel of about 4000 families. A rate of attrition of about 25% is observed, so that only 3015 households are surveyed in both periods. However, previous works (Davis and Stampini (2002)) have shown that this attrition is quite random in nature and is not expected to produce a bias in the analysis of household consumption. After cleaning from outlying values, we are left with a panel of two periods and 2616 families. Data from 1993 is used in order to increase the efficiency of estimation. In 1993, the LSMS surveyed 4454 households. After cleaning for outliers, we can exploit information on 4125 families.

[8]This hypothesis is crucial in the following argument

We study per-capita household consumption. Values from the three years are deflated and brought to a common unit of measure on the base of the price variation reflected in the change in the official poverty line indicated by the World Bank. In our model, consumption is a function of:

- demographic characteristics: household size, composition (size of groups by age and gender), age and gender of the household head;
- human capital, measured by the average years of schooling among adult members;
- labor market participation: among adult members, number of self-employed, number of big farmers, number of agricultural dependant workers and number of non-agricultural dependant workers;
- assets: availability of water and electricity in the house, property of the house (registered or not), land size and number of heads of cattle;
- geographical location, expressed by six dummy variables for urban and rural areas in the three region (Pacific, Central and Atlantic - omitted is the capital city, Managua).

The mean value of the above variables in the three years is reported in Table 1.

A number of interaction terms are included in the multivariate analysis. Results of the estimation are presented in Table 2 and 3.

6 Policy Description

We simulate two kinds of policies, the first focusing on human capital, the second on market integration (proxied by access to services). In both cases, we simulate both a universal program benefiting all families and one targeted to poor households only. For a sensible comparison of the effect of different programs on growth and distribution, it would be necessary to impose that they had the same cost. However, a detailed analysis of each program and its costs is beyond the scope of the present paper. Our main aim is to show how the relationship between growth and inequality effects is policy-specific and needs to be enquired through simulations based on micro-data. Therefore, we will keep our policies as simple as possible[9] and only is some cases we will make some attempt at ensuring budget neutrality.

[9] For the same reason we ignore the problem of program take up and assume that all eligible households participate successfully in the program.

In our model, human capital is proxied by average years of schooling of adult members in each family. The importance of human capital and education in fostering growth and welfare is emphasized by a wide literature (Gloom and Ravikumar (1992), Aghion, Caroli and Garcia-Penalosa (1999)). This consensus has provided the theoretical basis for conditional cash transfer programs implemented in recent years in Latin America, after the pioneering experience of Progresa in Mexico. These programs provide immediate poverty alleviation through a cash transfer if the family satisfies some behavioral requirements, among which is ensuring school attendance of children (in the case of Progresa, other conditions were regular health check-ups and participation in community meetings focused on nutritional education). In Nicaragua, a similar program - the *Red de Proteccion Social* (RPS) - has been implemented since 1999 (for details, see IFPRI's technical description at http://www.ifpri.org/themes/mp18/Nicaraguarps/technical_description.pdf).

The universal policy we simulate consists in increasing average schooling of adults by one year for all households. As far as concerns the targeted policy, in this case we make an attempt at keeping the pressure on the public budget constant. As in Nicaragua about half of the population lives in poverty, we suppose that a targeted policy with equal costs would be able to ensure a double increase in education for poor families only. Hence, we analyze the effect of an increase in average schooling by two years.

The second set of policies we consider is related with market integration. Marginal location, lack of good roads, transportation and communications force households to subsistence livelihood strategies. Lack of integration with the markets reduces the range of alternatives accessible for the allocation of labor resources and for the placement of local productions. In order to keep hypothesis as simple as possible, we proxy marginality and market proximity with access to electricity. Lack of electricity in the house affect mostly poor rural households. Lack of electricity prevents from engaging in activities related to textile production and food transformation and conservation. We simulate the effect of a universal policy which provides the service to all families which do not have access to it, and of a targeted policy benefiting only poor households. As most households with no access to electricity are poor, this is mostly a self-targeting policy and the cost of the universal and targeted programs should not differ much.

7 Regression Results

The effects of the four policies on growth and distribution are reported in Table 4. Results are presented for the whole country as well as separately for urban and rural areas.

The first column of the table shows the rate of growth of consumption associated with the implementation of the policy. The second shows the effect on the Gini coefficient of the distribution of consumption, expressed as percentage variation with respect to the initial value. The third column, eventually, reports the elasticity of inequality with respect to growth, i.e. the percentage variation of the Gini coefficient associated with a 1 percent increase in consumption as effect of a particular policy, as expressed by the following formula:

$$\varepsilon = \left(\frac{dG}{dC}\right)\left(\frac{C}{G}\right)$$

where G is the Gini coefficient and C is consumption. Figures 1 to 4 show the change in the distribution of consumption due to each policy (consumption is shown only until 15,000 Cordobas 2001 per capita per year in order to avoid compression in the figure).

It stands out that the policy which ensures the best result in terms of growth is the only one which increases inequality. When human capital is increased for all families, consumption increases by about 6 percent, but growth is higher for richer families than for poor ones. The Gini coefficient of inequality increases by 0.95 percent. Growth is higher in urban areas (6.55 percent) than in rural ones (4.52 percent). Urban and rural inequality are barely affected, so that the increase in the overall Gini coefficient is due to an increase of the rural/urban gap.

The targeted educational policy, which allows increasing average adult education of poor families by two years by saving on rich families, ensures about half of the growth performance of the universal program. Consumption grows by 3.41 percent. On the other hand, however, inequality decreases by 5.21 percent. In rural areas, the targeted policy outperforms the universal one on both dimensions. Consumption grows by 5.12 percent rather than by 4.52 percent (in the universal program) and inequality decreases by 5.76 percent rather than by 0.02 percent. In urban areas the targeted program obtains a better performance in terms of inequality (a decrease by 6.05 percent versus an increase by 0.12 percent with the universal program) at the price of lower growth (2.76 percent versus 6.55 percent). A policy maker who gives equal weight to urban and rural welfare and whose preferences are linear in inequality and growth performance (W= growth rate + decrease in inequality) will prefer the targeted to the universal program (WT=3.41+5.21=8.62 versus WU=5.99-0.95=5.04).

If preferences are lexicographic with infinite weight assigned to growth, the universal program will be chosen as it increases consumption more, no matter the effect on distribution. If preferences are lexicographic with infinite weight assigned to equality, the targeted program will be chosen instead. The choice of the policy maker depends on the degree of preference for growth with respect to equality. Furthermore, if urban and rural welfare are valued differently, some weights need to be introduced in the function of decision. Anyway, our point that higher growth is not necessarily and always associated with a reduction in inequality is made.

Both the universal and the targeted policies focusing on access to services guarantee a higher performance in terms of reduction in inequality (respectively 7.41 and 6.55 percent) but boost growth less (3.10 and 2.31 percent). In particular, growth is low in urban areas (0.87 and 0.62 percent) but is highest in rural areas, with an increase in consumption by 8.96 percent in the case of universal program and by 6.72 percent when the policy is targeted to the poor. An analogous path can be observed for inequality , which decreases by 3.28 percent and by 2.64 percent in urban areas and by 9.44 percent and 11.23 percent in rural areas. The highest performance of the targeted program is a result of the exclusion of non poor families. In any case, the targeted infrastructural policy is associated with the highest elasticity of inequality reduction with respect to consumption growth. At the country level, it ensures a reduction in inequality by 2.84 percent for every percentage point of consumption growth.

However, the universal infrastructural policy outperforms the targeted one on both dimensions of growth and reduction in inequality (with the exception of rural areas). Nevertheless, the choice is complicated by budget considerations. On the base of the share of poor families among those with no access to electricity, we can argue that the cost of the targeted program amounts to about 70 percent of the cost of the universal one. On the other hand, it ensures 75 percent of the growth performance (2.31 percent versus 3.10 percent) and 88 percent of the reduction in inequality. For a sensible comparison it would be necessary either to re-scale one of the two policies in order to ensure budget neutrality or to include cost considerations in the decision function of the policy maker.

8 Conclusions and Policy Implications

A consistent stream of economic literature studies the problem of growth and distribution through the analysis of the relationship between the two in different countries and at different times.

Inequality is one of the factors which influence growth. More specifically, it is found that a higher rate of inequality is associated with lower growth. The economic rationale is that a more equal distribution increases the size of markets; a higher number of individuals can buy market goods and this boosts production. Furthermore, a higher rate of saving is observed in countries with medium inequality, like Italy and Japan, rather than in more unequal countries like the United States. Higher savings can foster investment and future production and consumption.

However, this literature treats countries as black boxes, pulled together in a statistic analysis which forgets the particularity of the micro-structure of each economy. Furthermore, a relationship of causality which goes from inequality to growth is imposed.

On the contrary, we argue that growth and inequality are two simultaneous effects of microeconomic processes and that the relationship between the two depends on the single change that we are interested in analyzing. Rather than saying that less inequality boosts growth, with the implicit policy recommendation to reduce inequality, we suggest that different policies affect growth and inequality differently. Policy makers interested in fostering growth and decreasing inequality need to study the microeconomic consequences of alternative policies and decide according to their preferences for the two goals. This requires the integration of general equilibrium models, in order to account for cross-sector effects, with micro-data on household decisions.

However, such a rigorous approach is beyond the scope of the present paper. As common in the literature on poverty reduction and program evaluation, we use a model of consumption based on data from household surveys only within a single country. In particular, we use data from three LSMS carried out in Nicaragua between 1993 and 2001 in order to analyze the effect of universal and targeted policies on education and access to services on growth and distribution. The fundamental point is that different policies affect growth and distribution differently.

In particular, not always a higher growth is associated with a (higher) reduction in inequality. Specifically, we find that a universal policy focusing on human capital as proxied by average adult education obtains the best performance in terms of growth, but increases inequality. A more positive effect on distribution is obtained through a targeted policy, at the cost of lower growth. At least in this case, the policy maker needs to specify some degree of preference between growth and equality in order to chose the preferred program.

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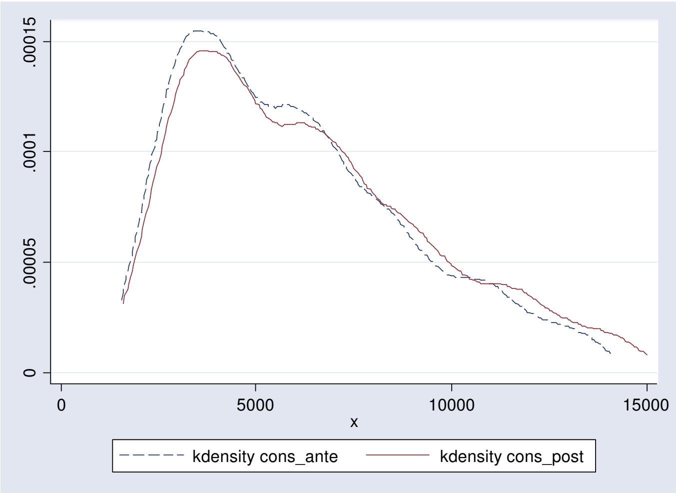

Figure 1: Policy 1: universal increase in education

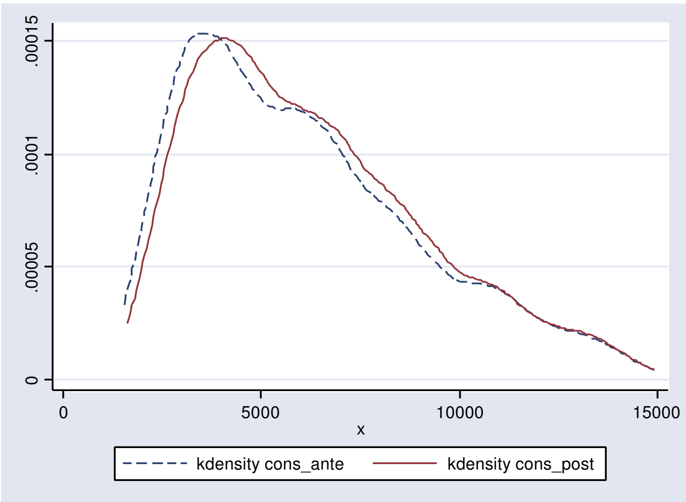

Figure 2: Policy 2: targeted increase in education

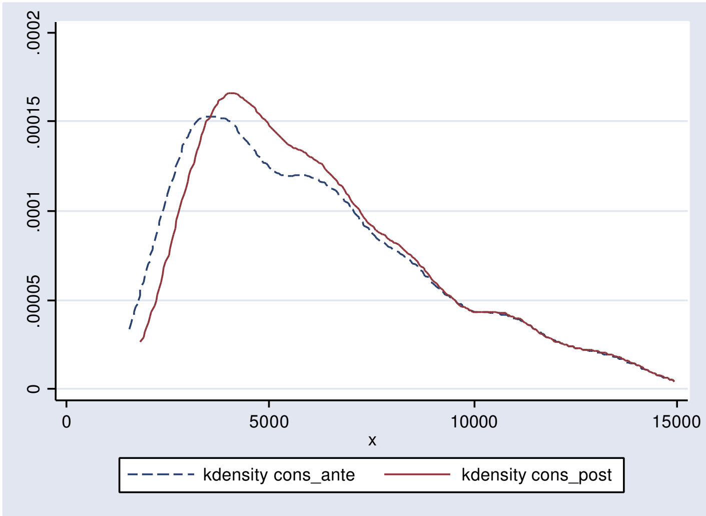

Figure 3: Policy 3: universal provision of electricity

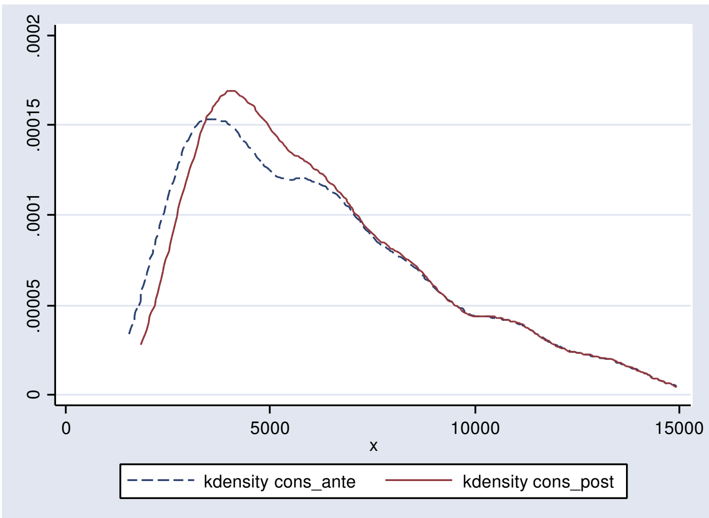

Figure 4: Policy 4: targeted provision of electricity

Table 1: Mean value of the variables included in the model (unweighted)

VARIABLE: MEAN VALUE/YEAR	1993	1998	2001
Number of observations	4125	2616	2616
Per capita household consumption*	4292	5579	7567
Deflated per-capita household consumption*	8595	6756	7567
Female headed household	0,280	0,270	0,290
Head?s age	43,94	46,29	48,80
Family size (ln)	1,580	1,660	1,610
# children age 0-4	0,860	0,810	0,630
# children age 5-10	1,010	1,070	0,980
# males 11-14	0,320	0,330	0,320
# females 11-14	0,320	0,330	0,310
# males age 15-19	0,310	0,390	0,380
# females age 15-19	0,310	0,370	0,350
# males age 20-34	0,580	0,580	0,580
# females age 20-34	0,640	0,650	0,620
# males age 35-59	0,440	0,500	0,500
# females age 35-59	0,480	0,560	0,590
# males age $\geq$ 60	0,140	0,160	0,180
Hh average years of education	4,420	4,660	5,080
# adults, self	0,650	0,730	0,740
# adults, patron	0,010	0,090	0,140
# adults, agricultural wage	0,180	0,380	0,360
# adults, non-agricultural wage	0,730	0,860	0,920
Dummy: water in the house	0,550	0,530	0,580
Dummy: electricity	0,660	0,630	0,690
Dummy: dirt floor	0,460	0,510	0,470
Dummy: registered property of the house	0,560	0,490	0,530
Dummy: non-registered property of the house	0,270	0,350	0,310
Total land size (hectares)	2,880	6,880	6,290
# head of cattle	1,770	1,720	1,650
Pacific region - urban	0,150	0,220	0,240
Pacific region - rural	0,090	0,170	0,160
Central region - urban	0,060	0,070	0,070
Central region - rural	0,060	0,070	0,070
Atlantic region - urban	0,160	0,150	0,150
Atlantic region ? rural	0,240	0,200	0,200
Managua	0,240	0,120	0,120
* Cordobas 2001 per year,			

Table 2: Random effect estimation

Dependent variable: Household per-capita consumption (ln)	Coefficient	(p-value)
Female headed household	-0.033**	(0.018)
Head?s age	-0,000	(0,890)
Family size (ln)	-0,610***	(0,000)
# children age 0-4	-0,034***	(0,000)
# children age 5-10	-0,008	(0,227)
# males 11-14	-0,001	(0,910)
# females 11-14	0,018*	(0,070)
# males age 15-19	0,003	(0,713)
# females age 15-19	0,030***	(0,002)
# males age 20-34	0,028***	(0,003)
# females age 20-34	0,058***	(0,000)
# males age 35-59	0,044***	(0,001)
# females age 35-59	0,064***	(0,000)
# males age ≥60	0,032*	(0,083)
Hh average years of education	0,070***	(0,000)
# adults, self	0,046***	(0,001)
# adults, patron	0,247***	(0,000)
# adults, agricultural wage	0,004	(0,740)
# adults, non-agricultural wage	0,020	(0,135)
Dummy: water in the house	0,075***	(0,003)
Dummy: electricity	0,141**	(0,025)
Dummy: dirt floor	-0,218***	(0,000)
Dummy: registered property of the house	0,036**	(0,014)
Dummy: non-registered property of the house	-0,031**	(0,049)
Total land size	0,001*	(0,084)
# head of cattle	0,012***	(0,000)
Pacific region - urban	-0,210***	(0,003)
Pacific region - rural	-0,186***	(0,002)
Central region - urban	-0,186***	(0,008)
Central region - rural	-0,196***	(0,002)

Table 3: Random effect estimation(continued)

Dependent variable: Household per-capita consumption (ln)	Coefficient	(p-value)
Atlantic region - urban	-0,350***	(0,000)
Atlantic region - rural	-0,365***	(0,000)
Dummy: year 1998	0,010	(0,436)
Dummy: year 2001	-0,007	(0,598)
Interaction: education * adults, self	0,001	(0,661)
Interaction: education * adults, patron	0,004	(0,569)
Interaction: education * adults, agricultural wage	-0,003	(0,409)
Interaction: education * adults, non-agricultural wage	0,002	(0,349)
Interaction: education * land size	0,000	(0,649)
Interaction: education * # heads of cattle	-0,000**	(0,037)
Interaction: education * Atlantic region - rural	-0,036***	(0,000)
Interaction: education * Central region - rural	-0,000	(0,964)
Interaction: education * Pacific region - rural	-0,019***	(0,004)
Interaction: education * Atlantic region - urban	-0,002	(0,818)
Interaction: education * Central region - urban	-0,004	(0,497)
Interaction: education * Pacific region - urban	-0,014***	(0,005)
Interaction: electricity * adults, self	0,002	(0,927)
Interaction: electricity * adults, patron	-0,136***	(0,004)
Interaction: electricity * adults, agricultural wage	-0,026	(0,117)
Interaction: electricity * adults, non-agricultural wage	-0,046***	(0,002)
Interaction: electricity * land size	-0,000	(0,696)
Interaction: electricity * # heads of cattle	-0,005***	(0,001)
Interaction: electricity * Atlantic region - rural	0,115	(0,171)
Interaction: electricity * Central region - rural	0,063	(0,330)
Interaction: electricity * Pacific region - rural	0,094	(0,146)
Interaction: electricity * Atlantic region - urban	0,092	(0,220)
Interaction: electricity * Central region - urban	0,200***	(0,004)
Interaction: electricity * Pacific region - urban	0,137*	(0,062)
Interaction: water * electricity	0,053*	(0,084)
Constant	9,293***	(0,000)
Observations	9268	
R-squared	0,599	
p values in parentheses		
* significant at 10%; ** significant at 5%; *** significant at 1%		

Table 4: Policy effects on growth and distribution

TOTAL	Growth	Inequality	Elasticity
Education - universal	0,06	0,01	0,16
Education - targeted	0,03	-0,05	-1,52
Infrastructure - universal	0,03	-0,07	-2,39
Infrastructure - targeted	0,02	-0,07	-2,84
URBAN	Growth	Inequality	Elasticity
Education - universal	0,07	0,00	0,02
Education - targeted	0,03	-0,06	-2,19
Infrastructure - universal	0,01	-0,03	-3,77
Infrastructure - targeted	0,01	-0,03	-4,25
RURAL	Growth	Inequality	Elasticity
Education - universal	0,05	0,00	0,00
Education - targeted	0,05	-0,06	-1,13
Infrastructure - universal	0,09	-0,09	-1,05
Infrastructure - targeted	0,07	-0,11	-1,67