Poverty and income distribution in Latin America: on the complementarities between trade policy and social public spending

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UNITED NATIONS

ECLAC

MINISTERIO
DE ASUNTOS EXTERIORES
Y DE COOPERACIÓN

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Economic Commission for Latin America and the Caribbean (ECLAC)

Contents

Abstract

In this paper we evaluate the poverty and distributional effects of fiscal spending and trade policies within a simultaneous framework. We provide the first systematic analysis testing for the existence of complementarities between trade and fiscal spending policies using data from Latin America. We show that the benefits of trade openness especially for the low income and middle class household groups greatly depend on the size of the government-provided social and human capital. Conversely, the benefits of publicly-provided of social-human capital for the poor depend to a large extent on the degree of openness of the trade regime. Social-human capital has a much smaller effect on household incomes when trade is restricted and may even have a deleterious effect if trade is sufficiently restricted. Efforts to promote trade have lower positive effects for households if the per capita social and human capital is low.

I. Introduction

Trade liberalization often implies important changes in the composition of production as well as in output and factor prices with significant impact on both the level of aggregate income and its distribution. These changes may induce negative consequences for the poor and for income distribution (Goldberg and Pavcnik, 2004 and 2007). A policy issue is how to mitigate the potentially negative effects on the poor and on equity that increasing trade openness may entail.

Studies have focused on the role of social policies and emergency anti-poverty programs to limit the social costs associated with major restructuring of economic activity. In fact, some countries in Latin America have implemented large social transfer programs to mitigate the negative consequences of such economic restructuring.[1] However, the welfare of the poor and other low income classes depends more on stocks of social or human capital rather than on flows of social spending.[2] While social spending contributes to build social capital it often takes time to achieve its impact; one of the main effects of these programs is their contribution to gradually building up stocks of social or human capital while the instantaneous direct effects on household welfare are likely to be of second order of importance and also mainly short-lived.

If the financing of the new social programs is through a reallocation of public spending an important question is what other spending items are cut. Recent studies have shown that certain countries in Latin America devote more than 50% of their revenues to providing subsidies to small economic elites to the detriment of spending in social and other public goods that generally are pro-growth and tend to benefit the majority of the population, not merely the wealthy (López and Galinato, 2007). So, one may speculate that cutting non-social subsidies to finance the build-up of social capital may be an effective way of promoting equity and reducing poverty.

In addition, there is the issue of the effectiveness of social spending to raise household income, especially of the poor. An important question is whether or not social spending is in fact targeted to the development of social capital stocks that benefit the poorest segments of society and whether social capital stocks are effective in reducing poverty and income disparities. There is a suspicion that many social programs in Latin America, including expenditures in public education,

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[1]   Throughout this paper we use an extended definition of social spending to include not only direct social transfers but also social security, spending in education, health care, social housing, and related items.

[2]   Even direct social transfer programs can be regarded as building units in constructing the necessary social infrastructure to "reach" the poor and allowing the poor to get better nourishment and education both of which involve stock effects that take years of consistent flow spending policies to build. Spending on other social goods such as education and health are obviously contributions to build human capital stocks.

health care and others, are in fact poorly targeted and create social capital that end up benefiting more the middle and even upper classes rather than the poor (Goñi et al. 2008).

The conventional approach in the literature has been to examine the poverty and distribution effects of trade policies and fiscal policies separately. A common feature of the vast trade policy evaluation literature summarized by Goldberg and Pavcnik's (2004) comprehensive survey article is that the connections between trade liberalization and inequality and poverty are established making abstraction of the fiscal spending environment which may nonetheless affect the size and even direction of the impact of trade policy. This piecemeal approach continues to prevail in more recent analyses of trade policy as shown by the more recent survey by Goldberg and Pavcnik (2007) and by Perry and Olarreaga (2006).

Similarly, the literature examining the effects of fiscal policy on poverty and inequality has largely made abstraction of the role of the trade regime in affecting the consequences of trade policy (van de Walle, 1998; Chu et.al., 2000; Wodon et.al., 2003; Goñi et.al., 2008; López and Torero, 2010; López and Islam, 2008). This piecemeal evaluation approach is likely to contribute to explain the often contradictory findings encountered in these literatures. If for example there are important complementarities between fiscal spending in social goods and trade policy, the partial evaluation of each of these policies may yield highly unstable results; when the author uses data for countries that spend a lot in social goods the effect of trade liberalization may be large, pro-poor and pro-equity, but authors analyzing countries where social spending is low would reach opposite conclusions.[3]

In this paper we break with this traditional piecemeal approach. We evaluate the poverty and distributional effects of fiscal spending and trade policies within a simultaneous framework. We provide the first systematic analysis testing for the existence of complementarities between trade and fiscal spending policies using data from Latin America. Fiscal expenditures often lead to the creation of capital stocks that over time impinge on the income of the various household groups.[4] We focus on the complementarities and substitutions that may arise between these government-provided capital stocks and trade policies for household incomes. We distinguish between government-provided social or human capital stocks created over time mostly through government expenditures in social goods and government-provided non-social capital stocks created over time by government spending in non-social goods.

A hypothesis that we test is that government-provided social or human capital stocks tend to make the benefits of trade liberalization larger and better distributed across the households and that a more open trade regime increases the pay-off of social capital especially for the poorest households. In addition, we test the hypothesis that the effect of social capital is enhanced by a more open trade regime.

To test the above hypotheses we use existing data for Latin American and Caribbean countries on public spending over the period 1987-2006. We use government spending in social programs series to construct stocks of government-provided social capital and series of spending in non-social goods to construct series of non-social capital stocks. In addition, we use measures of the degree of trade openness available in the literature that are computed annually for each country in the region. These data is combined with data from periodical household surveys implemented in many countries that allow computing various measures of poverty and income distribution. We examine how the size of the effect of trade openness on poverty and, more generally income distribution, is affected by the social and non-social government-provided capital stocks. If the hypothesis that trade liberalization and government-provided social capital is correct we would expect that the estimated elasticity of poverty with respect to trade openness be lower in countries that have greater per capita social capital stocks than those that have a lower stock. If trade openness (ceteris paribus) increases poverty the size of such effect would be lower in countries exhibiting a higher social capital stock and if the effect is to decrease poverty this effect would be magnified in countries lower stocks of social capital.

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[3]   Even the few studies of fiscal policies that "control" for the trade regime or studies of trade liberalization that control for certain aspects of fiscal policies do not really deal with the issue of interaction among policies; that is, merely controlling for the other policies does not by itself allow one to measure and test how the effectiveness of one set of policies affect that of the other one.

[4]   Government spending rarely has merely instantaneous effects; expenditures create capital in the form of social or human capital and non-social capital including infrastructure and others.

II. Econometric model

A. The basic specification

We divide the total household population of a country into M social groups to reflect the income distribution. We assume that the per capita household income of a particular group i at time t in country j, y_{ijt}, is determined by the per capita stock of government-provided social goods, S_{jt}^{s}, per capita stock of government-provided non-social goods, S_{jt}^{n}, which in turn are related to past allocations of government expenditures in social and non-social goods, respectively. In addition, we hypothesize that income distribution is associated with the country's per capita GDP, Y_{jt} by characteristics of the trade regime, Z_{jt}, by unobserved random or fixed effects specific to the social group in each country, $\tilde{\psi}_{ij}$, by country-specific time-varying effects, $\tilde{v}_{jt}$, and a random disturbance, $\tilde{\varepsilon}_{ijt}$.

Thus, if there are M household groups, we have a system of M equations such as,

$$(1) \qquad y_{ijt} = \tilde{\psi}_{ij} + \alpha_{1i}S_{jt}^{s} + \alpha_{2i}Y_{jt} + \alpha_{3i}Z_{jt} + \alpha_{4i}S_{jt}^{n} + \tilde{v}_{jt} + \tilde{\varepsilon}_{ijt}, \qquad i = 1,2,.....M$$

Importantly, the time-varying effects $\tilde{v}_{jt}$, which are a generalization of the standard fixed effects, control for a myriad of possibly unobserved (or at least hard to measure with precision) and hence omitted time-varying country variables that may affect the income of the various groups including macro and microeconomic policies, external shocks, institutional changes and so forth.[5] That is, the specification postulated in Equation (1) controls for both group specific effects, $\tilde{\psi}_{ij}$, allowing them to be different within and across countries as well as for non-random country-specific effects that change over time in a different way for each country ($\tilde{v}_{jt}$). Also we note that the

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[5]   Data on some important economy-wide variables (i.e., taxes, subsidies, various components of private capital stocks, and so forth) can often be estimated from existing statistics but with a low degree of precision. Thus, one could use these estimated variables but at a high cost associated with increased measurement errors biases caused by the use of explanatory variables that are gauged with little precision. We choose instead to use a more parsimonious model specification that relies on few conventional explanatory variables but that rely on country time-varying effects to control for the possible omitted variable biases associated with such a parsimonious model.

parameter vectors, α_{1i}, α_{2i}, α_{3i}, and α_{4i} are all allowed being different for each of the M household income groups considered in order to allow for differential effects of the respective variables on the per capita income of each particular group. The flexibility to estimate such a large number of parameters is possible because we jointly estimate the M group income equations.

The system estimation of the complete income distribution used here is more flexible and more general than most other specifications popular in the existing literature which use isolated measures of income distribution or poverty (such as Gini coefficients, proportion of the population below the poverty threshold, per capita income of the poorest quintile, and so forth). This flexibility is due to the large number of degrees of freedom which, in turn, permits us to use methods such as the country time-varying effects which demand a great deal of observations.

The above model postulates that group per capita incomes are associated to the stocks of government-provided capital accumulated through government spending over many years, not directly to the current flows of government expenditures. While we have data on the flows of government expenditures for various key components we do not have direct measures of their respective stock levels. We use a perpetual inventory model to construct capital stocks series for social and non-social goods using the government-provided expenditures in social and non-social goods, respectively (Griliches, 1979). The stock of publicly-provided social goods at time t in country j (S_{jt}^{s}) is,

$$(2) \qquad S_{jt}^{s} = gs_{jt} + (1-\delta_{s})S_{jt-1}^{s} \,,$$

where gs_{jt} are real government expenditures in social goods at time t and δ_{s} is the rate of depreciation of social public goods. In addition the perpetual inventory method derives the initial stock of capital (S_{j0}^{s}) as follows,

$$(3) \qquad S_{j0}^{s} = \frac{gs_{j0}}{\eta_{js} + \delta_{s}} \,,$$

where η_{js} is the rate of growth of the government expenditure in social goods. Using (3) and (2) we can construct a series of government-provided social capital stock over the sample time. A similar approach is used to estimate the stock of non-social government-provided capital (S_{jt}^{n}). A problem with this approach is that one needs to assume the rates of depreciation that apply to each capital stock. We use depreciation rates often used in the literature but we check the sensitivity of the results to varying the depreciation rates within reasonable ranges.

We estimate equation system (1) log differences. Expressed in changes over time the system of M equations become,

$$(4) \qquad g_{ijt} = \alpha_{1i}e_{jt}^{s} + \alpha_{2i}g_{jt}^{Y} + \alpha_{3i}z_{jt} + \alpha_{4i}e_{jt}^{n} + v_{jt} + \varepsilon_{ijt} \,, \qquad\qquad i = 1,....,M$$

where, $g_{ijt} \equiv y_{ijt} - y_{ijt-1}$; $g_{jt}^{Y} \equiv Y_{jt} - Y_{jt-1}$; $e_{jt}^{s} \equiv S_{jt}^{s} - S_{jt-1}^{s}$; $e_{jt}^{n} \equiv S_{jt}^{n} - S_{jt-1}^{n}$; $z_{jt} \equiv Z_{jt} - Z_{jt-1}$; $v_{jt} \equiv \tilde{v}_{jt} - \tilde{v}_{jt-1}$

It is important to note that while the fixed group effects ($\tilde{\psi}_{ij}$ in (1)) vanish in (4) due to the specification in differences the time-varying country effects (v_{jt}) do not disappear and in fact play a vital role in mitigating biases due to omission of country-wide unobserved variables. Alternatively, we may assume that $\tilde{\psi}_{ij}$ is random in which case Equation (4) can be enhanced to include a random effect factor.

The change of the government stock variables from period *t–1* to *t* is equal to the government spending at time *t–1* in the respective stock, less the depreciation of the stock. Thus, an additional advantage of using differences is that effectively using lagged instead of current government expenditures implicit in the stocks of government-provided capitals mitigates possible biases in the estimation of the coefficients due to reverse causality between government spending patterns and household income groups. Under certain assumptions we could also justify the use of lagged trade regime indicators instead of current ones. It is likely that changes in the trade regime may not have an instantaneous effect on the income distribution across groups. Under this assumption we could use lagged values of both the government spending variables and trade openness indicators which may mitigate reverse causality biases.

However, even if we use lagged values for the government spending and trade indicators we could still have biases and inconsistencies if the lagged values of these variables are correlated with unobserved or omitted variables that in turn affect current group household incomes.   But the fact that we control for country-specific time-varying effects (v_{jt}) prevents these biases as long as the omitted variables in each country are economy-wide and not group-specific.

In the benchmark estimation we disaggregate the households into four income groups: the poor, defined as the households in the bottom two quintiles of the income distribution, the middle class encompassing the households in the 41% to 70% of the income distribution, the upper middle class including households in the 71 to 90%, and the rich which include the households in richest 10% of the distribution. Alternatively, we divide the households into the ten income deciles. Apart from providing richer measures the use of all ten deciles instead of four groups contributes to shed light into the effects of the variables of interest into the poorest segments of society. We estimate the four or ten equations as a SUR system.

B. Generalizations of the basic model

1. Trade openness and government-provided capital stocks: interactions

Given our purposes we need to generalize (1) and (4) to allow for interactions between the government-provided capital stocks and the trade openness indicators. These interactions measure how the effect of trade openness on the income distribution profile is affected by the government capital stocks and vice-versa. Thus, Equation (1) is generalized to allow for such interactions as follows:

(1') $$y_{ijt} = \tilde{\psi}_{ij} + \alpha_{1i}S_{jt}^s + \alpha_{2i}Y_{jt} + \alpha_{3i}Z_{jt} + \alpha_{4i}S_{jt}^n + \beta_{1i}S_{jt}^s Z_{jt} + \beta_{2i}S_{jt}^n Z_{jt} + \tilde{v}_{jt} + \tilde{\varepsilon}_{ijt} ; \qquad i = 1,2,.....M$$

where the group-specific coefficients β_{1i} and β_{2i} measure the interactions between the trade regime and the effectiveness of government-provided social and non-social stocks. This specification in differences becomes,

(4') $$g_{ijt} = \alpha_{1i}e_{jt}^s + \alpha_{2i}g_{jt}^Y + \alpha_{3i}z_{jt} + \alpha_{4i}e_{jt}^n + \beta_{1i}I_{jt}^s + \beta_{2i}I_{jt}^n + v_{jt} + \varepsilon_{ijt}$$

where $I_{tj}^s \equiv (S_t^s - S_{t-1}^s)(Z_t - Z_{t-1})$ and $I_{tj}^n \equiv (S_t^n - S_{t-1}^n)(Z_t - Z_{t-1})$

2. Joint estimation of trade openness

In addition we extend the system to M+1 equations by estimating a trade openness relationship jointly with the group income functions. We postulate that trade openness as measured by a "structure trade intensity" (SATI) index (to be defined below) is determined by per capita income, the stocks of government-provided social and non-social capital stocks, by trade policies including import tariff

levels, tariff dispersion and the existence of free trade agreements and by the country-specific time-varying effects.[6] The fact that we estimate this equation jointly with the group income equations give us the degrees of freedom needed control for time-varying country effects in this equation as well. Thus, the trade openness equation estimated in difference form is the following:

$$(5) \qquad z_{jt} = \gamma_1 e_{jt}^s + \gamma_2 g_{jt}^Y + \gamma_3 e_{jt}^n + \Omega_1 m_{jt} + \Omega_2 d_{jt} + \Omega_3 tr_{jt} + \Lambda_{jt} + \mu_{jt}$$

where m_{jt}, d_{jt}, and tr_{jt} are the annual change in average tariff, in tariff dispersion and in the number of free trade agreements, respectively, Λ_{jt} are the time-varying country effects, and μ_{jt} is a random disturbance.

It is expected that the average tariff level lowers trade openness. Free trade agreements may increase or reduced the volume of trade; as is well known, trade agreements have trade creation and trade destruction effects, so the net effect is in general ambiguous. Tariff dispersion is also likely to have an ambiguous effect on trade openness. Thus, the effects of free trade treaties and of tariff dispersion on trade openness are mainly an empirical matter.

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[6]   The SATI index normalizes the trade flows of a country by its size, geographic location, population and several other natural structural factors that are likely to affect trade openness. In this way SATI captures mainly the relative degree of openness of the countries that are associated with factors such as trade policy that are often endogenous to the country in question.

III. The data

The average annual group per capita income is obtained from household surveys in the different countries considered; the data was converted to purchase power parity in constant 2005 US dollars. We combine the data obtained from the Chen and Ravallion income inequality data set available at the World Bank's PovcalNet, and the Socio-Economic Database for Latin America and the Caribbean (CEDLAS and World Bank). Table 1 shows a description of the data used in the main regressions and their respective sources. In the appendix we provide a summary statistics of these data.

The stocks of social capital have been created applying the "perpetual inventory method" using the data on government expenditures for social and non-social items using expressions (2) and (3). We have created the series of social and non-social government-provided capital stocks assuming a 3% annual rate of depreciation for social capital and 6% for the non-social capital stocks.

The SATI was calculated following the methodology developed by Lant Pritchett (1996), in which the SATI is the residual of the following regression, using the 18 countries included in the sample of analysis:

$$\ln(Trade)_{ijt} = \alpha_{0i} + \alpha_{1i}\ln(population)_{jt} + \alpha_{2i}\ln(area)_{jt} + \alpha_{3i}\ln(areasq)_{jt} + \alpha_{4i}\ln(GDPpercapita)_{jt}$$
$$+ \alpha_{5i}\ln(GDPpercapita\_sq)_{jt} + \alpha_{6i}OilExporter + \alpha_{7i}IndEconomy + \varepsilon_{ijt}$$

The definitions and sources of each variable used in the SATI regression are described in Table A2 in the appendix.

TABLE 1
DESCRIPTION AND SOURCES OF THE VARIABLES USED IN THE REGRESSIONS

Variable	Description	Source
Per capita income of group 1	Average yearly per capita income in Group 1 (0 - 40%)	Chen & Ravallion income inequality dataset available at the World Bank's PovcalNet <http://iresearch.worldbank.org/Povcal Net/jsp/index.jsp> & Socio-Economic Database for Latin America and the Caribbean (CEDLAS and World Bank) <http://www.depeco.econo.unlp.edu.ar /sedlac/esp/estadisticas.php>
Per capita income of group 2	Average yearly per capita income in Group 2 (41 - 70%)	
Per capita income of group 3	Average yearly per capita income in Group 3 (71 -90%)	
Per capita income of group 4	Average yearly per capita income in Group 1 (91-100%)	

(continues)

Table 1 (conclusion)

	Per Capita Government Expenditures in the following COFOG categories:	
Social Expenditure	- Education - Health - Housing - Social Protection and transfers	ECLAC Statistics
Non Social Expenditure	Per Capita Government Expenditures in the following COFOG categories: - Non-social transfers - Defense - Economic Affairs - Public Order &Safety - Transport & Communications	ECLAC Statistics
Per capita GDP	Self explanatory	World Development Indicators
Per capita stock social capital	Per capita stock of government provided social capital, calculated using the inventory method, with 3% of depreciation and using the rate of growth of social expenditure to estimate the initial stock	Own calculations
Per capita stock of non-social capital	Per capita stock of government provided non social capital, calculated using the inventory method, with 6% of depreciation and using the rate of growth of non-social expenditure to estimate the initial stock	Own calculations
Tariff	Weighted average tariff	International Trade and Integration Division, ECLAC, taken from WITS
Treaties	Index that represents the number of treaties active in each year for each country	International Trade and Integration Division, ECLAC, taken from WITS
Tariff dispersion	Standard deviation of the tariff divided by its weighted average	International Trade and Integration Division, ECLAC, taken from WITS
Polity2	Score ranges from -10 to 10, with the more democratic a nation, the higher the score.	Polity IV www.cidcm.umd.edu
Years of duration of the last political regime	Number of years since the most recent regime change	Polity IV www.cidcm.umd.edu
Political Competition	Score that indicates how competitive is the Political System	Polity IV www.cidcm.umd.edu

Source: Author's elaboration.

IV. The results

A. Specification tests

Table 2 shows the joint estimates of the four per capita group income equations and the trade openness equation allowing for interactions between the effects of trade openness and government-provided social and non-social capital. We now implement various specification tests.

1. Trade/capital stocks interactions

We tested for the joint significance of the trade/capital stocks interactive effects finding that these interactive terms are jointly significant. That is, we tested the hypothesis that $\beta_{1i} = \beta_{2i} = 0$ for all $i = 1,...,4$. As can be seen in Table 2 the likelihood ratio test rejects the restricted model by a significant margin. What this test shows is that the level and composition of government-provided capital stocks are important determinants of the impact of trade on the per capita income of the household groups and that the effects of trade openness should not be evaluated ignoring the level and composition of publicly-provided capital.

2. Country specific time-varying effects

We also tested for the validity of the country time-varying effects against the restriction that all country effects are fixed. That is, we tested the null hypothesis that $\nu_{jt} = \nu_j$ and $\Lambda_{jt} = \Lambda_j$ for all j. As can be seen in the table the restricted fixed country effect model is rejected by a wide margin in favor of the time-varying effect model.

Thus, the above two specification tests corroborate the key tenets of this paper: that the effects of trade policy and of government spending policies on income distribution should not be evaluated independently to each other, and that merely controlling for fixed effects is an inadequate procedure.

3. Biases due to endogenous capital stocks and trade policy index

Despite that the capital stocks are derived by accumulating lagged government expenditures to the previous stocks it is possible that such lagged expenditures be correlated with omitted concurrent variables which could bias the estimates. We argued in the previous section that the fact that we used time-varying effects largely minimizes such risk. We nonetheless use instrumental variables for both

capital stocks and trade to see whether or not the key qualitative results are affected by the use of instrumental variables.

We use several political and institutional variables as identifying instruments including measures of political competition, years of democratic stability and the so-called Polity2 index, in addition to the lagged trade policy indicators (average tariff, tariff dispersion and treaties, all lagged one period).[7] The description of the politico-institutional variables can be found in Table 1. We postulate that the politico-institutional variables are correlated with the stocks of social and non-social capital because when institutions are more democratic and transparent politicians are likely to be more responsive to social concerns. One of the main social issues in Latin America is the concentration of income and poverty. So we can reasonably expect that more democratic societies will tend to spend a greater fraction of public spending in social goods as opposed to subsidies that are often captured by small elites. Thus, we expect a positive correlation between the quality of politico-institutional variables and social capital stocks and a negative one with non-social stocks.

The politico-institutional identifying instrumental variables are also likely to satisfy the exclusion restriction in the context of our model. The exclusion restriction requires that the instruments be uncorrelated with the errors of the main regressions. That is, in our case should be uncorrelated with the disturbances of the group income equations (all the effects of the instruments should take place via the variables that are instrumented, in this case the stocks of social and non-social capitals and trade index). The fact that we control for time varying country effects makes it plausible that the exclusion restriction is in fact satisfied. The time varying effects control for all omitted economy-wide factors that may affect the distribution of income. Hence, they should also control for any direct effects of the politico-institutional that are not channeled through the capital stocks or trade index. That is, the often elusive exclusion restriction is likely to be satisfied.

Table AII.1 in Appendix II shows the results using Three Stage Least Square (3SLS) estimators instead of the usual single equation IV estimators in order to allow for the disturbances across equations to remain correlated. In this case we do not use interactive terms so the estimated coefficients directly show net effects (that is, this model uses the specification shown by equation (4)). Below we compare these results to the net effects estimated using our benchmark estimates (based on Equation (5)) and show that in general the use of 3SLS did not affect the fundamental qualitative results concerning the net effects of social and non-social capital stocks and of trade openness on the group incomes. Thus it appears that the use of country time-varying effects in conjunction with lagged fiscal spending variables to construct the capital stocks is an effective mechanism by itself to prevent biases of the key coefficients.

B. Analysis of the estimates

We now turn to the analysis of the coefficient estimates. The net impact of the social and non-social capital stocks on income distribution is the result of two effects: a direct effect and an indirect one that occurs via the interaction with the trade openness variable. The direct effect of per capita government-provided social capital stock is positive and highly significant for all four groups while the direct effect of the per capita non-social government stocks is negative and significant for the poor and lower middle classes, non-significant for the upper middle class but positive and significant for the richest

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[7]   Political Competition is a key instrumental variable used. It combines information regarding Regulation of Participation and Competitiveness of Participation. Regulation of Participation measures the extent that there are binding rules on when, whether, and how political preferences are expressed. One-party states and Western democracies both regulate participation but they do so in different ways, the former by channeling participation through a single party structure, with sharp limits on diversity of opinion; the latter by allowing relatively stable and enduring groups to compete nonviolently for political influence. The polar opposite is unregulated participation, in which there are no enduring national political organizations and no effective regime controls on political activity. In such situations political competition is fluid and often characterized by recurring coercion among shifting coalitions of partisan groups. Competitiveness of participation refers to the extent to which alternative preferences for policy and leadership can be pursued in the political arena.

group. We first consider the net effects evaluated using average values of the variables (that is, as if we consider a "representative" country of the region) and then we look at the net effects going beyond the average by considering the variability of the key variables over time and across countries.

TABLE 2
JOINT ESTIMATES OF THE GROUP PER CAPITA INCOME AND TRADE OPENNESS:
SUR-TIME-VARYING COUNTRY EFFECTS METHOD

	Log Diff Per capita income of group 1		Log Diff Per capita income of group 2		Log Diff Per capita income of group 3		Log Diff Per capita income of group 4		Log Diff SATI	
Log Diff Per capita stock of social capital	0.316	***	0.387	***	0.390	***	0.714	***	0.436	***
	0.105		0.0844		0.0815		0.128		0.0657	
Log Diff Per capita stock of non-social capital	-0.751	***	-0.340	***	-0.0312		0.482	***	-0.0380	
	0.113		0.0909		0.088		0.139		0.0718	
Log Diff SATI	0.0112		1.23		3.826	**	3.247			
	2.15		1.72		1.654		2.605			
Log Diff (Per capita stock social capital*SATI)	0.865	***	0.561	***	0.387	**	0.321			
	0.213		0.17		0.163		0.256			
Log Diff (Per capita stock non-social capital *SATI)	-0.881	**	-0.664	**	-0.775	**	-0.613			
	0.411		0.328		0.314		0.495			
Log Diff Per capita GDP	1.142	***	0.683	***	0.603	***	0.0228		-0.474	***
	0.262		0.21		0.203		0.32		0.147	
Number of active free trade agreements lagged									0.0308	**
									0.0141	
Tariff dispersion lagged									-0.0690	***
									0.0105	
Log Diff tariff									-0.182	***
									0.0309	
R-squared	0.885		0.888		0.894		0.872		0.897	

LR test: restricted model without interactions, unrestricted model including interactions: 106	LR test: restricted model country fixed effects, unrestricted model time varying country effects: 1485.2

Source: Author's elaboration.

Note: (i) The total number of observations for the equation system is 720.
(ii) All explanatory variables with the exception of tariffs, trade agreements and tariff dispersion are per capita.
(iii) Standard errors are shown below the coefficients: ** significant at 5%; *** significant at 1%.
(iv) Estimation includes 124 coefficients to capture the time-varying country effects, which are not shown in the table.
(v) Critical values for the LR tests at 1% level of significance are χ^2 (2)=9.21 and for χ^2 (107)=143.94.

1. Analysis for the average or representative case

Table 3 shows the net effects of the two stock variables and trade index on the per capita income of the various household groups, measured in terms of elasticity, and calculated using the coefficients in

Table 2 with all net effects evaluated at mean values of the variables. The net effect of social capital on per capita income is positive and significant for all income groups but the net effect of non-social capital is positive and significant only for the richest group, is insignificant for the upper middle class and negative and significant for the poorest two groups. These results imply that the effect of non-social government spending is not only bad for equity but that it may be absolutely deleterious for the poorest segments of society. Social capital on the other hand has a positive and significant impact on the per capita income of all groups. It benefits most of the population more or less equally except for the top group that seems to derive even greater benefits than the rest of the household population. That is, while social spending appears to promote higher household income for all groups, it is not pro-distribution.

TABLE 3
NET ELASTICITIES OF GROUP INCOMES WITH RESPECT TO SOCIAL CAPITAL,
NON-SOCIAL CAPITAL, AND TRADE OPENNESS

	Group 1		Group 2		Group 3		Group 4	
Net effect of Per Capita Stock of Social Capital	0.31	***	0.38	***	0.39	***	0.71	***
	0.105		0.084		0.081		0.128	
Net effect of Per Capita Stock of Non Social Capital	-0.75	***	-0.34	***	-0.03		0.48	***
	0.11		0.09		0.09		0.14	
Net effect of SATI	-0.08		0.32	**	0.29	**	0.58	***
	0.17		0.14		0.13		0.21	

Source: Author's elaboration.

Note: * significant at 10%.
** significant at 5%.
*** significant at 1%.
Standard errors are shown below the estimates.

Thus, governments in Latin America appear on average to gear non-social capital mainly to benefit the rich but surprisingly non-social capital is deleterious to the poor and lower middle income classes. A possible explanation for this is that government provided non-social goods tends to make the economy more capital-intensive thus hurting the unskilled which are among the poorest groups in society. Expansion of non-social capital may crowd out more labor-intensive investments that would benefit the poorest segments of the labor force.

Social capital provided by the government is genuinely complementary with private investments as shown by the fact that it increases income of all households significantly, but it is not pro-distribution. However, as shown in Table 3, the net effects the social capital evaluated at mean values of the variables has an almost identical net proportional effect on three of the four income groups but has a greater net effect on the richest group. This suggests that for the average country in the Region, social expenditures, and hence the resulting social capital, are not well targeted to the poorest segments of society. It appears that the upper income classes are able to capture a sizable portion of the government-provided social capital. This is consistent with several studies that have shown that the upper middle and upper classes tend to benefit much from publicly-provided often free education, specially tertiary education, from subsidized health care, public pensions, and even certain social transfers (van de Walle, 1998; Cisse et al., 2007; Goni et.al., 2010).

Turning now into the trade effects: The results in Table 2 suggest that direct impact of trade openness on household income of the poor is basically negligible but for the higher income groups the direct impact is positive (positive and significant for the upper middle income group and positive and nearly significant for the rich). Table 3 shows the net effects of trade openness once the trade-capital

stocks interactive effects are accounted for, all evaluated at mean values of the variables. The net impacts of trade openness are positive and significant for the top three income groups while are insignificant for the bottom group. Moreover, the elasticity of increasing trade openness on the income of the wealthiest households is almost twice as large as that for the two middle income groups. Thus, the results suggest that while trade openness does not on average have a net deleterious effect on the poor it does tend to worsen income distribution by offering benefits mainly to the richest households.

It is important to note the contrasting effects of government-provided social and non-social capital. Social capital enhances positive direct income impacts or reduces the size of negative direct income effects of trade openness. That is, despite that social capital is not well targeted to the poorest segments of society it does increase the benefits of increasing trade openness. By contrast, as reflected in the negative signs of the trade/capital stocks interactive coefficients, non-social government-provided capital stocks worsen any possible negative effect of trade openness on the income of the three lowest income groups and has no significant effect on the effect of trade on the income of the richest households.

The last column of Table 2 shows the estimates of the determinants of trade openness. The sign pattern of the trade policy variables is quite reasonable. The effects of both average tariff levels and their dispersion as measured by their coefficient of variability are highly significant and negative. The average tariff elasticity suggests that reducing tariff by 10% may increase trade openness by almost 2 % while reducing tariff dispersion by a similar magnitude may increase trade by about 0.7%. The effect of free trade agreement turned out to be positive although this effect is not as significant and robust as that of the tariff. This latter result would suggest that in Latin America the increasing number of free trade agreements has resulted in more trade creation than destruction.

Comparing the net effects calculated using the coefficient estimated using the benchmark regression model in Table 3 with the estimates obtained using IV methods in Table AII.1 in Appendix 2 shows a remarkable degree of similarity. While the actual values of the estimated coefficients are of course different the sign structure and significance of the coefficients are identical. In addition the relative values of the estimates are mostly preserved. For example both estimates yield the result that the stock of social capital has a similar positive and significant effects on all three lower income groups but a much higher also significant effect on the per capita income of the richest group. This high degree of consistency between the IV and non-IV estimates gives us confidence that the results using the benchmark model are free of simultaneous equation biases.

2. Analysis of net effects using key aspects of the distribution of the variables

The previous analysis focuses on net effects evaluated at the average values of the capital stocks and of the trade index. We now look at the net effects considering certain key aspects of the distribution of the relevant variables (the two social capitals and the index of trade openness) across countries and time. Table 4 shows the critical values of these variables that lead to a reversal of the sign of the net effects. This table shows the sensitivity of the net effects to changes in these three variables. The first row of the table shows that the net effect of social capital on the poorest group income reverses when the log of the value of the trade openness index is below -0.37. The trade index is below -0.37 in about 12 % of the observations. That is, the net impact of the stock of social capital becomes detrimental for the poorest group in countries or periods in which the trade regime is highly restrictive. For the other three groups the critical values of the SATI index are lower than any value for the index observed in the sample. That is, for the other three groups the stock of social capital exerts a positive effect in the upper three income groups even under the most restricted trade regimes in the sample.

The case of non-social government-provided capital is different: It has a detrimental effect for the poorest group regardless of the degree of openness observed but it causes the income of the second poorest group to increase when the economy is so closed that only occurs in 6% of the observations. It induces positive income effects in the lowest 45% of SATI for the middles class and is positive at all

levels of SATI for the wealthiest group. Thus the first two rows of Table 4 show that social capital and trade tend to be complements while non-social capital can only have positive welfare effects among the poor only under very restrictive trade regimes.

The net effects of trade openness, in turn, are also heavily dependent on the stocks of social and non-social capitals. A positive net impact of trade on the income of the poorest group requires a high level of social capital stock (a log value of 9.36) that is only satisfied by 49% of the observations. That is trade can be pro-poor only if the stock of social capital is so high that less than 50% of the observations satisfy. For the countries that have lower per capita social capital stocks the net effect of trade openness on the income of the poor is negative. Attaining a net effect of trade on the income of the higher income groups is much less demanding in terms of social capital: in most observations the net effect of trade is positive for the two middle class groups and is positive in practically all cases for the richest group. That is, unless the availability of social capital is extremely low, the rich always benefit out of trade liberalization but for lower income groups attaining positive effects of trade are increasingly more demanding in terms of social capital.

TABLE 4
CRITICAL VALUES FOR SIGN REVERSAL OF THE NET EFFECT OF SOCIAL CAPITAL, NON-SOCIAL CAPITAL AND SATI ON GROUP INCOME

		Group 1	Group 2	Group 3	Group 4
Minimum value of log SATI for *positive* net effect of Social Capital on group income	critical value for log SATI	-0.37	-0.69	-1.01	-2.22
	% in the sample of SATI below critical value	12%	0	0	0
Minimum value of log SATI for *positive* net effect of non Social Capital on group income	critical value for log SATI	-0.85	-0.51	-0.04	0.79
	% in the sample of SATI below critical value	0	6%	45%	100%
Minimum value of log social capital for *positive* net SATI effect (non-social capital evaluated at the mean)	critical value for log of social capital	9.36	8.70	8.54	7.46
	% in the sample of social capital above critical value	49%	68%	71%	98%
maximum value of log non social capital for *positive* net SATI effect (social capital evaluated at the mean)	critical value for log of non social capital	9.12	9.69	9.57	10.15
	% in the sample of non social capital below critical value	45%	76%	70%	98%

Source: Author's elaboration.

3. Economic growth and income distribution

An important finding shown in Table 2 is the high responsiveness of most household income groups to changes in per capita GDP growth. Increasing the rate of economic growth tends to benefit the poorest income group more than proportionally and improves the income of the other groups less than proportionally. That is, accelerating economic growth appears to be pro-distribution. These results provide support and in fact strengthen findings in the literature concerning the effects of economic growth on household income. Dollar and Kraay (2002, 2004) and others have shown that economic growth causes the income of the poor to increase significantly. We show here that economic growth is not only pro-poor but that it is also a powerful factor of equity, by benefiting the poor more than the upper middle income groups and the rich. Economic growth appears to be a much more powerful and effective pro-distribution factor than social policies themselves.

It might seem surprising that the income of the rich is not significantly responsive to variations in the rate of economic growth. One possible explanation may be associated to the fact that the income sources of the rich are highly diversified both within the country and internationally. In addition the rich are likely to have much more flexibility to respond to macroeconomic fluctuations including their capacity to invest in the countries that grow the fastest and to move their investments into particular activities that grow in periods of general growth slowdown. What happens is that even in periods of slow average growth there are always sectors that are either not affected or that even prosper in such times. The rich have a much greater ability to identify activities not affected by the economic slowdown and move into such sectors. All this makes the income of the rich to be much less dependent on the fluctuations of the aggregate level of per capita income growth.

C. Sensitivity analyses

We perform a series of sensitivity analyses to ascertain the robustness of the estimators provided in Table 2. In addition to the specification tests reported earlier, we further alter or generalize the specification of the equations, we check for extreme data points that may dominate the sign and significance of the key estimates and for individual country dominance.

1. Allowing for convergence (or divergence)

Table 5 reports the results obtained when the specification of the equations is changed to incorporate the initial per capita income of each group as explanatory variables. That is, these estimates allow for convergence or divergence of the group incomes over the period. We find that the initial income levels do add explanatory power to the regressions with the coefficients of these variables being highly significant. The fact that the coefficient of the initial per capita income is positive and significant for the bottom income group and negative and significant for the other three richer groups suggests a degree of per capita income convergence among the groups. However, allowing for convergence factors does not alter the basic sign structure of the coefficients associated with the government capital stocks and trade. All conclusions obtained using the benchmark regressions reported in Table 2 are in fact confirmed qualitatively.

2. Further disaggregating the income groups

We further disaggregate the households into ten groups instead of four. Table 6 shows these estimates. The qualitative findings are very similar to those using the more aggregated group structure. They do provide a few more details about the differential effects of social capital on group income. For example they show that that social spending appears to have the smallest impact on the income of the poorest 10% of the households. This is consistent with findings in the literature suggesting that government social programs have their greatest difficulties in reaching the extreme poor, which are the bottom 10% of the income distribution.

3. Sample dominance

Table AII.2 in Appendix 2 shows the results of the dominance test. We sequentially re-estimate the model withdrawing the top and bottom 2.5% of the observations for each of the capital stocks. As can be seen in this Table the qualitative effects and statistical significance of the net effects of the capital stocks on group per capita income is not affected by these procedures. That is, the key findings are not the result of freak observations that may dominate the estimation.

We also perform dominance checks to verify whether the inclusion of specific countries dominate the results. We sequentially eliminate the observations from countries that contribute to less than 5 % of the total data points. Figures A1 to A4 show how the significance of the coefficients of the capital stock variables changes for each group when we implement these procedures. As can be seen

in these figures the only coefficient that falls outside the margin of significance when we omit the observations of at least one country is the direct effect of social capital on the poorest group. In fact when the observations for Nicaragua are excluded this coefficient becomes marginally insignificant although still positive. Excluding the observations of any other country does not affect the sign and significance of the coefficients. This apparent weakness of the direct effect of the social capital stock on the poorest group was already apparent in the estimation allowing for group convergence (see Table 4). However, the fact that the coefficient of the trade/social capital interaction remains positive and highly significant implies that the net effect of social capital is still robust.

TABLE 5
GROUP PER CAPITA INCOME ESTIMATES USING SUR-TIME VARYING COUNTRY EFFECTS METHOD CONTROLLING FOR GROUP-INCOME CONVERGENCE (LOG DIFFERENCES WITH TIME COUNTRY VARYING EFFECTS)

	Log Diff Per capita income of group 1	Log Diff Per capita income of group 2	Log Diff Per capita income of group 3	Log Diff Per capita income of group 4	Log Diff SATI
Log Diff Per capita stock of social capital	0.164	0.501 ***	0.594 ***	1.041 ***	0.400 ***
	0.121	0.0974	0.0915	0.145	0.0668
Log Diff Per capita stock of non-social capital	-0.823 ***	-0.287 ***	0.0633	0.635 ***	-0.0297
	0.116	0.0931	0.0874	0.138	0.0722
Log Diff SATI	1.48	0.19	1.95	0.186	
	2.208	1.767	1.657	2.623	
Log Diff (Per capita stock social capital*SATI)	0.845 ***	0.578 ***	0.418 ***	0.368	
	0.211	0.169	0.158	0.249	
Log Diff (Per capita stock non-social capital *SATI)	-1.013 **	-0.574 *	-0.612 **	-0.343	
	0.41	0.328	0.307	0.485	
Log Diff Per capita GDP	1.104 ***	0.705 ***	0.643 ***	0.0891	-0.582 ***
	0.263	0.211	0.197	0.312	0.148
Number of active free trade agreements lagged					0.0387* **
					0.0146
Tariff dispersion lagged					-0.0499 ***
					0.0111
Log Diff tariff					-0.170 ***
					0.0321
Log Initial per capita income	0.00580 **	-0.00374 *	-0.00613 ***	-0.00870 ***	
	0.00282	0.00199	0.00173	0.00243	
R-squared	0.888	0.892	0.905	0.885	0.901

Source: Author's elaboration.
Note: * significant at 10%.
** significant at 5%.
*** significant at 1%. The total number of observations for the equation system is 720. Standard errors are shown below the coefficients. Estimation includes 124 coefficients that capture the time-varying country effects, which are not shown in the table.

TABLE 6
GROUP INCOME ESTIMATES USING 10 INCOME GROUPS. SUR-TIME VARYING COUNTRY EFFECTS METHOD

	Log Diff Per capita income of decile 1	Log Diff Per capita income of decile 2	Log Diff Per capita income of decile 3	Log Diff Per capita income of decile 4	Log Diff Per capita income of decile 5	Log Diff Per capita income of decile 6	Log Diff Per capita income of decile 7	Log Diff Per capita income of decile 8	Log Diff Per capita income of decile 9	Log Diff Per capita income of decile 10	Log Diff SATI
Log Diff Per capita stock of social capital	-0.0322	0.284**	0.375***	0.400***	0.397***	0.386***	0.386***	0.382***	0.400***	0.715***	0.399***
	0.188	0.128	0.102	0.0934	0.0885	0.0843	0.0829	0.0819	0.0829	0.128	0.0649
Log Diff Per capita stock of non-social capital	-1.499***	-0.952***	-0.663***	-0.521***	-0.427***	-0.357***	-0.270***	-0.137	0.0459	0.483***	-0.0409
	0.203	0.137	0.109	0.1	0.0952	0.0908	0.0894	0.0884	0.0896	0.139	0.0716
Log Diff SATI	1.878	0.305	-0.559	-0.228	0.354	1.33	1.788	2.642	4.762***	3.375	
	3.824	2.611	2.084	1.91	1.808	1.717	1.686	1.662	1.682	2.604	
Log Diff (Per capita stock social capital*SATI)	1.208***	1.055***	0.813***	0.714***	0.641***	0.586***	0.475***	0.383**	0.373**	0.307	
	0.378	0.259	0.207	0.189	0.179	0.17	0.166	0.164	0.166	0.256	
Log Diff (Per capita stock non-social capital *SATI)	-1.468**	-1.129**	-0.764*	-0.682*	-0.657*	-0.701**	-0.634**	-0.635**	-0.869***	-0.616	
	0.729	0.499	0.398	0.365	0.345	0.327	0.321	0.316	0.32	0.495	
Log Diff Per capita GDP	1.521***	1.457***	1.071***	0.864***	0.753***	0.686***	0.625***	0.597***	0.596***	0.0177	-0.419***
	0.468	0.318	0.254	0.233	0.221	0.21	0.207	0.204	0.207	0.32	0.147
Number of active free trade agreements lagged											0.0307**
											0.0138
Tariff dispersion lagged											-0.0681***
											0.0101
Log Diff tariff											-0.230***
											0.03
R-squared	0.874	0.883	0.887	0.884	0.886	0.888	0.890	0.891	0.895	0.873	0.892

Source: Author's elaboration.

Note: * significant at 10%.
** significant at 5%.
*** significant at 1%. The total number of observations for the equation system is 1584. Standard errors are shown below the coefficients. Estimation includes 124 coefficients that capture the time-varying country effects, which are not shown in the table.

V. Conclusion

To the best of our knowledge this is the first analysis that considers the interdependences between the consequences of trade liberalization and fiscal expenditure policies for poverty and income distribution. We have shown that this approach is very fruitful providing several important policy relevant insights that were not systematically examined in previous studies.

The main finding of this paper is that government-provided social capital goods are complementary with policies that promote trade openness. The benefits of trade openness especially for the low income and middle class household groups greatly depend on the size of the government-provided social capital. Conversely, the benefits of social capital for the poor depend to a large extent on the degree of openness of the trade regime. Social capital has a much smaller effect on household incomes when trade is restricted and may even have a deleterious effect if trade is sufficiently restricted. Efforts to promote trade have lower positive effects for households if the per capita social capital is low.

While government social capital stocks have positive effects for all household groups at least when trade is sufficiently open their effects are not pro-distribution. Social capital goods tend to benefit more the richest income groups than the middle income and poor households. A surprising finding is that government-provided non-social capital stocks only benefit the richest segments of society and is detrimental for the poor. Middle income households can only benefit out of non-social capital if the trade regime is highly restricted. Thus, trade and non-social capital are not complementary policies.   A reason for non-social capital to be mostly beneficial to rich households may be that the non-social component of the government-supplied capital stocks tend to be directed to the rich via subsidies and other types of expenditures that are greatly motivated by rent-seeking activities based on political contacts and campaign contribution which in Latin America are often the privilege of the richest segments of society.

These results may have important implications for policy design. They suggests that the process of trade liberalization should be accompanied by a progressive reallocation of government spending from non-social to social goods, so that the stock of social capital is allowed to grow faster and non-social capital at a slower pace. This would have direct net positive welfare effects on the middle income and poor households and at the same time it would greatly enhance the benefits of trade liberalization for the vast majority of the households. At the same time increasing trade liberalization would magnify the beneficial effects of shifting the structure of government-provided capital from non-social to social capital. Finally, the analysis suggests that trade reform should be implemented gradually to give time to allow the fiscal spending reallocation to manifest itself into changes in capital stocks.

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Annexes

Annex 1

TABLE A1
SUMMARY STATISTICS OF THE DATA USED IN REGRESSIONS

Variable	Mean	Std. Dev.	Min	Max
Per capita income of group 1	882	362	343	2 089
Per capita income of group 2	2 253	757	1 092	4 806
Per capita income of group 3	4 380	1 339	2 063	8 578
Per capita income of group 4	12 767	3 424	5 608	22 526
Per capita Social Expenditure	1 023	653	150	2 573
Per capita Non Social Expenditure	936	533	254	2 802
Natural Log of SATI	-0.006	0.3	-0.6	0.7
Per capita GDP	7 168	2 654	1 963	13 025
Per capita stock of social capital	14 539	10 520	1 472	38 633
Per capita stock of non-social capital	11 724	6 540	2 790	27 666
polity2	7.9	1.5	1.0	10.0
durable	18.9	18.2	0	86.0
polcomp	8.0	8.1	-88	10.0

Source: Author's elaboration.

Note: All economic variables are in Purchasing Power Parity constant 2005 International Dollars.

TABLE A2
DEFINITION OF VARIABLES USED TO CALCULATE SATI

Variable Name	Definition	Source
trade	Trade is the sum of exports and imports of goods and services measured as a share of gross domestic product	World Development Indicators
population	Population of the country, Millions of persons	World Development Indicators
area	Geographical area of the country, Millions of square kilometers	World Development Indicators
GDP_percapita	GDP per capita in constant 2000 US$	World Development Indicators
oild70s	Dummy with a value of one when the oil exports of a country represent at least 30% of their total exports for each year in the 70's	UNCTAD Handbook of Statistics 2001
oild80s	Dummy with a value of one when the oil exports of a country represent at least 30% of their total exports for each year in the 80's	UNCTAD Handbook of Statistics 2001
oild90s	Dummy with a value of one when the oil exports of a country represent at least 30% of their total exports for each year in the 90's	UNCTAD Handbook of Statistics 2001
IndEconomy	Industrial Market Economy: dummy variable which assigns the value of one to countries that are considered industrialized.	OECD

Source: Author's elaboration.

Annex 2

IV estimates and dominance checks

TABLE A3
3SLS ESTIMATES OF PER CAPITA INCOME WITH INSTRUMENTAL VARIABLES
(LOG DIFFERENCES WITH TIME COUNTRY VARYING EFFECTS)

	Log Diff Per capita income of group 1	Log Diff Per capita income of group 2	Log Diff Per capita income of group 3	Log Diff Per capita income of group 4
Log Diff Per capita stock of social capital	0.409***	0.409***	0.394***	0.601***
	0.138	0.115	0.101	0.156
Log Diff Per capita stock of non-social capital	-0.864***	-0.404***	0.0323	0.760***
	0.145	0.12	0.105	0.163
Log Diff SATI	0.243	0.773***	0.734***	1.076***
	0.197	0.164	0.143	0.222
Log Diff Per capita GDP	1.158***	0.770***	0.556**	-0.0612
	0.317	0.263	0.23	0.357
R-squared	0.835	0.831	0.871	0.850

Source: Author's elaboration.
Note: * significant at 10%.
** significant at 5%.
*** significant at 1%. The total number of observations for the equation system is 576. Standard errors are shown below the coefficients. Estimations include country*year dummies. Log diff social capital, log diff non-social capital and log diff SATI are instrumented using lag of social capital, lag of non-social capital, political competition, years of duration of the last political regime, polity 2, number of active free trade agreements lagged, tariff dispersion lagged and log diff tariff. First stage R2 are about 0.78 for social capital, 0.90 for non social capital and 0.88 for SATI.

TABLE A4
DOMINANCE TESTS OF THE EFFECT OF THE STOCK OF SOCIAL CAPITAL
ON PER CAPITA INCOME OF EACH GROUP

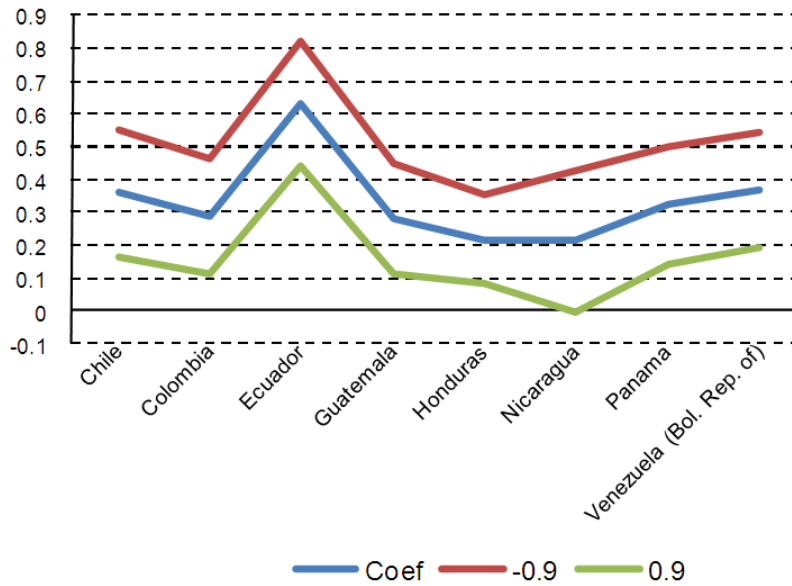|	Coefficient of the Per capita stock of social capital in the regression of Group 1	Coefficient of the Per capita stock of social capital in the regression of Group 2	Coefficient of the Per capita stock of social capital in the regression of Group 3	Coefficient of the Per capita stock of social capital in the regression of Group 4
Dropping top 2.5% of per capita income	0.32***	0.39***	0.39***	0.71***
	0.11	0.09	0.08	0.13
Dropping bottom 2.5% of per capita income	0.31***	0.23**	0.28***	0.71***
	0.11	0.10	0.10	0.13
Dropping top 2.5% of stock social	0.32***	0.38***	0.39***	0.71***
	0.11	0.09	0.08	0.13
Dropping bottom 2.5% of stock social	0.24*	0.30***	0.35***	0.67***
	0.14	0.11	0.10	0.16

Source: Author's elaboration.
Note: * significant at 10%.
** significant at 5%.
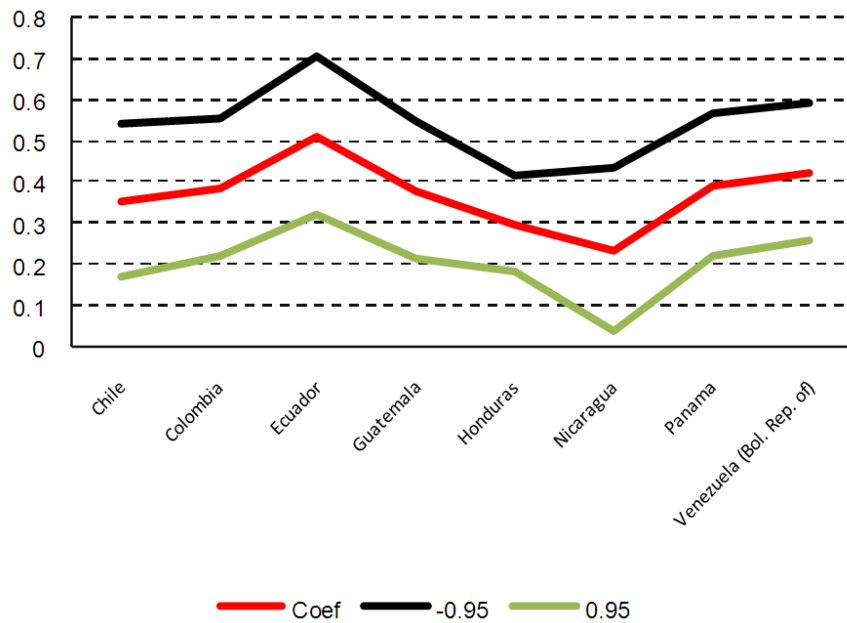*** significant at 1%.

Country dominance checks*

FIGURE A5a
SUR ESTIMATES, NET EFFECT OF SOCIAL CAPITAL IN GROUP 1
ONE COUNTRY EXCLUDED FROM EACH ESTIMATION, 90% CONFIDENCE INTERVAL

Source: Author's elaboration.

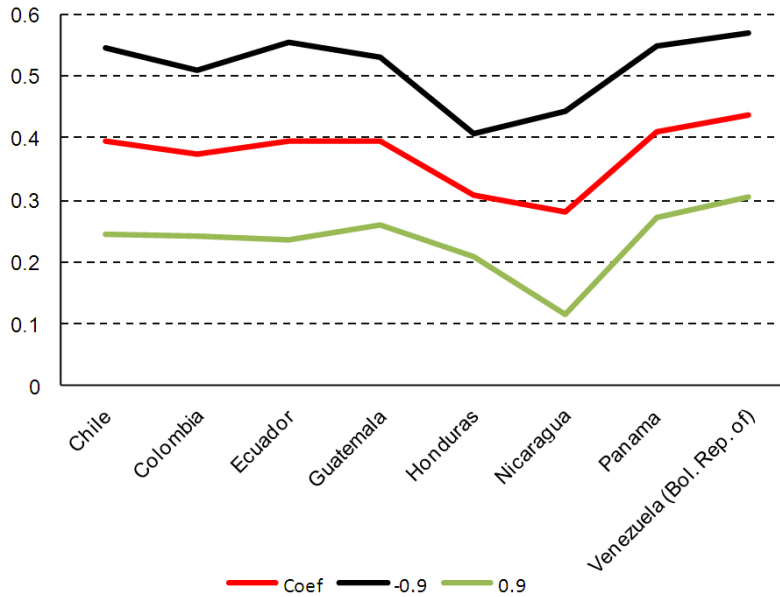Note: Excluded countries represent less than 5% of the total number of observations.

FIGURE A5b
SUR ESTIMATES, NET EFFECT OF SOCIAL CAPITAL IN GROUP 2
ONE COUNTRY EXCLUDED FROM EACH ESTIMATION, 95% CONFIDENCE INTERVAL

Source: Author's elaboration.

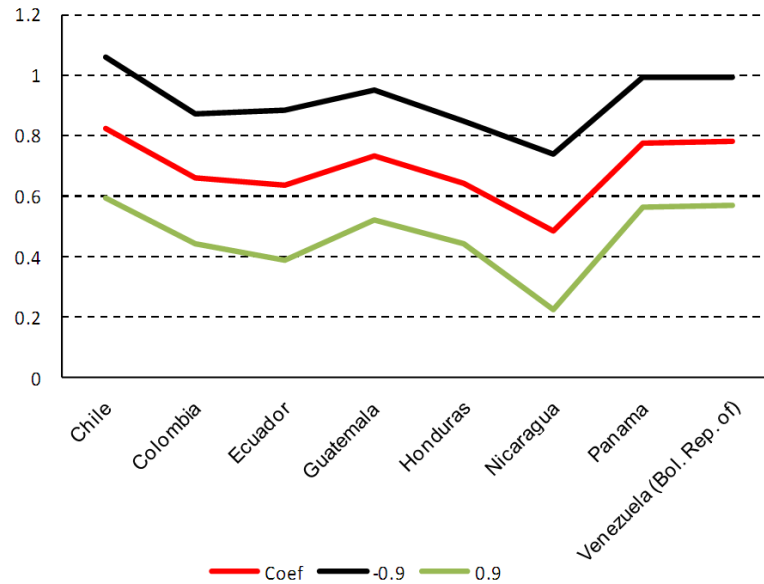Note: Excluded countries represent less than 5% of the total number of observations.

FIGURE A5c

SUR ESTIMATES, NET EFFECT OF SOCIAL CAPITAL IN GROUP 3

ONE COUNTRY EXCLUDED FROM EACH ESTIMATION, 95% CONFIDENCE INTERVAL

Source: Author's elaboration.

Note: Excluded countries represent less than 5% of the total number of observations.

FIGURE A5d

SUR ESTIMATES, NET EFFECT OF SOCIAL CAPITAL IN GROUP 4

ONE COUNTRY EXCLUDED FROM EACH ESTIMATION, 95% CONFIDENCE INTERVAL

Source: Author's elaboration.

Note: Excluded countries represent less than 5% of the total number of observations.