HEALTH EXPENDITURE, POVERTY AND ECONOMIC DEVELOPMENT IN LATIN AMERICA, 2000-2005

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Abstract

Two of the main problems of many Latin American countries are poverty and low levels of expenditure on health. In many countries there has been little progress in this regard due to the lack of resources, and thus it is important to focus on the main policies that may improve Latin American development because its positive effect on income per capita and health expenditure. This article analyses the evolution of health expenditure, poverty indicators and economic development in American countries for the period 2000-2005, and focus on the important positive effect that the necessary increase in industrial development will have on poverty eradication and health improvement for the next years. Both national policies and international cooperation to development in the poorest countries of Latin America should favor all the factors of production which contribute to foster economic development, and particularly the investment in industry.

JEL classification: C5, C51, I1, I2, I3, O5, O51, O54
Keywords: Health Expenditure, Education, Development, Poverty

1. Introduction

The Millennium Development Goals (MDGs) are addressed to diminish poverty and to increase health expenditure per inhabitant but international cooperation policies implemented until now seem not have enough effect. In our view this goals may only be reached if international cooperation to development focuses particularly in the main factors which foster economic development: human capital, industrial investment and other ones.

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It is not enough to foster international transfers to alleviate the poverty trap, but it is necessary to design economic policies addressed to increase investment, with international institutions support addressed to diminish the risk of investment in developing countries, and other measures which would have a highly positive impact on economic development, because the increase in real income per inhabitant is the most important factor to finance health. Thus the MDGs should be addressed within a general policy to improve economic development.

Section 2 analyses some selected studies related with these objectives in Latin America. Section 3 analyze the evolution of health expenditure in American countries for the period 2000-2005, relating the increase with the evolution of real Gross Domestic Product (GDP) per inhabitant. Section 4 analyses the important effect of education and investment to improve economic development and eradicate poverty.

Section 5 presents the estimation of two equations relating health expenditure and real GDP per capita, and one equation to measure the impact of education on development with a sample of 22 American countries. We also include a reference to some econometric models which relate education, economic development and health expenditure in other areas of the world. Finally section 6 presents the main conclusions, with particular focus on international cooperation in order to foster economic development, eradicate poverty and improve health expenditure per inhabitant

2. Literature revision

Lunde, Skoufias and Patrinos(2007), analyze poverty, social networks and economic opportunities of indigenous people in Latin America and find that low education levels translate into low income, resulting in poor health and reduced schooling for future generations. They also show that the networks available to indigenous people do not facilitate employment in non traditional sectors.

Glassman, Todd and Gaarder(2007) analyze the demand-side prograr called Conditional Cash Transfers (CCTs) in seven Latin American countries. The program was addressed to reduce poverty, increase food consumption, reduce poverty and use of preventive health care, particularly children vaccination. While CCT impact evaluations provided unambiguous evidence that financial incentives increase utilization of key services by the poor, the studies gave little attention to the impact on health-related behaviors and recommend expanding the scope of future evaluations.

Gasparini et al (2007) analyze the incidence of poverty among the elderly in Latin America and the Caribbean, based on microdata from 20 countries, from household survey. Presents a comparison with the general population and suggest some measures in order to improve the situation of the old population in those countries.

Astorga, Berges and Fitzgerald, V.(2004) analyze three indicators of the standard of living to asses the economic development of Latin America during the twentieth century: per capita income, life expectancy and literacy. The found that the three indicators evolve positively in the period 1940-1980. Since 1980 they found that while average per capita income has generally remained steady, relative living standards (measured by a composite welfare index) have risen gradually as life expectancy in the region has converged with the USA level.

Idelovitch and Ringskog (1995) addressed the important role for Private Sector Participation (PSP) in sanitation and water quality supply. They present the conclusions from several Seminars of World Bank on this important question and analyze the experience of Buenos Aires.

Rawlings and Rubio(2003) analyze the evaluation of the impact of conditional cash transfer programs in several Latin American countries and found a positive impact on sending children to school and to bring them to health centers on a regular basis.

Bobadilla and Possas(1992) analyzed the main features of the national health systems in Brazil, Colombia, and Mexico, and the effects of epidemiological transition with new health problems in those countries. They recommend policies addressed to meet health needs, having into account the dispersion of rural population and the difficulties of transport in many areas.

Lamelas and Cancelo(2003) present an interesting econometric model to explain the effects of economic development and the educational level of population on the diminution of infant mortality in the Andean Community. Similarly Lamelas and Aguayo(2003) present an econometric model which show the positive impact of education and development on life expectation in the Mercosur countries.

Guisan and Arranz(2001) and (2003) present some interesting econometric models and analyze the main factors which explain public and private expenditure on education and health, and the impact of economic development on those indicators of social wellbeing in OECD countries.

As seen in Guisan and Exposito(2006) and (2007), for African countries, health care expenditure, is positively related with the educational level of population not only because human capital is one of the main factors fostering the increase of real income per inhabitant, but also because for a given level of economic development there is another positive impact of education on health care and health expenditure.

3. Health expenditure indicators in America, 2000-2005.

Table 1 shows the evolution of health expenditure per head in America and table 2 the number of hospital beds per 1000 people. The indicator of table 1 is generally more representative of the quantity of human and material resources devoted to health care than the indicator of table 2.

The high values of health expenditure in the United States (more than 4000 dollars per capita) and in Canada (a little below 3000) are far over Latin American countries. The lowest value for year 2005 corresponds to Haiti (112) and the highest among Latin American countries to Argentina (1148). In comparison with OECD countries, Latin American average is rather low and some countries are clearly in an urgent need to improve health resources.

Table 1. Health Expenditure per head in American Countries (dollars per inhabitant at 2000 prices and PPPs)

	Public % Gdp 2000	Private % Gdp 2000	Total % Gdp 2000	Per head 2000	Per head 2005
Argentina	4.93	3.97	8.90	1083	1148
Bolivia	3.67	2.43	6.10	146	156
Brazil	3.12	4.48	7.60	555	593
Canada	6.26	2.64	8.90	2429	2618
Chile	2.83	3.27	6.10	556	689
Colombia	6.23	1.47	7.70	481	535
Costa Rica	4.98	1.32	6.30	543	563
Dominican Rep.	2.18	4.62	6.80	437	461
Ecuador	1.28	2.82	4.10	138	157
El Salvador	3.61	4.39	8.00	368	379
Guatemala	2.19	3.31	5.50	219	220
Haiti	2.45	4.35	6.80	122	112
Honduras	3.58	2.82	6.40	160	160
Jamaica	3.26	2.94	6.20	226	244
Mexico	2.61	2.99	5.60	507	511
Nicaragua	3.73	3.37	7.10	233	234
Panama	5.31	2.49	7.80	481	550
Paraguay	3.38	5.02	8.40	382	373
Peru	2.49	2.21	4.70	222	262
United States	5.85	7.45	13.30	4518	4979
Uruguay	3.51	6.99	10.50	922	954
Venezuela	3.37	2.83	6.20	352	362

Source: Elaboration from WB(2007) for the first two colums. Columns 4 and 5 are provisional estimations calculated by applying column 3 to data of real Gdp per head in year 2005 ($ at 200 prices and purchasing power parities).

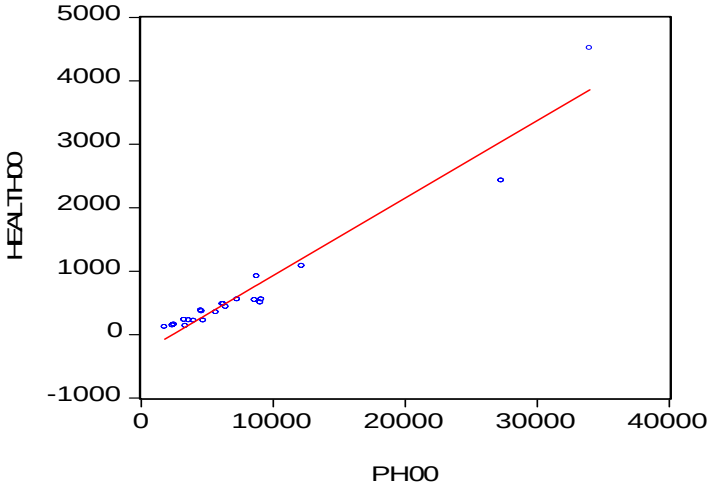
Table 2. Hospital beds per 1000 people, year 2003

	Countries and territories
1. 10 or more	Belarus, Japan, Monaco Russian Federation and Virgin Islands (US)
2. between 7 and 9.9	Australia Austria Azerbaijan, Barbados, Czech R., Finland, France, Hungary, Iceland Kazakhstan, Korea R., Latvia, Lithuania, Slovak R., Turkmenistan, Ukraine
3. Between 5 and 6.9	Belgium, Bulgaria, Bermuda, Croatia Estonia, Grenada, Israel, Kyrgyz Rep., Luxembourg, Moldova, Netherlands Antilles, New Zealand, Palau, Poland, Romania, Serbia & Montenegro, Slovenia, St. Kitts and Nevis, Switzerland. Tajikistan, Uzbekistan,
4. Between 4 and 4.9	**Argentina**, Armenia, Cuba, Cyprus, Denmark, Georgia, Greece, Indonesia, Ireland, Italy, Macedonia, Malta, Netherlands, St.Vincent and Grenadines, United Kingdom.
5. Between 3 and 3.9	Albania, Andorra, Bahamas, Bosnia and Herzegovina, **Canada**, Dominica, Lebanon, Libya, Norway, Portugal, Puerto Rico, Samoa, Singapore, Spain, St. Lucia, Suriname, Sweden, Tonga, Trinidad and Tobago, **United States** and Vanuatu.
6. Between 2 and 2.9	Algeria, Antigua and Barbuda, **Brazil**, Brunei, **Chile**, China, **Dominican R**., Egypt, Guyana, **Panama** and other
7. Between 1 and 1.9	Belize, Bhutan, **Bolivia**, Burkina Faso, **Colombia**, **Costa Rica**, Djibouti, **Ecuador**, **Honduras**, **Jamaica**, Malawi, **Mexico**, **Paraguay**, **Peru**, Philippines, **Uruguay**, Tunisia, and other
8. Between 0.5 and 0.9	**El Salvador, Guatemala**, **Haiti**, India, Morocco, **Nicaragua**, Pakistan, Sudan, **Venezuela** and other
9. Below 0.5	Madagascar, Mali, Nepal, Niger, Senegal, Somalia, and other

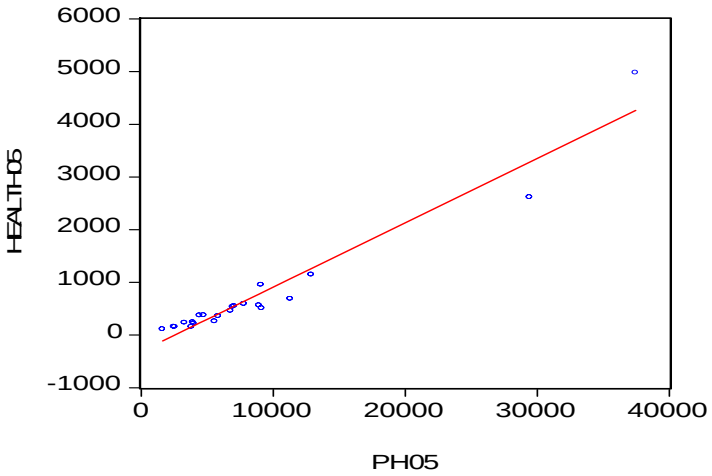
Source: Elaboration from WB(2007) and CEPAL(2007). Countries in table 1 appear in bold face. Countries without data for year 2003 include data for previous year.

Graphs 1 to 3 show the important positive relationship between health expenditure per inhabitant and real Gross Domestic Product per capita (Ph) in American countries for the years 2000 and 2005.

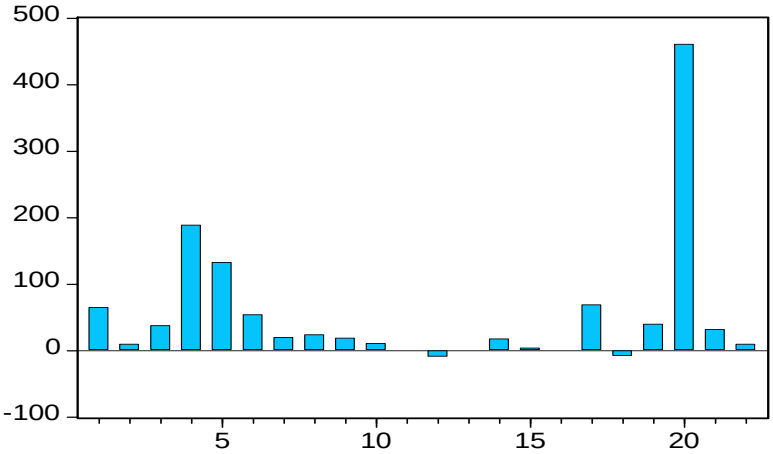
Graph 1. Health expenditure and Gdp per capita in 22 American countries, year 2000 (dollars at 2000 prices and PPPs)



Graph 2. Health expenditure and Gdp per capita in 22 American countries, year 2005 (dollars at 2000 prices and PPPs)



Graph 3. Increase of health expenditure per capita in the countries of table 1 for the period 2000-2005 ($ at 2000 prices and PPPs)



The highest increase of health expenditure corresponds to the United States followed by Canada, Chile, Panama Argentina and Colombia. In section 5 we present the estimation of an equation which relates increases in health expenditure and increase in real Gdp per capita.

Regarding hospital beds we notice that 18 out of 22 American countries of table 1 are below 2 hospital beds per 1000 people, which seems a very low value for good health assistance, having into account that countries with 3 and more usually experienced full occupation.

Although public policies may provide some basic resources for the poorest in low income countries, it is really important to understand that a good level of health expenditure per inhabitant is only possible when the educational level of population and other factors experienced enough improvement to guarantee sustained development and increase real income per inhabitant. In the next section we analyze the evolution of poverty and development in Latin American countries.

3. Poverty and economic development in Latin America.

Table 3 present the evolution of poverty and undernourishment.

Table 3. Undernourishment and poverty in Latin America, 1996-2004.

	Prevalence Undernourishment (% people)		Poverty % Headcount Below 2 dollars	
	1997	**2004**	**1996**	**2004**
Argentina	2.50	3.00	9.76	17.41
Bolivia	24.00	23.00	..	42.18
Brazil	10.00	7.00	21.73	21.15
Chile	5.00	4.00	9.71	5.63
Colombia	13.00	13.00	18.36	17.76
Costa Rica	5.00	5.00	13.30	9.83
Cuba	17.00	2.50	..	..
Dominican Republic	26.00	29.00	11.67	16.22
Ecuador	5.00	6.00	..	40.77
El Salvador	14.00	11.00	51.92	40.55
Guatemala	21.00	22.00	..	31.89
Guyana	12.00	8.00	..	6.10
Haiti	59.00	46.00	..	77.99
Honduras	21.00	23.00	51.26	35.71
Jamaica	11.00	9.00	19.63	14.37
Mexico	5.00	5.00	27.82	11.65
Nicaragua	33.00	27.00	..	79.93
Panama	24.00	23.00	18.47	18.03
Paraguay	13.00	15.00	..	29.81
Peru	19.00	12.00	28.38	30.63
Uruguay	4.00	2.50	4.55	5.73
Venezuela, RB	15.00	18.00	36.41	40.12
Latin America & C.	11.24	9.58	23.07	20.34
World	14.66	13.89	--	--

Source: Elaborated from WB(2007). In case of unavailable data for years 1997 and 2005, a provisional estimation was calculated based on data for other years, and on ECLAC(2007).

There are also a few countries with a level of income per capita about world average which could easily avoid extreme poverty if they reach a better organization and distribution of production and income. They should improve domestic policies in this regard.

Poverty head count, at a level below 2 dollars per head and per day, have experienced slight diminution for the period 2000-2005, from 23% to 20% of population, although it is still too high. The economic crisis of Argentina has caused important socio-economic problems and this indicator have experienced a very bad evolution in that period.

Levels of undernourishment have diminished from 11.2% of population in 1997 to nearly 9.6% in year 2004 for the whole group of Latin America and the Caribbean, but in a few countries this level was unfortunately still very high, with a percentage over 40% in Haiti, and percentages over 20% in Bolivia, Dominican Republic, Guatemala, Nicaragua and Panama.

Many authors have insisted upon the question of inequality as one of the main explanations for the lack of eradication of extreme poverty, but in our view it is not usually the main actual explanation for poverty. We find that poverty is mainly caused by the low levels of production per inhabitant, together with other negative factors related with geographic isolation, lack of infrastructures, low cultural level and low performance of public administration organization.

Regarding the increase in inequality that often arises at the first stage of economic development, when only a few deciles of population increases their levels of production and income per capita, it may be noticed that this is a transitory effect which will evolve later, at a second stage to a more egalitarian situation, accordingly to the well-known inverted V theory. The total process is a change from equality in poverty to equality in middle income per capita. Usually there are improvements in real income per capita and public expenditure on social services for the poorest sectors of society both at the first stage and at the second stage.

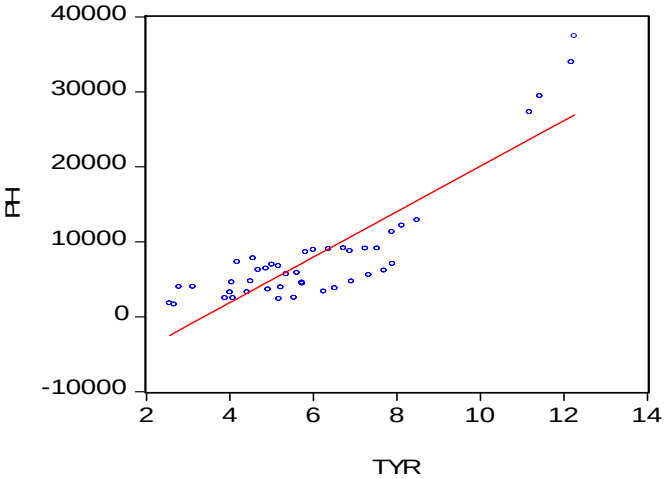
Table 4, and graphs 3 and 4. show the positive relationship between education and development, and between educational level of population and health expenditure per capita in America.

Table 4. Educational level of population and economic development

	Tyr 95	Tyr 99	Eduh 95	Eduh 00	Ph 00	Ph 05
Argentina	8.12	8.49	294	562	12173	12899
Bolivia	5.18	5.54	68	115	2398	2555
Brazil	4.18	4.56	259	304	7301	7808
Canada	11.18	11.43	1620	1425	27290	29415
Chile	7.53	7.89	245	330	9121	11301
Colombia	4.68	5.01	209	253	6244	6949
Costa Rica	5.82	6.01	265	409	8621	8931
Dominican Rep.	4.87	5.17	64	138	6426	6779
Ecuador	6.25	6.52	131	47	3374	3821
El Salvador	4.05	4.50	40	117	4595	4742
Guatemala	2.79	3.12	56	62	3978	3997
Haiti	2.56	2.67	13	26	1797	1642
Honduras	3.89	4.08	78	89	2506	2494
Jamaica	4.92	5.22	184	220	3651	3934
Mexico	6.37	6.73	423	439	9048	9132
Nicaragua	4.01	4.42	72	108	3278	3291
Panama	7.70	7.90	340	319	6164	7052
Paraguay	5.73	5.74	99	203	4553	4437
Peru	6.92	7.33	55	138	4722	5569
United States	12.18	12.25	1371	1627	33970	37437
Uruguay	6.88	7.25	192	233	8781	9087
Venezuela, RB	5.35	5.61	418	247	5685	5842

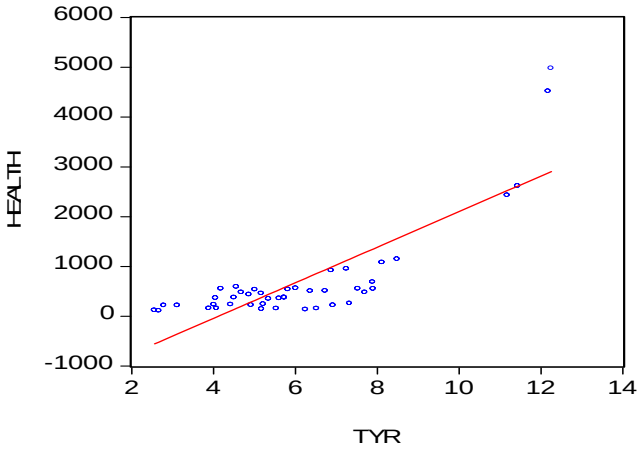
Sources: Elaboration from Barro and Lee(2000) and WB(2007). Tyr is total average years of schooling of population over 15 years. Data for educational expenditure per capita, Eduh, includes public expenditure (capital and current) for year 1995 and public and private (current) in year 2005. Data for Gross Domestic Product per capita are expressed in dollars per inhabitant at 2000 prices and Purchasing Power Parities (PPPs).

Graph 3. Relationship between Ph and Tyr in 22 American countries, years 2000-2005



Note: Own elaboration from table 4. Tyr is total average years of schooling of population over 15 years old and Ph is real Gdp per capita.

Graph 3. Relationship between Health and Tyr in 22 American countries, years 2000-2005



Note: Own elaboration from tables 1 and 4. Tyr is total average years of schooling of population over 15 years old and Health is real health expenditure per capita.

The highest levels in both graphs correspond to the United States and Canada. The Latin American countries with the highest educational levels may improve the values of real Gdp and real health expenditure per inhabitant if they improve their industrial development, as seen in Guisan, Aguayo and Exposito(2001) and other studies cited in the bibliography.

In many Latin American Countries the most urgent measure to eradicate poverty and increase health expenditure is to foster productive investment, particularly in industry due to the positive impact of industry on building and services, and the educational level of population. In the most developed countries of Latin America there is also a clear need to achieve best levels of public administration organization regarding the spread of social services and help to the poorest sectors of population.

4. Econometric models of health and education.

First of all we present the estimation of two equations which relate Health expenditure per inhabitant in year 2005 (Health05) with real Gdp per inhabitant in the same year (Ph05), with a sample of the 22 American countries of table 1.

Equation 1 is a model in levels with Health as a linear function of Ph and equation 2 is a mixed dynamic model, where Health05 dependens on the lagged value Health00 and the increase of Ph for the period 2000-2005.

Besides we present the estimation of equation 3 which relates economic development with the educational level of population in American countries, with a sample of 44 observations, 22 for each of the years 2000 and 2005. In this equation we have included a dummy variable D20, to take into account particular circumstances of the United States where the value of real Gdp per capita is higher than expected accordingly to the model. The positive value of the coefficient of this variable indicates a higher impact on PH.

Equation 1. Health expenditure and Gdp per capita in American countries: cross-section model in levels for year 2005.

Dependent Variable: HEALTH05. Method Leas Squares. Observations: 22				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-328.6991	123.4991	-2.661551	0.0150
PH05	0.126856	0.010745	11.80556	0.0000
R-squared	0.874507	Mean dependent var		739.0909
Adjusted R-squared	0.868232	S.D. dependent var		1086.558
S.E. of regression	394.4185	Akaike info criterion		14.87921
Sum squared resid	3111318.	Schwarz criterion		14.97840
Log likelihood	-161.6713	F-statistic		139.3714
Durbin-Watson stat	2.890424	Prob(F-statistic)		0.000000

Equation 2. Health expenditure and Gdp per capita in American countries: mixed dynamic model relating values of years 2005 and 2000.

Dependent Variable: HEALTH05. Method Leas Squares. Observations: 22				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
HEALTH00	1.050196	0.009311	112.7891	0.0000
PH05-PH00	0.051848	0.010387	4.991427	0.0001
R-squared	0.999593	Mean dependent var		739.0909
Adjusted R-squared	0.999573	S.D. dependent var		1086.558
S.E. of regression	22.45930	Akaike info criterion		9.147795
Sum squared resid	10088.41	Schwarz criterion		9.246981
Log likelihood	-98.62574	Durbin-Watson stat		1.611039

Equation 3. Real Gdp per capita and educational indicators.

Dependent Variable: PH. Method Least Squares. Observations: 44				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
EDUH	13.89659	1.027212	13.52846	0.0000
TYR	583.8864	68.14408	8.568411	0.0000
D20	7740.333	1547.284	5.002528	0.0000
R-squared	0.961005	Mean dependent var		8290.682
Adjusted R-squared	0.959103	S.D. dependent var		8162.278
S.E. of regression	1650.660	Akaike info criterion		17.72148
Sum squared resid	1.12E+08	Schwarz criterion		17.84313
Log likelihood	-386.8726	Durbin-Watson stat		1.899140

Regarding equations 1 and 2 we notice that the goodness of fit is high in both equations, although equation 2 has better values with a higher level of the adjusted R^2 and a lower level of the S.E. (standard error). The coefficient of PH is highly significant in both equations.

The educational level of population, and the missing variables related with the included explanatory variables, show a positive and significant effect on PH and thus, indirectly on Health expenditure per inhabitant. The effect of education and the missing variables in the United States is higher than the average effect estimated for American countries, and the coefficient of the dummy for this country is positive and significantly different from zero.

We may include, in future studies, more explanatory variables and distinguish between private an public health expenditure, accordingly to the econometric literature in this regard.

Some interesting studies related with econometric modeling of health expenditure in other areas of the world are the following ones.

The articles by Newhouse(1977) and (1992) have been very influential for the estimation of a Health Expenditure function, and the most common regressions for that purpose include income per head, the ageing of population and the share of public expenditure on Gdp, as explanatory variables.

Hitiris(1999) present an estimation with a panel of observations of 7 OECD countries during the period 1960-90, with the purpose of analysing the factors that explain the fast rising of Health Expenditure on many countries, with a preoccupation about the cost containment. However we think that the increase in the share of Medical Care on total individual Consumption is not a wrong feature of some countries but a reasonable choice of citizens, who decide to increase this expenditure when the level of economic development allows for that, in order to improve their level of wellbeing.

Guisan and Arranz (2001) and (2003) present some econometric models for Private Consumption Expenditure on the groups of

Medical Care and Education and Culture, with a sample of 24 OECD countries in 1996, having into account the level of family income, by means of the variable of total Consumption Expenditure, and the substitution relation of public expenditure on private one.

Some of the main conclusions of that study, regarding private and public consumption expenditure on Medical Care, Education and Culture are the following ones:

1) Expenditure on Medical Care and Education and Culture are important and show an increasing share in total individual consumption, with economic development, as the demand for these goods and services usually contributes to a higher quality of life. While total private consumption per capita during the period 1970-94 increased by 75% in OECD countries, expenditure on Medical care increased more than 100%.

2) According to the selected statistics the highest levels of total expenditure per inhabitant on Medical Care, among 24 OECD countries in 1996, correspond to Japan with 3747 dollars, followed by the USA with 3402 dollars, Iceland with 3213, France with 2674, and Canada with 2480.

3) There are important differences between private and public distribution of Medical Care expenditure between countries like the USA, where about 97% is private, and other cases like Japan, France, and the majority of the 24 OECD countries, where more than 80% is public.

4) The highest levels of total expenditure per inhabitant on Education and Culture, among 24 OECD countries in 1996, correspond to Denmark with 3758, followed by the USA with 3453, Australia with 3204, Canada with 3113, and Japan with 3093.

5) The econometric models of OECD countries show that there is a positive and significant impact of the increase in total consumption per inhabitant on both groups of Medical Care and Education and Culture, and that there is a substitution effect of

public expenditure on private one, in both cases, being this effect more remarkable in the case of Medical Care.

Another study, for 38 African countries in the period 2000-2005, published by Guisan and Exposito(2007) present two equations relating, respectively, Health expenditure per capita with Gdp per capita (PH) and PH with two educational indicators .

The first equation includes two dummy variables for two countries which showed specific divergences with the general estimation:

Health00 = 0.0551 PH00 + the effect of two country dummies
(32.20)
Adjusted R^2 = 0.9730; S. E = 24.7; Mean of dep. Variable 113.67

The second equation relates GDP per capita in year 2005 with two indicators of the educational level: Tyr in 1995 (total average years of schooling of population over 15 years old in that year, related with the Tyr of population over 25 years in 2005), and the product of Tyr in 1999 by an indicator of expenditure on education in year 2000 (Educ00). The results were as follows:

Ph05 = 322.05 Tyr95 + 2.65 * Tyr99*Educ00
(4.66) (10.91)
Adjusted R^2 = 0.8598; S.E. 959; Mean of the dep. Variable: 2326

The terms within parentheses are the t-ratios which show the significant effect of the explanatory variables. There are many variables related with the educational level of population, including investment and industrial production per inhabitant, which usually improve with higher levels of human and social capital.

5. Conclusions

We conclude that many Latin American countries have experienced a low increase in economic development for the period 2000-2005 and that it is necessary to foster, at a higher degree, both

domestic and international support to the Millennium Development Goals (MDGS) in order to increase health expenditure per capita, and to eradicate extreme poverty and undernourishment. Economic Policies only addressed to improve social services and international cooperation have a positive effect but are not sufficient to reach an important improvement in the poorest countries. In order to reach MDGs and get a substantial improvement it is necessary to design and support effective policies of economic development with special focus on human capital and industrialization.

The results for American countries agree with the results for OECD and African countries, regarding the positive impact of Gdp per capita on health expenditure per inhabitant and the positive impact of education on real Gdp per capita.

The increase of international cooperation to get higher levels of investment per inhabitant in the poorest Latin American countries is of uppermost importance and for that there are two main types of measures: 1) to increase the educational level of population, in order to moderate demographic growth and get higher levels of domestic savings per inhabitant and other positive effects, 2) to increase domestic and international investment in many Latin American countries, with institutional support when necessary in order to diminish a high degree of risk and attract savings with this purpose.

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