

INVESTMENT, POVERTY AND DEVELOPMENT IN ASIA-PACIFIC COUNTRIES: ECONOMETRIC MODELS AND EVOLUTION, 2000-2010

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Abstract

To achieve the United Nations MDGs (Millennium Development Goals) in less developed Asian countries it is required to increase international cooperation to reach higher educational level of population and investment per head. In this article we analyze the evolution of economic development and poverty count in 30 countries of Asia and Pacific, and estimated the positive effect of education and investment on development. Poverty count is very high in several Asian countries and we recommend international cooperation to eradicate poverty and increase investment and development. International cooperation to development should have into account that trade deficits should be sustainable and economic policies should avoid financial crisis, both in developing and developed countries, derived from strong and unsustainable trade balances.

JEL codes: I2, E2, O1, O5, O53, O56

Keywords: Poverty eradication, Asian countries, Asia-Pacific, Econometric models of International Development, Investment and Savings, Education and Development, Millennium Development Goals.

1. Introduction

There has been little evolution in several Asian countries during the period 2000-2010 in order to eradicate poverty and to achieve the Millennium Development Goals (MDGs) of the United Nations. Here we analyze the main causes of this evolution in several Asian countries, related with low educational level of population and with low levels of investment per head, and present the estimation of some econometric models.

Section 2 analyses the evolution of economic development and poverty in 30 countries of Asia and Pacific.

Section 3 presents the evolution of investment and savings per capita in those countries and analyze the positive relation of education, investment per capita and economic development. Presents a summary of positive effects of education and natural resources on trade, investment and development.

Section 4 presents the estimation of some econometric models which measure the positive effect of investment.

Finally section 5 presents the main conclusions with emphasis in fostering international cooperation for education and investment, provided that this cooperation avoids financial crisis and strong unbalances in foreign trade.

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2. Economic Development and poverty in Asia-Pacific, 2000-2010

Table 1 presents the evolution of real Gross Domestic Product (GDP) per head in 30 Asia-Pacific countries for the period 2000-2010.

Table 1. GDP per capita in 30 Asia-Pacific countries: years 2000, 2005, 2010.
Dollars per head at 2005 prices and Purchasing Power Parities (PPPs)

Nb	Country	2000	2005	2010	Increase 2000-2010 (\$2005)	% Rate of growth 2000-2010
6	Australia	28926	31702	34411	5485	1.74
9	Bangladesh	901	1068	1488	587	5.02
19	Cambodia	1009	1443	1968	959	6.68
25	China	2664	4076	6816	4152	9.39
26	H-K China	29785	35678	41713	11928	3.37
53	India	1718	2234	3073	1355	5.81
54	Indonesia	2714	3197	3880	1166	3.57
55	Iran	7667	9314	10526	2859	3.17
57	Israel	22991	23207	26023	3032	1.24
60	Japan	28613	30310	30573	1960	0.66
61	Jordan	3632	4342	5157	1525	3.51
64	Korea R	17489	21342	27027	9538	4.35
65	Kuwait	33603	43560	49934	16331	3.96
67	Lao PDR	1452	1814	2288	836	4.55
69	Lebanon	8328	9561	12621	4293	4.16
75	Malaysia	10271	11746	13214	2943	2.52
80	Mongolia	2029	2609	3620	1591	5.79
83	Myanmar	582	854	1749	1167	11.01
85	Nepal	905	960	1075	170	1.73
87	New Zealand	21975	24718	24649	2674	1.15
92	Pakistan	1931	2184	2411	480	2.22
94	Papua-New Guinea	1963	1883	2217	254	1.22
97	Philippines	2637	2959	3560	923	3.00
103	Saudi Arabia	19716	21220	20374	658	0.33
106	Singapore	37304	43334	51966	14662	3.31
111	Sri Lanka	3068	3546	4555	1487	3.95
114	Syrian AR	3725	4002	4741	1016	2.41
117	Thailand	5729	7069	7673	1944	2.92
129	Vietnam	1597	2143	2875	1278	5.88
130	Yemen	2064	2189	2380	316	1.42

Source: Elaborated from WB(2012). Notes: Nb is the number of each country in the alphabetical list of 132 World countries and the number that appears in the graphs. In the case of China data are presented for mainland China and Hong-Kong China. Column 4 is the difference between years

2010 and 2000, in \$ at 2005 prices and PPPs. Column 5 is the annual exponential rate of growth of Gdp per capita (PH) for the period 2000-2010 in percentage (%): $(\ln(PH_{10}) - \ln(PH_{00})) * 100 / 10$

A first group, with the highest levels of Gdp per capita (PH) in year 2010, over 20000 \$ at 2005 prices and PPPs include: Australia, Hong-Kong, Israel, Japan, Korea Republic (South), Kuwait, New Zealand, Saudi Arabia and Singapore.

A second group correspond to countries with PH in year 2010 within 10000 and 20000: Iran, Lebanon, Malaysia.

A third group includes countries with PH in year 2010 between 5000 and 10000 \$ at 2005 prices and PPPs: China, Jordan and Thailand

A fourth group includes countries with PH in year 2010 between 2500 and 5000: India, Indonesia, Mongolia, Philippines, Sri Lanka, Syrian AR and Vietnam.

A fifth group, with the lowest levels of GDP per capita (PH) in year 2010, below 2500 Dollars at 2005 prices and PPPs, includes: Bangladesh, Cambodia, Lao PDR, Myanmar, Nepal, Pakistan, Papua-New Guinea and Yemen.

The highest increases for the period 2000-2010, over 4000 \$ at 2005 prices and PPPs, correspond, in this order, to: Kuwait, Singapore, Hong-Kong, Korea R (South), Australia, Lebanon and China.

This set of 30 countries had a population of 3913 million people in year 2010, many of them living in low and very low income countries, and thus affected by high percentages of poverty count. Table 2 shows the percentage of poverty among population of Asia-Pacific countries, accordingly to World Development Indicators (WDI). More information in the Annex

Table 2. Poverty count in 30 Asia-Pacific countries

Percentage of poverty	Countries
>80	Bangladesh, India
60-80	Cambodia, Lao PDR, Nepal, Pakistan
40-60	Indonesia, Mongolia, Philippines, Sri-Lanka, Yemen
20-40	China, Thailand
10-20	-
0-10	Australia, Hong-Kong (China), Israel, Japan, Jordan, Korea R (South), Malaysia, New Zealand, Singapore
Not available, With Ph10>10000	Iran, Kuwait, Lebanon, Saudi Arabia
Not available, with Ph10<10000	Myanmar, Papua-New Guinea, Syrian AR, Vietnam

Nota: Guisan and Exposito(2010), elaborated from WB(2010). The set of 30 countries does not include countries with less than 1 million inhabitants nor without available data.

We notice very low levels of production per head in several Asian countries, clearly below World average accordingly to the international comparisons in the Annex. This implies that hundreds of million people suffer severe poverty in those countries, and that international cooperation should contribute to foster development and eradicate poverty in the next years.

As it has shown in Guisan, Aguayo and Exposito(2001), Guisan and Neira(2006), Guisan(2009) and other studies, it is of uppermost importance to foster education and investment, among other factors, in low income countries in order to eradicate poverty and improve socio-economic wellbeing of population. In the next section we analyze the evolution of Investment per head for 2000-2010.

3. Investment, Savings and development in Asia Pacific, 2000-2010

3.1. Investment and Savings per head

Table 3 present values of real investment and real savings, per head, in 28 Asia-Pacific countries in year 2000, 2005 and 2010. Graphs 1 to 4 present the values of real investment per head in year 2010.

Table 3. Investment and Savings per capita in Asia-Pacific: 2000, 2005, 2010
(Dollars (USD) per inhabitant at 2005 prices and PPPs)

	Investment			Savings			Savings less Investment
Country	2000	2005	2010	2000	2005	2010	2010
Australia	6942	8243	9638	5785	6023	8361	-1277
Bangladesh	207	267	363	243	331	572	209
Cambodia	182	260	342	141	202	247	-95
China	932	1793	3257	986	2079	3608	351
H-K China	8042	7492	8580	9531	11417	12514	3934
India	412	760	1068	430	760	1036	-33
Indonesia	597	799	1260	679	831	1240	-21
Iran	2530	3074	NA	2990	NA	NA	NA
Israel	4828	4409	4052	3908	5106	4757	704
Japan	7153	7274	6183	8012	8184	7263	1080
Jordan	799	1476	791	835	738	471	-319
Korea R	5422	6403	7879	5771	6829	8554	675
Kuwait	3696	6970	NA	16802	24829	NA	NA
Lao PDR	407	617	596	247	290	448	-148
Lebanon	1666	2103	4125	NA	478	1511	-2614
Malaysia	2773	2349	2830	3698	4111	4349	1519
Mongolia	588	965	1477	467	1070	982	-495
Myanmar	70	NA	396	NA	NA	671	275
Nepal	217	250	373	199	298	368	-5
New Zealand	4835	6180	4912	3736	3955	NA	NA
Pakistan	328	415	370	386	568	525	154
Papua-New Guinea	432	377	395	628	527	450	55
Philippines	554	444	731	976	651	968	237
Saudi Arabia	3746	3820	4483	5718	10186	5327	844
Singapore	12310	8667	12386	17533	16900	23848	11462
Sri Lanka	859	922	1266	675	816	1128	-138
Syrian AR	633	720	892	820	760	797	-95
Thailand	1318	2191	1990	1719	1909	2370	380
Vietnam	479	771	1118	495	771	916	-202
Yemen	392	NA	276	702	NA	216	-61

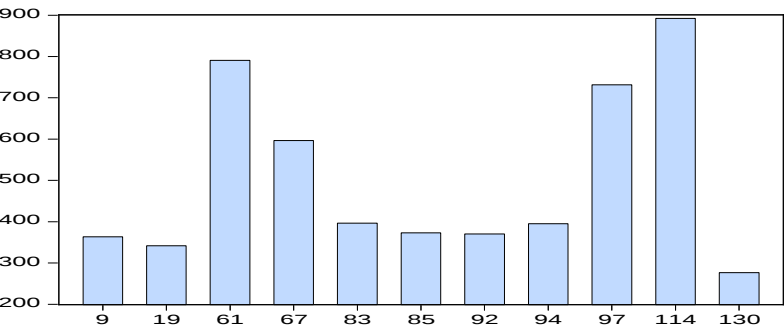
Note: Not available: NA. Source: Elaborated from WB(2012).

There are 11 countries with very low investment (below 1000 USD in year 2010), mostly affected, with the only exception of Jordan, by high percentages of poverty count.

Graphs 1 to 4 show four groups of countries accordingly to investment per head.

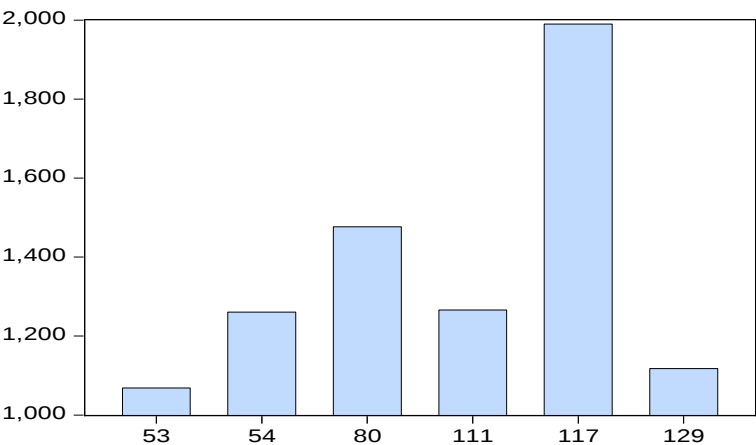
There are many other explanatory variables of economic development, from demand and supply side, as seen in Guisan(2009b), but most of them are related with the levels of education, investment and savings per head, as seen in the figure 1 in section 3.2.

Graph 1. Countries with Investment per head < 1000 USD in 2010
(Dollars per capita at 2005 prices and PPPs)



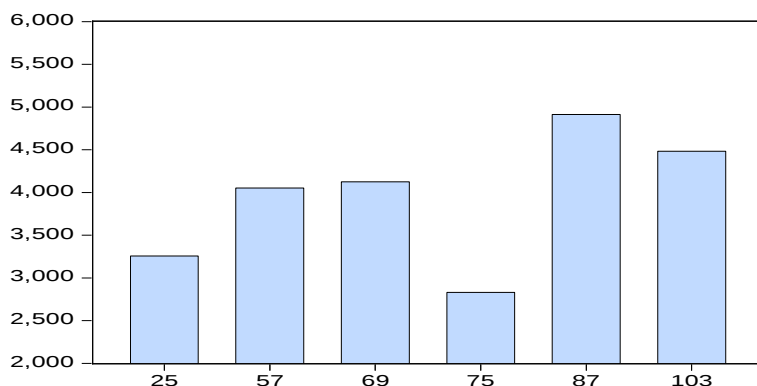
Note: countries number: 9 Bangladesh, 19 Cambodia, 61 Jordan, 67 Lao PDR, 83 Myanmar, 85 Nepal, 92 Pakistan, Papua-New Guinea, 97 Philippines, 114 Syrian Ar, 130 Yemen. Source: Elaborated from WDI, see table 4.

Graph 2. Countries with Investment per head between 1000 and 2000 USD in 2010
(Dollars per capita at 2005 prices and PPPs)



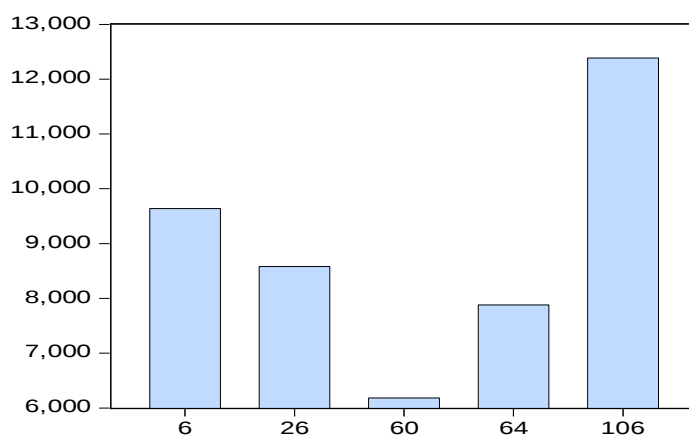
Note: Country number: 53 India, 54 Indonesia, 80 Mongolia, 111 Sri Lanka, 117 Thailand, 129 Vietnam. Source: Elaborated from WDI, see table 4.

Graph 3. Countries with Investment per head between 2000 and 6000 USD in 2010
(Dollars per capita at 2005 prices and PPPs)



Note: Country number: 25 China, 57 Israel, 69 Lebanon, 75 Malaysia, 87 New Zealand, 103 Saudi Arabia. Source: Elaborated from WDI, see table 4.

Graph 4. Countries with Investment per head > 6000 USD in year 2010
(Dollars per capita at 2005 prices and PPPs)

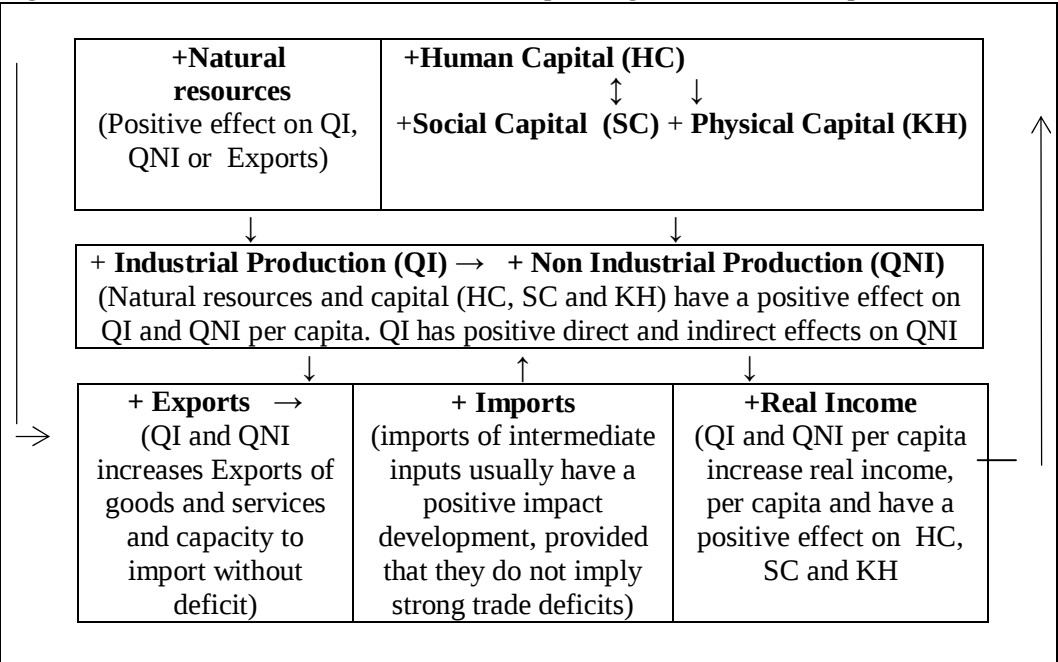


Note: Country number: 6 Australia, 26 Hong-Kong China, 60 Japan, 64 Korea Republic (South), 106 Singapore. Source: Elaborated from WDI, see table 4.

Countries may finance investment per capita with their own savings or attracting foreign investment. Countries with high levels of savings per head often invest part of their savings abroad and get income from their foreign investments. International flows may have positive impacts on economic development in many cases, provided that there is not a high degree of risk of instability in the financial support from abroad and other conditions. Economic development is usually positively related with education, given the positive direct and indirect effects of education in investment and production per head, as seen in Guisan and Neira(2006) and other studies.

3.2. Education, Investment and other factors of economic development

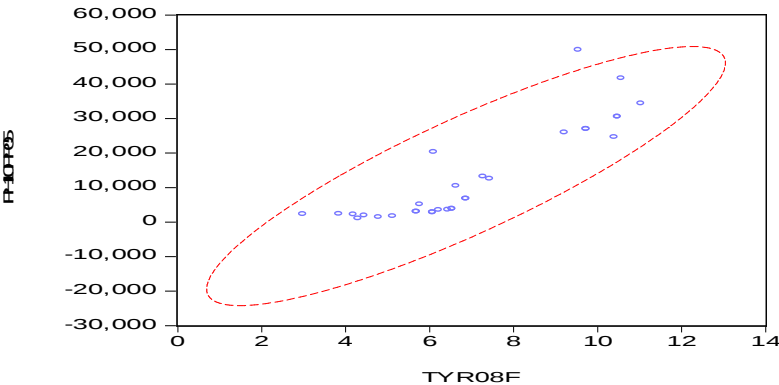
Figure 1. Main economic and social factors explaining economic development



Source: Short version of figure elaborated by Guisan(2009b). Human capital (HC) includes educational and research indicators.

The following graph shows the positive relationship between the educational level of population and economic development in the 30 countries of Asia and Pacific.

Graph 5. GDP per capita in 2010 (PH10) and educational level of population in Asia-Pacific



Source: Elaborated by Guisan and Exposito. Relationship between Try08f (estimation of average total years of schooling in year 2008 based on Barro and Lee and other sources) and GDP per capita in year 2010 (expressed in USD at 2005 prices and PPPs)

Economic development is positively related with education, given the positive direct and indirect effects of education as seen in Guisan and Neira(2006) and other studies. Guisan, Aguayo and Exposito(2001) show that education usually moderates excessively high average Fertility Rates and contributes to increase IH ,and KH, and it also contributes to improve SC, through their effects on quality of Government.

4. Econometric Models: impact of education, savings and foreign investment

Equation 1 shows the positive impact on investment per head, in 30 Asia-Pacific countries, in year 2010 (IH10), of the following explanatory variables:

IH00: Lagged value of investment per head in year 2000.

EDU1: Educational Level of Population given by estimated average years of schooling of adult population during the period 2000-2010. See Annex.

SH10-SH00: Increase of Savings per head during the period 2000-2010.

Equation 1: Impact of education and savings on Investment per head in Asia-Pacific

Dependent Variable: IH10. Method: Least Squares. Included observations: 25				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
Initial Investment: IH00	0.785281	0.079778	9.843297	0.0000
Educational level: EDU1	110.2524	39.65246	2.780469	0.0109
Increase in Savings: SH10-SH00	0.451655	0.141284	3.196783	0.0042
R-squared	0.959041	Mean dependent var		2903.840
Adjusted R-squared	0.955318	S.D. dependent var		3411.651
S.E. of regression	721.1591	Akaike info criterion		16.11176
Sum squared resid	11441549	Schwarz criterion		16.25803
Log likelihood	-198.3970	Hannan-Quinn criter.		16.15233
Durbin-Watson stat	2.176573			

Equation 2 shows the relationship between Production per head in year 2010 (PH10), its lagged value in year 2005 (PH05), average savings and average investment not financed by savings in the period 2005-2010.

Equation 2. Impact of Investment and Savings on real GDP per head in Asia-Pacific

Dependent Variable: PH10. Method Least Squares. Included observations: 25				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
PH05	0.742286	0.089328	8.309711	0.0000
SH (average 2005-2010)	1.463542	0.340675	4.296013	0.0003
IH-SH (average 2005-2010)	1.064603	0.321051	3.315998	0.0031
R-squared	0.994026	Mean dependent var		12612.80
Adjusted R-squared	0.993483	S.D. dependent var		14427.61
S.E. of regression	1164.693	Akaike info criterion		17.07047
Sum squared resid	29843232	Schwarz criterion		17.21673
Log likelihood	-210.3809	Hannan-Quinn criter.		17.11104
Durbin-Watson stat	2.261647			

These equations show the positive impact of savings and investment on production per head. The educational level of population has an important role due to its impact on investment per head and other positive effects as seen in the next section.

5. Conclusions

In this study we have shown little advancement in several Asian countries in order to eradicate poverty, mainly due to the low levels of education and capacity to invest.

It should be advisable to favour international investment in low income countries addressed to increase their levels of economic development, provided that investment is sustainable and not subject to strong unbalances in foreign trade.

It is important to develop trade policies addressed to avoid strong and unsustainable disequilibria in the balance of payments, both of developed and developing countries, in order to avoid financial crisis with negative consequences on development.

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⁴ <http://www.usc.es/economet/eedi.htm>

On line annex at the journal Website: <http://www.usc.es/economet/aeid.htm>

Annex.

Tabla A1. Poverty country in Asia and Pacific, 1995-2005:
percentage of population below 2\$ per day

País	% 1995	% 2000	% 2005	Population 2005
Australia	0	0	0	20.321
Bangladesh	79.30	84.00	..	141.822
Cambodia	77.71	77.71	..	14.071
China	53.34	45.49	34.89	1304.5
Hong Kong, China	0	0	0	6.944
India	..	80.36	80.36	1094.583
Indonesia	..	55.39	52.42	220.558
Iran, Islamic Rep	..	..	..	67.7
Israel	0	0	0	6.909
Japan	0	0	0	127.956
Jordan	7.38	7.16	6.95	5.411
Korea, Rep.	..	2.00	..	48.294
Kuwait	..	..	..	2.535
Lao PDR	73.19	73.66	74.13	5.924
Lebanon	..	..	..	3.577
Malaysia	13.97	9.25	..	25.347
Mongolia	49.96	119.49	44.58	2.554
Myanmar	..	..	..	50.519
Nepal	77.85	73.19	68.53	27.133
New Zealand	0	0	0	4.11
Pakistan	65.82	69.70	..	155.772
Papua New Guinea	..	..	..	5.887
Philippines	45.05	47.48	42.96	83.054
Saudi Arabia	..	..	..	24.573
Singapore	0	0	0	4.351
Sri Lanka	45.35	43.47	41.60	19.582
Syrian Arab R.	..	..	..	19.043
Thailand	28.25	32.47	25.15	64.233
Vietnam	..	..	..	82.966
Yemen, Rep.	45.24	45.24	..	20.975

Source: Elaborated from WB(2010).

Table A2. Real GDP and rate of growth in World major areas: years 2000 y 2010
(Billion Dollars at prices and Purchasing Power Parities (PPPs) of year 2005)

Área	PIB 2000	PIB 2010	Tasa anual	% World Share 2000	% World Share 2010
Africa Subsaharian	1050	1744	5.07	2.19	2.58
Asia South	2287	4603	7.00	4.77	6.80
China	3367	9114	9.95	7.02	13.47
Latin America and the Caribbean	4309	5959	3.24	8.98	8.81
Middle East and North Africa (MENA)	2307	3496	4.16	4.81	5.17
OECD	31613	37223	1.63	65.90	55.03
Rest of World (ROW)	3036	5509	5.96	6.33	8.14
World	47969	67646	3.44	100	100

Source: Elaborated by M.C. Guisan from World Bank statistics.

Table A2 shows that World GDP has grown at a rate of 3.44% per year during the decade 2000-2010, over to the average rate of the second half of the 20th Century which was around 2.07%, as seen in Guisán, Aguayo y Expósito(2001 b).

Tabla A3 Population (million people), annual rate of growth and annual increase

Área	Population 2000	Population 2010	Annual Rate	Annual Increase
Africa Subsahariana	667	854	2.47	19
Asia South	1360	1580	1.50	22
China	1263	1338	0.58	8
Latin America and the Caribbean	520	589	1.24	7
MENA	313	383	2.02	7
OCDE	1153	1236	0.70	8
Resto del Mundo	804	861	0.68	6
Total Mundo	6080	6841	1.18	76

Source: Elaborated by M.C. Guisan from World Bank statistics.

Tabla A4. PIB por habitante, tasa anual de crecimiento e incremento anual
(Dólares per cápita a precios y paridades de compra del 2005)

Área	PH 2000	PH 2010	Tasa anual	Incremento Anual (\$ 2000)
África Subsahariana	1575	2041	2.60	47
América Latina y C.	8280	10117	2.00	184
Asia Sur	1682	2914	5.50	123
China	2667	6810	9.37	414
MENA	7379	9132	2.13	175
OCDE	27423	30112	0.93	269
Resto del Mundo	3776	6401	5.28	262
Total Mundo	7890	9889	2.26	200

Source: Elaborated by M.C. Guisan from World Bank statistics.

Tabla A5. Education and Voice of Citizens in Asia and Pacific

País	Edu1 2004	Edu2 2005	Voice of Citizens
Australia	9.62	11.94	7.68
Bangladesh	4.64	4.19	3.74
Cambodia	3.69	5.70	3.26
China	6.37	7.05	1.60
H-K China	10.18	9.41	6.18
India	5.12	3.98	5.76
Indonesia	5.77	5.12	4.66
Iran	5.73	6.14	1.96
Israel	8.08	11.89	6.56
Japan	9.85	11.13	6.86
Jordan	4.29	8.02	3.72
Korea R	8.39	11.14	6.32
Kuwait	9.39	5.98	4.08
Lao PDR	3.52	4.22	1.68
Lebanon	6.61	-	4.10
Malaysia	6.22	8.94	3.90
Mongolia	5.53	8.23	5.26
Myanmar	4.92	3.48	0.68
Nepal	3.91	2.74	3.22
New Zealand	8.61	12.26	7.98
Pakistan	3.54	4.51	2.90
Papua-New Guinea	4.21	3.87	5.24
Philippines	5.02	8.32	4.66
Saudi Arabia	5.32	7.24	1.82
Singapore	10.78	8.14	4.14
Sri Lanka	6.16	7.92	4.22
Syrian AR	4.66	4.83	1.46
Thailand	6.54	5.88	3.78
Vietnam	5.55	4.93	1.78
Yemen	2.14	1.78	2.88

Nota: Edu1 is an indicator of average years of total schooling, around year 2005, of adult population (+25 years old) estimated by Guisán(2009) and base don the trend show in Barro y Lee(2000) and other indicators. Edu2 is the indicator of average years of schooling in year 2005 accordingly to the update base of Barro and Lee(2010) published by WB(2010). Voice of citizens has been elaborated by conversion to a decimal base from the scale -2.5 to 2.5 of Kaufman et al(2008); 0 indicates low level of government listening to citizens and 10 is the maximum value.

Table A6. Percentage of Investment and Savings on GDP, in 2000, 2005, 2010

Country	ZPI00	ZPI05	ZPI10	ZPS00	ZPS05	ZPS10
Australia	24	26	28	20	19	24
Bangladesh	23	25	24	27	31	38
Cambodia	18	18	17	14	14	13
China	35	44	48	37	51	53
H-K china	27	21	21	32	32	30
India	24	34	35	25	34	34
Indonesia	22	25	32	25	26	32
Iran	33	33	NA	39	NA	NA
Israel	21	19	16	17	22	18
Japan	25	24	20	28	27	24
Jordan	22	34	15	23	17	9
Korea R	31	30	29	33	32	32
Kuwait	11	16	NA	50	57	NA
Lao PDR	28	34	26	17	16	20
Lebanon	20	22	33	NA	5	12
Malaysia	27	20	21	36	35	33
Mongolia	29	37	41	23	41	27
Myanmar	12	NA	23	NA	NA	38
Nepal	24	26	35	22	31	34
N Zealand	22	25	20	17	16	NA
Pakistan	17	19	15	20	26	22
Papua NG	22	20	18	32	28	20
Philippines	21	15	21	37	22	27
Saudi Arabia	19	18	22	29	48	26
Singapore	33	20	24	47	39	46
Sri Lanka	28	26	28	22	23	25
Syrian AR	17	18	19	22	19	17
Thailand	23	31	26	30	27	31
Vietnam	30	36	39	31	36	32
Yemen	19	NA	12	34	NA	9

Source: WB(2010). NA: not available.