

INTERNATIONAL COMPARISONS OF WORLD DEVELOPMENT: 2 EBOOKS ON EDUCATION, PRODUCTION, POVERTY AND QUALITY OF LIFE FOR THE PERIODS 1960-2000 AND 2021-2023

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Abstract

In Section 1 we cite a paper with some selected readings on international cooperation to development written for the first quarter of the 21st century, and the role of academic Blogs on social diffusion of those studies. In sections 2 and 3 we present a reference to 2 ebooks published by the Euro-American Association of Economic Development Studies, in year 2003. Section 2 summarizes some of the main contents of the Book EE11, by Guisan, Aguayo and Exposito(2023), on World development for 1960-2000, and Section 3 summarizes the main contents of the book by Guisan(2023), EE12, for the period 2001-2023. Both books include results of international econometric models that relate Education, Production per capita and Indicators of Quality of Life, with data from the OECD, Latin America, Africa, Asia or other areas. Both books are free downloadable and include links to more than 150 interesting studies cited in the bibliography, many of them free available. The main conclusion from the empirical studies is that international cooperation should be focused on support to education, production, investment, peace, and quality of government.

Keywords: Books on World Development, Blogs on World Development, Education and International Cooperation to Development, International Comparisons of Quality of Life. International panel models of demand and supply, Sustainable development, America, Europe, Eurasia, Africa, Asia and Oceania, 1960-2023.

JEL Codes: C51, C52, E2, I3, L6, O51, O52, O53, O54, O55, O56, O57

1. Introduction

The Euro-American Association of Economic Development Studies (EAAEDS) has published, for the period 2001-2023, more than 1000 articles on international development, in its journals AEID, RSES, EEDI and IJAEQS, and also 2 e-books in English, with interesting surveys of research studies on World Development, for the periods 1960-2000 and 2001-2023 (books EE11 and EE12).

The books published by the EAAEDS are free available on line at the international academic network Ideas-Repec and at the Spanish website Dialnet.

Here, we present a selection of contents of book EE11 in section 2 and of book EE12 in section 3. These books include references to more than 150 empirical studies published for 1975-2025, with links to free downloadable pdf versions at Ideas.Repec.

Section 4 present the main conclusions, highlighting the important role of international cooperation for Education

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Finally, in the Annex we include data and links to data already included in our articles, regarding indicators of economic development and quality of life in 164 countries around the year 2019.

In Guisan(2024), EcoDev 127, we expect to include a reference to other studies that we have published on international development and updates of the contents of these books since year 2024.

2. Book EE1: Education and International Development 1960-2000

Guisan, Maria-Carmen (ed.), 2023. "[Education And International Development, 1960-2000: Economic Studies Of Oecd Countries, Latin America, Europe, Africa And Asia](#)," [ESTUDIOS ECONOMICOS EEBOOK](#), Euro-American Association of Economic Development, edition 1, volume 11, number EE11.

Note: Full content available at <https://ideas.repec.org/s/ea/eebook.html> and individual access to each article at: <https://ideas.repec.org/s/ea/eechap.html>

2.1. EE11. Chapter 1: World development in the 20th century

[Chapter 1. World Development in the 20th century. Evolution and Econometric Models](#), by Maria-Carmen Guisan

Tables 2.1 and 2.2 show the exponential rates of annual increase of real Gross Domestic Product (GDP); Population (POP) and GDP per head (GDH), for the periods 1913-1950 and 1950-1998. The exponential rate of real Production per capita (GDPH) is exactly equal to the difference between the exponential rates of GDP and POP.

The highest rates of increase of GDPH usually correspond to countries and areas with the highest levels of Education, although other factors usually are also important to foster economic development.

Table 2.1 Exponential rates (%) of GDP, Population and GDPH, 1913-1950
(average annual rate of variation)

Area	GDP	POP	GDPH
Western Europe	1.18	0.42	0.76
USA and other countries	2.77	1.24	1.53
Japan	2.19	1.30	0.89
Asia excl. Japan	0.90	0.92	-0.02
Latin America	3.37	1.95	1.42
Eastern Europe and Eurasia	1.82	0.34	1.48
Africa	2.65	1.64	1.01
World	1.83	0.93	0.90

Source: Table 1.1. of the book EE11. From Guisan, Aguayo and Exposito (2001) with data from Maddison(2001). The group “USA and other countries”, by Maddison. Includes USA, Canada, Australia and New Zealand.

That chapter is based in the statistics published by Maddison(2000), and other historical statistics cited in the book, for the first half of the 20th century and from OECD and World Bank statistics for the second half.

For the 20th century there were great increases of real Gross Domestic Product (GDP), Population (POP) and Production per head (GDPH), in the World.

The increase of real production per capita was very important for the second half of the century. The average rate of increase of GDPH was 0.90% for the period 1913-1950 and 2.07 for the period 1950-1998.

Table 2.2. Exponential rates (%) of increase of GDP, POP and GDPH, 1950-1998
(average annual rates of variation)

Area	GDP	POP	GDPH
Western Europe	3.34	0.50	2.84
USA and other countries	3.42	1.26	2.16
Japan	5.78	0.86	4.92
Asia excl. Japan	5.19	2.00	3.19
Latin America	4.04	2.33	1.71
Eastern Europe and Eurasia	1.97	0.90	1.07
Africa	3.49	2.50	0.99
World	3.84	1.77	2.07

Source: Table 1.2 of the book EE11. See footnote of table 1.

There were important differences by geographical areas. For the period 1950-1998 the highest increases of GDPH corresponded to Japan (4.92%), due to its high rate of GDP and moderate rate of POP, followed by the group “Asia excluding Japan” (3.19%), Western Europe (2.84%) and the group of “USA and other countries”.

Below the World average rate of increase of GDPH (2.07%) was Latin America (1.71), with a rate of Growth of GDP(4.04) slightly higher than World average and a high rate of Population growth (2.33) much higher than World average.

In the case of Eastern Europe and Eurasia, the rate of increase of GDPH was low (1.07%) due to the low increase of GDP.

In Africa, the rate of increase of GDP was low (0.99%), due to a high rate of growth of POP, in spite of an rate of growth of GDP of 3.49%. With the rate of Population growth of the World, the rate of increase of GDPH in Africa could have been 1.72% instead of 0.99%.

Higher development for the second century, in comparison with the period 1900-1950, is explained by the increase of the Educational level of population and to other factors that have contributed to increase the difference between the rate of growth of real GDP and the rate of Population growth, as well as to other advances that contributed to increase of investment per capita, productivity and quality of life in many areas.

Table 2.3 shows the positive correlation of the indicators of Education (Eduh, Tyr90 and Tyr99) with real production per head in Industry (qhi90, qhi99) and Services (qhs90, qhs99), and the negative correlation of Education with the average Fertility rate (Fer99)

Table 2.3. correlation coefficients of Eduh and Tyr99 with other variables.
(in 132 countries in year 1999)

Variables	eduh	tyr 90	tyr 99	qhi 90	qhi 99	qhs 90	qhs 99	Fer 99
eduh	1.00	0.80	0.80	0.91	0.92	0.93	0.91	-0.64
tyr99	0.80	0.98	1.00	0.77	0.82	0.82	0.84	-0.81

Source: Table 1.8 of the book EE11. Elaborated by Guisan for the book EE11, with data from World Bank another sources.

The indicators of Education: EDUH (average expenditure per heal on education for the period 1990-1999) and Tyr (Total average years of schooling of population age +25) are very important to moderate excessively higher average rates of Fertility and thus to increase investment per capita and qhi and qhs.

The increase of Industrial production per capita (qhi) usually has a high positive impact on production in Services per capita (qhs) and other positive effects on economic development. Improving economic development usually favors more expenditure on education, with increases of Eduh and Tyr, keeping moderate average Fertility rates, and increases savings per capita, investment per capita and economic development.

The countries and geographical areas with the highest values of the indicators of Education were those with the highest rates of increase of qhi, qhs and GDH.

Table 2.4 shows important differences on the educational level of Population for the period 1970-1990.

Table 2.4. Average School Years of Education od adult population

AREA	BARRO and LEE		NERUH et al.
	1970	1990	1987
Developing Countries	2.66	4.43	4.48
Middle East and North Afr. (MENA)	2.05	4.47	4.79
Sub-Saharan Africa	2.06	2.93	2.54
Latin America	3.82	5.24	5.52
East Asia and South Pacific	3.80	6.08	5.13
South Asia	2.03	3.85	3.39
OECD	7.58	9.02	10.0

Source: Table 2.3 of the book EE11. Elaborated by Guisan(1997) from BARRO and LEE(1996), population over age 25 and from NERUH et al. (1995), population between the ages 15-64.

The average School Years (Tyr) in OECD countries was as high as 7.58 in year 1970. While in Latin America it was 3.82 and in below 3 in MENA countries, Sub-Saharan Africa and South Asia. For the period 1970-1990 there was a general improve of Tyr, but the value was yet very slow in Sub-Saharan Africa (2.93).

Chapter 1 also includes econometric models of World development, with samples of 132 countries, and international models of countries of Latin America, Europe, Africa and Asia. The model by Guisan, Aguayo and Exposito is one of the first World models showing the impact of average schooling on moderation of average Fertility rates.

2.2. EE11. Chapters 2 and 3: Development in the OECD 1960-2000.

Chapter 2. Development in the OECD, 1960-2000: Econometric Models and Indicators. Guisan, Maria-Carmen (2023)

Chapter 3. Production by sector in OECD Countries, 1960-2000. Guisan, Maria-Carmen; Exposito, Pilar (2023)

Many countries of the OECD have got high, or very high, levels of average years of schooling per adult what, together with other factors, was very important to increase investment per capita and development for the second half of the 20th century.

Table 2.5 presents the evolution of Production per capita in several OECD countries for the period 1900-1997, and Table 3.5 shows the evolution of real Industrial Production per capita in 6 OECD countries for the period 1960-2000.

For the period 1900-1950 the United States showed an important increase, from 4.6 to 10.7 thousand dollars per capita at constant prices, in spite of the great depression of year 1929 and the first and second World wars.

For that period the increase was low in Europe, from 3.4 to 5.3 as average values of the European Union of 15 countries (EU15). The increase was higher in France and the United Kingdom in comparison with Germany and Spain. Japan experienced low increase of Production per capita for that period, from 1.5 in 1900 to 2.5 in 1950

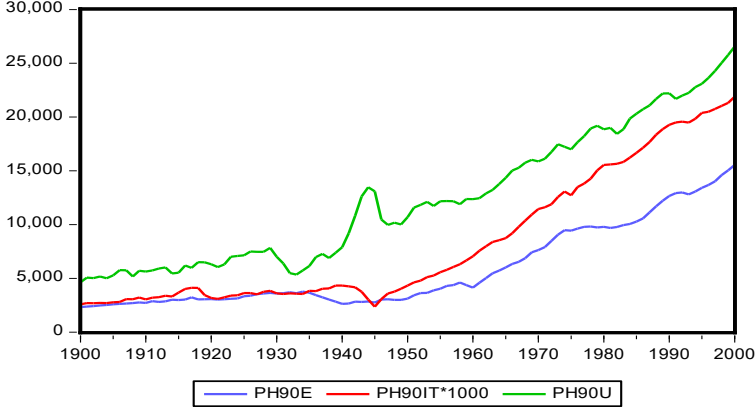
Table 2.5. Production per capita of France, Germany, Spain, UK, Japan, USA and EU15 (thousand Dollars at 1990 prices and exchange rates)

	USA	EU15	France	Germany	Spain	UK	Japan
1900	4.646	3.446	3.643	2.306	2.330	4.383	1.502
1910	5.639	3.779	3.743	2.595	2.709	4.499	1.662
1920	6.306	3.423	3.886	2.356	3.076	4.753	2.141
1930	7.010	4.607	5.506	3.466	3.587	5.309	2.333
1940	7.896	4.073	4.875	5.149	2.628	6.690	3.691
1950	10.687	5.279	6.318	4.849	3.119	6.970	2.476
1960	12.359	7.916	8.949	9.008	4.141	8.928	5.146
1970	15.871	11.751	13.842	13.001	7.634	11.120	12.505
1980	18.856	15.084	17.971	16.878	9.789	13.355	17.183
1990	22.224	18.495	21.199	20.665	12.662	16.947	24.042
1997	24.733	20.173	22.549	22.341	14.179	18.648	26.503

Source: Table 2.1 of Chapter 2 of book EE11. Data elaborated, at 1990 prices and purchasing power parities, by M.C. Guisan from Maddison and other historical statistics, for the first half of the 20th century (cited in Guisan, Exposito and Cancelo (2000)), and from OECD statistics for the second half. Note: Data of Germany includes West and East Germany, based on the sources of data and estimations based on other indicators.

Graph 2.1 show the evolution of real Gross Domestic Product (GDP) per capita in 3 OECD countries, for the 20th century: Italy, Spain and the USA.

Graph 2.1. Real GDP per capita for 1900-2000: Italy, Spain and the USA



Source: Elaborated by M.C. Guisan from Maddison and other historical statistics for the first half of the 20th century, and from OECD statistics for the second half, as indicated in EE11.

For the period 1950-2000. Thanks to the peace, education and development policies, there were important increases of real GDP per capita in the USA (from 10.7 to 24.7) and the EU15 (from 5.3 to 20.2). Among the major European countries the highest positions in year 1997 corresponded to France (22.5 thousand Dollars at constant prices per capita) and Germany (22.341). The United Kingdom reached 18.6 and Spain 14.2. Japan experienced a great increase, from 2.5 in 1950 to 26.5 in 1997. Graph 1 shows the evolution of real Production per capita in Spain and Italy in comparison with the United States.

Tables 2.6 and 2.7 show the evolution of real values of industrial production per head (qhi) and non-industrial production per head (qhni).

Table 2.6. Industrial production per head (QHI) in 6 OECD countries, 1960-2000 (Thousand Dollars per inhabitant at 2000 Prices and Exchange Rates)

	QHI00 Germany	QHI00 Spain	QHI00 France	QHI00 Italy	QHI00 UK	QHI00 USA
1960	2.114	0.551	1.665	1.252	2.920	2.470
1970	3.458	1.270	2.534	2.292	3.503	3.511
1975	3.507	1.708	2.754	2.411	3.545	3.640
1980	4.124	1.803	3.167	3.086	3.759	4.234
1985	4.293	1.789	3.103	2.940	3.909	4.405
1990	4.909	2.167	3.522	3.423	4.412	4.787
1995	4.732	2.252	3.445	3.669	4.623	5.596
2000	5.218	2.712	3.809	3.926	4.884	6.282

Source: Table 2.11 of Chapter 2 of book EE11. Elaborated by M.C. Guisan, from OECD National Accounts Statistics. Note: Data of Germany for 1960-1990 has been calculated by adding to the West Germany data from the OECD statistics our estimations for East Germany.

Table 2.7. Non-Industrial Production per head (QHNI) in 6 OECD countries, 1960-2000 (Thosuang Dollars per inhabitant at 2000 Prices and Exchange Rates)

	QHNI00 Germany	QHNI00 Spain	QHNI00 France	QHI00 Italy	QHI00 U K	QHI00 USA
1960	6.566	3.150	6.089	4.684	7.583	13.438
1965	7.894	4.479	7.624	5.678	8.536	15.357
1970	9.069	5.552	9.460	7.355	9.578	16.916
1975	10.269	6.722	10.883	8.308	10.848	18.241
1980	12.139	7.023	12.318	10.009	11.951	20.035
1985	13.345	7.415	13.295	11.238	13.368	21.746
1990	15.003	9.175	15.025	13.108	15.688	23.787
1995	16.215	9.817	15.936	13.900	16.883	24.311
2000	17.535	11.626	18.738	15.262	20.207	28.325

Source: Elaborated by M.C. Guisan(2023), in book EE11, from OECD statistics. Note: Data of Germany for 1960-1990 calculated from OECD for West and own estimations for East.

With a panel of 120 observations of 6 OECD countries of tables 5 and 6, with annual data for the period 1965-2000, the book EE11 includes the following estimated relationship of QHNI, elaborated by Guisan(2023) in Chapter 2 of the book. The variables are expressed in Dollars per inhabitant at 2000 prices and exchange rates.

Equation 1 is based on the macroeconometric approach followed by the author, since Guisan(1980) (ESWC80) to Guisan(2005) (book by IUP) and other studies.. It is a mixed dynamic model where QHNI, of country i in year t , depends on its lagged value value, of country i in year $(t-1)$, and on the increases of QHI, MHG and XHG, of country i in year t . The equation has into account intersectoral relationships and the role of foreign trade on the availability of intermediate inputs.

Equation 1, $QHNI = f(QHI(-1))$ and increase of QHI, MHG and XHGA.

Panel model of 6 OECD countries for the period 1965-2000

Dependent variable QHNI. Method: Pooled Least Squares				
Sample: 1965 2000. 36 obs. Cross-sections: 6. Total pool: 120				
White diagonal standard errors & covariance (d.f. corrected)				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
QHNI00?(-1)	1.011842	0.002432	416.0210	0.0000
D(QHI00?)	0.565950	0.222643	2.541959	0.0123
D(MHG00?)	1.040119	0.175164	5.937978	0.0000
D(XHG00?)	-0.422826	0.162931	-2.595128	0.0107
R-squared	0.998988	Mean dependent var		14.41407
Adjusted R-squared	0.998961	S.D. dependent var		5.875765
S.E. of regression	0.189363	Akaike info criterion		-0.457539
Sum squared resid	4.159560	Schwarz criterion		-0.364622
Log likelihood	31.45232	Hannan-Quinn criter.		-0.419805
Durbin-Watson stat	1.405708			

Source: Equation 2.1 of chapter 2 of book EE11 by Guisan(2023)

From the supply side of Intermediate Inputs, Imports of goods per capita (MHG) has a positive impact on QHNI, because they contribute to increase domestic availability of intermediate inputs, while Exports of goods per capita has negative impact on QHNI because it suppose diminution of intermediate inputs in the domestic market. As seen in Guisan(2007), Ijaeqs , the total effect of foreign trade includes also the effect of MHG and XHG on QHI. MHG may have an effect complementary (positive) or substitutive (negative) for QHI, an XHG usually has a positive impact on QHI from the demand side.

A simultaneous increase of one unity in MHG and XHG implies an increase of QHNI, given by the sum of the 2 coefficients ($1.040119 - 0.422826 = 0.617293$). In some countries, with important impact of Exports of Services through touristic activities, there is also a positive impact of Exports of Services per capita on QHNI.

Chapter 2 also analyze the positive impact of the increase of GDPH and Labour Productivity ($PM = GDP/L$) on the increase of real wages in OECD countries.

Chapter 3 analyzes Production and Employment by sector in OECD countries, 1960-2000. It includes a comparison of Employment by sector in 4 OECD countries. Table 7 includes a comparison of rates of Employment in Services (commercial & Hostelry, Social and Total for years 1965 and 1999. Based on tables 3.13 to 3.15 of that chapter of book EE11.

Table 2.8. Rates of Employment in Services
(Employed people per 1000 inhabitants)

	Commercial		Social Public		Social Total		Services Total	
Country	1970	1999	1970	1990	1970	1990	1970	1999
USA	77	105	64	67	110	140	234	364
Japan	85	95	30	32	96	144	230	330
Germany	67	73	49	68	83	123	203	294
Spain	51	65	30	50	53	75	122	227

Source: Tables 3.13 to 3.15, elaborated by Guisan(2023), in chapter 3 of the book EE11, from OECD Labour Force statistics. Note: Data for Germany are approximated, having into account information of West and East, as indicated in the book.

The rate of Employment in Commercial Services and Hostelry increase in all countries of table 7 for the period 1970-1999, and varied in year 1999 between the minimum of 65 in Spain to the maximum of 105 in the United States.

The rate of Employment in Social services increased in all the countries of table 7 for the period 1970-1990, and varied in year 1999 between the minimum of 75 in Spain and the maximum of 144 in Japan.

For the period 1970-1999, the rate of Employment in Total Services increase from 234 to 364 in the United States, from 230 to 330 in Japan, from 203 to 294 in Germany, and from 122 to 227 in Spain.

In year 1990, the rate of social services employment per 1000 people varied, in table 3.7, between 75 in Spain and 144 in Japan.

2.4. EE11. Chapters 4 and 5: Latin America, Europe and the United States

Chapter 4. Econometric models of Latin America. Studies of the period 1984-2000. Guisan, Maria-Carmen; Aguayo, Eva (2023).
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Chapter 5. A Comparison of Regional Development in the European Union and the United States, 1960-2000, Maria-Carmen Guisan (2023)
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We analyze several studies that show the important impact of Education on Latin America Development. We include a table with indicators of Education in year 1999 (Eduh=public expenditure in Education per inhabitant, and Tyr=total average years of schooling of adult population) in 22 American countries: 20 Latin American and Caribbean countries, in comparison with Canada and the United States. Most Latin American countries were very low in comparison with the USA and Canada.

Education expenditure per capita The value of Eduh was higher than 1300 in USA and Canada, and took values below 200 in several American countries (Bolivia, Dominican Republic, Ecuador, El Salvador, Guatemala, Haiti, Honduras, Jamaica, Nicaragua, Paraguay, Peru and Uruguay. The indicator had values between 200 and 500 in Argentina, Brazil, Chile, Colombia, Costa Rica, Mexico, Panama, Uruguay and Venezuela.

Total average years of schooling: The indicator Tyr99 reached a value of 11.4 in Canada and 12.2 in the USA. The value was lower than 6 in Bolivia, Brazil, Colombia, Dominican Republic, El Salvador, Guatemala, Haiti, Honduras, Jamaica, Nicaragua, Paraguay and Venezuela. Tyr99 took values between 6 and 9 in Argentina, Chile, Costa Rica, Ecuador, Mexico, Panama, Peru and Uruguay.

We found a positive correlation between the percentage of illiterate population and average Fertility rate per woman, and a high negative correlation between percentage of population with secondary studies of second cycle with average Fertility rate. The moderation of Fertility rate, favors the increase of investment per capita and economic development.

We analyze production per capita by sector of 22 American countries in year 1999 with the highest levels of Industrial production per inhabitant (Industry and Building) in Canada and the United States (higher than 8000 Dollars). Among the 20 Latin American and Caribbean countries only Argentina reached a level of 4000 Dollars per capita. Countries with value between 2000 and 4000: Brazil, Chile, Mexico, Peru and Uruguay. Countries with value below 2000: Bolivia, Colombia, Costa Rica, Dominican R., Ecuador, El Salvador, Guatemala, Haiti, Honduras, Nicaragua, Panama, Paraguay and Venezuela.

In this chapter we include a comparison of the increase of real Gross Domestic Product (GDP) per capita in 5 European countries, with the increase of Real Income per capita in the 8 BEA regions of the United States.

The percentages of increase of real Production per capita in the group of 5 European countries, for the period 1960-2000, were: 62% in Germany, 227% in Spain, 91% in France, 124% in Italy and 39% in the United Kingdom.

The percentages of increase of Real Income per capita in the 8 BEA regions of the United States, for the period 1960-2000, were: 187% in New England, 157% in Mideast, 139% in Great Lakes, 160% in Plains, 207% in Southeast, 161% in Southwest, 150% in Rocky Mountain, and 124% in Far West.

In the USA all the BEA regions had percentages of increase higher than 100, and in the group of 5 European countries, only Spain and Italy reached percentages of increase higher than 100 for the period 1960-2000.

3. Book EE12: Education and International Development, 2001-2023

The book presents a summary of our quantitative studies published for the period 2001-2023, related with the role of Education, Industry, Foreign Trade and other variables in Development and Quality of Life.

Guisan, Maria-Carmen (2023). Education, Economic Freedom, Development and Quality of Life: International Studies of OECD countries, Latin America, Europe, Africa and Asia. Book EE12. Euro-American Association of Economic Development Studies. EEBOOKS, available at Ideas.Repec.

Note: Boo

Book EE12 is available at <https://ideas.repec.org/s/ea/eebook.html>

3.1. EE12. Chapter 1: Development and Quality of Life, 2001-2023

Chapter 1. Education, World Development and Quality of Life, 2001-2023. Guisan, Maria-Carmen

Includes references to our studies on Investment and Manufacturing in 132 studies, as well a general view of Food and Poverty in the World, and a general view of Population and CO2 Emissions in year 2020. Besides the chapter includes a reference to our econometric model relating development and several indicators of quality of life in 164 countries in year 2016.

Manufacturing: Manufacturing per capita, is usually a necessary and sufficient condition for development of Services and other economic sectors. Only a few countries or territories get high real income per capita with low levels of manufacturing per capita, due to a high development of Oil, Mining, Tourism, Trade (particularly in case of harbors with high level of activity in Imports and Exports) or to other special circumstances.

We classify countries in several groups, accordingly to their level of production per capita (GDPH) in year 2015: Group 1, with the highest level of GDPH (higher than 35000 Dollars at 2005 prices and Purchasing Power Parities), includes 12 countries (Australia, Austria, Canada, Germany, Ireland, Kuwait, Netherlands, Norway, Singapore, Sweden, Switzerland and the United States), and the Chinese territory of Hong-Kong. The non weighted average of Manufacturing per capita, in this group was 6034 in year 2015. There were some cases of high GDPH per capita in spite of low values of Manufacturing per capita, explained by high production per capita in Mining (Australia), Oil (Kuwait and Norway), or to a high level of trade with other regions or countries (Hong-Kong).

Groups 7 to 12, of countries with GDPH below 10000 in year 2015, had levels of Manufacturing per capita below 3000, with several of them below 100.

Food and Poverty. According to the FAO statistics, there was an important increase of Food Production per capita for the period 1979-2014, with percentages of increase of 64% for three Cereals and 15% for a set of three legumes. Besides there was a negative variation of 20% in the case of potatoes, and increase of 14% in Milk, 37% in Meat and 35% in Fish. This increase of production has contributed to Poverty diminution.

World Bank(2022) reports on poverty and says: “*Progress in reducing global poverty has essentially halted: by 2030, nearly 7 percent of the world's population—nearly 600 million people—will still struggle in extreme poverty. Within-country inequality increased in as many countries as it declined, but after decades of convergence, global inequality increased. The poorest have also suffered disproportionate losses in health and education with devastating consequences*”.

Environment and sustainability: According to table 1.13 of the book EE11, elaborated from European Union and World Bank indicators, CO2 Emissions per capita in the World, evolved from 4.23 in year 1970 to 4.93 in year 2015, but total Population evolved from 3594 to 7341 million and Total CO2 Emissions evolved from 15583 million Tm, in year 1970, to 36191 million Tm in year 2015, with an increase of 20608 million Tm. The effect of the increase of World Population explains more than 85% of the increase of the Total CO2 Emissions in the period 1970-2015. The empirical studies, for the period 1990-2023, show that Education leads usually to moderate excessive average rates of Fertility, compatible with sustainable development and poverty eradication.

An econometric model of quality of life in 164 countries

The book includes a summary of the main conclusions of the econometric model estimated by Guisan(2021) with 164 countries, analyzing the evolution for 1995-2019.

Figure 4.1. Several positive effects of Education on Quality of Life

- 1) Education usually contributes to moderate average values of FER.
- 2) Education usually contributes to increase PH (directly in equation 2 and indirectly through its effect on diminution of FER in equation 1).
- 3) Education usually contributes to increase X2 (Voice of Citizens) in equation 4, directly and indirectly through its positive effect on PH.
- 4) Education usually contributes to increase X4 (Peace) in equation 5, through the positive impact of X2.
- 5) Education usually contributes to increase X1=Happiness in equation 3, indirectly through the effects of PH and X2.

Source: Figure 1.9 by Guisan(2023) in the book EE11, from international statistics. Notes: PH=GDP per capita, FER= Fertility rate, X1=Satisfaction with Life, X2=Voice of Citizens, X4=Peace. Indicators X1, X2 and X4 are in decimal scale (0 minimum, 10 maximum).

Besides, Equation 1.10 by Guisan(2023) in the book EE11 shows the positive impact that usually has X8=Economic Freedom on economic development, with data from Heritage(2022).

Econometric model by Guisan(2023) on Freedom and Development

Chapter 1 of book EE12 includes the estimation of an econometric model relating Production per capita in year 2019 (Ph19) with its lagged value in year 1995 (Ph95) and with indicators of Quality of Government (X2) and Economic Freedom (X6). The data of these variables are included in the table A1 in the Annex. The results of the estimation with data of 157 countries appear in Equation 3.1..

Equation 3.1. PH19/1000 related with its lagged value, X2 and X6

Dependent Variable: PH19/1000				
Method: Least Squares				
Sample: 1 164. Included observations: 157				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
PH95/1000	0.938906	0.038974	24.09085	0.0000
X2=Voice of Citizens	2.494999	0.480337	5.194270	0.0000
X6=Freedom/10	1.329558	0.677197	1.963326	0.0515
C	-12.20457	2.701671	-4.517415	0.0000
D71	37.81689	5.316384	7.113272	0.0000
D135	29.15025	5.371833	5.426499	0.0000
D154	-44.48723	6.003932	-7.409682	0.0000
R-squared	0.942403	Mean dependent var		21.16546
Adjusted R-squared	0.940099	S.D. dependent var		21.38315
S.E. of regression	5.233451	Akaike info criterion		6.191580
Sum squared resid	4108.352	Schwarz criterion		6.327846
Log likelihood	-479.0391	Hannan-Quinn criter.		6.246923
F-statistic	409.0506	Durbin-Watson stat		1.869016
Prob(F-statistic)	0.000000			

Source: Elaborated by Guisan(2023) in book EE12, with data elaborated by Guisan(2021) and (2023) from World Bank, for PH and X2. Besides we have included the indicator x6 that appear in table A1 in the Annex, elaborated from Heritage(2022) Freedom in percentage points, being X6 in decimal scale (X6=Freedom/10).

Equation 1.10 includes 3 dummy variable for 3 countries with special positive effects, where PH increased more than expected by the model (71 Ireland and 135 Singapore, and one countries with special negative effect, where PH increased less than expected (154 United Araba Emirates). This country, oil producer, had levels of real GDP per capita extraordinarily high until year 2006 and evolved at a lower level since that year.

The results show a high goodness of fit in spite of lack of several important missing variables. This happens when the missing variables (educational level of population, political stability, peace, and other ones) have a high degree of correlation with the relevant explanatory variables included, as it is explained in chapter 5 of the book of Econometrics by Guisan(1997) and in the Annex of Guisan(2022) in AEID 22-1.

The empirical evidence shows that Freedom for labor, investment and business usually contributes to foster economic development, and freedom for choosing the own choices in the life has usually a positive impact on X1=Satisfaction with life.

3.2. EE12. Chapter 2: OECD countries, 2001-2023

Chapter 2. Econometric Models of OECD Countries, 2001-2023, Guisan, Maria-Carmen

We have highlight the analysis of economic growth and development with a panel of 6 OECD countries (France, Germany, Italy, Spain, UK and USA), from the approaches of Demand, Supply of Primary Inputs and Supply of Intermediate Inputs (having into account intersectoral reglationships and the role of Foreign Trade).

We estimate models of Wages and Employment with a panel of 3 OECD countries (Germany, Spain and the United States).

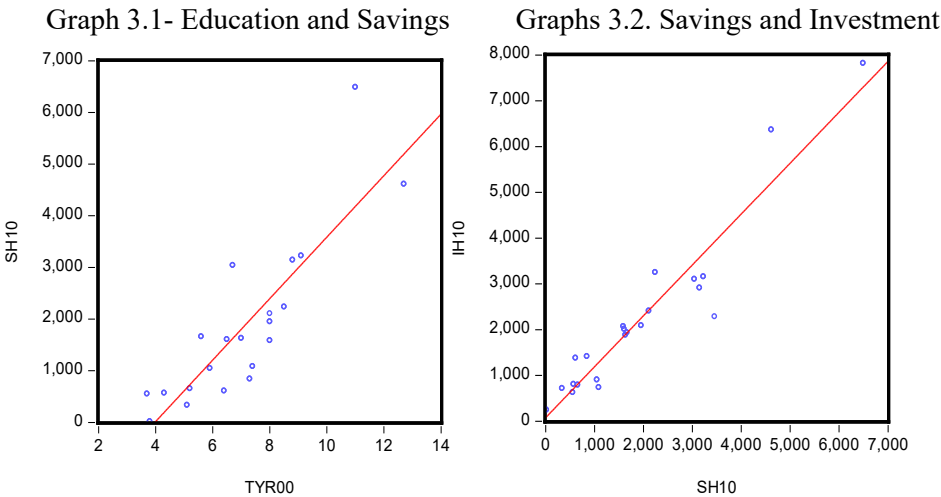
This chapter also includes a reference to the analysis of economic development and Quality of Life in countries and regions of the OECD in year 2016.

3.3. EE12. Chapter 3: Latin America, 2001-2023

Chapter 3. Development Studies of Latin Americ, 2001-2023, Guisan, Maria-Carmen

Chapter 3 includes 2 sections: 1) Education, Investment and Quality of Life in 22 American countries. 2) Development of 8 Latin American countries for 1950-2021.

In section 1) we analyze Education, Manufacturing, Investment and indicators of quality of life in 22 American countries. The relation between Education and Savings per capita in 22 American countries, amd between Savings and Investment per capita is shown in the following graphs. Where we relate Savings per capita in year 2010 (SH10), and Investment per capita in year 2010 (IH10) with an indicator of Education: Tyr00 (average years of Schooling of adult population in year 2000).



Source: Graphs elaborated by author from table 3.1 in chapter 3 of the book EE12 by Guisan(2023), with data from WHR (United Nations), for Tyr, and World Bank for SH and IH.

Section 2) analyses economic development in 8 Latin American countries for the period 1950-2021. The following table presents a short version of the table

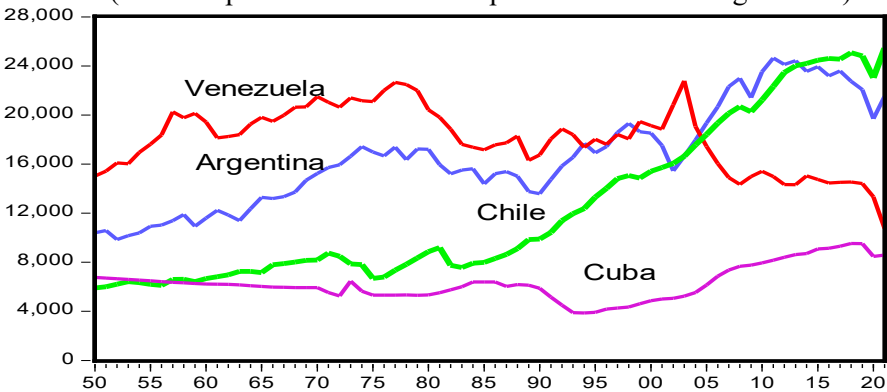
Table 3.1. Real GDP per capita (Dollars at 2017 prices and Parities)
in 8 Latin American countries years 1950. 1980. 2000, 2020 and 2021

	1950	1980	2000	2010	2021
Argentina	10407	17205	18525	23521	21527
Brazil	3367	10470	11529	14825	14592
Chile	5904	8865	15416	21225	25449
Colombia	3879	7684	9138	11890	14649
Cuba	6764	5344	4869	7953	8589
Mexico	5680	15696	17943	18037	19086
Peru	3898	7243	6376	9997	12515
Venezuela	15029	20421	19133	15410	10749
Average	6866	11616	12866	15357	15895
World	3977	8507	11108	13868	16997

Source: Table 3.11 of EE12, elaborated by Guisan(2023) from Maddison(2000), World Bank(2023) and ECLAC(2023). Average is the non-weighted average of the 8 Latin American countries of this table.

Graphs 4.3 and 4.4, show international comparisons for the period 1950-2021

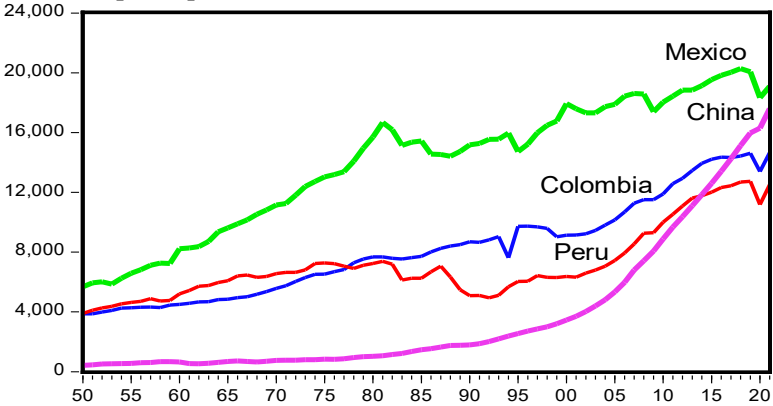
Graph 3.3. GDP per capita in 4 Latin American countries, 1950.2021
(Dollares per inhabitant at 2017 prices and Purchasing Parities)



Sources: Guisan(2023) chapter 4 of EE12.

In year 1950 the top position in graph 4.3, corresponded to Venezuela, followed by Argentina, and the lowest positives in that graph corresponded to Chile and Cuba. In year 2021 the top position corresponded to Chile, followed by Argentina, and the lowest positions, in graph 4.3. corresponded to Venezuela and Cuba.

Graph 3.4. GDP per capita in 3 Latin American countries and China, 1960-2021



Sources: Guisan(2023) chapter 4 of EE12.

Chile, Argentina and Mexico, were in the top positions in year 2021 in table 3.3.

We compare several indicators of economic development and quality of life in 8 Latin American countries, table 3.4 shows the non-weighted average of the indicators in those countries in comparison with the averages of top OECD countries and World.

Table 3.2. Manufacturing per capita (QMH1) (\$ at 2005 prices and PPPs) and other indicators of development and quality of life around year 2019

	QMH 2015	X1 Happy	X2 Voice	X4 Peace	X5 Stability	X6 Free	X7 PM2.5	X8 Hom.
Argentina	2277	5.93	4.56	5.14	5.08	5.01	13.3	5
Brazil	1036	6.33	4.10	3.93	4.16	5.33	12.7	21
Chile	1853	6.17	6.98	5.42	5.14	7.44	21.0	4
Colombia	1176	6.01	5.08	3.27	3.66	6.51	16.5	26
Cuba	1288	4.68	2.16	5.94	6.20	2.95	20.0	4
Mexico	2609	6.32	4.68	3.45	3.30	6.37	20.9	29
Peru	1294	5.84	4.52	4.92	4.42	6.65	24.8	7
Venezuela	1290	4.93	1.96	4.40	1.80	2.48	99.9	41
Av. 8 countries	1603	5.78	4.26	4.56	4.22	5.34	28.6	17
Top OECD	6353	7.07	8.24	6.30	7.50	8.00	14.0	2.6
China	2791	5.34	1.72	4.72	4.42	4.80	52.7	0.6
World	1798	5.35	5.00	4.80	5.00	5.00	46.0	6.2

Source: Guisan(2023), chapter 3 of book EE12. Elaborated by authors from the international sources there cited. Notes: Data of year 2015 for the indicator of Manufacturing per capita. Data around year 2019 for the indicators X1 to X8.

QMH15: average of 8 Latin American countries was slightly lower than World average. Argentina, Chile and Mexico had values over World average, but low in comparison with the OECD.

X1=Life Satisfaction: The average of 8 Latin American countries was 5.78, slightly higher than World average (5.35) but below OECD (7.07).

X2 =Voice of citizens: It is an important indicator of quality of government. The average value in 8 Latin American countries was 4.26, below World average (5.0) and top OECD countries (8.24).

X4 = Peace: The indicator of Peace, expressed in decimal scale (being 0 minimum of peace and 10 maximum) had an average value of 4.56 in 8 Latin American countries, below World average (4.80) and very much below top OECD countries (6.30).

X5 = Political Stability: The average of 8 Latin American countries was 4.22, below World average (5.0) and very much below top OECD countries (7.50).

X6 = Free: It is an indicator of Economic Freedom, from Heritage (in decimal scale (from minimum 0 to maximum 10). The average of 8 Latin American countries was 5.34, slightly higher than World average (5.0), and much lower than top OECD (8.0). There are important differences among Latin American countries, with Chile, Colombia, Mexico and Peru with values higher than 6, while Cuba and Venezuela presented values lower than 3.

X7 = Pollution measured by indicator PM2.5: The average value of 8 Latin American countries was 26.6, clearly below World average (46.0), but higher than the average of top OECD countries (14.0)

X8 = Homicides rate per 100 thousand people: The average value of 8 Latin American countries was 17, much higher than World average (6.2) and top OECD countries (2.6). Argentina, Chile and Cuba had values below World average, and the highest values in table 3.4 corresponded, in descending order to Venezuela, Mexico, Colombia and Brazil.

3.4. EE12. Chapters 4, 5 and 6. Studies of Europe, Africa, Asia and Oceania

Chapter 4. Development Studies of Europe and Eurasia, 2001-2023-
Author: Maria-Carmen Guisan

Chapter 4 has 2 sections: 1) Investment, Industry and Trade in Europe and Eurasia, 2001-2019. 2) Quality of Life in Europe and Eurasia 2019-2022.

In section 1) we analyze the evolution of real value added per inhabitant in Manufacturing (QMH) for the period 2000-2015 in 32 European and 10 countries of Eurasia and Central Asia.

Table 3.3 shows groups of countries classified by the value of QMH in year 2015, expressed in Dollars per capita at 2005 prices and Purchasing Parities.

Table 3.3. European and Eurasian countries classified by value of QMH
(Manufacturing per capita in year 2015, Dollars at 2005 prices and purchasing parities)

QMH	Countries
>4000	Ireland, Germany, Czech R., Switzerland, Austria, Slovenia, Sweden, Slovak R., Hungary, Netherlands, Denmark, Belgium, Italy, Poland, Finland
3000 to 4000	Lithuania, Spain, Belarus, UK, Norway, Turkey, Portugal, France, Estonia
1000 to 3000	Croatia, Bulgaria, Greece, Latvia, North Macedonia, Romania, Russia, Kazakhstan
< 1000	Ukraine, Albania, Moldova. Armenia, Georgia, Turkmenistan, Azerbaijan, Uzbekistan. Kyrgyz R., Tajikistan

Sources: Elaborated by Guisan(2017), from World Bank statistics. Notes: this table includes 32 European countries and 1 Eurasian country (Turkey). Other Eurasian countries are included in table 4.3. QMH=real Value-Added of Manufacturing per inhabitant, QNMH=real Value-Added of non-Manufacturing per inhabitant.

Table 3.4 shows the average values of several indicators of quality of life in 3 groups of countries:

Group 1: Western and Central European countries and Turkey. All the countries of tables 3.5 that are not included in Group 2 and 3.

Group 2: 3 Baltic countries. Estonia, Latvia, Lithuania

Group 3: 3 Eastern European countries (Belarus), Moldova, Ukraine, 3 Caucasian countries, (Armenia, Azerbaijan, Georgia), Russia and 5 Central Asian countries (Kazakhstan, Kyrgyz R., Tajikistan, Turkmenistan, Uzbekistan)

Table 3.4. Indicators of Development in 3 groups of countries in year 2019

Country	PH19	Tyr19	X1	X2	X4	X5	X6	X7	X8
Group 1	42189	11.7	6.50	6.01	6.01	6.1	7.1	15.4	1.3
Group 2	34786	13.1	6.16	7.19	5.85	6.27	7.7	10.7	3.8
Group 3	14414	11.5	5.47	4.37	4.47	4.17	5.9	23.3	4.0

Source: Guisan(2023) in Chapter 4 of book EE12.

PH19: The average value of Production per capita in year 2019 (PH19) was highest in group 1, followed by group 2 and lowest in group 3. In group 1 there was a great difference between the lowest value (Albania with 13671) and the top European countries, with PH19 higher than 50000 (Austria, Belgium, Denmark, Germany, Iceland, Ireland, Luxembourg, Netherlands, Norway, Sweden and Switzerland. In group 2, the 3 countries had values of PH19 between 30000 and 40000. In group 3 there were great differences between the lowest values (Kyrgyz R 5258 and Tajikistan 3402) and the highest ones (Kazakhstan 26352 and Russian Federation 27211).

Tyr19: The average value of years of schooling of adult population in year 2019 were very alike in the three groups, although there were differences among countries within each group. In group 1 the highest values corresponded to Germany, Switzerland and

the UK (with values higher than 13). The 3 countries of group 2 had values around 13, and in group 3 the values of Tyr99 were between 10 and 12.2, with the highest value in Russian Federation.

X1=Satisfaction with life: The highest values in group 1 (higher than 7) corresponded to Austria, Denmark, Finland, Germany, Iceland, Ireland, Luxembourg, Netherlands, Norway, Sweden, Switzerland, and UK. In group 2, the highest value corresponded to Lithuania (6.26) and in group 3 to Uzbekistan (6.18).

X2=Voice of Citizens. The highest values in group 1 (higher than 8) corresponded to Austria, Denmark, Finland, Iceland, Luxembourg, Netherlands, Norway, Sweden and Switzerland (higher than 9, in the top position of European countries). In group 2 the 3 countries has values between 6.76 and 7.68). In group 3 only Georgia had a value higher than 6.

X4 =Peace: The highest values in group 1 (higher than 6.5) corresponded to Austria, Czech R., Denmark, Iceland, Ireland, Portugal, Slovenia and Switzerland. In grup 2 the indicator was between 5 and 6. In group 3 the indicator was lower than 5 in many countries, with the lowest values in Russian Federation (2.52) and Ukraine (3.35). In group 3 only Moldova and Kazakhstan had a value of X4 between 5 and 5.5.

X5= Political Stability. The highest values in group 1 (higher than 7) corresponded to Iceland, Luxembourg, Norway, Portugal, Sweden and Switzerland. In group 2 the highest value corresponded to Lithuania (6.6) and in group 3 to Belarus (5.7). The lowest values of the 42 countries of this study corresponded to Turkey (2.3) and Ukraine (2.2).

X6=Freedom. The highest values in group 1 (higher than 7.5) corresponded to Denmark, Finland, Germany, Iceland, Ireland, Luxembourg, Netherlands, Norway, Sweden and Switzerland. In group 2 the 3 countries had values between 7.5 and 8. In group 3 the highest value corresponde a Georgia (7.2) and the lowest to Turkmenistan (4.6).

X7=Pollution (PM2.5). In group 1, the lowest levels of Pollution corresponded to countries with values lower tha 10 (Finland, Iceland, Ireland, Norway, Spain and Sweden and the highest (higher than 25) to Bosnia-Herzegovina, North Macedonia and Turkey. In group 2, the lowest level of Pollution corresponded to Estonia (6.7) and the highest to Latvia (13.4). In group 3 all the countries had values higher than 10, with the highest value in Tajikistan (46.2) and the lowest in Kazakhstan (13.8).

X8=Homicides rate. In group 1, 30 countries had values below 4, and only Montenegro (4.46) and Turkey(4.31) had a value over 4. In group 2 the values were between 3.2 and 4.2. In group 3, the lowest value corresponded to Georgia (1.0) and there were other 6 countries below 4 (Armenia, Azerbaijan, Belarus, Moldova, Tajikistan and Uzbekistan. The highest value corresponded to Russian Federation (10.8) and other 4 countries had values higher than 4 (Ukraine, Kazakhstan, Kyrgyz R. and Turkmenistan.

Chapter 5. Development Studies of Africa, 2001-2023. Maria-Carmen Guisan

Chapter 5, of book EE12, has 2 sections: 1) Studies of the period 2007-2020 on Education, Investment and Production. 2) Studies of the period 2021-2023 on Education and Quality of Life in Africa.

As seen in section 3, for the period 1960-2000, many African countries had low levels in the indicators of schooling (Tyr=average years of schooling, Eduh=average expenditure per inhabitant on Education). In table 3.4 the value of Tyr in Sub-Saharan Africa evolved from 2.06 in 1970 to 2.93 in 1990, while OECD countries evolved from 7.58 in 1970 to 10.0 in 1990.

For the period 1990-2019 there were increases in Tyr in many countries of Africa, and, in year 2019, the average years of schooling of adult population varied between 4.2 in Western Africa to 8.0 in Southern Africa, with important positive effects on economic development.

Table 3.5 shoes the average values of Production per capita (Ph), Tyr and 7 indicators of quality of Life in 5 African geographical areas.

Table 3.5. Averages values of Indicators in 5 African Areas, 2019

Indicator	Northern	Western	Southern	Central	Eastern
Ph=Production per capita	11348	3249	10261	6141	5488
Tyr=Schooling	7.2	4.2	8.0	5.8	5.7
X1=Happiness	4.82	4.83	4.16	4.79	4.33
X2= Voice	3.67	3.63	4.57	2.48	3.74
X4=Peace	4.00	4.61	4.91	3.94	4.65
X5=Stability	2.7	3.7	5.3	3.3	4.0
X6= Freedom (Economic)	4.2	5.6	5.6	5.1	5.2
X7= PM2.5	50.1	39.7	23.8	49.5	31.4
X8=Homicides rate	2.10	7.2	23.6	8.3	6.1

Source: Elaborated from tables 5.3 and 5.4 of Guisan(2023), book EE12.

We may notice that the average level of X2=satisfaction with life, is below 5 in all the areas. There are also low average levels of Voice of Citizens in all the areas, with the highest value in Southern Africa and the Lowest in Central Africa. The indicator of Peace is also below 5. Political stability only is higher than 5 in Southern Africa. The indicator Economic Freedom is over 5 in all the areas but in Northern Africa. Pollution is high in the 5 areas, and Homicides rate per 100 thousand people is very high in Southern Africa.

Chapter 5 of EE12 analyzes the evolution of QMH (real valued added of Manufacturing per inhabitant), for the period 2000-2015, and the values are very low in the majority of countries. Only 2 countries present values higher than 1000 Dollars per capita: South Africa and Tunisia, and several countries had values below 100 in year 2015. Poverty eradication and increase of development and quality of life, usually requires economic policies addressed to increase industrial production per capita, due to its usual positive effects on non manufacturing production and development.

Chapter 6. Development Studies of Asia and Oceania, 2001-2023.
Maria-Carmen Guisan

Chapter 6 has 3 sections. 1) Studies of the period 2004-2020, on Investment and Development. 2) A comparison of development in India and China, 1950-2020. 3) Studies of the years 2021 and 2022, on Quality of Life in Asia and Pacific.

In the first section of chapter 6, we analyze the evolution of Investment, Savings and Manufacturing and Non-Manufacturing production per capita in 30 countries or territories of Asia and Pacific (29 countries and Hong-Kong). Table 3.6 shows the countries classified by the level of Manufacturing per capita (QMH) in year 2015.

Table 3.6. Manufacturing per capita in year 2015 (Dollars at 2005 prices and parities)

QMH	Countries or territories
>4000	Singapore, Korea R., Japan,
3000 to 4000	Israel, Malaysia
1000 to 3000	Australia, New Zealand, Saudi Arabia, Thailand, Lebanon, Kuwait, Iran, China, Indonesia
< 1000	Philippines, Jordan, Sri Lanka, Pakistan, Vietnam, India, Cambodia, Mongolia, Papua NG, Bangladesh, Yemen R, Lao PDR, Nepal, Myanmar
Not available	Syria AR,

Source: Table 6.3 of Guisan(2023) in the book EE12.

The second section of chapter 6 of book EE12 presents a comparison of the evolution of India, China and OECD countries since year 1960.

We noticed a high improvement in Life Expectancy, for the period 1960-2019, with data from the World Bank statistics: In India, from 42.27 in 1960 to 69.66 years of Life Expectancy in year 2019. In China from 43.73 in 1960 to 76.91 in year 2019.

The comparison with 2 OECD countries with high values of Life Expectancy (Japan and Spain): Japan evolved from 67.97 in 1960 to 84.36 in year 2019, and in Spain from 66.68 in 1960 to 79.34 in year 2019.

Table 3.7. Real Value-Added, per capita and by sector and Population, 2017
(Value-Added per capita \$ at 2011 prices and PPPs, Population in millions)

Country	Agriculture	Industry	Services	Total	Population
India	1018	1727	3772	6516	1340
China	1154	6184	7916	15254	1390
Japan	463	11339	27105	38907	127
Spain	956	6878	26291	34126	46.6
UK	263	7065	32900	40229	59.7
Mexico	608	5530	11817	17956	125

Source: Elaborated by Guisan(2023) in the book EE12, from World Bank statistics.

For the period 1995-2017 there has been an important increase in Industrial Development of India and China. In year 2017 industrial development of China reached a level higher than Mexico and slightly below Spain, but India had yet a lower level.

Industrial development contributes to foster development of Services, although there are also other factors that contribute to increase real value-added of Services per capita. The analysis of why two countries with similar values of Industry per capita have very different levels of services requires a more detailed study.

Very often in international comparisons may happen that there are differences between two countries regarding the classification of some activities as Industry or Services: When industrial firms have a great degree of outsourcing (they buy services from other firms that belong to the Services sector) in one country and have low degree of outsourcing in the other country (many services related with industrial production are provided within the firm, and statistically accounts as value-added of Industry).

In the third section of chapter 6 of EE12 there is a comparison of development and quality of life in Asia and Oceania in year 2019. The book presents data for each country regarding the indicators PH, Tyr and X1, X2, X4, X5, X6, X7 and X8. Table 4.8 shows the values of India and China in comparison with the average of Asia and Oceania, and in comparison with a high income country (Australia) and a low income country (Afghanistan).

Table 3.8. Indicators of Development and Quality of Life in Asia-Pacific, year 2019

Country	ph19	tyr19	X1	X2	X4	X5	X6	x7	X8
Afghanistan	2065	3.9	2.52	1.96	0.92	0	0.0	56.9	6.35
Australia	49456	12.7	7.18	8.24	6.33	6.8	7.8	8.6	0.94
China	16092	8.1	5.34	6.30	4.72	4.5	4.8	52.7	0.62
China. H-K	59586	12.3	5.48	8.32	6.23	4.6	NA	33.5	0.38
India	6717	6.5	3.82	5.78	3.62	3.5	5.4	90.9	3.22
Average of Asia and Oceania	24385	8.9	5.56	5.29	4.79	4.3	5.7	37.2	2.69

Source: Elaborated from Chapter 6, of Guisan(2023). Note: Data sources and definitions cited in section 4.4 of this article.

In table 4.8: Australia and Hong-Kong(China) have the highest levels of production per capita (PH19) and educational level of population (Tyr19), they present also the highest levels of X1 (Satisfaction with Life), X2 (Voice of Citizens), X4 (Peace).

In the table only Australia has a value of X5 (Political Stability), higher than 5. The highest value of X6 (Economic Freedom) corresponds to Australia.

The indicator X7 (Pollution measured by PM2.5) had a very high average value in Asia, with values higher than 50, among countries of table 4.8 in Afghanistan, China, and India.

The indicator X8 (Homicides rate per 100 thousand people) is higher than the average of Asia and Oceania, among the countries of table 4.8 in Afghanistan and India.

India needs to increase the low value of indicator X1=Satisfaction with Life, and for that purpose it is important to diminish poverty and increase social support regarding health assistance, as well as to diminish pollution and to foster peace and political stability. Those factors, together with the increase of average years of Education, may contribute to increase investment per capita (both from domestic and from foreign origin) and industrial production per capita, with their positive impact on development.

4. Main conclusions on the role of Education and World Development

Some of the main conclusions of our empirical studies on the role of Education on economic and social Development, in many areas of the World, for the period 1960-2000, explained in the books EE11, by Guisan, Aguayo and Exposito(2023) and for the period 2001-2023, explained in the book EE12 by Guisan(2023) are the following ones:

- 1) Education contributes to moderate excessive average fertility rates and, for a given growth of production, contributes to increase real Production per capita and real income per capita. International quantitative studies show that usually Education has a high positive impact not only on production per capita but also on other variables that diminish poverty and increase quality of life.
- 2) Education has usually a very positive impact on the quality of the environment and sustainable development and the quality of environment. The studies cited in Guisan(2023), book EE12, show that the strong increase of CO2 emissions in the World, for the period 1970-2020, has been mainly due to the high increase of Population in countries with low Educational levels.
- 3) The econometric models show that Education usually contributes to increase Voice of Citizens, usually with its positive effect on quality of government policies, freedom and on diminution of violence. The positive evolution of those indicators usually contributes to foster economic development.
- 4) International cooperation for Education is important in order to eradicate poverty, and to foster sustainable development both at country level and in the World, avoiding great environmental damages.
- 5) The empirical evidence also shows that Education is usually positively related with other indicators of quality of government as Voice of Citizens, Peace and Freedom, and also with indicators of quality of environment. Good levels of those indicators usually contribute to increase wellbeing of citizens. In the table in the Annex we include data of the indicator X7=Pollution, and may notice that in countries with high levels of education and development the level of X7 is usually low and in many countries with low levels of education this indicator shows high, or very high pollution, and also the correlation between Education and several indicators in 164 countries.

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Annex: Indicators of Development and Wellbeing in 164 countries

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Annes. Indicators of Development and Wellbeing in 164 countries

Figure A1, Name and sources of Indicators X1 to X8.

X1 = Satisfaction with life from WHR
X2 = Voice of Citizens from World Bank WGI
X3 = Conflict, indicator of lack of Peace, from EIDP
X4 = Peace, indicator of Peace = 10-X3
X5 = Political Stability
X6 =Free=Freedom/10. Calculated, in decimal scale, from the Freedom indicated of the percentage of Freedom published by Heritage Foundation
X7= Pollution measured by PM2.5 per m3 of air
X8 = Homicides Rate per 100 thousand Population

Source: Elaborated by M.C. Guisan

Besides, we have used also indicators: Tyr (Total Years of Schooling) for Education Fer (Fertility rate) which usually diminishes with the increase of Tyr, and IPS (Indicator of Political Stability).

Guisan(2021), in AEID 21-2, includes a table with data, in 164 countries, of Production per head (PH) in years 1995 and 2019, and the indicators Tyr, Fer, x1, x2, x4 and x8.

Guisan(2022), in AEID 22-2, includes a table with data, of 164 countries, for years 1995, 2019 and 2020 of the variables PH and IPS, and data for years 1005 and 2019 for the variable MEH (Military Expenditure per head).

Table A1 shows the correlation between Education, Production per capita and the indicators X1, X2, X6 and X8

Table A1. Correlation coefficient of variables of table A2.

	TYR10	PH19	X1	X2	X6	X8
TYR10	1.0000	0.7150	0.6997	0.7370	0.6550	-0.5582
PH19	0.7150	1.0000	0.7570	0.8362	0.7195	-0.4006
X1	0.6997	0.7570	1.0000	0.7592	0.7555	-0.4591
X2	0.7370	0.8362	0.7592	1.0000	0.8418	-0.4681
X6	0.6550	0.7195	0.7555	0.8418	1.0000	-0.5283
X8	-0.5582	-0.4006	-0.4591	-0.4681	-0.5283	1.0000

Source: Elaborated by M.C. Guisan in this article of AEID 23-2

Production (PH19) and the indicator of Education (TYR10) are poitively correlated between them and with the positive indicators of quality of life (X1,X2 and X6) and negatively with the negative indicator of quality of life (X8).

In table A2 we include data of 164 countries of the following variables: PH95 and PH19 are data of real Gross Domestirc Product per capita, in years 1995 and 2019, in Dollars per inhabitant at 2017 prices and Purchasing Power Parities, Tyr10=average years of schooling of adult population (+25) in year 2010.

The indicators X1, X2, X6 and X7 are in decimal scale, around year 2019.

X1= Satisfaction with Life from World Human Report (Gallup and United Nations)

X2= Voice of Citizens, elaborated in decimal scale, from data of WGI -2.5 to 2.5).

X6= Elaborated in decimal scale from the indicator of Heritage Foundation (Freedom, in scale 100), $x_6 = \text{Freedom}/10$, in decimal scale).

X8= Indicator of Pollution measured by Particles of 2.5 microns.

Table A2. Development, Education and 4 indicators of quality of life, 164 countries

Nb	Country	PH 95	PH 19	Tyr 10	X1 Satisfac tion	X2 Voice	X6 Free	X7 Pollu tion
1	Afghanistan	1287*	2065	3.2	2.52	1.96	0.00	56.91
2	Albania	4472	13671	9.3	5.12	4.72	6.66	18.20
3	Algeria	7935	11511	7.1	4.89	3.94	4.58	38.88
4	Angola	4140	6670	4.7	3.79	2.64	5.26	32.39
5	Argentina	17363	22064	10.3	5.93	4.56	5.01	13.31
6	Armenia	3008	13654	11.1	5.28	4.76	6.53	32.53
7	Australia	32947	49456	12.6	7.18	8.24	7.77	8.55
8	Austria	40367	55833	11.8	7.27	8.32	7.38	12.48
9	Azerbaijan	3025	14439	10.5	5.17	4.66	6.16	19.93
10	Bahrain	47157	45060	8.4	6.65	5.86	6.20	70.82
11	Bangladesh	1697	4754	5.3	5.03	3.42	5.27	60.85
12	Belarus	5805	19283	12.0	5.53	3.54	5.30	18.77
13	Belgium	37778	51736	11.1	6.83	7.24	6.96	12.89
14	Benin	2253	3287	2.8	5.05	4.48	6.10	39.00
15	Bermuda	68313	81804	11.0	NA	8.08	NA	na
16	Bolivia	5050	8724	7.8	5.72	3.88	4.30	21.57
17	Bosnia+Herz.	2053	14897	7.1	5.81	3.04	6.34	27.75
18	Botswana	9935	17777	8.9	3.47	5.52	6.48	23.09
19	Brazil	11251	14759	6.9	6.33	4.10	5.33	12.71
20	Bulgaria	10966	23192	10.8	5.27	4.86	7.10	19.45
21	Burkina Faso	1076	2178	1.4	4.83	3.66	5.83	42.94
22	Burundi	948	752	2.6	3.78	2.48	3.94	38.90
23	Cabo Verde	2547	7172	5.1	5.50	5.50	6.67	34.78
24	Cambodia	1182	4389	4.4	4.83	4.16	5.71	25.61
25	Cameroon	2531	3642	5.3	5.14	3.24	5.29	72.79
26	Canada	31934	49017	12.6	7.10	8.28	7.66	6.43
27	Central Afr. R	1099	945	3.6	3.48	1.62	4.57	56.83
28	Chad	941	1580	1.9	4.36	2.08	4.98	66.03
29	Chile	13288	24969	9.0	6.17	6.98	7.44	21.04
30	China	2391	16092	7.3	5.34	6.30	4.80	52.66
31	China. H-K	34546	59586	11.5	5.48	8.32	NA	na
32	Colombia	9400	14585	7.4	6.01	5.08	6.51	16.53
33	Comoros	2751	3059	4.2	4.29	1.82	5.04	20.55
34	Congo. DR	1040	1098	5.9	4.42	1.62	4.76	44.97
35	Congo. Rep.	4548	3872	6.1	5.35	2.14	4.85	46.64
36	Costa Rica	10996	20106	8.3	7.07	5.72	6.54	15.73

37	Cote d'Ivoire	4065	5213	4.2	5.31	4.04	6.16	25.89
38	Croatia	15003	28754	10.8	5.88	5.88	6.76	17.90
39	Cyprus	28692	40227	11.5	6.22	6.76	7.29	17.29
40	Czech R	22759	40981	12.4	6.97	6.92	7.44	16.07
41	Denmark	43016	57162	12.7	7.62	8.78	7.80	10.03
42	Djibouti	1708*	5535	4.0	4.37	3.64	5.53	45.55
43	Dominican R	7397	18413	7.3	5.55	4.34	6.30	13.73
44	Ecuador	8576	11371	7.8	5.76	4.12	5.43	14.89
45	Egypt. AR	6483	11763	6.5	4.28	3.90	4.91	87.00
46	El Salvador	6212	8796	7.1	6.06	4.28	5.96	24.47
47	Eq Guinea	1781	18503	5.5	5.35	2.06	4.72	53.24
48	Estonia	12744	36437	12.5	6.19	7.68	8.00	6.73
49	Eswatini	5259	8622	5.7	4.31	3.46	5.14	17.17
50	Ethiopia	677	2221	2.3	4.28	3.90	4.96	38.98
51	Finland	31449	48563	12.8	7.84	8.90	7.83	5.86
52	France	35178	46018	10.9	6.69	7.50	6.59	11.81
53	Gabon	18515	14950	7.6	4.85	3.18	5.58	44.39
54	Gambia	2128	2223	2.8	5.05	3.66	5.80	33.98
55	Georgia	3244	14989	12.2	4.89	6.58	7.18	22.20
56	Germany	39278	53809	13.8	7.16	7.72	7.61	12.03
57	Ghana	2515	5411	6.7	5.09	4.70	5.98	34.71
58	Greece	24966	29723	10.3	5.72	5.88	6.15	16.22
59	Guatemala	6030	8648	4.3	6.44	3.62	6.32	24.07
60	Guinea	1595	2567	1.6	4.98	3.22	5.42	26.06
61	Guinea-Bissau	2088	1939	2.6	4.98	2.14	4.60	29.77
62	Guyana	6664	13082	8.1	6.44	4.12	5.95	22.38
63	Haiti	2591	2905	4.7	3.62	0.94	5.00	15.02
64	Honduras	4025	5736	5.4	5.92	3.80	5.95	20.63
65	Hungary	16610	32554	12.2	5.99	6.16	6.69	15.93
66	Iceland	33339	56383	10.6	7.55	8.04	7.70	6.48
67	India	2106	6717	5.4	3.82	5.78	5.39	90.87
68	Indonesia	5892	11812	7.4	5.35	5.74	6.44	16.50
69	Iran. IR.	9320	12389	9.0	4.85	3.02	4.24	38.98
70	Iraq	4479	10815	6.4	4.72	2.34	NA	64.64
71	Ireland	32309	86710	11.1	7.09	7.96	8.20	8.21
72	Israel	28385	40074	12.6	7.16	7.20	6.80	21.38
73	Italy	38947	42663	9.7	6.48	5.80	6.54	16.75
74	Jamaica	9957	9775	8.9	6.31	5.82	6.74	13.40
75	Japan	34415	41477	11.5	5.94	8.20	6.99	11.70
76	Jordan	8334	10071	9.8	4.39	5.22	6.01	33.01
77	Kazakhstan	8552	26352	11.4	6.15	5.32	6.44	13.82
78	Kenya	2968	4330	6.1	4.61	4.30	5.26	28.58
79	Korea. R	18120	42719	11.6	5.85	7.84	7.46	25.04
80	Kuwait	63725	49854	6.8	6.11	4.68	5.83	60.75
81	Kyrgyz R	2517	5258	10.6	5.74	3.92	5.58	22.74
82	Lao PDR	2330	7887	4.6	5.03	3.46	4.92	25.11

83	Latvia	9506	30859	12.5	6.03	6.76	7.48	13.43
84	Lebanon	13309	14552	7.9	4.58	2.66	4.73	30.62
85	Lesotho	1622	2695	5.6	3.51	3.18	4.81	28.03
86	Liberia	1589*	1428	4.1	4.63	2.18	4.79	17.98
87	Libya	15909*	15174	7.3	5.41	0.98	NA	54.25
88	Lithuania	10640	37063	11.6	6.26	7.12	7.58	11.85
89	Luxembourg	76727	113940	11.8	7.32	8.68	8.06	10.36
90	Madagascar	1569	1619	6.0	4.21	3.00	5.89	22.54
91	Malawi	743	1086	4.3	3.60	3.42	5.30	23.57
92	Malaysia	14260	28364	9.8	5.38	7.08	6.81	16.04
93	Maldives	10598	19531	4.9	5.20	4.78	4.73	na
94	Mali	1458	2322	2.0	4.72	2.70	5.59	38.53
95	Malta	19626	43703	10.3	6.60	7.08	7.15	13.91
96	Mauritania	4769	5197	3.8	4.23	3.46	5.53	47.42
97	Mauritius	9567	22870	8.2	6.05	6.74	7.09	14.46
98	Mexico	14809	19701	8.0	6.32	4.68	6.37	20.92
99	Moldova	5696	13022	11.1	5.77	4.08	6.13	16.25
100	Mongolia	4129	12317	9.5	5.68	4.32	6.39	40.11
101	Montenegro	10537*	21534	11.1	5.58	4.96	5.78	20.78
102	Morocco	3821	7537	4.2	4.92	4.94	5.92	32.59
103	Mozambique	469	1282	3.2	4.79	3.56	5.13	21.30
104	Myanmar	775	5083	4.1	4.43	3.00	NA	35.56
105	N. Macedonia	9025	16600	9.1	5.10	5.28	6.57	29.73
106	Namibia	6237	9728	6.2	4.57	5.10	5.92	25.36
107	Nepal	1585	3436	3.3	5.27	3.12	4.97	99.73
108	Netherlands	39498	56784	12.0	7.46	8.70	7.95	12.03
109	New Zealand	29816	42878	12.0	7.28	8.18	8.06	5.96
110	Nicaragua	3385	5452	6.0	5.97	3.58	5.48	17.61
111	Niger	1012	1225	1.4	5.07	3.76	5.49	94.05
112	Nigeria	2902	5135	5.2	4.76	2.94	5.44	71.80
113	Norway	49261	64453	12.7	7.39	8.88	7.69	6.96
114	Oman	29045	27299	7.9	6.85	5.28	5.66	41.12
115	Pakistan	3180	4690	4.7	4.93	3.90	4.88	58.28
116	Panama	12643	31440	9.3	6.18	5.14	6.54	11.40
117	Papua N.G	3272	4350	4.0	NA	3.30	5.46	12.29
118	Paraguay	9314	12619	7.7	5.65	4.06	6.29	11.91
119	Peru	6154	12854	8.4	5.84	4.52	6.65	24.79
120	Philippines	4178	8915	8.9	5.88	5.12	6.11	18.07
121	Poland	12460	33121	12.2	6.17	5.76	6.87	20.88
122	Portugal	25524	34880	8.1	5.93	7.04	7.08	8.16
123	Puerto Rico	25288	34805	13.3	6.95	4.48	NA	8.35
124	Qatar	84144*	90044	8.4	NA	6.82	6.77	91.19
125	Romania	12117	29858	10.7	6.14	4.56	6.71	14.61
126	Russian Fed	13308	27211	11.5	5.48	5.06	5.61	16.16
127	Rwanda	746	2228	3.8	3.42	5.68	5.71	43.21
128	Samoa	4097	6517	10.0	NA	6.04	6.83	11.55

129	Sao Tome+P	1482*	4005	4.9	NA	3.72	6.03	28.54
130	Saudi Arabia	42856	46962	8.9	6.49	5.30	5.55	87.95
131	Senegal	2380	3361	2.4	5.13	5.02	6.00	40.70
132	Serbia	7752	18292	10.4	6.08	5.06	6.52	24.73
133	Seychelles	15488	27521	9.4	NA	6.02	6.11	20.18
134	Sierra Leone	1111	1720	3.1	3.85	2.96	5.20	21.63
135	Singapore	48642	97989	11.0	6.38	9.68	8.44	19.08
136	Slovak R	13256	31888	11.6	6.33	6.08	6.97	17.56
137	Slovenia	21479	38945	12.1	6.64	7.34	7.05	16.02
138	South Africa	9541	12482	10.2	4.96	5.60	5.62	25.10
139	Spain	29042	40804	9.4	6.49	6.78	6.82	9.70
140	Sri Lanka	4790	13070	10.8	NA	4.86	5.33	11.10
141	Sudan	1805	4186	3.1	NA	2.02	3.20	55.37
142	Sweden	34234	52851	12.3	7.36	8.44	7.79	6.18
143	Switzerland	52196	68474	13.3	7.57	9.04	8.42	10.30
144	Tajikistan	1354	3402	10.9	5.47	3.58	4.97	46.15
145	Tanzania	1294	2660	5.1	3.62	3.46	5.95	29.08
146	Thailand	10017	18451	7.3	5.99	5.60	6.32	26.26
147	Timor-Leste	2411*	3553	4.4	NA	3.40	4.63	19.26
148	Togo	1207	1599	4.3	4.11	3.62	5.72	35.73
149	Tonga	4652	6378	10.7	NA	5.32	6.08	10.79
150	Trinidad+T	11946	25931	10.8	NA	5.36	5.88	24.11
151	Tunisia	5931	10756	6.7	4.60	4.60	5.42	37.66
152	Turkey	13638	28199	6.5	4.95	4.92	5.69	44.31
153	Turkmenistan	3988	15538	9.9	5.07	2.68	4.62	21.77
154	UAE	101571	67119	9.9	6.56	7.66	7.02	40.92
155	Uganda	1083	2187	5.7	4.64	3.84	5.42	50.49
156	UK	32571	46406	13.2	7.06	7.76	7.27	10.47
157	Ukraine	7617	12809	11.3	4.88	4.28	5.41	20.31
158	Uruguay	11997	21346	8.4	6.43	6.56	7.00	9.27
159	USA	42975	62555	13.3	6.95	7.64	7.21	7.41
160	Uzbekistan	2494	7014	10.7	6.18	3.98	5.57	28.46
161	Vietnam	2253	8041	7.5	5.41	5.40	6.06	29.63
162	W.Bank&Gaza	4047	6245	8.5	4.52	3.72	NA	na
163	Zambia	1909	3470	6.6	4.07	3.46	4.87	27.44
164	Zimbabwe	3227	2800	7.3	3.15	2.50	3.31	22.25
	World	13849	21564	8.04	5.53	4.98	6.04	4.94

Sources: Elaborated by Guisan(2021), in AEID 21-2, from WB(2021) WDI and WGI for PH and X2; United Nations WHR(2021) for X1, UNDP(2021) for Tyr and Heritage Forundation(2022) for Freedom, being X6=Freedom/10, in decimal scale. X7=PM2.5 is an indicator of Pollution per cubic meter of air. Notes: * Data of X6 in Puerto Rico from the Fraser Institute(2023) (Economic Freedom of North America). The last row of table A2 includes the non weighted average World average, of 164 countries, for comparison purposes of each country with the average.