

# A DEMOGRAPHIC, ECONOMIC AND STATISTICAL APPROACH TO RELIGION AND WELFARE

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**Abstract:** According to Michael J. Vlach, the world's great religions are defined by five significant factors: the number of adherents or followers, territorial dispersion or spreading (meaning the number of countries in which these great religions have found adherents), independence from any other religion of the world, the existence of a material body of their doctrine (usually, a book considered holy by the adherents), and the current practice of religion. In this paper a number of general criteria are also identified for grouping the world's populations, i.e. some synthetic demographic factors are detailed, as well, such as life expectancy and demographic aging. The contribution capitalizes on the data in the annual report of the CIA, available on the Internet, which includes the key indicators on world population, offered to the public by the U.S. institution, detailed and complete for a number of more than 200 countries in the world, where religious faith is present mainly as a firm option of the inhabitants; demographic evolution and economic growth are radically different, and so per capita GDP becomes a polarization axis. Also, the category of those having no religious creed, and that of the atheists are equally important contemporary landmarks in the initial segmentation of the population. Starting from the high degree of determination of religion as a factor of wealth, potential statistical associations are quantified. Some conclusions naturally arise from the general approach of the statistical investigation.

**Keywords:** major world religion, religious demography, religion-calendar connections, religion-welfare associations, demography and demographic indicators, Yule association coefficient.

## 1. INTRODUCTION

Is there a special and statistically quantifiable relationship between religion and some essential elements of contemporary existence, welfare, calendar and demography?

One can quickly detail various general associations for the prolific conjecture questioningly suggested above. Both religion, and any other major concepts remain images of reciprocity in the sense of equidistant reflection, and also bipolar mutual extrapolation.

If the idea is agreed that welfare may be a Weberian reflection of religion consciously assumed, then a regular calendar or schedule is only a reflection in terms of astronomy, or will it also include religious or deep welfare elements, and will demography be influenced by both religion and welfare? Immediate echoes are also the numerous potential statistical associations, concerning a certain distribution of wealth in relation to territorially dominant religion, regarding the birth rate, mortality and nuptiality, according to religion and welfare, etc.

Statistically speaking, even a multiple, much deeper correlation can be developed, starting from religion as a factor of demography and welfare, and moving to migration flows as factors of welfare convergence, or segmentation or arbitrary setting of zero time along a time scale, symbolically called a calendar ...

If demography increasingly defined itself as a form of statistical and mathematical knowledge of human populations, and religion as a unified system of beliefs and practices of things considered sacred, or well isolated and preserved, (i.e. esoteric), the calendar, as a concept of Greek origin (kalendae), meaning an instrument through which human population is called, convened, welfare is delimited by special economic statistical concepts, such as GDP per capita, or the available average net income. Methodical induction, as used in demography, harmoniously blends with the seduction of religion, rigorous statistical information substitutes for the astronomical precision of the calendar; do the real and natural or earthly worlds, continually and naturally repopulated, have the astral support of the calendars of earthly religions, and also the welfare and effects of the natural or migratory demographic movements? Of course, the present paper cannot answer so many questions, still it can investigate some possible statistical associations centered on religion, focusing especially on religion and welfare.

## 2. HOW IS A RELIGION OF MAJOR IMPACT DEFINED?

One can define, through the simplicity of demography, and also with the characteristic calm of statistical data, a major religious preponderance of the world population, although there are nations dominated by atheism, lack of faith or irreligiosity. The first states, in which atheists and unbelievers, or people of no religious creed have the primacy in relation to their specific demographic weight, are presented by the American sociologist Phil Zuckerman, who focused mainly on their official data. The first-ranking states of the world, in proportion to the minimum and maximum estimates of the number and weight of unbelievers, atheists or people of no religious creed, in the first decade of the 20th century is presented in the following table

*Table no.1*

Country	Total population -number of inhabitants-	Atheists, unbelievers of people of no religious creed - in % -	Atheists, unbelievers of people of no religious creed - number of inhabitants -
Sweden	8 986 000	46 - 85	4 133 560 – 7 638 100
Vietnam	82 690 000	81	66 978 900
Denmark	5 413 000	43 - 80	2 327 590 – 4 330 400
Norway	4 575 000	31 - 72	1 418 250 – 3 294 000
Japan	127 333 000	64 - 65	81 493 120 – 82 766 450
Czech Republic	10 246 100	54 - 61	5 328 940 – 6 250 121
Finland	5 215 000	28 - 60	1 460 200 – 3 129 000

France	60 424 000	43 - 54	25 982 320- 31 420 480
South Korea	48 598 000	30 - 52	14 579 400 -25 270 960
Estonia	1 342 000	49	657 580
Germany	82 425 000	41 - 49	33 794 250 – 40 388 250
Russia	143 782 000	24 - 48	34 507 680 – 69 015 360
Hungary	10 032 000	32 - 46	3 210 240 – 4 614 720
Holland	16 318 000	39 - 44	6 364 020 – 7 179 920
England	60 271 000	31 - 44	18 684 010 – 26 519 240

Source: Martin, M., (2005), *The Cambridge Companion to Atheism*, Cambridge UK.: Cambridge University Press.

Atheists claim that God does not exist. They argue that there is no God in the world (Pantheists), or beyond the world (Deists), or, implicitly, do not accept the affirmative idea that God exists both in the world and beyond the world (Theists). This is a positioning simultaneously outside the inner and outer world, of a negativistic type, or affirmative as against a denial of faith, most atheists variously defining themselves as non-theistic, unbelieving, unreligious (or unchurched), etc.

Atheists in our contemporary world are either traditional (in their opinion there has never been, there is not, and will never be a God, and the certainty of there not being a God is, to them, total) or mythological (their God was once alive, that is, a model in which people used to believe, and according to which they lived, but they consider this myth dead and no longer valid, generating an intermediate positioning along a course ranging somewhere between the certainty of mythological existence and the incomplete uncertainty of God's disappearance), or of a semantic type (in this semantic context, any discussion about God is dead, because religious language has no cognitive sense, this concept does not imply a complete denial of the existence of God, but different degrees of uncertainty). Globally, one can define, in keeping with the specific range of arguments and manner of arguing, several atheistic arguments, which form bodies of a number of significant impact theories:

#### Old and new theories of contemporary atheism

Table no. 2

Theism versus humanitarianism	A theory of Albert Camus, presented in one of the books of this existentialist philosopher, titled <i>The Plague</i> (La Peste), according to which we must join either the doctor and fight against the "plague" brought by the rats sent by God to a sinful city, or the priest and refuse to fight against the "plague", and so refrain from fighting against a theistic God. Refusing to fight is antihumanitarian, and fighting means to face with God, who sent the "plague" as a punishment, and so God does not coincide with the idea of perfection (perfect goodness).
Suffering of the innocent	Contrary to some theists who claim that this is the best of all possible worlds, it seems an undeniable that life in this world could be improved. For example, not all evils are deserved, cruelty, cancer, rape hurt innocent victims. But an all-wise, almighty and perfectly good God would not allow innocents to suffer. Even a single act of injustice in the world (and it is sure that there are many such acts of injustice) would argue against the existence of a God about whom one can say is right(ful), in an absolute manner.
Suffering cannot be justified	Theists claim that some evils are a necessary condition, or a means to accomplish a greater good. For example, pain is sometimes used for endurance, but some atheists believe that this

	argument has a boomerang effect, and becomes a challenge to the existence of God, for if suffering could be justified, it would be completely wrong to make efforts to eliminate them. Therefore suffering cannot be justified, nor can the theistic God be said to exist, that new theoretical construct claims.
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Another typology of contemporary atheism is generated by the means of presenting the fundamental antinomy within the theoretical body of unbelief. According to some authors, there are four major, clearly delimited and specific antinomies (Geisler, 1993):

a. the antinomy of omnipotence, which argues that a omnipotent God is a contradiction in terms (if there were an almighty God, he could make anything, including a stone so heavy that he were unable to lift, therefore there is no omnipotent God as theists claim).

b. the antinomy of perfection, which argues that God has every perfection, which is mutually exclusive (How could a single person possess both love and hate? Similarly, God cannot be both omniscient and all-loving).

c. the antinomy of creation favours the idea embraces the idea that God is a necessary being, and His will is one with His essence, but based on this statement some argue that what God wants in His will, He must necessarily want; on the other hand, theists claim that God was free not to create, as it is virtually impossible for a creation to necessarily arise from God, and also simultaneously with a void time, and therefore they state: either God is not necessary, or creation is not necessary, in both cases traditional theistic God can not exist.

d. the antinomy of time describes the world as having a beginning in time, an original point, not eternal, except for God, who is eternal; (but if the world had a beginning in time, it must have been a time before the beginning, however it is impossible there to be time before time started, and therefore there cannot be a theist God who created the world in time).

However, those who believe, globally, for all their diversity and heterogeneity of belief, are far more numerous than those who do not, or refuse to believe in God. During the Renaissance three categories of essential religious populations were defined, Christians, Jews and pagans. Islam, Hinduism, and Buddhism joined, after 1800, Christianity and Judaism, and so the list of "five" has become, from that moment on, the list of the most amply shared religious beliefs in the world. Gradually, five more religions have been included on this list, namely Confucianism, Daoism, Jainism, Zoroastrianism and Shintoism.

Today, Christians are, despite their diversity, the largest religious community in the world (a little more than 33.0%), of which Roman Catholics are the majority, with more than 17.3%, while Protestants represent almost 5.8%, the Greek Orthodox have less than 3.4%, and the Anglicans represent 1.2%. Islamists are actually the second largest religious community worldwide, representing over 20.1% of the world population, Hinduism is placed in third position with 13.3%, and Buddhism is following with 5.9%; other religions represent 12.6%, 12.0% are unbelievers, and atheists represent 2.4%, according to the estimates published

on <http://www.adherents.com> at the end of 2005. Two strongly different limits are presented in assessing the number of atheists and unbelievers, infidels or people not having a religious creed. David Barrett provides the lower one, placed at about 918.3 million people, when assessing, in both the Encyclopaedia Britannica, and the World Christian Encyclopedia, 2001, according to recent censuses and specialized surveys, own reports and their journeys and investigations “on the place”, a total number of people declared atheists over 150.1 million (2.5% of the world population), and about 768.2 million people unbelievers, infidels or having a religious creed (12.7% of the world population). It is the American sociologist Phil Zuckerman who tentatively established the upper limit, when, in one of his analyses published in “The Cambridge Companion to Atheism”, edited by Michael Martin, at Cambridge University Press, in 2005, estimated the number of those who “do not believe” at over 1,500 million people...

In order to define or characterize a religion with global (world) incidence, a set of at least five significant factors of global or world impact are considered:

1. the large number of adherents, as most of the main world religions have the main magnitude of their followers into the millions of people;
2. the territorial spreading or dispersion in territorial areas, in terms of a significant number of countries where the major religions of the world have found adherents;
3. the independence from any other religion in the world;
4. the existence of a material body of their doctrine, which comprises, in the vast majority of the cases, a book considered sacred by the adherents;
5. the current practice of the religion, in order for it to be considered a truly major religion (Vlach, 2008).

The main elements that are the object of religions, fashioning their typology into groups or classes, are in turn rather limited, becoming in practice of mere criteria of structuring and classification:

- a. belief in a supreme form (monotheism), or several superior beings (polytheism), or a superior form, worshiped among other deities, as if it were unique (henotheism);
- b. the number of teachings about the supreme being or superior beings, and the believers’ moral and religious duties;
- c. the aggregating material nature, or the available expression of the religion represented;
- d. the given form of internal worship (fear, love, hope), and external worship (sacrifice, prayers, songs, dances, etc.).

One can estimate that there are now over 10,000 religions in the world. Among the most popular religions of the world in terms of a single founder, of the adherents or followers, and their historical impact remain Zoroastrianism, Buddhism, Judaism, Shintoism, Christianity, Islam, Taoism, Confucianism, Hinduism, the most common of which is Christianity.

### 3. METHODOLOGY OF THE ASSOCIATIVE STATISTICAL PROCESS

The associative statistical approach follows the conceptualization of a scientific thinking and research, according to which statistics is a thinking system focusing

on observation, treatment and research, the cycle involving five practical stages: problem definition → programme of investigation → resulting data → analysis and interpretation of data → conclusions. This view was formulated by Maxine Pfannkuch and Chris Wild from Auckland University, New Zealand, redefining the content of contemporary statistical research in the new millennium.

The main source used in the investigation is the CIA report is the year 2005/2006, entitled The World Factbook (the report has been available since 1981, initially referring to only 165 states, in a volume of only 225 pages, since 1996 it appeared on CD-ROM, and since 2005 it has comprised more than 250 countries and 700 pages of indicators, for which the data were used from the middle of the first decade of this new century, accessible on: <http://www.cia.gov/library/publications/the-world-factbook/index.html> or [http://education.yahoo.com.reference/factbook/pk](http://education.yahoo.com/reference/factbook/pk)), as well as other specialized site like U.S. Census Bureau (<http://www.census.gov/cgi-bin/ipc/idbagg> and on <http://www.adherents.com>). The methods used in the statistical investigation are the correlation or identification and evaluation of the significant factors by their statistical association with a resultative variable of the GDP type.

The option for a Yule association coefficient, to the detriment of the contingency coefficient is related to the simplicity of calculations. Association, defined by G.U. Yule and M.G. Kendall as a situation where one variable cannot occur without the presence of another explanatory variable, while the other one may exist in an absolutely independent manner, is measurable through two classic ways derived from a table of double entry, maximally simplified (based on average values, defining, in a balanced manner, the populations into two groups, or proceeding from two opposite statuses “non alpha and alpha”):

#### The classic calculation procedure for a tetrachoric “r”, or association coefficient

Table no. 3.

x <sub>i</sub>	y <sub>i</sub>		Total
	y <sub>1</sub>	non y <sub>1</sub>	
x <sub>1</sub>	a	b	a+b
non x <sub>1</sub>	c	d	c+d
Total	a+c	b+d	a+b+c+d

Three constructions of Yule interdependence coefficients dominate the practice of association in the area of the alternative variables and the variables converted from numerical into binary, with the average (variants below average becoming alpha, and the equal and above average variants, non alpha):

$$Q_1 = (ad-bc):(ad+bc) \tag{1}$$

$$Q_2 = \left[ 1 - \sqrt{(bc):(ad)} \right] : \left[ 1 + \sqrt{(bc):(ad)} \right] \tag{2}$$

$$Q_3 = \left[ \sqrt{(ad)} - \sqrt{(bc)} \right] : \left[ \sqrt{(ad)} + \sqrt{(bc)} \right] \tag{3}$$

although none of them makes a structural causal distinction between the forms of complete association of a positive and

negative nature, detailed for the three specific situations (either in positive form  $b = c, c = 0$ , or  $b = c = 0$ , or in a negative form  $a = 0, d = 0$ , or  $a = d = 0$ ). However, the first method of calculation has remained in place as the fastest and easiest way to identify the an association and the intensity of an association.

The contingency coefficient proposed by Karl Pearson and determined by the relationship:

$$Q_c = \sqrt{\phi^2} = [(ad) - (bc)] : \left[ \sqrt{(a+d)(a+c)(b+d)(c+d)} \right] \quad (4)$$

or the Ciuprov coefficient, usually noted by T, whose method of calculation is:

$$T^2 = \phi^2 : \left[ \sqrt{(k-1)(h-1)} \right] \quad (5)$$

although belonging to the same range of values, [-1,1], are less used, compared with the Yule coefficient, in the measurements aimed at identifying and ranking correlations through simple associations. The criterion of complete lack of association, or of independence, in all the variants of calculation used, is limited, after processing, to equal proportions  $ad = bc$ , and the association is a special case of contingency, when  $k = h = 2$  și  $T^2 = \phi^2$ , for square contingency. In this paper, the image of the method of Yule association coefficient in its  $Q_1 = (ad-bc):(ad+bc)$  variant was considered significant, being selected as the principal evaluation of the associative statistical approach. After an overview of the associations, using as a measure of explanatory and explained variables, the number of states, it was found that the structural influences are better reflected, and have much more relevant final values if the number of inhabitants is turned to account.

#### 4. GENERAL RESULTS OF ASSOCIATION QUANTIFICATION

An overview of world population, in relation to the major religions and adherents to these religions, according to the data in the CIA report entitled The World Factbook, presents the following detailed significant features:

- from a total of 251 states of the world, 226 were provided, in the report, with relevant data, and 221 religious countries of the world have been identified, out of which in 205 one religion is dominant, belonging to the broad scope of the four major groups, selected according to level of adhesion, i.e. at least 5% of all religious population (Christianity in 141, Islam in 51, Hinduism in 3, and Buddhism in 10), and 16 countries where the representative weight is held by indigenous religious groups, or is shared, fairly evenly, between far more religions;

- out of the 221de states dominated by religion, globally (203 in the end, according to data of CIA Report, where are 208 countries with complete and comparable data in point of time reference universe), a total of 194 countries of the world are mono-religious (Christianity in 125, Islam in 41, Buddhism in 8, Hinduism in 3, though there are comparable data only for 189 states), and 44 multi-religious nations (Christianity is relatively dominant in 16 countries, Islam in other 10, Buddhism in 2, while the remaining 16 states belonging to other indigenous religions, or do not have a dominant religion among those considered major, and out of the total number, only 14 provide complete data);

- five states are excessively dominated by atheism, and the lack of religiosity with the great majority of their population, viz. over 1.4 billion inhabitants worldwide;

#### The main religious structures in world population

Table no.4.

	Population with GDP ≥ 10.200\$*	Population with GDP < 10.200\$*	Total number of inhabitants
Number of religious inhabitants, from which:	1339071039	3598688984	4937760023
Christianity, from which:	1058139076	804662384	1862801460
- Catholicism	491961713	582681939	1074643652
- Protestantism	319392447	45153337	364545784
- Orthodoxy	18073425	47008019	65081444
Islam – Total number	67393066	1380118235	1447511301
Hinduism - Total number	1240827	1123639142	1124879969
Buddhism – Total number	132408886	157598323	290007209
Atheists and unbelievers	153271889	1421574101	1574845990
Population – Total number	1492200034	5020178682	6512378716

\*Note-GDP is expressed in \$ at purchasing power parity (PPP)

- a weight assessment, with shifts per cent, through the concentration of world population into just five major religions, gathering only 194 states prevalently defined by a single religion (including atheists and the category of declared non-religious people) and not exhaustive, as in the previous table, reveals an interesting structural hierarchy as a general tendency to concentrate in three major directions: Christianity 29%, atheists and nonreligious 27%, and 23% Islam, covering the Pareto optimum, 20/80;

#### Major religious groups, concentrated by state, according to the criterion of the majority of their members, with additional information on GDP and life expectancy

Table no. 5

Major religious groups	States	Number of adherents	Structure (%)		GDP (\$PPP / loc)	Life expectancy - years -
			in the five groups <sup>a</sup>	mini mal structure of adherents		
Christianity	126	1535281390	28.9	41.3	16180	71.99
Atheists and unbelievers	5	1415851205	26.7	59	7757	72.15
Islam	50	1206708912	22.7	47	3748	61.34
Hinduism	3	905153393	17.1	48	3749	64.60
Buddhism	10	246625108	4.6	42.5	17227	73.26
Total <sup>a</sup>	194	5309620008	100.0	-	10200 <sup>b</sup>	64.77 <sup>b</sup>

<sup>a</sup> Note - the structure was determined from the aggregate population of the group of the major religions (including the atheists and non-religious people, but excluding the states without an obvious religious dominant)

<sup>b</sup> Note - the final average data refer to the aggregate population, and reflects a polarization of the rest of the world's population not included the table, populations benefiting from a GDP between \$500 and \$3,000 / capita and average life expectancy between 35 and 50 years (belonging to populations where the majority are religions with fewer followers).

- the heterogeneity of populations of adherents to the great religions is different, being relatively highlighted by the magnitude of some of the variables, stressing the higher relative homogeneity of atheists and non-religious people, as well as Hinduism, in contrast with the maximal heterogeneity of Christianity;

#### The maximum and minimum GDP and life expectancy limits, in the major religious groups

Table no. 6

Major religious groups	GDP* (\$PPP / capita)		Life expectancy - years -	
	Minimum	Maximum	Minimum	Maximum
Christianity	600	71400	32.62	83.51
Atheists and				

unbelievers	3100	21900	67.08	76.22
Islam	600	49700	40.22	78.4
Hinduism	1500	13700	60.18	72.63
Buddhism	1400	33100	54.78	82.19
Total value	600	71400	32.62	83.51

\*Note-GDP is expressed in \$ at purchasing power parity (PPP)

- the economic and demographic consequences of the great religions are different, and their economic impact is polarizing (the average index of religious cohesion, determined as the ratio of the maximum GDP / capita and the minimum GDP / capita, is 459.6%, against a background of concentration of the major religious groups in only five categories, and the average life expectancy gap is circa 12 years, according to table no. 4), with maximum amplitude accents within the groups (the internal coefficient of cohesion in the groups ranging from 7.07 to 119.0, being determined similarly, and the internal difference of life expectancy ranges between 9.14 and 50.89 years, in keeping with table no. 6);

- economic growth, although homogeneous at the level of the major religious groups, is heterogeneous in most groups of maximal amplitude, belonging to Islam, and the spectrum magnitude, from negative to positive values, pertains to Christianity;-

#### Maximum and minimum economic growth (rate index real GDP), per denomination

Table no. 7

Major religious groups	Economic growth rate index -%-( $\frac{\text{REAL GDP}}{\text{REAL GDP}} - 100$ )	Economic growth (%)	
		Minimum	Maximum
Christianity	4.65	-4.4	18.6
Atheists and unbelievers			
Islam	10.2	1.8	10.7
Hinduism	6.06	6.4	34.5
Buddhism	9.01	1.9	9.2
	3.75	2.2	8.8

- the age structure as a whole reveals an aggregate population, which is still embraced by demographical appellation of young population, with only 7.3% of the population "5 years and above" (the theoretical threshold of aging is considered even 7%), with 64.9% population between 15 and 64, and 27.8% of the population below 14%, but distributed differently in relation to GDP per capita, in as many as 208 countries of the world, see table. 7;

#### Structure by age groups and in relation to the average GDP of 208 countries worldwide, dominated by religious faith, and their inhabitant

Table no. 8

Group-years-	GDP ≥ 10.200 (\$PPP/ capita)		GDP* < 10.200 (\$PPP/ capita)	
	≥ media	< media	≥ media	< media
Group 0 - 14	2780%	2780%	2780%	2780%
Inhabitants	70949298	224807028	1082298806	435916188
States' number	14	65	97	32
Group 15 - 64	≥ media 6490%	< media 6490%	≥ media 6490%	< media 6490%
Inhabitants	833846919	166154688	1624738481	1599554205
States' number	66	13	37	92
Group ≥ 65 ani	≥ media 730%	< media 730%	≥ media 730%	< media 730%
Inhabitants	185515378	11069857	124238883	124001715
States' number	58	21	19	110

\*Note-GDP is expressed in \$ at purchasing power parity (PPP)

- as can be seen, there occurs a significant structural differentiation in relation to macroeconomic outcome

(GDP), countries with a GDP below the average of \$ 10.200 PPP / capita form a more homogeneous population under 15 years, presents an important extension of the share of population covered by the group under 15, while those with a GDP above average constitute a more homogeneous population over 65 years, and reflects an increased aging process.

The associations originally made between the numbers of states in keeping with religious dominance are relatively inconsistent. Changing the measuring unit from number of states to population, the adherents to one of the major religious groups, increased the accuracy of the associations, combine homogeneously and provide a thorough measurement, integrating almost completely the specific structural elements. The new comparable combinations, entirely based on the data from the 208 resulting countries, display high levels of the Yule coefficients, and are converted into some interesting points of view, statistically substantiated in Table 9, which focuses the coefficients determined in the context of the new unit, the number of adherents being expressed in millions.

Table no. 9

The association between religiosity and economic level (GDP)			
	Religious	Non religious	Total
GDP ≥ 10200\$*	1130.8	96.1	1226.9
GDP < 10200\$*	3061.2	1319.8	4381.0
Total	4192.0	1415.9	5607.9
$Q_1 = (ad-bc):(ad+bc) = - 0.671$			
The association between Christianity and economic level (GDP)			
	Christian	Non Christian	Total
GDP ≥ 10200\$*	876.5	254.3	1130.8
GDP < 10200\$*	665.8	2395.4	3061.2
Total	1542.3	2649.7	4192.0
$Q_1 = (ad-bc):(ad+bc) = 0.851$			
The association between Orthodoxy and economic level (GDP)			
	Orthodox	Non Orthodox	Total
GDP ≥ 10200\$*	18.1	1040.1	1058.1
GDP < 10200\$*	47.0	757.7	804.7
Total	65.1	1797.7	1862.8
$Q_1 = (ad-bc):(ad+bc) = - 0.562$			
The association between mono/ multireligious and economic level (GDP)			
	Mono religious	Multi religious	Total
GDP ≥ 10200\$*	1052.0	78.8	1130.8
GDP < 10200\$*	2785.5	275.7	3061.2
Total	3837.5	354.5	4192.0
$Q_1 = (ad-bc):(ad+bc) = 0.138$			
The association between Catholicism and economic level (GDP)			
	Catholic	Non Catholic	Total
GDP ≥ 10200\$*	491.9	566.2	1058.1
GDP < 10200\$*	582.7	222.0	804.7
Total	1074.6	788.2	1862.8
$Q_1 = (ad-bc):(ad+bc) = - 0.503$			
The association between Protestantism and economic level (GDP)			
	Protestant	Non Protestant	Total
GDP ≥ 10200\$*	319.4	738.7	1058.1

GDP<10200\$*	45.2	759.5	804.7
Total	364.6	1498.2	1862.8
$Q_1 = (ad-bc):(ad+bc) = 0.758$			
The association between Islam and economic level (GDP)			
	Islam	Non Islam	Total
GDP≥10200\$*	65.7	1065.1	1130.8
GDP<10200\$*	1077.6	1983.6	3061.2
Total	1143.3	3048.7	4192.0
$Q_1 = (ad-bc):(ad+bc) = -0.796$			
The association between Buddhism and economic level (GDP)			
	Buddhist	Non Buddhist	Total
GDP≥10200\$*	109.2	1021.6	1130.8
GDP<10200\$*	137.4	2923.8	3061.2
Total	246.6	3945.4	4192.0
$Q_1 = (ad-bc):(ad+bc) = 0.389$			
The association between age group 15-64 years (average value is 64.9%) and economic level (GDP)			
	% ≥ 64.9	% <64.9	Total
GDP≥10200\$*	833.8	166.2	1000.0
GDP<10200\$*	1624.8	1599.5	3224.3
Total	2458.6	1765.7	4224.3
$Q_1 = (ad-bc):(ad+bc) = 0.663$			
The association between Hinduism and economic level (GDP)			
	Hindu	Non hindu	Total
GDP≥10200\$*	595.6	1130,2	1130,8
GDP<10200\$*	904.7	2156,5	3061,2
Total	905.3	3286,7	4192,0
$Q_1 = (ad-bc):(ad+bc) = -0.997$			
The association between age group 0 -14 years (average value is 27.8%) and economic level (GDP)			
	% ≥ 27.8	% <27.8	Total
GDP≥10200\$*	71.0	224.8	295.8
GDP<10200\$*	1082.3	435.9	1518.2
Total	1153.3	660.7	1814.0
$Q_1 = (ad-bc):(ad+bc) = -0.774$			
The association between age group ≥ 65 years (average value is 7.3%) and economic level (GDP)			
	% ≥ 7.3	% < 7.3	Total
GDP≥10200\$*	185.5	11.1	196.6
GDP<10200\$*	124.0	153.5	277.5
Total	309.5	164.6	474.1
$Q_1 = (ad-bc):(ad+bc) = 0.908$			

The association between life expectancy and economic level (GDP) is, as is otherwise recognized in calculating the human development index (HDI), almost complete;

Table no. 10

The association between life expectancy (LE) and economic level (GDP)			
	LE≥64,77	LE<64,77	Total
GDP≥10200\$*	1445.8	46.4	1492.2
GDP<10200\$*	2711.5	2308.7	5020.2
Total	4157.3	2355.1	6512.4
$Q_1 = (ad-bc):(ad+bc) = 0.873$			

The synthesis of the statistical associations between religion and wealth with a comparability ensured methodologically,

resulting from the use of two concepts embodied in different measuring units (number of states and people), tested and validated with z test, looks like this:

Table no.11

The associations' type	Association's coefficient based on the number of states	Association's coefficient based on the number of inhabitants
Religious/non religious variable and economic level (GDP)	$Q_1 = -0.043$	$Q_1 = 0.671$
Monoreligious/multireligious variable and economic level (GDP)	$Q_1 = 0.405$	$Q_1 = 0.138$
Christian / non- Christian variable and economic level (GDP)	$Q_1 = 0.552$	$Q_1 = 0.851$
Orthodox /non-Orthodox variable and economic level (GDP)	$Q_1 = -0.487$	$Q_1 = -0.562$
Catholic/ non-Catholic variable and economic level (GDP)	$Q_1 = 0.317$	$Q_1 = -0.503$
Protestant/ non-Protestant variable and economic level (GDP)	$Q_1 = 0.317$	$Q_1 = 0.758$
Islam/non- Islam variable and economic level (GDP)	$Q_1 = -0.544$	$Q_1 = -0.796$
Hindu/non- Hindu variable and economic level (GDP)	$Q_1 = -0.299$	$Q_1 = -0.997$
Buddhist/non- Buddhist variable and economic level (GDP)	$Q_1 = -0.184$	$Q_1 = 0.389$
The group of age 0 -14 variable and economic level (GDP)	$Q_1 = -0.867$	$Q_1 = -0.774$
The group of age 15 -64 variable and economic level (GDP)	$Q_1 = 0.853$	$Q_1 = 0.663$
The group of age ≥ 65 variable and economic level (GDP)	$Q_1 = 0.882$	$Q_1 = 0.796$
The life expectancz (LE) variable and economic level (GDP)	$Q_1 = 0.844$	$Q_1 = 0.873$

The majority religion in the world remains the Christian type, which encourages marriage and child bearing. It is against contraception and divorce. These issues should be relevant as far as the rate of marriage, birth, contraception and divorce are concerned. The comparative data reveal the following aspects:

#### Marriage rate per 1,000 inhabitants, for the first typologies of religions

Table no.12

Religion	Demographic indicator
Atheists and unbelievers	6,8
Buddhism	5,7
Christianity	5,5
Judaism	6
Hinduism	8,7
Islam	8,9
Other different religions	*

\*lack of homogeneous data

At first glance, it is at least curious as far as Christians are concerned, because their religious precepts encourage le marriage, considering that it is not good for man to live alone. Let us not however forget that most Christians are in Europe, whose trend towards demographic implosion and accelerated aging is unique worldwide, among all the continents...

#### Birth rate per 1,000 inhabitants, for the first typologies of religions

Table no. 13.

Religion	Average value	Minimum value	Maximum value
Atheists and unbelievers	12.36	9	16.6
Buddhism	16.47	7.3	35

Christianity	19.64	8.2	48.1
Judaism	17.7	-	-
Hinduism	22.83	15.3	30.5
Islam	29.53	9	50.2
Other different religions	37.4	36.8	38.6

Note: the sign "-" indicates that it is not the case to make the determination (i.e. there is a single value)

We could exaggerate and say that this category includes people who want to be successful professionally and materially first, considering childcare a barrier to personal fulfillment. Christianity is placed behind Islam, even if the interval including the minimum and maximum values records them quite close. The other religions have the largest number of potential children

#### Fertility rate per 1,000 people, for the first typologies of religions

Table no. 14

Religion	Demographic indicator
Atheists and unbelievers	1.7
Buddhism	1.9
Christianity	2.7
Judaism	2.8
Hinduism	2.7
Islam	3.6
Other different religions	4.3

The birth rate indicator closely follows the normal population fertility, religion and faith being expressions of certain demographic policies, no less than contraception, which has become the result of atheism or clear lack of religiousness...

#### Contraceptive methods in the first-ranking religious types

Table no. 15

Religion	Number of cases of applied contraceptive methods (%)
Atheists and unbelievers	87.67
Buddhism	59.84
Christianity	60.06
Judaism	68.00
Hinduism	56.12
Islam	45.89
Other different religions	27.53

Atheists use the most contraceptive methods, and also, surprisingly enough, Judaism. The rates are relatively high for Christianity. Certainly the degree of economic and cultural level influence, in developed countries, the application of these methods, which eventually have higher and closer-ranging values.

#### Divorce rate for the first religion typologies

Table no. 16

Religion	Divorce rate to 1000 inhabitants	Divorce rate to 100 marriages
Atheists and unbelievers	2.77	44.43*
Buddhism	1.24	1.9
Christianity	1.74	24.42
Judaism	1.56	30.1
Hinduism	0.87	**
Islam	1.53	9.06
Other different religions	**	**

\*China is not included in the calculation due to lack of specified data. \*\*Missing data

Through natural association, the highest rate of divorce is noted with atheists (unbelievers and unchurched or non-religious people). The following places are held by Judaism and Christianity.

#### Life expectancy in the first typologies of religion

Table no. 17

Religion	Life expectancy (LE)		
	Average value	Minimum value	Maximum value
Atheists and unbelievers	72.15	67.08	76.22
Buddhism	73.26	54.78	82.19
Christianity	71.99	32.62	83.51
Judaism	64.60	60.18	72.63
Hinduism	61.34	40.22	78.40
Islam	79.78	-	-
Other different religions	64.77	32.62	83.51

Note: the sign "-" indicates that it is not the case to make the determination (i.e. there is a single value)

Finally, it can be noticed that religion influences and stratifies the world's population according to the demographic indicator of life expectancy in a significant manner. The way demography is reflected in the world of religions defines a normal aspect of reciprocity. In conclusion, we many religious typologies are revealed, as well as clusters and discontinuities of adherence and classes of beliefs, according to the various and unsuspected religious traditions and customs of the peoples.

#### 6. SOME USEFUL CONCLUSIONS AND SOME SUSTAINABLE DEMOGRAPHIC IMPLICATIONS

The two categories of associative evaluations are based on the idea that there exists a state policy, supported by the Constitution, as far as religious freedom and expression are expressed (the measure being the state), with immediate economic consequences, and also on the substance and homogeneous geographical distribution of the major religious groups (the unit being, in this latter case, the inhabitant adhering to such group).

I. One can state with certainty that there is a connection of a statistical type, identified as a simple association between religiosity and economic welfare, through the level of development (GDP). From the general picture of the confrontations there also occur abnormal situations between the two types of measurements, generated by geography of the spreading pattern of certain religions (especially Buddhism, where also occurs the alternating sign of multi-religious people, without however an obvious structural dominant).

II. One can certify a direct link, of average intensity in keeping with the number of states, and a link of strong intensity, if the value of adherents is capitalized on, as number of inhabitants, between the religious status of Christianity (as an alternative explanatory variable, with the states of being Christian of being non-Christian) and the economic result (materialized in GDP, and turned into an alternative resultative variant, in relation to the average \$10,200 PPP/capita). By working on, and refining the details, some statistical associations reveal unexpected variability of the intensities and signs or directions of association: in Christianity, according to the second, larger and more homogeneous approach, two different trends can

be perceived, namely the first one: inverse association between Catholicism and the economic level (Q1= -0.503), and between Orthodoxy and the GDP level (Q1 = -0.562), and a second one: direct association between Protestantism and welfare (Q1 = 0.758).

III. An indirect association of particular complexity and almost maximal intensity occurs between Islam and Hinduism as religious status and wealth (through macroeconomic outcome) between Islam and the GDP, the inverse association of high intensity and confirmed by both approaches (Q1 = -0.796) and between Hinduism and welfare surprise occurs in the functional maximal inverse association (Q1 = -0.997).

IV. Between Buddhism and the GDP, due to its heterogeneity and specific geographical spreading, totally opposite signs appear (Q1 = -0.184 and Q1 = 0.389), as the adherents of this religion see the strongest polarization, in point of both life expectancy and GDP.

V. Between life expectancy and the economic level (GDP), as was expected, the association is virtually complete (Q1 = 0.873).

VI. Also, natural relations can be identified, of direct association between the degree of aging of the population and the economic level (GDP), with a very high coefficient of association, Q1= -0.796, and differentiated as indirect association between the high structural level of rejuvenation of the population and GDP, namely Q = - 0.774.

VII. Potential statistical and demographic associations can be identified and quantified, under the influence of religious phenomena such as the rate of marriage, fertility, birth, divorce, etc.

VIII. Several models can be proposed for estimating the GDP of a territorial aggregate where the great world religions are found.

A. A simple modelling, described in probabilistic terms exclusively by membership to one of the major religious groups, could lead to some improvements on GDP estimates, which are quite interesting in economic and statistical practice.

$$L = \begin{pmatrix} \text{christian} & \text{atheist} & \text{islam} & \text{hindu} & \text{buddhist} \\ 28.9 & 26.7 & 22.7 & 17.1 & 4.6 \end{pmatrix}, \text{ where}$$

the sum of the probabilities is:  $\sum_{i=1}^n p_i = 1$ .

B. Another modelling, described in terms of a simple lottery model, can assess the probability of achieving a certain level of GDP, based on its relative modification, described in terms of probabilities:

$$\Delta \text{final GDP} = \sum [\Delta_I \times Q_I \times PIB_I] = (\Delta \text{Christians } 0.851 \text{ GDP / Christian people}) + [\Delta \text{Islam } (-0.796) \text{ GDP / Islamic people}] + [\Delta \text{Hindu } (-0.997) \text{ GDP/Hindu people}] + (\Delta \text{Buddhists } 0.389 \text{ GDP/Buddhist people}) + (\Delta \text{atheists } 0.671 \text{ GDP /atheistic people}).$$

C. A practical integrative model for estimating the GDP can be obtained through a type of modelling based on the composite Lq lottery solution, including other associated factors (aging or rejuvenation of the population, life expectancy etc., together with religious beliefs or denomination); it can be formalized as follows:  $Lq = \alpha_1 p_1 + \alpha_2 p_2 \dots + \alpha_n p_n$ , and can be exemplified by a double lottery,

according to the probabilities of religion and age group (here, with the specific variants limited only to Christianity), etc.

$$Lq = \begin{pmatrix} \text{christian, christian, christian} \\ 28.9 & 28.9 & 28.9 & \dots \\ 0.20 & 0.67 & 0.13 & \dots \end{pmatrix}, \text{ its development}$$

capitalizing on the probabilities given by the following structure, refined and detailed by age and level of GDP per capita.

Table no. 18. Part I

	The group of age	Catholics	Orthodox	Protestants	Christians
PIB > 10200	0-14 years	20.85	14.28	20.43	20.35
	15-64 years	66.22	67.58	66.94	66.44
	>64 years	12.93	18.15	12.63	13.21
	Total	100.00	100.00	100.00	100.00
PIB < 10200	0-14 years	33.57	16.85	40.58	32.90
	15-64 years	61.67	69.23	56.52	61.42
	>64 years	4.77	13.92	2.90	5.68
	Total	100.00	100.00	100.00	100.00

Table no. 18. Part II

Islam	Hindu	Buddhist	Atheists	Total
34.90	24.40	14.37	14.59	19.81
61.67	69.10	66.56	71.21	67.02
3.43	6.50	19.07	14.20	13.17
100.00	100.00	100.00	100.00	100.00
35.52	31.40	27.15	21.82	30.24
60.32	63.73	66.82	70.68	64.23
4.16	4.87	6.03	7.50	5.53
100,00	100,00	100,00	100,00	100,00

The model focused on such a compound lottery can easily become a model of a triple, quadruple, etc. nature (by continuously multiplying the number of factors), as other associations, statistically measurable are added, revealing new factors selected with their probabilities of occurrence (the value of the association coefficient being the factorial criterion ranking). Demographically, any religion also has specific influences. Certainly, in terms of marriage rates, divorce, fertility or the number of contraceptive methods, there are many factors that influence whose intensity is ever greater at the expense of religious morality and teachings. Christianity, the most widely spread of the religions in the world, does not have the overwhelming influence of Islam, for instance...

Marriages are made at increasingly advanced ages, and in a decreasing number. Bringing up children is considered an obstacle to the individual's self-assertion. People are becoming less tolerant, which results in more easily dissolving marriages. Contraceptive methods are increasingly used to prevent child birth. Consequently, even if religion has relatively diminished its influence on society, it is still an important factor, both demographically and in point of morality and personal identity, allowing meditation and self-retrieving, in a world of sheer materialism, more efficient economically to the detriment of the spiritual aspects.



Based on the data in the Demographic Yearbook of Romania published in 2001, covering a period of nearly 50 years, and also in an attempt to discern associations and correlations with a lag, beyond the discussions, commented on in the introduction, of young people about the difficulty of booking a restaurant for an ordinary wedding party, or the rather difficult scheduling a religious marriage service in one of our Greek Orthodox churches, correlated with all the other events pertaining to an ordinary marriage, we tried to answer, demographically and statistically – while not ignoring the obviously economic, or marketing, or demographic policy facets – the natural question about a possible link between the seasonality of marriage and the type of religion where it is materialized, as well as a certain distribution of births in relation to the territorially dominant religion.

To do that, we will have recourse to the three long fasting periods in the Greek Orthodox calendar, placed in three significant periods of the year (astronomical spring, the hot weather period in August, and Santa Claus’s winter). Our

hypothesis is that marriages that fall outside the limits of traditional fasting periods, and also the births, follow the classical trajectory of a lag correlation, theoretically shaped for the first time by (Morice and Chartier, 1964):

$$r_h = \frac{\sum_{i=1}^n (x_i - \bar{x})(y_{i-h} - \bar{y})}{(n-h)\sigma_x\sigma_y},$$

where t is the number of

terms of the original series, and h the number of terms which differentiate, as lags, the second series.

The statistical calculation shows a value that is practically identical with nine, as the number of years or terms of the series increases, so a gap of nine months after marriage night ritual or custom... The capacity that statistical diagrams have to reveal hidden phenomena is also present in this beautiful and unexpected story of the relationship between religion, calendar and demographics. Who has eyes to see, let them look carefully at the following historiogramme as a special chronological graph:

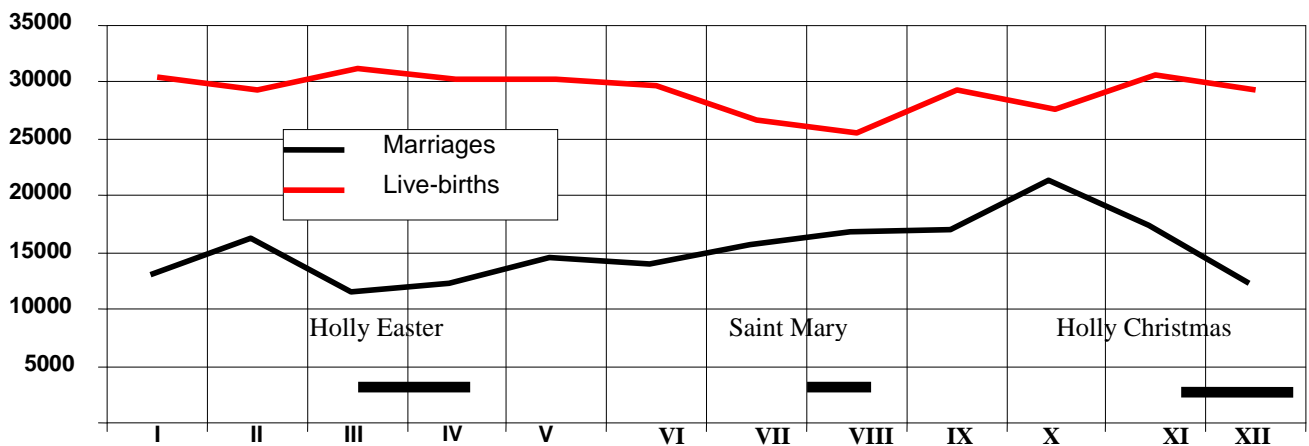


Figure no. 1. Marriages and Live-births related to religious major lents to Orthodox

Three conclusions are clearly distinguished in their association, which are highlighted quite clearly in graph form:

A. The bottom winding line represents the number of marriages during an average year, determined according to demographic data from the period 1957-2000, available in the Demographic Yearbook of Romania, published in 2001 by INS (National Institute of Statistics), Bucharest. During the major fasting periods in spring and winter, the line goes down to the lowest levels, while in midsummer the upward slope is milder... So, Romanians are mostly Orthodox, observing the restrictions imposed by fasting in the processes related to marriage.

B. At about nine months from the graph peak of marriages, or their maximum number, three significant

peaks, like three needle-stitches in the chart, stand out on the top line, that of the number of children born live: in September, 9 months after Advent, in November to December, again 9 months, this time after Easter fasting, and in March-April, evidently after nine months, but after the fasting period of Saint Mary’s celebration. Romanians still observe the custom of the first night of their marriage, as well as the restrictions of the religious calendar..

C. The distance between the two lines is relative, still it is placed at about 1/3, or at most half the value recorded by the level of marriage, in the average value of the measurements. In other words, Romanian couples who bring children into the world before marriage or outside it is 1/3, or at most half of the total number of Romanians who meet the precepts of their Orthodox religion.

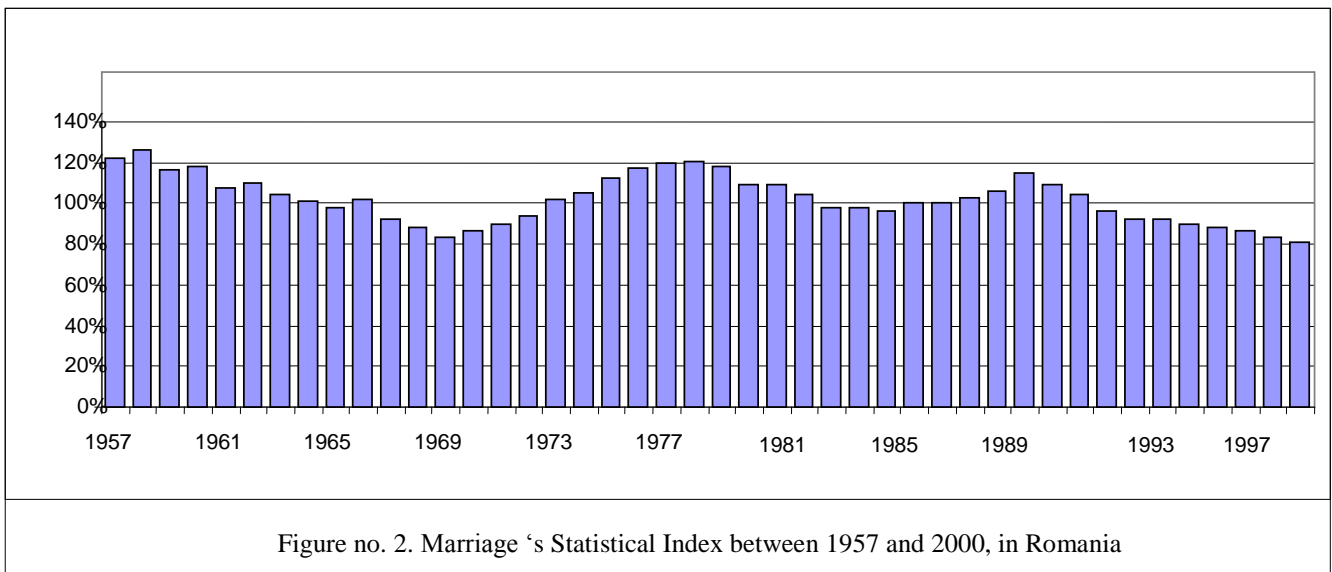


Figure no. 2. Marriage 's Statistical Index between 1957 and 2000, in Romania

Who could guess how many other influences have been maintained in relation to religion in the demographic evolution in the last half of the twentieth century, by the nuptial (or matrimonial) behaviour, and defined by this religious birth calendar? At the height of the atheist period, that was however a purely declarative one, under the influences of Marxism, the Orthodox Christians of the Eastern / Greek type, in our case Romania, remained the same unwavering traditionalists.

But does that not raise the issue of modernity and adaptability in the European Union, requiring the reconsideration of religion as an essential factor in multi- and trans-disciplinary approaches? Success, through tradition, in preserving national, and thus religious identity, especially the adequacy of other components of the human behaviour to modernity, reshapes human behaviour, making it similar to that of the rest of the population of the old, and also Christian Europe, of the inhabitants of planet Earth in general.

On a long term and very long, in the same global plane, there are two terrifying demographic projections in full contrast. These demographic projections, apparently absurd if considered with respect to time horizon and accuracy, belonging to François Héran, Director of the French National Institute of Demographic Studies (INED), focus on a diminished upward, or a steep downward trend; the former describes a positive rate of demographic surplus, which is however in decline, leading, in the year 2300, to a world population, still explosively booming, of about 36.4 billion people, and the latter, with a pessimistic level, almost stationary around 2075, a year that would correspond to a historic threshold of 9.2 billion people, a projection likely to be characterized by trends of early decline after the year 2100, and a decline severely installed beyond 2300, with a population of the Earth estimated at 2.3 billion inhabitants. A demographic century polarized and potentially conflicting, which is looming as a serious demographic reality, in the absence of an effort of the world religions to join in a desperate attempt to change, in a global and harmonized manner, the people's welfare, an alarming and uncertain century in the evolution of the human species...

## 7. A JUSTIFIED FINAL NOTE

Religion is still a "unified system of beliefs and practices relating to things considered sacred or well isolated and kept, as well as prohibited beliefs together with practices that finally cause a united, homogeneous community to become an entity from a moral standpoint". This classic definition given by Emil Durkheim brings about the conclusion that all religions also shape a specific attitude towards work and towards welfare. The diversity and specific tolerance of Christianity, evident in the maximal amplitude of its variability, dominates economically and demographically, and gradually decrease through the translation to other religions like Islam, Hinduism, Buddhism, becoming minimum in the area dominated by atheism. Within Christianity there are two contrary associations, one direct and strong, i.e. Protestantism, and another one, indirect and average, i.e. Catholicism and Orthodoxy... Although the importance of old age and its specific wisdom are indisputable, an old proverb like Who does not have an old man ought to buy one becomes an economic impossibility as in the areas where aging of the population is high, the economic level is also on the increase, in other words who has welfare has also secured the so much necessary elderly people.

The paradox outlined by the rapprochement between Buddhism and Christianity, respectively atheism, as variants that command the high level of life expectancy, and the relative level of welfare (GDP), emphasizes the fact that between the three attitudes there is still a special bond, which is not clearly revealed in an exclusively religious, economic or demographic manner. Demographically, religion associates different statistical influences. Certainly, in terms of marriage, divorce, and fertility rates, or the number of contraceptive methods, the influence factors are numerous that have an ever greater intensity at the expense of morality and religious teachings. Christianity, the most widely spread of religions, does not have the overwhelming influence that Islam has, for example...

Christian marriages are contracted at an increasingly advanced age, and in ever decreasing numbers. Bringing up

children is considered an obstacle to individual self-assertion, for today's Christian scientist's career. The people of the new millennium, who have become increasingly less religious and tolerant, contribute in excess, and with increasing ease to the dissolution of marriages, while contraceptive methods are increasingly used... Religiosity finally enhances, in a spectacular manner, welfare, too.

A final remark could be that, although religion seems to have declined in its relative influence on society, it will remain the most important demographic factor, both morally and identity-wise, for every individual, an essential landmark in man's spiritual recuperation, in a world of an excessive materialism and declaratively more and more efficient economically.

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