



# Church Attendance in the USA

Trend Estimation and Explanatory  
Determinants  
1974 – 2004

Rational Choice Sociology, Venice 2006  
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## 1. Motivation

- In a lot of western countries the development of church attendance is declining
- An exception seems to be the USA: mainly since George W. Bush is President of the United States the religious tendencies seem to become more radically
- The main questions:
  1. Which development shows religious activity in the USA, and can the statement of a „fundamental christianity“ be justified?
  2. Which determinants can explain religious activity in the long run?

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## 2. Theoretical Approaches

Theories of religion break down into demand-side and supply-side models

- ⇒ The pioneering model for the demand of religion: a Becker-style-household model of allocation of time and religious activity (Azzi, Ehrenberg; Sullivan, Sawkins et al.)
- ⇒ The religion market model focuses the supply-side factors (Finke, Stark)

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## 2. Theoretical Approaches

### 1. A Becker-style-model of allocation of time and church attendance (Azzi, Ehrenberg 1975)

- The approach is based upon three main reasons (motives) why people participate on religious activities: Salvation motive, consumption motive, social pressure motive
  - ⇒ the most important is the salvation motive: people are assumed to maximize an utility function which depends upon secular consumption in each life period and afterlife consumption
- Individuals allocate their time and goods among religious and secular commodities so as to maximize lifetime utility
  - ⇒ quasi concave utility function
  - ⇒ purchased goods and time are transformed in commodities
- In maximizing utility, people are constrained by a „full wealth“ restriction
  - ⇒ budget restriction: price for market goods, market wage, exogenous income and market interest rate
  - ⇒ time restriction
- Substitutional relation between secular and religious activities

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## 2. Theoretical Approaches

### Allocation-of-time model: Hypotheses

- The higher the individual wage rate the lower the religious activity
  - ⇒ a higher wage implies higher opportunity costs
- Women show higher religious activity than men
  - ⇒ gender gap
  - ⇒ lower wage rate and lower opportunity costs for women
- Difference in religious activity subject to the marital status
  - ⇒ denominational strictness implies being married as most accepted form of family status
- The higher the number of children the lower the religious activity
  - ⇒ increasing marginal costs for time spent in religious activities
- Belief in life after death conducts to a higher religious activity
  - ⇒ salvation motive: realization of returns in life after death
- If the individual belongs to an ethnic minority religious activity is higher
  - ⇒ lower opportunity cost because of discrimination and limited market chances

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## 2. Theoretical Approaches

### 2. Religious human capital (Iannaccone 1990)

- Religious human capital is a person's capacity to produce or appreciate religious commodities
  - It depends upon religious knowledge, church rituals and doctrine
  - Implication: The extension of the A-E allocation of time model through the religious human capital
  - Investments in religious human capital are contrary to human capital investments in an individual's lifetime
- Religious capital as the dynamic component of allocation of time through out a person's life-cycle

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## 2. Theoretical Approaches

### Religious human capital: Hypotheses

- The higher the age of an individual the higher the religious activity
  - ⇒ lower investments in human capital
  - ⇒ higher investments in religious capital
- The higher the degree the lower the religious activity
  - ⇒ investments in human capital for a long time

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### 3. Methodological Design

- Data set: General Social Survey, cumulative version 1974 – 2004
  - ⇒ Trend design in 31 waves
  - ⇒ time series and cross-sectional data available
- Description of religious activity as a time series
- Ordered logistic regression as a cumulative threshold model for analyzing the influence of various determinants on individual religious behaviour on 1975, 1984, 1994 and 2004

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### 3. Methodological Design

- Dependent Variable: religious activity in 9 categories
  - ⇒ for ordered logit model: no changes in religious activity necessary
- Independent Variables
  - ⇒ metrical variables: wage rate, age, number of children
  - ⇒ dummy construction for: degree, sex, marital status, belief in life after death and race

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## 4. Results

### Time series of religious activity



The Dickey/Fuller-Test and the Correlogramm of (partial) autocorrelation

- ⇒ no deterministic trend
- ⇒ random walk without drift

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## 4. Results

### Ordered logit regression: Odds ratios

Religious activity	1975		1984		1994		2004	
	Odds Ratio		Odds Ratio		Odds-Ratio		Odds Ratio	
Wagerate (\$/h)	0.97	(-1.992)	0.99	(-1.750)	1.00	(-0.402)	1.00	(-0.129)
Sex	1.09	(0.502)	2.13	(4.886)	1.66	(3.947)	1.96	(3.953)
Age	1.03	(5.340)	1.02	(3.507)	0.99	(-1.144)	1.00	(0.163)
Number of children	1.03	(0.487)	0.97	(-0.591)	1.18	(3.311)	1.12	(1.822)
Race	1.78	(2.221)	1.37	(1.502)	1.94	(3.951)	2.88	(4.788)
Married	0.89	(0.632)	1.29	(1.221)	1.29	(1.503)	1.90	(2.654)
Widowed	0.82	(0.663)	0.87	(-0.294)	1.72	(1.428)	0.93	(-0.102)
Separated/Divorced	0.59	(0.100)	0.84	(-0.698)	0.76	(-1.314)	0.81	(-0.766)
Belief in life after death	2.65	(5.340)	1.88	(3.335)	1.38	(1.889)	1.59	(2.156)
Highschool	1.83	(3.013)	1.05	(0.223)	2.31	(3.538)	0.98	(-0.066)
Junior College	0.91	(-0.160)	2.23	(2.154)	2.72	(3.272)	1.06	(0.156)
Bachelor	2.76	(3.350)	1.43	(1.303)	4.73	(5.625)	1.82	(1.194)
Graduate	2.37	(2.371)	2.67	(2.865)	6.13	(5.845)	2.04	(1.788)
Party identity	1.67	(2.618)	1.71	(3.112)	1.31	(1.726)	1.66	(2.646)
Pseudo R-Squared	0.0797		0.0745		0.0808		0.1015	
Number of observation	573		643		888		503	

Pseudo-R<sup>2</sup> nach Mc Fadden;

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## 4. Results

### Ordered logit regression

- For all four observations the thresholds are similar
- Only the variables belief in life after death and degree of graduate have significant effects on religious activity for all moments
- Pseudo-R<sup>2</sup>: the highest value in 2004
  - ⇒ religious activity is best represented and explained through the theoretical approaches of allocation of time and religious human capital

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## 5. Summary and Discussion

### The main results

- No confirmation of the statement of „fundamental christianity“
  - ⇒ religious activity doesn't follow a declining trend
  - ⇒ random walk: only a tendency of declining
- No definitive confirmation of the allocation of time and religious human capital models
  - ⇒ effects of some determinants contradict the postulated direction
  - ⇒ effects are changing with time

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## 5. Summary and Discussion

### Methodological Problems

- Interpretation of time series analysis
  - ⇒ in a statistical sense time series analysis is not a safe method
  - ⇒ adaptation of time series with different processes and orders
  - ⇒ different possibilities of interpretations of the results
- Wagerate for unemployed and homework
  - ⇒ by chance misspecification of the model because of selectivity
  - ⇒ threat of intern and extern validity, and biased estimation results
- Falling Number in the ORM
  - ⇒ a lot of observations lost
  - ⇒ type II error (beta-error) increases
  - ⇒ decision for the nullhypothesis although the alternative hypothesis would have been right

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## 5. Summary and Discussion

### Discussion

- Further theoretical determinants
  - ⇒ time series: relationship between religious activity and other time series like rates of fertility or education
  - ⇒ terms of interaction for analyzing age-wage-profiles or life-cycle-profiles
  - ⇒ effects of health, e.g. psychical vs. physical health, smoking, drinking
  - ⇒ geographical determinants, e.g. urban vs. rural regions

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# Appendix

<u>Abhängige Variable (ordinales Skalenniveau)</u>	
Religiöse Aktivität (attend):	0 Nie
	1 Weniger als einmal im Jahr
	2 einmal im Jahr
	3 Mehrmals pro Jahr
	4 Ein Mal im Monat
	5 2-3 Mal im Monat
	6 Fast jede Woche
	7 Jede Woche
	8 Mehrmals pro Woche
	9 Keine Angabe
	10 Weiß nicht
<u>Unabhängige Variablen</u>	
<u>Metrische Variablen</u>	
wagerate	Lohnrate in \$ pro Stunde
agen1	Alter der Befragten in Jahren
<u>Dummy-(1,0) Variablen</u>	
degree1	Befragte mit High School Abschluss
degree2	Befragte mit Junior College Abschluss
degree3	Befragte mit Bachelor Abschluss
degree4	Befragte mit Graduierten Abschluss
marital1	verheiratet
marital2	verwitwet
marital3	getrennt lebend oder geschieden
children	Anzahl vorhandener Kinder
sex1	Geschlecht
postlife1	Befragter glaubt an ein Leben nach dem Tod
race1	Befragter ist afroamerikanischer Herkunft
party1	Befragter ist Anhänger der Republikaner
<u>Zeitreihenvariablen</u>	
tsrelig	Zeitreihe religiöse Aktivität
tswage	Zeitreihe Lohnrate

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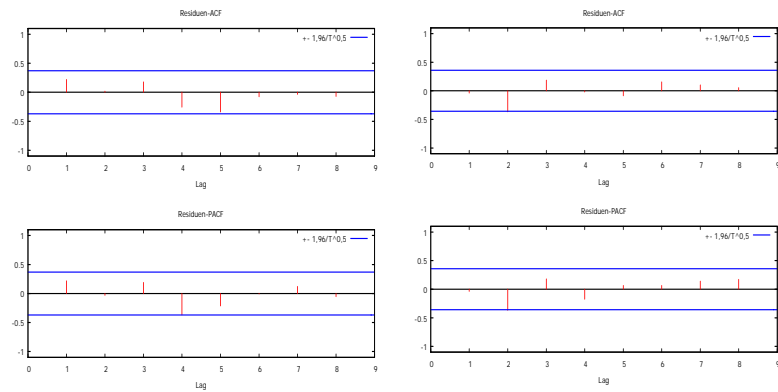
# Appendix

Variablen	1975		1984		1994		2004	
	N	%	N	%	N	%	N	%
<b>Dummy-Variablen</b>								
degree1	667	53.23	678	54.94	1350	54.39	1215	50.54
degree2	30	2.39	48	3.89	162	6.53	211	8.78
degree3	128	10.22	161	13.05	452	18.21	454	18.89
degree4	46	3.67	70	5.67	192	7.74	247	10.27
(Ref.Kat: kein Abschluss)								
sex1	690	55.07	712	57.65	1391	55.91	1291	53.68
(Ref.Kat: männlich)								
race1	145	11.57	194	15.71	458	18.41	534	22.20
(Ref.Kat: europ. Herkunft)								
marital1	880	70.23	730	59.11	1318	52.97	1280	53.22
marital2	49	3.91	42	3.40	87	3.50	65	2.70
marital3	123	9.82	195	15.79	499	20.06	457	19.00
(Ref.Kat: Single)								
postlife1	843	67.28	901	72.96	1206	48.47	819	34.05
(Ref.Kat: kein Glaube)								
party1	239	19.07	287	23.24	693	27.85	684	28.44
<b>Metrische Variablen</b>								
Lohnrate								
		658		743		1637		1315
Alter								
		1253		1235		2488		2405
Kinderanzahl								
		1250		1221		2484		2402

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## Appendix



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## Appendix

### Residuen-Autokorrelationsfunktion AR(1)

Ljung-Box  $Q^* = 8,7541$   
 Freiheitsgrade = 8, p-Wert = 0,3635

1) 0,2180    2) 0,0173    3) 0,1789    4) -0,2552    5) -0,3382    6) -0,0750  
 7) -0,0335    8) -0,0704

5%-kritischer Wert:  $1,96/T^{*0,5} = 0,370405$

### Residuen-Autokorrelationsfunktion AR(0)

Ljung-Box  $Q^* = 7,1529$   
 Freiheitsgrade = 8, p-Wert = 0,5202

1) -0,0377    2) -0,3657    3) 0,1867    4) -0,0185    5) -0,0870    6) 0,1549  
 7) 0,1013    8) 0,0537

5%-kritischer Wert:  $1,96/T^{*0,5} = 0,357845$

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## Appendix

Beobachtungen	Religiöse Aktivität	Prognose	Std. Fehler	95%-Konfidenzintervall
2005	-	3,72	0,1016	(3,51761, 3,91592)
2006	-	3,72	0,1288	(3,46718, 3,97218)
2007	-	3,72	0,1539	(3,41746, 4,02062)
2008	-	3,72	0,1749	(3,37647, 4,06189)
2009	-	3,72	0,1937	(3,33955, 4,09876)