May 1, 2017

The political economy of churches in Denmark, 1300-2015

Ella Paldam [a] and Martin Paldam [b*]

Abstract: The paper reports new time-series for the numbers and sizes of churches in Denmark over a 715-year period. Per capita, the new series are termed church densities. A pattern emerges in the series that corresponds to the main development in the economy: Until 1750, the economy was in the traditional steady state, where church densities were high and did not decline substantially. Modern development set in after 1750. Since then, church densities have declined more than five times. Moreover, capacity utilization of church rooms has declined, which means that the reduction in the demand for churches must have been even larger. We argue that this large decline is caused by fall in religiosity that is caused by economic development as measured by the rise in incomes. In parallel with similar transitions in other sectors, e.g., the Agricultural Transition, it is termed the Religious Transition.

Keywords: Church stock, Religious Transition, historical time series
Subject classification codes: N13, N14, Z12

Published in *Public Choice* 172(3-4), 443-63

[a] Department of the Study of Religion, School of Culture and Society, Aarhus University, Jens Chr. Skous Vej 3, DK-8000 Aarhus C.
[b] Department of Economics and Business, Aarhus University, Fuglesangs Allé 4, DK-8210 Aarhus V.
* Corresponding author: E-mail: mpaldam@econ.au.dk. URL: http://www.martin.paldam.dk.

1. Introduction: A 715-year perspective

Three observations prompted this paper: (1) The Danish population has grown more than six times since 1750; (2) most Danish churches were built before 1750. Consequently, Danish churches should be over-crowded; (3) but they are conspicuously under-crowded.

Although these observations seem to apply throughout Europe, this paper zooms in on Denmark, where unique micro data are available. The study uses historical and archaeological data to compile new time-series that measure the numbers and sizes of existing and abolished churches since 1300. Section 2 presents the analytical strategy and discusses the main patterns of the series. A 715-year perspective is unusual. Its strength is that it shows the big picture. Its weakness is that *no* other genuine time-series data with a similar scope exists. Nevertheless, trends for income and population are available, which allows us to calculate per capita church densities.

Section 3 presents the theories underlying our interpretation of the pattern in these data. The basic structure of the theory is the following causal sequence:

(1) **Income** ↑ ⇒ religiosity ↓ ⇒ demand for churches ↓ ⇒ **supply of churches** ↓

Only the bolded first and last part of this chain are observed. However, the strength of the correlation between the two observed variables allows us to infer the unobserved variation as well. Consequently, we find that an increase of income causes a fall in religiosity.

Section 4 shows that both income and church density series exhibit a distinct kink between 1750 and 1800. The series decrease much slower before the kink than after. This corresponds to the change from traditional to modern society. The development from 1750 to about 1960 is termed the Grand Transition. The large decline in per capita church density in this period is an observable aspect of the *Religious Transition*.

Three points should be noted: (i) The paper deals with the *churches* of the Church of Denmark [Folkekirken].[1] The Church changed from Roman Catholicism to Lutheran Protestantism with the Reformation in 1536. Other religions and spiritualities are disregarded. (ii) This study cover the present area of Denmark as fixed in 1920 (excl. Greenland and the Faroe Islands). (iii) The paper builds on a cross-country study of the main religiosity items in the World Values Surveys (see Paldam and Gundlach 2013).

[1] Danish words are given in [ ] after the English translation when necessary. For institutions, we try to use the English translation of the institution itself. Most Danish sources cited are in Danish, but English translations are given in { } in the reference list.

2. The new church stock data

Section 2.1 contains the master list of churches today, the historical sample, and a projection of available data to the full country. Section 2.2 explains how the church stock data were compiled. Section 2.3 discusses the shifting systems of church ownership and their effect on church closings, while section 2.4 rejects the possibility that the data hide a large increase in the effectiveness of churches. Finally, section 2.5 provides a first look at the pattern in the data series.

Our data start in year 1300, when Denmark had almost 2,000 churches and a population of about 500,000 people. Christianity was introduced around 850, and it gradually came to dominate in the succeeding centuries. The new religion needed a church stock, which was built from about 1050 to 1250 (Fenger 1988).[2] The building boom was over when our data start. Consequently, the new church stock must have reached equilibrium.

2.1 Present churches, historical sample and full set

The time series cover the ***church room*** (nave, chancel, and apse) of the churches. They consist of three main data sets reported in Table 1, where the data are aggregated to a 50-year period, while the home page of our project uses a much more bulky five-year period:

(1) The ***master list*** of all 2,394 present-day churches of the Church of Denmark was extracted from the official homepage for parishes, the Parish Portal (source 1 in Section A of the references), which is developed collaboratively by the Ministry for the Church, the Church of Denmark, and the individual parishes. The church stock is made up of local parish churches, but it also includes a small number of atypical churches in institutions such as prisons or cemeteries. Columns (1) and (2) in the table show these data.

(2) The ***historical sample*** is drawn from the project 'Denmark's Churches' at the Danish National Museum, referred to as the DNM-project (source 2). The DNM-project describes all known churches (including floor plans), which makes it a reliable source concerning information on closed churches. The project began in 1927, and new information is published continuously in volumes that cover each of Denmark's 23 pre-1970 counties.[3] At present, 16 counties have been published including the three counties of Greater Copenhagen.

[2] Two thousand churches were built between 1050 and 1250. It is often seen as a large effort, but it works out to only 10 churches per year, which is a moderate effort for a population of 500,000. During the next 715 years, only 924 churches were built.

[3] The project is expected to run for another 30 to 40 years.

Table 1. Master list, historical sample and projection to full country in 50-year intervals

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	Master list:		Historical sample:			Projection to full set			Size
	All existing churches		covers 64% at present			See section 2.1			Weighted
Year	Stock	Built	Stock	Built	Closed	Stock, S_N	Built, S_B	Closed, S_A	S_S
					Catholic period				
1300	1,604	-	1,240	-	-	1,986			2,143
1350	1,645	41	1,264	25	1	2,025	40	1	2,187
1400	1,653	8	1,291	31	4	2,068	49	6	2,238
1450	1,678	25	1,321	37	7	2,115	59	12	2,295
1500	1,698	20	1,340	23	4	2,146	38	7	2,342
					Protestant period				
1550	1,718	20	1,271	16	85	2,038	23	131	2,230
1600	1,730	12	1,225	20	66	1,971	30	98	2,161
1650	1,744	14	1,229	22	18	1,975	30	26	2,172
1700	1,751	7	1,223	23	29	1,962	29	42	2,157
1750	1,765	14	1,234	29	18	1,973	34	23	2,173
1800	1,775	10	1,227	20	27	1,959	25	38	2,160
1850	1,787	12	1,226	16	17	1,958	19	20	2,158
1900	1,954	167	1,306	116	36	2,078	172	53	2,306
1950	2,214	260	1,442	157	21	2,264	213	27	2,521
2000	2,404	194	1,551	121	12	2,404	159	19	2,680
2015	2,394	4	1,541	3	13	2,394	4	14	2,670
All			-	656	345	-	924	516	-

Note: Column (1) lists the present churches by building year, column (2) gives their year of construction. Source: the Parish Portal. Columns (3) to (5) show the DNM-sample. Columns (6) to (9) report the projection rounded to integers. The corresponding table in five-year intervals is available online (see source A6 in the reference list). Over a 715-year period, the stock has grown by 2,394/1,986 = 1.21 = 1.00003^{715}, so the average annual growth is 0.003%.

Columns (3), (4), and (5) in the table report this sample.

(3) The ***full set*** projects the historical sample to the full country. The projection disregards the three capital counties that are somewhat atypical in their development. The data for the remaining 13 counties were projected to the 20 counties using weights from the master list in 2015. Finally, the three capital counties were added to give the full set as reported in columns (6), (7), and (8) in Table 1. Since year 1300, 924 churches have been built and 516 have been closed. The average number of churches is close to 2,000, so all changes are small relative to the stock.

Column (1) shows that 1,604 of the existing churches were built before 1300, while column (6) shows that a total of 1,986 churches existed in 1300. This means that 382 churches built before 1300 were closed which represents 74% of all closed churches. The

Figure 1. The building and closing of churches in 5-year intervals

Figure 1a. Building of new churches

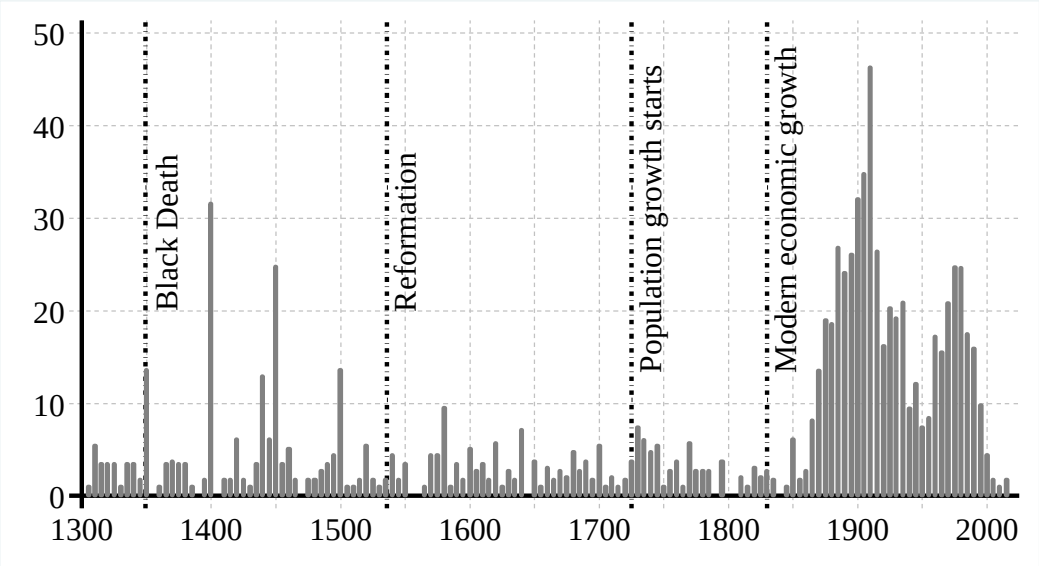
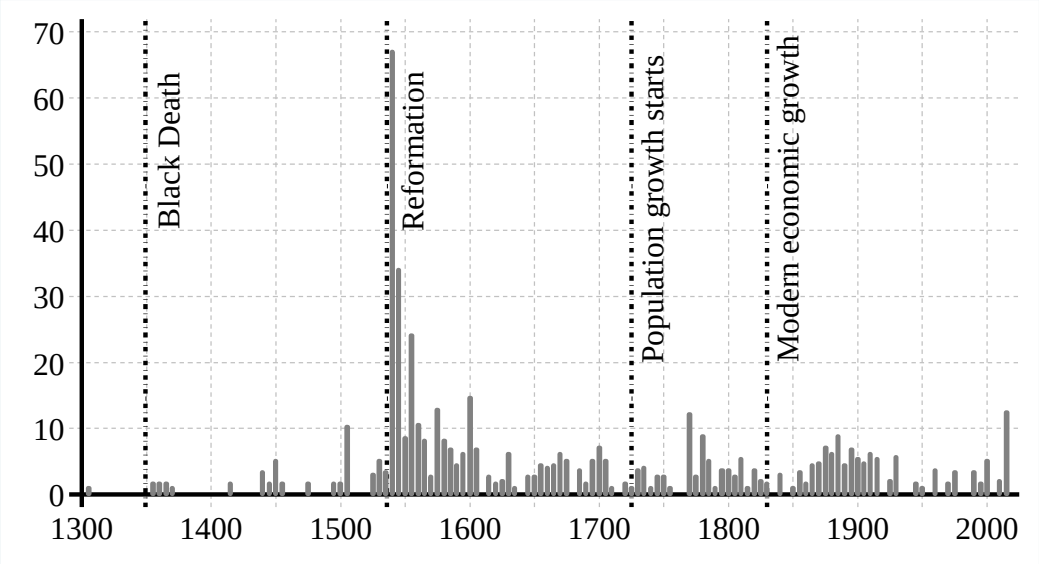


Figure 1b. Closing of churches



remaining 134 closed churches were built later.

Figure 1a shows that the building boom from 1050 to 1250 had ended in 1300, and that the next wave of church building occurred when modern economic growth was well under way from 1860 to 2000. The second boom cumulates to 24% of the stock. Figure 1b shows that a wave of church closings occurred after the Reformation (9% of the total stock). The Black Death epidemic is barely visible in the data, even when it killed about 25% of the Danish population (Ulsig 1991).

2.2 Coding and the size of the church room

The time series begin in 1300, when the church stock comprised 1,941 churches of which 1,604 (82.6%) are still in use. Medieval churches stand the test of time. They are sturdily constructed with thick stone walls and wooden roofs. Even if the roof catches fire, the walls remain standing. These *old churches* constitute 66.5% of the present church stock.

The DNM-data includes floor plans, which makes it possible to measure the size of church rooms and any change over time. Although the DNM-project does not include churches built after 1927, satellite photographs in online map-services made it possible to assess sizes of newer churches (source 8). All information has been double-checked against other available online resources (sources 3 to 5).

Table 2. The church variables, the size weights, and the densities

Part a: *Church stock*: Note identity $S_N = S_{N-1} + S_B - S_A$			
S_N	Number of churches		
S_B	Built in period		
S_A	Closed in period		
Part b: *Church size*, S_s sum after each church is weighted by size			
Weight	Type of church	Length of the church room[a)]	Seats today
1	Village church	Below 30 m	Below 200
2	Town church	Above 30 m	Between 200 and 800
3	Cathedral	Cathedral or similar size	Above 800
Part c: *Church density*, is calculated by division by population P			
s_N	Number density: $s_N = 1{,}000\ S_N/P$		
s_S	Size density: $s_S = 1{,}000\ S_S/P$		

Notes: (a) The church room consists of nave, chancel, and apse. The size is for standard proportions – non-standard church rooms are adjusted. Capital letters are macro, while small letters are micro.

Medieval Danish churches have a characteristic architecture in which the church room consists of nave, chancel, and apse in rather stable proportions. This design has influenced later churches.[4] After 1300, most churches were expanded with extra rooms, such as porches and large towers. In some instances, church rooms were modified as well, but most such changes were modest. Only 32 church rooms changed by one size category in our coding. All existing and closed churches were coded into two variables from 1300 to 2015 using a five-

[4] The largest Danish church, Grundtvigskirken, was built 1921-1940 in a (then) new suburb of Copenhagen to look like a giant village church. The fall in churchgoing has led to a rearrangement of the chairs in the church. The original number of chairs was 1,863 which has been reduced to 750 today (Grundtvigskirken, 2015). This points to the falling effectiveness of churches discussed in section 2.4.

year interval. The first variable records whether a given church existed in the period. The second variable codes the size of the church into three categories listed in Table 2. The similar format of most churches makes the size classification rather robust.

Information about closed churches is often scarce because building materials were reused. The year in which a church was abolished is often known, but sometimes a church faded over several decades prior to its final closure. Since most abolished churches were built before 1300, uncertainty regarding their building year does not influence the data. Fifty-six new churches were built on top of or adjacent to existing churches. If it was at the same location, it was coded as the same church, though the size might change. If it was at another location, even nearby, it was coded as a new church.

In addition to the size component, churches also have a 'prestige' component, which, in principle, is reflected in the construction (reconstruction) price per square meter (m^2). By boosting this price, the patron of a church may signal socio-political status. Thus, the demand side explains the numbers and sizes of churches, while the cost per m^2 is determined from the supply side. This justifies why the data disregard the cost component. Churches built after WWII are often designed by star architects and decorated by leading artists at substantial costs. Here, the explanation might be the pressures from the money accumulating in the Church Building Fund that needs an outlet. Like agriculture, the Church has declined relatively to other sectors, but it has continued to be an effective special interest.

Mission houses and community centers are special cases of church-related buildings: The period from 1850 to about 1950 saw the growth of a religious revival movement, Home Mission. It built approximately 900-1000 *mission houses* between 1850 and 1930 funded mostly by local groups (Larsen 1996). Mission houses are used for Bible study groups and meetings, and some have a designated service room. If the congregation remains within the Church of Denmark, the service rooms are included in our data.

Since 1950, the Church has built about 200 *community centers*. They are used for office space for church staff, meetings of the local church councils, wakes after funerals, and confirmation classes for teenagers, but also for cultural events such as lectures on various topics, art exhibitions, and musical playrooms for mothers with babies. One explanation for this building program may be the outlet problem of the Church Building Fund discussed above. An additional explanation is that the Church needs new buildings to accommodate initiatives undertaken to halt the decline in membership that has dropped from 95% of the population in 1965 to 75.9% in 2017 (Statistics Denmark 1979; 2017).

If mission houses and community centers are related to religiosity, that link should be reflected in the demand for churches and, as such, is covered by our measure.

2.3 The closing of churches – the factor of ownership

It has always been a difficult and slow process institutionally to close a church, but the fact that 516 churches have shut their door since 1300 indicates that it is possible. The incentive to close a church varies by ownership.[5] As discussed in section 3, the Church is a semi-public organization with a complex relationship to the state/crown, which has led to recurrent power struggles. Church ownership has passed through three main phases:

(i) In Catholic times, churches were funded by kings, wealthy landowners, and bishops, although they belonged to the Church (Ingesman 2013). Donations meant that the Church gradually accumulated around 40% of Danish farmland (Bøgh 2015).

(ii) After the Reformation, the King appropriated the property of the Catholic Church, which included the churches. However, de facto ownership soon moved to the (feudal) landowners (Paldam 2017).[6]

(iii) In the beginning of the 20th century, churches became public property administrated by locally elected parish councils as self-governing institutions (Christensen 2008).

With their local knowledge and economic interest in reducing unnecessary expenditure, private church owners are likely to respond faster and stronger to a fall in demand than the large (distant) bureaucracies of either the state or the Church. As expected, Figure 1b shows that most church closings took place between the Reformation and 1900 when churches were private property. The figure also shows that large institutions such as the Church or the state also adjust supply to demand, albeit more slowly.

The reasons why a church was closed (e.g. 400 years ago) are rarely fully known. In many cases, the DNM-volumes provide a dynamic explanation wherein the key factor is a *loss of demand* allowing the owner to let church maintenance slip. This led to a deterioration of the building, further reducing demand and making the process dynamic until the building had to be closed. The initial reason for the loss of demand was often that a neighboring church was preferred by the congregation, or, in some instances, entire villages moved.

This process ceased after the state took over ownership and old churches were declared historical treasures, but recently new initiatives to reduce church over-capacity have

[5] A large literature deals with the effects of ownership. The classic papers on property rights are republished in Pejovich (1997), while the World Bank (1995) compares private and public ownership.
[6] A detailed historical narrative of the period is found in Scocozza (1990).

appeared. In 2013, the Diocese of Copenhagen recommended that 17 large churches should be closed, and eight of these were closed. Politicians are currently debating a proposal to close 204 village churches.[7] Two special cases of ownership should be mentioned:

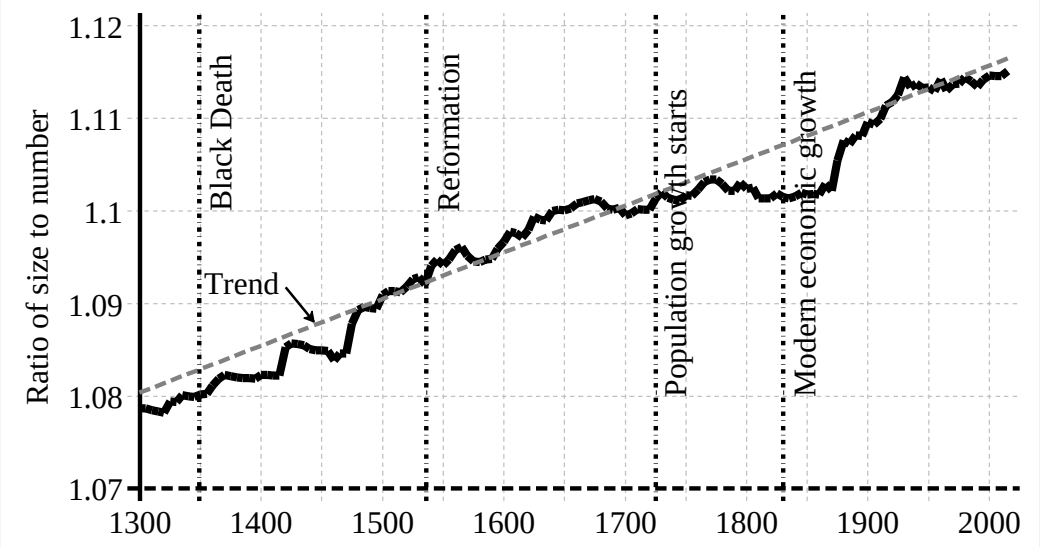
Before 1536, Denmark had 101 monasteries (Kristensen 2013). After the Reformation, all were closed. If the monasteries were in thinly populated parts of the country, their churches had no further use, but many of the monasteries were in towns and their churches were continued as Lutheran places of worship. Furthermore, some monasteries were secularized and used as hospitals and poor houses.

Feudal manors had large labor forces, so the large manor houses often contained a church. Land reforms around 1800 meant that most manorial land was sold/given to farmers, and the Agricultural Transition caused the labor force to decline. With some lag, most of the manor-churches were closed.

2.4 The falling effectiveness of churches

The church density series (see section 4) reflect that when the demographic development is taken into account, the post-1750 increase in church stock turns out to be a large decline in churches per capita.

Figure 2. The ratio S_S/S_N: The size of the average church



[7] See (Ministry for Culture 2013), (Ministry for the Church 2013), (Christian Daily 2016).

his trend may be explained by more effective capacity utilization in parallel with the 20th century development in institutions such as grocery stores and hospitals. Generally, small units either closed or expanded into more customer-efficient 'supermarkets'. To explore this possible explanation, two variables are necessary: (a) the average size of the churches and (b) the average number of churchgoers per service.

(a) Figure 2 displays the average size of churches calculated as the size/number ratio. The ratio is almost linear. Since 1300, it increased by 4% half of which occurred after 1750. Most of this increase is explained by new, relatively large town churches, while existing churches generally remained the same.

(b) Attendance statistics are weak, but ESS (European Social Surveys) and other pieces of evidence (Iversen 2013) find that today about 2-3% of the church members go to church regularly against approximately 10% in the 19th century.[8] From 1300-1750, churches appear to have been more important in people's life.

As the decline in churchgoing is much larger than the increase in church size, it appears that the trend in church capacity utilization goes in the opposite direction than in hospitals and grocery stores. Thus, the average church has become less effective in promoting its 'product'.

2.5 Summary: The church stock over the 715-year period

Figure 3 shows the path of the church stock data. The average number of churches is 2,059 with a standard deviation of 122. From 1300 to 1860, the two series are stationary in the sense that the stock at the end is the same as in the start. After 1860 the church stock grows by 26%. At the end a drop has started that is likely to continue.

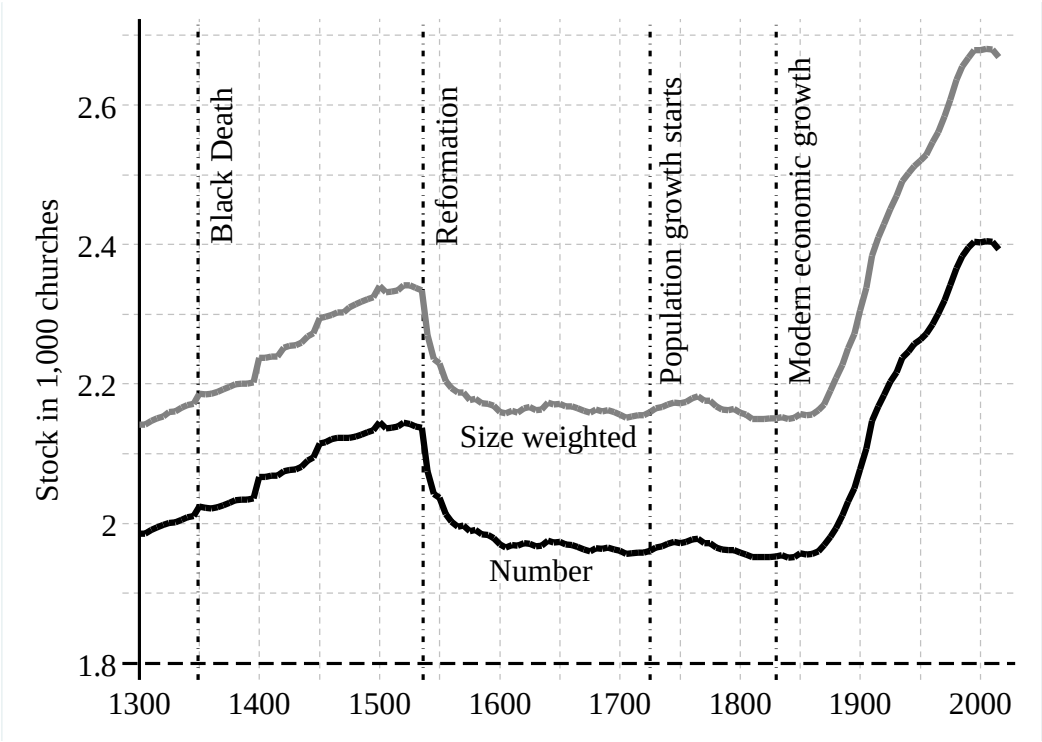
Population growth seems to rise already around 1750, but the upward kink in the church stock is observed only after 1860. The theory of the Religious Transition, discussed in section 3.4, predicts that the church stock should fall after the onset of modern economic growth in 1830. The transition explains why the church stock reacted so late and so little.

Furthermore, Figure 3 allows three observations on events: (1) The Black Death epidemic that hit the country in 1349 is not reflected in our data. (2) The Reformation caused a downward shift of about 9% in the series. The curve has the typical adjustment form which is steepest in the beginning and then gradually levels out after three-quarter of a century.

[8] It would be easy to count churchgoers, but it is rarely done. Niskanen's (1994) theory of the bureaucracy predicts that a bureau such as the Church wants to protect its budgets against threats. A key device in this endeavor is to refrain from collecting threatening information such as church attendance.

Then it remains constant until 1860. (3) Pietism[9] – about 1730-80 – imparts a small wave in the series only.

Figure 3. Number of churches S_N and their sizes S_S



3. Theories used in the interpretation

Religion is a free service produced by the non-market church-sector that is financed by alms/taxes. Until the late 1970s, the Church was a near monopoly organization with a shifting relation to the state. Churches are valuable real estate, but implicit and explicit regulations keep it isolated from the market. Nevertheless, the church stock per capita has developed in a way that is strongly connected to economic development. The paper analyzes that connection.

Section 3.1 reports the operational definitions used for religion and religiosity, and introduces sociological secularization theory. Section 3.2 sketches the model of the Religious Transition.[10] Section 3.3 develops the proxy model between religiosity and church density.

[9] During this period, a strongly religious royal court tried to make people more religious.
[10] Sections 3.1 and 3.2 refer to large literatures that do not overlap even though their subject does. While little is agreed upon in the secularization literature (Bruce 1992), the literature on growth is more united (Jones and Vollrath 2013).

3.1 Defining religion and religiosity – and secularization theory

Just as other complex cultural phenomena, religion and religiosity are notoriously hard to define. For the purpose of this paper, a *religion* is a *package* of beliefs and traditions tied together by a church. The package has many parts, such as the prescribed use of churches. An individual *belongs* to a religion if he 'buys' the package.

In the period of the study, Denmark has been Christian. The Reformation in 1536 replaced Catholicism with Lutheranism that remained the state religion until the Constitution of 1849 granted freedom of religion.[11] After that, the Lutheran Church kept an (ill-defined) constitutional status as the *People's Church*. As mentioned in section 2.2, membership was above 95% until the late 1960s when it began to decline to its present 75.9%.

An individual's *Religiosity* is a quantitative measure of the intensity of 'consumption' of the package. More precisely, it is the largest common factor in the importance of religion in all aspects of life, which covers all parts of the package. Religiosity is a per capita concept, so it should be related to the church stock per capita, which is the church density. If the package offered by a Church were consumed in fixed proportions, all (important) aspects of religiosity would move in parallel. It makes historical analysis of religiosity possible as it means that one observable variable such as church density will work as a religiosity proxy. Fortunately, the proxy has large movements, so that even if the proportions in the package shift gradually over centuries, it is treated as a part of a modest adjustment trend.

A core research field within the scientific study of religion concerns the secularizing effect of modernity. It deals with both religion and religiosity. Secularization theory goes back to classic sociological thinkers (Marx 1843, Durkheim 1893, Weber 1903/04), who conceptualized different processes through which scientific thinking would replace religion in post-Enlightenment societies. It became clear during the 20th century that religion did not disappear, which sparked considerable debate about secularization theory among sociologists of religion.[12] Roughly speaking, European scholars have argued that secularization occurs, while Americans have argued it does not (Casanova 2006). In recent years, however, American analyses have started to focus on the rising number of religiously non-affiliated, the 'nones' (e.g., Zuckerman 2008, Putnam and Campbell 2010 and PEW 2015).

Over the course of this debate, the term secularization has acquired countless

[11] Before 1849, other religions were not permitted, with a few exceptions. In 1674, religious freedom was granted to Fredericia, which was a walled garrison town. In 1682, the Catholic Church and three reformed denominations were permitted to hold services for foreigners, notably diplomats.

[12] Some proponents of secularization are (Wilson 1966, Berger 1967, Norris and Inglehart 2011, Ahlin 2015), while some opponents are (Stark and Iannaccone 1984, Berger 1996, Stark 1999).

connotations and definitions (Shiner 1967, Dobbelaere 2002). This paper looks at an important indicator of the intensity of the dominant religion in Denmark. Thus, it provides an insight into macro aspects of the decline in institutionalized religiosity.

Our data do not include non-institutionalized religion such as different forms of spirituality or folk beliefs. Such beliefs appear to be widespread in Western Europe (Heelas and Woodhead 2005). This is not new; folk beliefs and other religious movements always thrived alongside institutionalized religion (Ingesman 2013).

3.2 Religiosity in growth theory: The Grand and the Religious Transitions

Growth theory is built on the macro production function that produces GDP, Y, with four factors of production: knowledge, A, physical and human capital, K and H, and labor, L.

(2) $Y_t = A_t F(K_t, H_t, L_t)$, where t is time

Growth has two basic steady states: A *traditional* one with an (almost) unchanged technology producing a low and stable income, and a *modern* with technological progress producing high incomes and moderate growth. The change between these steady states is the *Grand Transition*. It consists of transitions in all socio-political variables, including religiosity.[13]

The key channel (c1) through which religion and religiosity enters into the process of growth is through knowledge, A, that has a secular, Z, and a religious part, Ω.

(3) $A_t = Z_t + \Omega$ which is channel (c1) below

(4) $R_t^A = \Omega/A_t$ the importance of religion in knowledge – it falls as Z_t increases

While Z_t grows rapidly in modern society, Ω is roughly constant. Modern growth therefore is a process wherein the importance of religion in production falls relative to Z_t, the stock of secular knowledge, notably within science and technology (Gundlach and Paldam 2012).

The *Religious Transition* has been analyzed in the cross-country dimension by using the rich data for 95 countries in the WVS (World Value Survey), where 14 items that span many aspects of religiosity were analyzed (Paldam and Gundlach 2013). All items are in percentage terms and scaled so that higher religiosity yields higher scores. Each of the 14

[13] The *equivalence hypothesis* claims that the cross-country and the time-series pattern are almost the same. The most well-known transitions are the *Demographic* (Lee 2003) and the *Agricultural* ones (Timmer 1988). Transitions also occur in variables that are not purely 'economic' such as in *Democracy* (Paldam and Gundlach 2017), and *Corruption* (Gundlach and Paldam 2009). In the first three cases, *equivalence* holds. It seems to hold for corruption too, but historical data on corruption are anecdotal only. The present paper covers the time series dimension abundantly, but only for one crude proxy and one country.

items has a clear Religious Transition. By using factor analysis, a robust macro-measure, *R*, for religiosity emerged. Two main findings are relevant at present:

(i) The Religious Transition looks as expected. In countries at the traditional level, $R \approx 80\%$, while $R \approx 40\%$ in wealthy countries. Denmark is now at a bit less than 30%. If the level was 80% in Denmark before 1750, the decline is about 3 times. A formal test shows that the main direction of long-run causality is from income to religiosity.

(ii) It confirms the fixed proportions claim as all items (but one) have average factor loadings of around 0.85. Under the equivalence hypothesis, (i) and (ii) analyze the long run. The items used to calculate the *R*-score do not specify the religion, and the data used covers countries with many religions. If everybody had the same religion, the factor loadings would surely be (even) larger.

The production function (2) is an aggregate of the sectoral production functions: One is for (official) religion. It yields the GDP of the Church sector (with superscripts C):

(5) $\quad Y_t^C = \Omega\, F^C(S_t^C, H_t^C, L_t^C), \qquad$ where $\Omega \approx A^C$ and $S^C \approx K^C$

Technical progress is slow in this field, so it is taken to be a part of a small trend below. A big organization like the Church has rules for employment per church, so (5) becomes (6), which may also be read as the adding-up equation in equilibrium

(6) $\quad Y^C{}_t \approx rS^C{}_t + w(L^C{}_t + H^C{}_t), \qquad$ where the 'prices' $r = \partial Y^C/\partial S^C$ and $w = \partial Y^C/\partial(L^C + H^C)$

Equation (6) is used in section 4.4 to give a crude measure of the labor share and the share of the sector GDP for the church sector.

The main empirical problem with transition theory is that since the Grand Transition changes everything, a great deal of confluence exists between all time-series during the transition, which makes it too easy to present explanations that fit the data. In other words, even when a connection is found between religiosity and a variable that changes during the transition, one has an explanation, though it is likely to be one channel only. Apart from (c1) – the increasing availabilities of scientific/technological alternatives – three additional channels should be mentioned:

(c2) *Education*: The Grand Transition causes large increases in human capital, H_t, as people need more knowledge to function in society. The main way by which A_t enters the production function is $H_t = H^{Z_t} + H^{\Omega}$, where H_t come to contain an ever smaller share of

religious knowledge. That causes religiosity to fall, though the actual mechanism is debated (Becker *et al.* 2014, Franck and Iannaccone 2014).

(c3) *Risk*: Life in traditional society is uncertain. Agricultural technologies and medical knowledge are limited, so mortality from malnutrition and disease is high. In modern nations, technological developments have eliminated the insecurity of subsistence farming and brought major improvements in health. Also, the growth of insurance and the welfare state have reduced risk. Thus, the need for divine protection has fallen (Malinowski 1948, Norris and Inglehart 2011).

(c4) *The secularization of institutions*: in traditional society, the Church is important for the production of education, healthcare, and social protection. The transition causes a large-scale expansion in the demand for these goods. Churches are unable to finance the expansion out of alms, so the institutions providing the goods are secularized, notably in welfare states (Wilson 1966, Scheve and Stasavage 2006).

These channels overlap, they vary in strength over time, and they work both on the demand for and on the supply of religion. To estimate their importance over time would require unavailable data. Thus, we bypass the channels and treat income as a catchall variable for the transition. While (c1) argues that the relation between income and religiosity is simultaneous, the other channels argue that income is causing religiosity.

3.3 The proxy relation from the two explanations of the demand for churches

This section uses the variables listed in Table 3.The demand for churches is measured by churchgoing. The demand-supply balance is explained by equation (7), while equation (8) treats the relation between churchgoing and the rest of the religious package of the Church.

Table 3. Six variables appearing in equations (7) to (11)

Defined per capita		Comment
d_t	demand for churches	observable as churchgoing, but poorly known
r_t	Religiosity	unobserved, but calculated in equation (9)
s_t	church density	from Table 4
κ_t	capacity utilization	poorly known relation of demand to supply
$\beta_0{}^t$	net trend from 0 to t	see section 3.3 on three components (i) to (iii)
μ_ρ	importance of churchgoing	constant that shifts when religion ρ changes

Demand, D, for churches is equal to supply, S, in the usual way: In the short run, S_S, depends upon capacity utilization κ. In the longer run, a small trend, β_{1t}, enters for changes in the effectiveness of church use, discussed in section 2.4.

(7) $D_t = (\kappa_t + \beta_{1t})S_t$ or per capita $d_t = (\kappa_t + \beta_{1t})s_t$

If $\kappa < 1$, there is over-capacity, so churches are too empty. This gives high production costs per churchgoer, which yields a pressure to close churches. If $\kappa > 1$, there is under-capacity, so churches have congestion problems, which yield a pressure to build churches.

Churchgoing is an important part of religion, ρ, and we assume that it has a fixed proportion to religiosity given by μ_ρ. However, the relation may have a long run trend, β_{2t}.

(8) $d_t = (\mu_\rho + \beta_{2t})\, r_t$

Relations (7) and (8) yield $(\kappa_t + \beta_{1t})\, s_t = (\mu_\rho + \beta_{2t})\, r_t$, so that $r_t = s_t\, (\kappa_t + [\beta_{1t} - \beta_{2t}\, (r_t/s_t)])/\mu_\rho$, where the expression in the []-bracket is a composite trend β_t. [14]

(9) $r_t = s_t\, (\kappa_t + \beta_t)/\mu_\rho$, which is religiosity as a function of church density

This relation may be assessed at certain points in time. The scale parameter, μ_ρ, depends upon the religion, ρ, which changes once at the Reformation, where s falls by 9%. When μ_ρ is adjusted for this change, it becomes constant. Imagine a period from 0 to t that starts in equilibrium: Here $\kappa_0 \approx 1$ and $\beta_0^0 = 0$, so that $(\kappa_0 + \beta_0^0) = 1$, and the adjusted μ divides out:

(10) $$\frac{r_t}{r_0} = \frac{s_t(\kappa_t + \beta_0^t)/\mu}{s_0(\kappa_0 + \beta_0^0)/\mu} = (\kappa_t + \beta_0^t)\frac{s_t}{s_0},$$ or seen from today approximately[15]

(11) $$\frac{r_0}{r_t} = \frac{s_0}{(\kappa_t + \beta_0^t)s_t} \approx (\kappa_t^{-1} + \beta_t^0)\frac{s_0}{s_t},$$ which is measured in *times*

Section 4.1 report data for the s's. The cointegration test in section 4.2 gives an estimate of the trend. It finds that income, y, increases about 0.1% less than s decreases per year. The trend between r and s, may be a little different, but the direction of the difference is unknown.

[14] The composite trend β_t has three parts: (i) The Church package may shift slowly over the centuries. (ii) When transport becomes cheaper, the church stock can be more effectively used. This is a negative trend, so that r decreases a little less than s. (iii) The increasing urbanization and other movements of the population makes the church distribution less efficient. We assess that (ii) is larger than (iii), while the sign on (i) is uncertain.

[15] The approximation is quite good if β is close to zero. If (10) and (11) could be estimated, it is possible that (11) has the better fit, and that, consequently, (12) is the approximation.

The capacity utilization κ and the trends β are poorly known, so we only evaluate (11) in three years 1300, 1750, and 2000, which covers traditional society and the transition.

4. Church densities and an interpretation

Section 4.1 reports economic and demographic data, and uses these data to convert the church stock into church densities. It includes Figure 4, which serves as a visual confirmation of the theory of the Religious Transition, while section 4.2 reports correlations and a formal causality test. Section 4.3 contains the estimates of religiosity, while section 4.4 presents crude estimates of the share of church staff and the GDP of the Church. This section uses *gdp* for GDP per capita and *income* for the natural logarithm to gdp.

4.1 Development in population, income, and the church densities

The population and income data used are given in Table 4. The data are the assessments of Maddison (2003). The first Danish census was in 1769. The data can be projected backward to 1750, but earlier data are increasingly uncertain, so before 1750 the church stock data are more precise than the density data. Population growth started to increase sometime in the first half of the 18th century. After 1970, population growth has fallen to 0.4% once again, so the Demographic Transition took place from about 1725 to 1970. Historical national accounts start 1820 and modern economic growth began in the 1830s.

When the time scope, T, is 715 years, the range of possible growth rates becomes small. If the growth rate, g, for a variable, x_t, changes even with 0.1 percentage points, the value of x_{1300} changes by a factor 2 relative to x_{2000}. That sensitivity represents the uncertainty of the existing population estimates. From the equivalence hypothesis and our knowledge about how people lived in 1300, it appears that the *gdp* in Denmark in 1300 must have been about the same as in a poor African country today. That is, in the range from \$400 to \$800.[16] Maddison's 'guess' is in the middle.

From 1300 to 1750, the growth rate for P was 0.13 $\pm$ 0.05%, and for the *gdp* it was 0.15 $\pm$ 0.05%. These growth rates reflect the near-stability of the traditional steady state. While the trends are known reasonably well, the annual changes are unknown.

[16] Maddison's gdp data are in 1990 International Geary-Khamis dollars.

Table 4. Population, *gdp*, income, and church densities

Year	(1) Population, *P* Number 1,000	(2) Growth % pa.	(3) *gdp*, GDP per capita *gdp*	(4) Growth % pa.	(5) Income $y = \ln gdp$	(6) Church densities Church $s_N = S_N/P$	(7) Size $s_S = S_S/P$
Uncertain assessments – trends only							
1000	**360**	-	**400**	-	-	-	-
1300	490	0.10	578	0.12	6.36	4.054	4.373
1350	515	0.10	614	0.12	6.42	3.932	4.247
1400	542	0.10	653	0.12	6.48	3.815	4.129
1450	570	0.10	694	0.12	6.54	3.711	4.026
1500	**600**	0.10	**738**	0.12	6.60	3.577	3.903
1550	624	0.08	804	0.17	6.69	3.266	3.574
1600	**650**	0.08	**875**	0.17	6.77	3.032	3.325
1650	675	0.07	953	0.17	6.86	2.925	3.218
1700	**700**	0.07	**1,039**	0.17	6.95	2.802	3.081
Based on primary data from 1750			Based on primary data from 1820			Fairly reliable	
1750	862	0.42	1,131	0.17	7.03	2.288	2.521
1800	1,063	0.42	1,231	0.17	7.12	1.843	2.032
1820	**1,155**	0.42	**1,274**	0.17	7.15	-	-
1850	**1,499**	0.87	**1,767**	1.10	7.48	1.306	1.439
1900	**2,561**	1.08	**3,017**	1.08	8.01	0.811	0.900
1950	**4,271**	1.03	**6,943**	1.68	8.85	0.530	0.590
2000	**5,330**	0.45	**22,975**	2.42	10.04	0.451	0.503
2015	**5,660**	0.40	**23,904**	0.26	10.08	0.423	0.472

Fall in traditional period from 1300 to 1750 is $s_{N1300}/s_{N1750} = 1.77$ or 1.6 corrected for Reformation

Fall in transition period from 1750 to 2000 is $s_{N2000}/s_{N1750} = 5.07$

The source for columns (1) and (3) is the Maddison Project (2013), the *gdp* data are in 1990 international Geary-Khamis dollar. Data given in **bold** correspond to Maddison, while data given in normal text are our interpolations. The densities in columns (6) and (7) are scaled by 1,000. Income, *y*, is the (natural) logarithm to *gdp*. Thus, when income changes by 1 point, *gdp* changes 2.7 times.

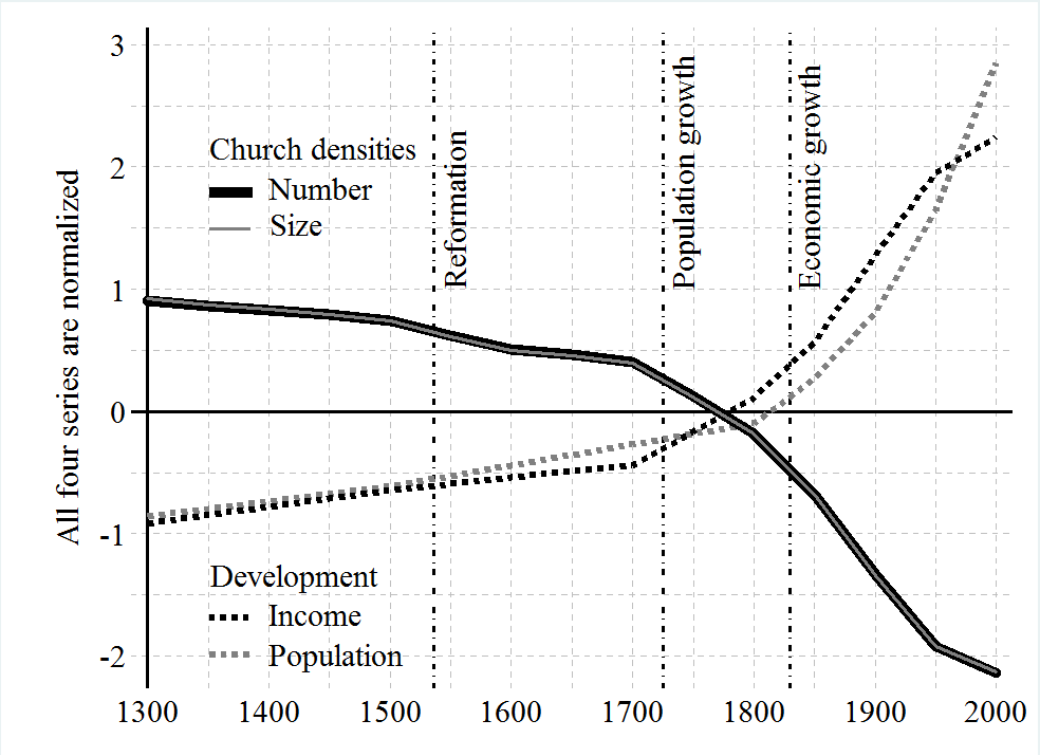
Between 1750 and 1800, population growth rates are higher, and known with increasing precision.[17] The economic upswing probably started before the Napoleonic Wars, but Danish involvement on the losing side interrupted economic growth. From about 1830, growth picks up.

[17] The increase in population between 1700 and 1800 may have played a causal role in starting the Grand Transition. The same pattern is found in the United Kingdom (Clark 2007).

4.2 From correlations to causality

The two sets of curves in Figure 4 have the same form, but in the reverse, as also seen from the (symmetrical) correlations in Table 5. When development turns up, the densities turn down. The decline in the densities is explained by the denominator (i.e., the population). Note that population data are uncertain before 1750, which makes the densities uncertain as well.

Figure 4. Comparing economic development and church densities



Notes: All four series are in logarithms and normalized to zero mean and a standard deviation of one. The two normalized church densities overlap to be almost identical (for visibility reasons, the 'number' curve is represented in bold). The data are the 15 observations for 1300, 1350, …, 2000 from columns (1) , (3) , (6) and (7) in Table 4.

Table 5 raises the usual question: What are the causal factors, if any, that lie underneath the high correlations? Table 6 gives the standard test for Granger causality using the observations reported in Table 4.[18] The upper section gives co-integration tests. The tests are similar in Reg 1 and Reg 2, which only differ by the trend-term, β. However, the D-F test in Reg 1 is just below and in Reg 2 just above the 5% significance limit. The trend is significant, even if it is only 5% per 50-year period, i.e., −0.1% p.a. The lower section of the table gives standard

[18] Table 5 shows a high confluence between variables which makes it difficult to detect causality. Even though 15 observations are rather few, the tests nevertheless seem to work.

Granger-causality tests including a trend: The tests reject non-causality, both ways and with one and two lags. Therefore, we are looking at causal relations, not just confluent series.

Table 5. Correlation between the four time series depicted in Figure 4

		Ln(*gdp*)	Ln(*P*)	Ln(s_n)	Ln(s_s)
Income	Ln(*gdp*)	-	0.971	-0.960	-0.960
Population	Ln(*P*)	0.971	-	-0.998	-0.998
Density, numbers	Ln(s_n)	-0.960	-0.998	-	1.000
Density, size	Ln(s_s)	-0.960	-0.998	1.000	-

Table 6. Co-integration and causality tests between church density and income

Co-integration: Dickey-Fuller test (D-F) on residuals from Reg 1 and 2					
s_N =	*Constant*	*Income*	*Trend*	R^2	D-F test
Reg 1	**5.75**	**-0.69**	-	0.92	0.57
	(14.2)	(-12.5)			(1.8)
Reg 2	**6.12**	**-0.49**	**-0.055**	0.96	**0.52**
	(17.8)	(-6.1)	(2.9)		(2.0)

Granger causality tests using Reg 2 that include a trend							
y nGc s_n				s_n nGc *y*			
Lag	Years	χ^2	p%	Lag	Years	χ^2	p%
1	50	**49.9**	0	1	50	**38.6**	0
2	100	**15.7**	0	2	100	**62.5**	0

Note: Reg is regression. Parentheses report t-ratios. Significant estimates are in bold. The D-F (Dicky-Fuller) test is a regression that explains the residuals of a regression with the lagged residuals. If it is 1 or -1, the regression contains a unit root. 'nGc' means 'not Granger causing'. If the χ^2 is high, it is rejected. Consequently, causality is accepted. The causality test used is an add-in program to Stata by P. Joly.

4.3 Religiosity evaluated in 1300, 1750, and 2000 by Equation (11) from section 3.7

The last two rows in Table 4 report the ratio between the densities (s_0/s_t). The trend, β_0^t, was estimated in Table 6 to be −0.1% annually. The calculations assume that the church stock was in equilibrium in 1300 and in 1750, so that $\kappa_{1300}^{-1} \approx \kappa_{1750}^{-1} = 1 \pm 0.25$.

Only κ_{2000}^{-1} remains: The church stock peaked at 2400 churches in year 2000. The average church had 150 seats,[19] Thus, about 360'000 seats were available every Sunday. The church had 4'400'000 members. Section 2.4 found that 2½% of these go to church regularly. This is 110'000 churchgoers, so capacity utilization is $\kappa_{2000}^{-1} \approx 3 \pm 1$.

[19] This estimate is based on the number of seats reported by Kirsten Jensen (source 4).

Table 7. Summary of effects on religiosity for two periods ($T = t_2 - t_1$)

Equation (11) is: $\frac{r_0}{r_t} \approx (\kappa_t^{-1} + \beta_t^0)\frac{s_0}{s_t}$	From Section 3.6	Traditional period 1300 to 1750 $T = 450$	Transition period 1750 to 2000 $T = 250$
Fall in density, (s_0/s_t)	Table 4 last 2 rows	1.6	5
Capacity utilization, κ_t^{-1}	See text	1	2
Size of trend, $\beta_t^0 = -(1-1.001^{-t})$	Section 4.2	-0.36	-0.78
Total fall $(r_0 - r_t)/r_t$		0 ± 0.5	8 ± 1

What happened during the two periods is as follows: In traditional time before 1750, religiosity was roughly constant and rather high. However, when modernization set in after 1750, religiosity started to decline. Since then it has fallen by about 8 times.

4.4 Some implications: The shares of the church staff and the Church GDP

The large decline in church densities implies a similar decline in the size of the Church measured in other dimensions. Here we supplement the church stock data with some uncertain assessments.

Table 8. The population and the church staff in years 1500, 1600, and 2000

Variable	Source	Catholic, 1400		Protestant, 1600		Today, 2000	
Population	Table 4	540,000		650,000		5,300,000	
		Buildings	Staff	Buildings	Staff	Buildings	Staff
Churches	Table 1	2,020	8,080	1,920	7,700	2,400	8,000 [b]
Monasteries	[a]	101	1,500			5 [c]	20
Total (minus overlap)			9,000		7,700		8,000
In % of labor force [d]			3.3		2.4		0.3
Index (set at 100 in 1400)			100		71		8

Note: It is assumed that a church had four staff members, and that a monastery had a staff of 15. The overlap is the church work done by staff of the monastery. (a) Sources: Kristensen (2013), the Catholic Church (references), and Wiki-Danmark. (b) Today, many churches are run jointly, so the staff is less than four per church. (c) Small new monasteries of the Catholic Church. (d) The labor force is estimated at 50% of the population.

Table 8 presents an assessment of the size of the church staff (including the lay staff). Before the Reformation, the staff was quite large because the Church needed many people to produce the three major collective goods (education, healthcare, and social protection). When the monasteries were closed after the Reformation, the staff predictably fell. The table suggests that church staff before the Reformation comprised 3.3% of the labor force. This fell

to 2.4% afterwards. It is 0.3% today. By these assessments, the presence of church employees in the life of the average Dane has fallen even faster than church density. Think of the chance that a person you randomly meet is a church employee. This chance has fallen more than ten times since the 15th century.

Equation (6) suggests that we may compute a crude estimate of the Church's contribution to GDP at factor costs if the share of the church staff from Table 8 is supplemented with the annual capital costs of the Church's buildings.[20] The share of lay staff likely has fallen over time as the Church ceded to the state the institutions producing healthcare, education, and social protection. From estimates, it appears that the Church's share of GDP may have been about 12% in 1400 (Paldam 2016). Today it is below 1%.

5. Conclusion

Around 1300, Denmark had approximately 255 persons per church. In 2000, this number had increased 8.7 times to 2,216 persons per church; i.e., the church density has fallen 8.7 times. This paper argues that most of this decline is caused by a decrease in religiosity.

In the 450 years from 1300 to 1750 (i.e., the traditional steady state), the economy grew by an average annual rate of about 0.15%, and the population by about 0.13% annually. In this period, the number of churches per capita fell by 0.1% yearly. The relation between religiosity and church density seems to have followed a similarly trend, so we conclude that the level of religiosity must have been roughly constant during those years.

After 1750, church density in Denmark fell more than five times and since there also has been a reduction in the capacity utilization for Danish churches, the decline in churchgoing is even higher. This was the Religious Transition. As religiosity was more than five times higher before the transition than after, it was as high as it is in low-income countries today.

The strong growth of income after 1830 leads to an increase in the population of five times until 1950 – this is the Demographic Transition. It would have caused a large building boom of new churches with constant religiosity. This boom would certainly have been possible given the large increase in incomes, but only a small increase in the church stock took place.

[20] Paldam (2017) supplements the production estimates of equation (6) with assessments of the Church's incomes that tally reasonably well.

The transition framework predicts that the level of religiosity should stabilize in the modern steady state. However, adjustments in this field have long lags. In Figure 4 and in the 5-year data it appears that the fall in religiosity has decelerated – a convergence to the modern level seems to be underway.

The economics of this paper is a story about the Danish church sector that produces institutionalized religion. It used to be an important and powerful sector, but in the last 250 years, church output has stagnated, while the rest of the economy and the population have expanded substantially. Thus, the church sector has shrunk, becoming a rather modest one. Our explanation of this decline is that as Danes got wealthier, the demand for the church's product dropped.

Acknowledgements:

We are grateful to Thomas Clausen and especially Sophie Bønding for research assistance and to our two departments for financing that assistance, as well as Erich Gundlach for many discussions, and the referees and editor for unusually constructive comments. We also want to thank Casper Worm Hansen, who contributed to the design and early stages of the project; Michael Andersen and his staff at the DNM project for a fruitful meeting; the Center for Contemporary Religions at Aarhus University for consultations; Leif Danziger, Niels Haldrup, Karsten Merrald Sørensen, and Ron Wintrobe has given useful comments. The paper has been presented at the Department of the Study of Religion, Aarhus University; The Danish Public Choice 2015 Workshop, Aarhus; The European Public Choice 2015 Meeting, Groningen; the Society for the Scientific Study of Religion's 2015 Meeting, Los Angeles; The Department of Economics, Deakin University 2016, Melbourne.

A: Sources for church data (all URLs accessed in late spring 2016):

1	Parish Portal [Sogneportalen] http://sogn.dk/index.html	Official list from the Ministry for the Church. Covers all present churches, including the URLs of the church.
2	DNM-Project (at the Danish National Museum) http://danmarkskirker.natmus.dk	Detailed ongoing registration. Only systematic source on closed churches. Started 1927 – app 36% missing[a)].
3	Wiki-Danmark https://da.wikipedia.org/wiki/	Ongoing data collection project, p.t., currently covering about 70% of the churches. Fine and concise reporting.
4	Kirsten M. Jensen's project http://www.kirkehistorie.dk	Ongoing data collection project. Covers age and seats in app 60% of the churches.
5	Poul Reitoft's project http://www.reitoft.dk/kirker.html	Only names of churches and year of construction, and regional classification based on the church classification.
6	Church Project home page http://www.martin.paldam.dk/GT-Religious.php	It refers to the homepage of our coded data.
7	Church statistics [Kirkestatistik] http://www.km.dk/folkekirken/kirkestatistik/	Church statistics, covers membership data, baptisms, etc.
8	Krak, addresses and maps http://www.krak.dk	Addresses and maps of all existing churches.
9	Catholic Church in Denmark https://www.katolsk.dk	Source for present monasteries

Sources 3 to 5 are typical hobby-projects, done with great care and a strong interest in the subject. They appear to use the DNM data as a source. They have been used to control the data reported in Table 1.
a). The DNM-project does not have a fixed format in the reports, and most researchers of the project are from a qualitative tradition. Each church has an article that describes the historical development of the building, including its inventory and its location as well as relevant folk legends and historical circumstances.

B: Other references:

Ahlin, L. (2015). Growth in alternative therapy: A valid argument against the secularization thesis? *Contemporary Religion* 30, 399-413

Becker, S.O., Nagler, M., Woessmann, L. (2014). *Education Promoted Secularization*. CEPR disc. paper 9884

Berger, P.L. (1967). *The sacred canopy: Elements of a sociological theory of religion*. Garden City, NY: Doubleday

Berger, P.L. (1996/97). Secularism in retreat. *The National Interest* 46, 3-12

Bøgh, A. (2015). Højmiddelalderen, ca. 1050 – 1340: Kirke og gejstlighed {The middle ages, ap. 1050-1340: Church and clergy}. URL: danmarkshistorien.dk/historiske-perioder/hoejmiddelalderen-ca-1050-1340-/kirke-og-gejstlighed/

Bruce, S., ed. (1992). *Religion and modernization: Sociologists and historians debate the secularization thesis*. Oxford: Clarendon

Casanova, J. (2006). Rethinking secularization: A global comparative perspective. *The Hedgehog Review* 8, 7-22

Christensen, N. (2008). Menighedsrådenes historie {The history of Danish parish councils}. URL: kristendom-.dk/guide-til-folkekirken/menighedsrådenes-historie

Christian Daily [Kristeligt Dagblad] (2016). Kirkelukninger {Church Closings}. Online collection of articles

about church closing from 2013 onwards. URL: kristeligt-dagblad.dk/kirkelukninger

Clark, G. (2007). *A farewell to alms. A brief economic history of the world*. Princeton, NJ: Princeton UP

Dobbelaere, K. (2002). *Secularization: An analysis at three levels.* Bruxelles: Peter Lang

Durkheim, E. (1893) [1984]. *The division of labour in Society*. London: Palgrave MacMillan

ESS, European Social Surveys. URL: http://www.europeansocialsurvey.org/ download March 2017

Fenger, O. (1988). *Kirker rejses alle vegne.* 1050-1250 {Churches are being raised everywhere}. Vol 4 in Olsen, O., ed. Danmarkshistorien {The History of Denmark}. Copenhagen: Gyldendal og Politiken

Franck, R., Iannaccone, L.R. (2014) Religious decline in the 20th century West: Testing alternative explanations. *Public Choice* 159, 385-414

Grundtvigskirken (2015). Grundtvig og kirken {Grundtvig and the Church}. URL: grundtvigskirke.dk/page/403/kirken-og-grundtvig

Gundlach, E., Paldam, M. (2009). The transition of corruption: From poverty to honesty. *Economic Letters* 103, *14*6-48

Gundlach, E., Paldam, M. (2012). A model of the religious transition. *Theoretical Econ. Letters* 2012, 419-22

Heelas, P., Woodhead, L. (2005). *The Spiritual Revolution: Why Religion is Giving Way to Spirituality.* Hoboken NJ.: Wiley-Blackwell

Ingesman, P. (2013). Den danske kirke i middelalderen {The Church of Denmark in medieval times}. In Ingesman, P., Pedersen N.A., eds. *Kirkens historie* {*History of the Church*}. Vol 1, 687-715. Copenhagen: Hans Reitzels Forlag

Iversen, H.R. (2013). Hvorfor forstår vi kirkestatistik, som vi gør? {Why do we understand church statistics as we do?}. In Nielsen, M.V., Iversen H.R., eds., Tal om Kirken. Undersøgelser af Folkekirkens aktivitets- og deltagerstatistik {Church Data: Studies of activity and members participation} (115-128). URL: teol.ku.dk/cfk/dokumenter/Tal_om_kirken_NY_med_tabeller rev_12.02.pdf

Jones, C.I., Vollrath, D. (2013). *Introduction to Economic Growth*. 3rd ed., New York: WW Norton

Kristensen, H.K. (2013). *Klostre i det middelalderlige Danmark {Monasteries in medieval Denmark}*. Højbjerg: Jysk Arkæologisk Selskab

Larsen, K.E. (1996). *Indre Mission i nyere tid {Home Mission Today}.* Fredericia: Lohse

Lee, R. (2003). The demographic transition: Three centuries of fundamental change. *Journal of Economic Perspectives* 1, 167–190

Maddison Project (2013).[21] URL: ggdc.net/maddison/maddison-project/home.htm

Maddison, A. (2001). *The world economy: A Millennial Perspective.* Paris: OECD

Maddison, A. (2003). *The world economy: Historical statistics.* Paris: OECD

Malinowski, B.K. (1948). *Magic, science and religion and other essays*. Glencoe, IL: The Free Press

Marx, K. (1843) [1970]. *Critique of Hegel's 'Philosophy of Right'*. Cambridge: Cambridge UP

Ministry for Culture [Kulturministeriet] (2013). Afgørelse i 14 kirkelukningssager i Københavns Stift {A decision on the closing of 14 churches in the Diocese of Copenhagen}. URL: kum.dk/nyheder-og-presse/pressemeddelelser/nyheder/afgoerelse-i-14-kirkelukningssager-i-koebenhavns-stift/1/1/

Ministry for the Church [Kirkeministeriet] (2013). Sareen vil have retningslinjer for kirkelukninger {Sareen

[21] Maddison (1926-2010) updated his data till 2010 one month before he passed away. His project was continued after 2012 by a group of economic historians.

calls for church closing guidelines}. URL: km.dk/folkekirken/nyhedsarkiv-kirke/nyhed-om-kirke/-news/sareen-vil-have-retningslinjer-for-kirkelukninger/

Niskanen, W.A. (1994). *Bureaucracy and Public Economics.* Aldershot: Edward Elgar

Norris, P., Inglehart, R. (2011). *Sacred and Secular: Religion and politics worldwide* (2nd Ed.). New York, NY: Cambridge UP

Paldam, M. (2017). An economic perspective on the Reformation and the downscaling of the Church in Denmark, 1450-1650. Working paper available from URL: martin.paldam.dk/GT-Religion.php

Paldam, M., Gundlach, E. (2013). The religious transition. A long-run perspective. *Public Choice* 156, 105-123

Paldam, M., Gundlach, E. (2017). Jumps into democracy: The transition in the Polity Index. Conference paper

Pejovich, S., ed. (1997). *The Economic Foundations of Property Rights. Selected Readings*. Cheltenham: Edward Elgar

PEW Research Center (2015). America's changing religious landscape. May 12. URL: pewforum.org/files/-2015/ 05/RLS-08-26-full-report.pdf

Putnam, R.D., Campbell, D.E. (2010). *American grace: How religion divides and unites us.* New York, NY: Simon & Shuster

Scheve, K., Stasavage, D. (2006). Religion and preferences for social insurance. *Quarterly Journal of Political Science* 1, 255-86

Scocozza, B. (1990). Ved afgrundens rand (1600-1700) {At the edge of the abyss}. Vol 8 in Olsen, O., ed. Danmarkshistorien {The History of Denmark}. Copenhagen: Gyldendal og Politiken

Shiner, L. (1967). The concept of secularization in empirical research. *Journal for the Scientific Study of Religion* 6, 207-220

Stark, R. (1999). Secularization, R.I.P. *Sociology of Religion* 60, 249-73

Stark, R., Iannaccone, L. (1984). A supply-side reinterpretation of the 'secularization' of Europe. *Journal for the Scientific Study of Religion* 33, 230-52

Statistics Denmark. (1979). *Dansk kultur-statistik 1960-1977* {Danish cultural statistics 1969-1977}, URL: dst.dk/Site/Dst/Udgivelser/GetPubFile.aspx?id=4808&sid=kult1960-1977

Statstics Denmark. (2017). Folkekirkens medlemstal {Church membership}. URL: km.dk/folkekirken/kirke-statistik/folkekirkens-medlemstal/

Timmer, C.P. (1988) The agricultural transformation. In Chenery, H., Srinivasan, T.N., eds. *Handbook of Development Economics* Vol 1, 275-331. Amsterdam: North Holland

Ulsig, E. (1991). Pest og befolkningsnedgang i Danmark i det 14. århundrede {Plague and Population decline in Denmark in the 14th Century}. *Historisk Tidsskrift* 15, 21-43

Weber, M. (1903/04) [2002]. *The protestant ethic and the spirit of capitalism*. London: Penguin.

Wilson, B. (1966). *Religion in secular society: A sociological comment*. London: C.A. Watts

World Bank (1995). *Bureaucrats in business: The economics and politics of government ownership*. Washington, DC: Oxford UP

Zuckerman, P. (2008). *Society without God: What the least religious nations can tell us about contentment*. New York: New York UP