

The present churches: Age and size distribution

The following is calculated from the master-list covering the present stock of churches, plus about 5 churches that have been closed recently.¹

Table 1 lists the five sources used in compiling the master list: NM and SP are primary independently collected data. The other 3 sources use these data, but they also use other sources. The master list is based on SP, PR and KJ with WI as a control. Everything will later be controlled by NM, which will improve the age information and add the app 600 churches that have been closed.

Table 1. Sources of the master list of the Danish church stock

KJ	Made by Kirsten M. Jensen http://www.kirkehistorie.dk	Fine survey – but covers only about 54 % of the church stock
NM	National Museum Church Project www.danmarkskirker.natmus.dk	Detailed registration. Only systematic source for abolished churches. Project started 1930 – app 30 % of the country is still missing.
PR	Made by Poul Reitof www.reitof.dk/kirker.html	Fine survey – only names of churches, year of construction, and regional classification.
SP	Sogneportalen http://sogn.dk/index.html	Official list from the Ministry of Church affairs. Covers all churches in use, addresses etc. Links to the home pages of the church (if any).
WI	Wiki-Danmark www.wikipidea.dk	Fine and concise source covering about 70% of the churches.

1. The age distribution

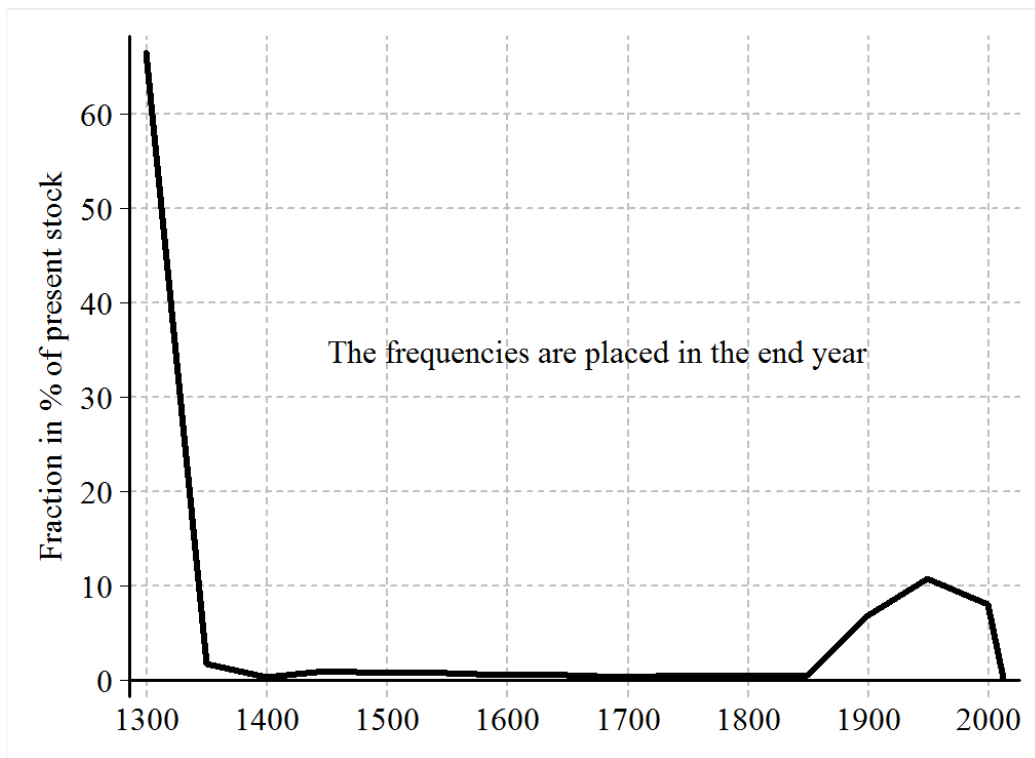
Table 2 and Figure 1 overleaf give the age distribution of the present church stock. The information from year 1300 is fairly precise. But before 1300 the information is often given for the century only. SP gives the location only, and appears to have few errors only. PR gives the age and location of almost all churches. KJ covers the location as well and for 54 % of the churches, and also the age and the number of seats. The age information in PR and KJ is normally the same. In a few cases of disagreement or where PR misses information, WI has been used.

1. This note belongs to a project, which has the home page: <http://www.martin.paldam.dk/GT-Religious.php>. It contains the latest version of the master list.

Table 2. Age distribution of the present churches

(1) Time period From	(2) To	(3) All churches Number	(4) In %	(5) With seat information Number	(6) In %	(7) Seats/all %
1000	1299	1604	66.5	844	64.9	52.6
1300	1349	41	1.7	29	2.2	70.7
1350	1399	8	0.3	8	0.6	100.0
1400	1449	25	1.0	18	1.4	72.0
1450	1499	20	0.8	9	0.7	45.0
1500	1549	20	0.8	15	1.2	75.0
1550	1599	12	0.5	3	0.2	25.0
1600	1649	14	0.6	7	0.5	50.0
1650	1699	7	0.3	4	0.3	57.1
1700	1749	14	0.6	13	1.0	92.9
1750	1799	10	0.4	4	0.3	40.0
1800	1849	12	0.5	8	0.6	66.7
1850	1899	167	6.9	83	6.4	49.7
1900	1949	260	10.8	148	11.4	56.9
1950	1999	194	8.0	106	8.2	54.6
2000	2012	4	0.2	1	0.1	25.0
Sums		2412	100.0	1300	100.0	53.9

Figure 1. The percentage frequencies from column (4)



The first observation from Table 2 and Figure 1 is that the number of churches built between 1300 and 1850 is extremely small – most half centuries adds less than 1 % to the present stock. Thus, in Table 3 the church stock is aggregated in 3 groups: 66.5 built before 1300, 7.6 % built between 1300 and 1850 and 25.9 % build after 1850.

Table 3. Age distribution grouped

(1)	(2)	(3)	(4)	(5)	(6)	(7)
Time period		All churches		With seat information		Seats/all
From	To	Number	In %	Number	In %	%
1000	1299	1604	66.5	844	64.9	52.6
1300	1849	183	7.6	118	9.1	64.5
1850	2012	625	25.9	338	26.0	54.1
Sums		2412	100.0	1300	100.0	53.9

Note: The $\chi^2(3)$ -test that the distribution of the churches with seat-information are a random sample of all observations is 11.6 %. Thus, it is not rejected.

2. An experiment

At a meeting with the NM-team we were given the assessment that app 600 churches have been closed – from the counties we have covered this appears a fair assessment. Most were closed from 1550 to 1700, and few churches built after 1850 has been closed. Thus, must of churches closed were probably built before 1300. It appears that a new wave of church closings is underway.

Table 4 is a hypothetical experiment, which assumes that 3/4 of the closed churches were built before 1300. The experiment suggests that almost 70 % of the present and past churches were built before 1300.

Table 4. A hypothetical experiment adding 600 closed churches

(1)	(2)	(3)	(4)	(5)	(6)	(7)
Time period		All churches		Adding 600 (guess)		
From	To	Number	In %	Closed	Number	In %
1000	1299	1,604	66.5	450	2,054	69.9
1300	1849	183	7.6	120	303	8.6
1850	2012	625	25.9	30	655	21.6
Sums		2,412	100.0	600	3,012	100.0

Note: The $\chi^2(3)$ -test that the distribution of the churches with seat-information are a random.

3. Using the seat data from KJ as a size measure

For the 53.9 % of the churches KJ provides information about the seats. For easy reference the churches covered are termed *seat-churches*.

Section 5 and Table 7 analyze the regional representativity of the sample. It is shown that the sample is not random as Copenhagen and Zealand are well covered, and Mid Jutland is poorly covered. This reflects the way the project has progressed.

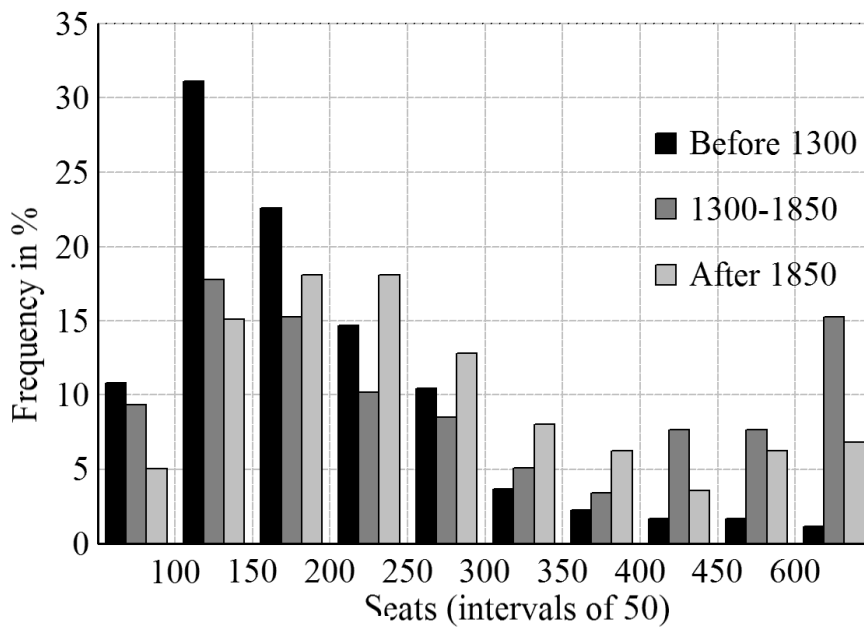
However, the sample is fairly random over time: Column (7) in Tables 2 and 3 gives the seats/all-ratio. This is the number of seat-churches in % of all churches. Table 2 has many age categories with few churches. Here the seats/all-ratio becomes volatile. Table 3 aggregate some categories, so that the number of churches in all age categories is substantial, and it appears that a standard $\chi^2(3)$ -test does not reject that the sample is a random draw from all churches.

Table 5 and Figure 2 give the size distribution for the three periods used in Tables 3 and 4. It is obvious that the distribution is skew. There is even a small secondary top of large churches. Nearly all the large churches are built in the second and third period. The largest of all Danish churches – Grundtvigskirken – (Bispebjerg, Copenhagen) with 1,915 seats, was built 1921 to 1940.

Table 5. A cross tabulation of age (columns) and size (rows) of churches

			(1a)	(2a)	(3a)	(4a)	(1b)	(2b)	(3b)	(4b)
			Age				Frequencies in % of those built in period			
			From	1300	1850	All	-	1300	1850	All
			To	1299	1849	2012	1299	1849	2012	
Seats	From	To								
(1)	0	99	91	11	17	119	10.8	9.3	5.0	9.2
(2)	100	149	263	21	51	335	31.1	17.8	15.1	25.8
(3)	150	199	191	18	61	270	22.6	15.3	18.1	20.8
(4)	200	249	124	12	61	197	14.7	10.2	18.1	15.2
(5)	250	299	88	10	43	141	10.4	8.5	12.8	10.8
(6)	300	349	31	6	27	64	3.7	5.1	8.0	4.9
(7)	350	399	19	4	21	44	2.2	3.4	6.2	3.4
(8)	400	449	14	9	12	35	1.7	7.6	3.6	2.7
(9)	450	599	14	9	21	44	1.7	7.6	6.2	3.4
(10)	600	Up	10	18	23	51	1.2	15.3	6.8	3.9
(11)		All	845	118	337	1300	100	100	100	100
Average size			180.6	319.2	267.1	215.6				
Median size			150	220	220	170				
Standard deviation			105.6	269.1	191.4	160.3				

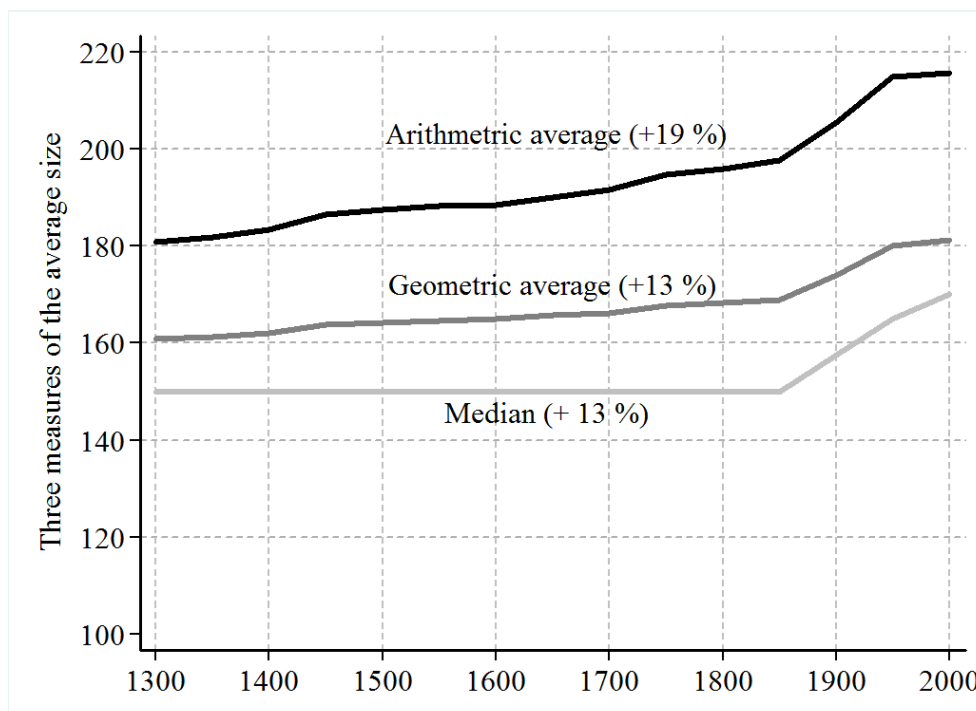
Figure 2. The size distribution of churches built in the three periods



4. The average size over time

Figure 3 shows the development over time of the average church, using the data reported in Table 6. The calculation is done for the seat-churches only. This assumes that the distribution is representative over time, and it disregards the closed churches.

Figure 3. The path of the average church size based on the seat-churches



As Figure 2 showed that the distribution is as non-normal, three averages are shown. They are the standard arithmetic and geometric averages and the median.

Table 6. The averages shown on Figure 3

	From Start to	Averages		
		Arithmetic	Geometric	Median
(1)	1300	180.8	160.8	150.0
(2)	1350	181.8	161.2	150.0
(3)	1400	183.5	162.1	150.0
(4)	1450	186.5	163.7	150.0
(5)	1500	187.4	164.1	150.0
(6)	1550	188.2	164.7	150.0
(7)	1600	188.5	165.0	150.0
(8)	1650	190.1	165.7	150.0
(9)	1700	191.5	166.2	150.0
(10)	1750	194.7	167.8	150.0
(11)	1800	195.9	168.3	150.0
(12)	1850	197.7	168.9	150.0
(13)	1900	205.4	174.0	157.5
(14)	1950	214.9	180.0	165.0
(15)	2000	215.6	181.2	170.0
Ratio of (15) to (1)		1.193	1.133	1.127

The median is constant till 1950. The other two averages grow slowly. Newer churches tend to be larger, but they are also fewer. This causes the church size to grow rather slowly.

5. The differences in size across regions

As already mentioned the seat-churches have a rather skew sample geographically. Table 7 shows that distribution across the 5 regions of the country. Only 2.9 % of the many churches in Mid Jutland are covered, so the data for that region is such a small sample that the calculations done for the region is unreliable. Both the Capital and Zealand are rather well covered, while the remaining regions are likely to be adequately covered as well.

The capital region has significantly larger churches than the other regions. However, Table 8 shows that there are considerably fewer churches per capita in the Capital region.

Table 7. The regional distribution of the seat-churches

Region	(1)	(2)	(3)	(4)	(5)	(6)
	Church counts			Averages		
	All	Seats	Seat/all	Arithmetic	Geometric	Median
Capital	299	281	94.0	300.9	238.8	225.0
Mid Jutland	696	20	2.9	241.8	209.0	217.5
North Jutland	399	276	69.2	172.1	150.3	150.0
South Denmark	570	286	50.2	230.4	206.3	200.0
Zealand	453	437	96.5	176.8	155.6	150.0
All	2417	1300	53.8	215.6	181.2	170.0

Note: All include 5 churches with no age information, not included in Tables 2, 3 and 4.

Table 8 gives an estimate of the number of people per church seats in the 5 regions. While 4 of the regions have approximately the same number of persons per seat, the Capital region has almost twice as many persons per seat. It shows that the larger size of the churches in the Capital region does not compensate for the small number of churches.

Table 8. The number of persons per church and per seats in the regions.

Column (4) is the product of columns (2) and (4) from Table 7

	(1)	(2)	(3)	(4)	(5)
	Population	Churches	Population	Seats	Population
	Year 2010		per church	(1) x (4)	Per seat
(1) Capital	1,680,271	299	5,620	89,956	18.7
(2) Mid Jutland	1,253,998	696	1,802	168,258	7.5
(3) North Jutland	579,628	399	1,453	68,666	8.4
(4) South Denmark	1,200,227	570	2,106	131,349	9.1
(5) Zealand	820,564	453	1,811	80,109	10.2
Country	5,534,688	2417	2,290	521,105	10.6

Note: row (3) in the table is based on very thin information.

A 'good' Lutheran should attend the Sunday service in his/her church. If every church held one service at 10 o'clock every Sunday and all Danes were 'good' Lutherans 11.6 people would queue for each seat. About 20 % of the population is not a member of the church, and some are kids, infirm or traveling, so that they may be excused. However, there are there are still at least 5 persons per seat . Also, it is known that the average Danish church holds less than one service per week.