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Version 4

An economic perspective on the Reformation and the downscaling of the Church in Denmark, 1450-1650

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Abstract: The Reformation in 1536 Denmark changed the state religion from Catholic to Lutheran. The paper assess that the Church-sector in the economy peaked around 1500, where its share of the economy (the GDP) was about 12%. After the Reformation the share fell to about half. These assessments are reached by combining the few facts known about the period with our knowledge about the structure in the economy today in countries at the same level of development as Denmark were at that time. It is discussed how the fall in the share of the Church was accommodated and how it influenced the political structure in the country.

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1. Introduction

In 1536 the Danish state religion changed from Catholic to Lutheran. This paper considers the period around this change in an economic perspective and assesses the share of the Church sector in percent of GDP.[2] It appears that Church sector peaked at the end of the Catholic time, where the share was about 12% – today it is below 1%.

The fall has two independent parts: (1) The Reformation cut the income of the Church to about half. This caused a similar fall in the activity of the Church. (2) The Religious Transition from 1750 reduced religiosity five times until now, causing a similar fall in the share of the sector. This paper tells the first part of the story, while second part is told in Paldam and Paldam (2017b).

Most of the economic data needed for the analysis do not exists before 1820. So the analysis patches together data from three sources: (s1) A new time-series for the church-stock, see Paldam and Paldam (2017a); (s2) A few commonly accepted facts about Danish history;[3] and (s3) some stylized facts from the patterns of development literature.

Many studies have found that the equivalence hypothesis is a good approximation: It says that long-run time-series patterns are almost the same as cross-country patterns. In our case it means that the structure in the economy was roughly the same in Denmark 500 years ago as it is today in countries such as Tanzania.[4]

Four points should be made from the start: (i) A macro perspective is used – it disregards Danish regional differences. (ii) The main data assessed are GDP-shares, which are robust to territorial changes. (iii) I have tried to report precisely how everything is calculated to allow the reader, who may have other numbers in mind, to reassess the results.

Section 2 is an introduction to the pattern of development literature reporting the stylized facts used in the next sections. Section 3 deals with the Catholic period around 1500, while section 4 deals with the Lutheran period around 1600. Finally, section 5 concludes

[2] A 'church' is the cult building of the 'Church' with capital C. In this paper the Church is the State Church before 1849, and the dominating Church since then.

[3] The main sources for the Danish history used are Olsen (1988, 2005) vol 5-7, Dansk Socialhistorie vol 2-4, Dansk Kirkehistorie both volumes and Lausten (1987).

[4] Obviously, equivalence does not hold strictly, but it is often possible to adjust. When Denmark year 1600 is compared to Tanzania today one difference is the number of mobile telephones: However, the number of mobile phones in Tanzania today is reasonably well known, and the number in Denmark in year 1600 is known to be precisely zero. So it possible to assess what the difference means in sectors where it matters.

2. The patterns of development literature

A large literature going back to Simon Kuznets (1901-85) and Hollis B. Chenery (1918-94) discusses the pattern of economic development. A handful of standard results will be reported in this section. Section 2.1 explains how such results are reached. Section 2.2 looks at the characteristics of the traditional steady state, while Section 2.3 considers some stylized facts about agriculture and labor. Section 2.4 considers the implications for institutions and beliefs.

GDP per capita is termed *gdp* and population, *pop*, is measured in 1,000 persons.[5]

2.1 The transition pattern allowing backward projections

The theory of growth and development is built around the equilibrium concept of the steady state. Two basic steady states have been found:

A *traditional steady state.* It had a low stable technology, and a low and almost constant production and population. Table 1 below show how the macro-data looked in this period. The period covered by this paper in fully within this steady state.

A *modern steady state*. It has a high and dynamic technology, giving a much higher production and growth. As modern technology is international the countries that have reached this level converge to the same (high) standard of living. This period is outside the paper.

Modern development started a couple of hundred years ago in a few countries including Denmark, so a substantial gap has developed between the countries at the two steady states. The process of change between steady states is termed a transition, so the change between the two basic steady states is termed the Grand Transition.

National accounting started between the two world wars, but economic historians have compiled national accounts for a dozen countries back to the Napoleonic Wars. Today such national accounting is done for (nearly) all countries. That includes the few countries at the traditional stage and the many countries that are early in the Grand Transition.

As the traditional steady state was rather stable, we know that a backward projection of any time series, should converge to the stable level of the traditional steady state. If the backward projection for the time series and of the cross-country pattern gives roughly the same result we know that we have a solid stylized fact.

[5] The source for the data is Maddison (2001, 2003) and the Maddison project (since 2012). The *gdp* is measured in fixed PPP-prices, which is 1990 International Geary-Khamis $.

2.2 The traditional steady state

The period discussed is fully within the traditional steady state, so it has a slow progress of technology giving an almost constant *gdp*-level with average growth rates below 0.2% per year, or about 10-20% per century.[6] A similarly low growth rate applied to *pop*.

Table 1. Some assessments of historic *gdp* and *pop* from Maddison (2003)

Year	1000	[% pa] [a)]	1500	[% pa]	1600	[% pa]	1820	[% pa]
Gross domestic product per capita in 1990 international Geary-Khamis $								
Denmark	400	[0.00]	740	[0.12]	875	[0.17]	1,274	[0.17]
France	425	[-0.01]	730	[0.11]	840	[0.15]	1,135	[0.14]
Italy	450	[-0.06]	1,100	[0.18]	1,100	[0.00]	1,117	[0.01]
Netherlands	425	[0.00]	760	[0.12]	1,400	[0.61]	1,838	[0.12]
China	466	[0.00]	600	[0.05]	600	[0.00]	600	[0.00]
India	450	[0.00]	550	[0.04]	550	[0.00]	533	[-0.01]
Population in thousands, *pop*								
Denmark	360	[0.07]	600	[0.10]	650	[0.08]	1,155	[0.26]
France	6,500	[0.03]	15,000	[0.17]	18,500	[0.21]	31,250	[0.24]
Italy	5,000	[-0.05]	10,500	[0.15]	13,100	[0.22]	20,176	[0.20]
Netherlands	300	[0.04]	950	[0.23]	1,500	[0.46]	2,333	[0.20]
China	59,000	[0.00]	103,000	[0.11]	160,000	[0.44]	381,000	[0.40]
India	75,000	[0.00]	110,000	[0.08]	135,000	[0.21]	209,000	[0.20]

Note: The annual growth rate in the []-brackets is calculated since the last year given. [a)] Since year 1.

Table 1 reports Maddison's estimates for the *gdp* and *pop*, and the implied growth rates for Denmark and a few other countries. Note the small differences between the *gdp* levels in the countries listed. Even in 1820 Denmark had only twice the *gdp* of China, but then the difference grew to peak at about 17 times in 1969 – since then it has fallen.

The first row of Table 1 shows how Maddison thought that the *gdp* was distributed over time. He claimed that the growth rate was zero the first millennium, and 0.14% in average over the 820 years from 1000 to 1820. Thus, *gdp* was $ 740 in 1500 and $ 875 in 1600. This is the same as in Tanzania in 2008 and 2013 respectively. Such comparisons are very uncertain thanks to the large index problem, but they are illustrative, and they certainly show that changes are much faster today than they used to be.

Consider x_t and x_{t+N} for a variable, such as the *gdp* or *pop*, in the two years t and $t+N$. The average annual growth rate, r, follow from the mathematics of compound interest rates:

[6] In contrast, the modern steady state has growth rates of 1½-2% that increases gdp by 5-7 times per century.

(1) $\quad x_{t+N} = (1+r)^N x_t$ so that $r = \left(x_{t+T} / x_t \right)^{1/N} - 1$

Once *N* is large (1) gives a narrow range for the assessments of *r* as shown in Table 2. Think of the standard of living in Denmark 1000 years ago. It was probably as low as the lowest standard of living observed today – Maddison claimed that it was $gdp_{1000} \approx 400$ \$. The table shows how little it matters for the average growth rate if it was half or two or even three times higher.

Table 2. Illustrating the robustness of long run growth rates

From year 1000 to 2010			From year 1000 to 1820		
gdp_{2010}	gdp_{1000}	*r*	gdp_{1820}	gdp_{1000}	*r*
23,400	200	0.47	**1,274**	200	0.23
23,400	**400**	0.40	**1,274**	**400**	0.14
23,400	600	0.36	**1,274**	600	0.09
23,400	800	0.33	**1,274**	800	0.06

Note: The bolded estimates are the ones of Maddison

The small long-run growth of *pop* is the difference between high fertility and mortality rates – both were probably about 2½%. This implies a Malthusian mechanism (see Galor 2011) allowing a reasonably fast recuperation of the population after a catastrophe as the Black Death epidemic. It is a labor intensive to bring land under cultivation, but mass death due to an epidemic or war increases the cultivated land per capita and hence income per farmer, which is likely to decrease mortality temporarily.[7]

The theory of the steady state claims that all proportions in the economy were in a stable equilibrium. This, e.g., applies to the share of the major sectors in the economy.

2.3 The share of agriculture and the share of landowners and labor

The largest sector in the traditional steady state is agriculture; see, e.g., Gundlach and Paldam (2016). The point scatter of the app 1,050 5-year averages available for the share of the sector and income, show a clear transition path in both dimensions. There are of course exceptions in countries with unusual natural conditions, such as Greenland or Saudi Arabia.

[7] Imagine that the population fell by 25%, due to the Black Death. Consequently, it had to increase 1/0.75 = 1.33 times to catch up. If the loss of people increased population growth by 0.5 percentage points, it would take 62 years only for the population to increase by 33%, bringing it back to the pre epidemic level.

The standard classification of the conditions for agriculture put Denmark nicely in the middle of the scale for European countries, so we expect a normal agricultural transition as also shown by the available data. Therefore, it is assumed that from 1450 to 1650 Denmark had a share of agriculture in GDP of 50% $\pm$ 5%. This number allows us to make a handful of assessments, so it is a key number in the analysis.

Another number needed is the net share of income accruing to the landowners when farming is tenured. Danish tenure contracts changed over time and also differed regionally. In a comparative perspective the typical contract is found to allocate about 40% of the product to the landowner, see Binswanger, *et al.* (1995). However, this is the legal contract, and realities are a bit different. Landowners have always found it difficult to extract the full amount due – and through the centuries farmers have learned how to shirk. Also, landowners provided some services to the farmers, and there were monitoring and administrative costs. Thus, I assume that the net extraction was 25%, of the agricultural production.

In the period considered, the population pyramid really looked like a pyramid. Due to the high fertility and mortality, there were many children and few old people. The typical participation rate on the labor market was about 50% which included many self-employed and their spouses. Thus, when it is found that the Church staff is N persons, the share of employment as N over the population P times the participation rate $E = N/(0.5 \cdot P)$.

The wage share was much lower than it is today, but the factor wage share, which include an imputed wage for the self-employed was probably only a little lower than today. Say it was 70%. If the income of the Church staff is the same as the average person the share of Church staff in GDP is $0.7 \cdot E$, but if the salary differs by a factor q then the share of GDP becomes $q \cdot 0.7 \cdot E$.

2.4 The stability of beliefs and institutions: Kings, Church and Nobility

It is a difficult question how much the concept of the steady state can be extended to institutions. However, many writers have noted that the range of traditional political regimes is surprisingly narrow. They were normally hereditary kingdoms, allied with the Church and a feudal noble class. The theory of coalitions predicts that coalitions between three parties, where either two can dominate the third are rather unstable. This was indeed the case – stability was interrupted by unruly periods where the alliance between the three major players shifted. However, the kingdom itself was very stable. Since about 800 Danish kings have

been from the same family (broadly defined).[8]

The major study of traditional agricultural land-ownership systems by Binswanger, *et al*. (1995) already mentioned, stresses the stability of feudal systems. It is thus important that a substantial part of land shifted ownership from the Church to the King due to the Reformation, and during the next century ownership passed on to the nobility, strongly consolidating feudalism.

Seen from the perspective of the present study the stability of religions should also be stressed.[9] It seems that few countries have had more than one change per millennium. So when Denmark changed denomination from Catholic to Lutheran in 1536, it was the first time since 966 and the last time as of now. It turned out be a major institutional change, as it came to cause a realignment of the power of the three major players, with the Church as the big looser.

The change of religion came from below, but after some trouble (see below) a new King legalized the change. In the process his power increased, and the Church became weaker. Later the feudal structure became much stronger. Thus, the analysis deals with a key part in a major upheaval leading to a new power-structure and a different system of land ownership. No attempt will be made to tell the story of the historical events. I only look at the background in an economic perspective.

[8] The democratic constitution of 1849 turned country from an absolute into a constitutional monarchy, and it also introduced religious freedom, but it took more than a century before the freedom of religion caused more than 2% of the population to leave the Church. Even today about 77% are still Church members, though religiosity has fallen substantially.

[9] This assumes that the changes in the traditions and the theology that happens within a religion are very slow.

3. The size of the Church at end of the catholic period around 1500

The analysis from now concentrates on the Church share of GDP. Sections 3.1 discuss the income of the Church from production and taxes. Sections 3.2 turns to the expenditures for the Church itself and for the non-religious services it provided. Section 3.3 summarize on the wealth and power of the Church and the resentment it created.

3.1 The income of the Church: From production and taxes

The income from production came from three sources:

(1) Land-rent: It seems that most historical sources show that the Church had become a main landowner in the last century before the Reformation. The number most commonly cited is that the Church owned 40% of the land.

Assuming that the land of the Church was of average fertility the rules of thumb in section 2.4 means that the agricultural production of the Church-owned land was 0.4·50% = 20% of GDP. The net land-rents received by the Church was 0.25·20% = 5% of GDP. Perhaps this is to the high side, but probably by less than 1 pp.

(2) The Church also sold candles, medical herbs, letters of indulgence, and a few other items. However, it is unlikely that this amounted to even 1% of GDP. But it must mean that it is safe to set the estimate of the production income of the Church to 5%.

(3) The Church also received user fees from its schools and hospitals, but as argued in section 3.4 these fees must have been rather small.

The main tax of the Church is the tithe that was levied on agriculture (and fishing). The history of this tax in Denmark is surveyed in Dahlerup (1982). If all tithe was paid it should give the Church a tax income of about 0.1·50% = 5% of GDP. The rule was that the tithe was divided in three equal parts: The *church-part* was given to building and maintenance of the churches, the *parish-part* was to cover the salaries of the local church staff, and the *bishop-part* was to finance the top hierarchy of the Church. It appears that it covered the money sent to Rome, though the story of 'Peter's pence' is a complex one.

The way the tax was calculated changed frequently as it was always problematic to collect as much as the Church thought it should receive. The tax was collected locally and it was a perennial problem to collect the bishop-part. This seems to be a typical flypaper effect,

where the local branch of the Church kept most of what they should, and let the higher levels be the residual claimant. Imagine that only 70% was collected net of shirking and administrative costs. Thus, the tithe amounted to a little more than 3.5% of GDP.

The Church also tried to collect money from the rest of the population, and surely got something, notably in the form of inheritance and other gifts. Here little evidence exists, but it is clear that something was collected, especially by the monasteries. I think that it must have been less than what was collected from agriculture. Thus, I assume that the tax-income of the Church was a bit below 7% of GDP, but then half a dozen Cathedrals were built in the period from money collected.

This gives a total of (5+7)% = 12% that is my assessment of the size of the Church in the economy. This is a fairly large sector in the economy.

3.2 Expenditures of the Church: Financing the Church and the three big collective goods

In 1500 there were a total of 2,100 (±20) churches and 100 (±5) monasteries in Denmark.[10] At that time the building of new churches was already rather slow, but one third of the tithe reserved for the buildings (i.e., about 2-3% of GDP). It covered the costs of maintenance and repair, and a modest building program, which did include some cathedrals.

The 2,100 churches were of different size and so were the staff. I assess that the average staff was a bit above 4 per church, which includes the top hierarchy associated with the cathedrals. It gives a total number of 8,400. In addition there is the staff in the monasteries. They had a very skew size distribution, but if the size of the staff in the average monastery were 15, that gave a further 1,500 Church staff. Thus the total Church staff was probably close to 10,000; used in Table 4 below.

The population in 1500 was app 600,000 according to Maddison, and with a participation rate of 50% the labor force was 300,000. Hence, the Church employed 3.3% of the labor force. If the Church staff received the average income that would give a GDP share of 0.7 *x* 3.3% = 2.3% of GDP.

The priests and monks were committed to a life in austerity, but it is well-known that many found it difficult to follow that commitment. Bishops did live in some luxury, and it did extend somewhat down the line. Assume that the Church staff managed to have salaries of, e.g., 1.5 times the average a wage sum of 3.5% of GDP is reached. Adding the capital wage of 2-3%, this gives about 6.5% of GDP. Rome probably managed to extract ½%, so the total

[10] The church-data is from Paldam and Paldam (2017a), while the monastery-data is from Kristensen (2013).

expenditures of about 7%. This leaves 5% to other expenditures.

Here it should be noted that many members of the top hierarchy in the Church belonged to the nobility, and thus they had a network connecting them to the leaders of the country. This also meant that they were accustomed to a certain life style. Also, most bishops lived in substantial residences, looking a lot like the ones of their noble family.

The Big Three collective goods are (i) education, (ii) health and (iii) social protection. In the period discussed they were dominated by the Church.

The calculations above show that the Church had about 5% (of GDP) left to spend on the Big Three. A guess is that the 5% was allocated to 1½% to education, 1½% to health, and 2% to alms to the poor. These numbers are about one third of the numbers for LICs today. As regards (i) education and (ii) health two posts should be added: (c1) Most of the work was done by staff that is already accounted for, and (c2) people paid user costs for schools and hospitals, if they could. But, it is still clear that the net expenditures to either of these services must have been rather moderate.

Various estimates suggested that literacy rates were very low, such as 5% that included the Church staff, where presumably many could read. And, as few diseases could be cured the costs of the hospitals must have been low indeed. A survey of the state of the medical knowledge and the size of the profession is found in Porter (1997).

3.3 A rich and powerful Church

Thus, the Church controlled about 12% of GDP, and we have assessed that the staff of the Church was around 3.3% of the labor force, so obviously the Church was a wealthy organization. It showed its wealth in the building of churches including most of the 10 Danish cathedrals, and it appears that the top clergy did live rather well.

Also, this period saw the Renaissance in Rome, where the Church spent lavishly on buildings, art and other trappings of power and wealth. The top clergy in Rome did behave much more as rich nobility than as leaders of a Church that preached moral restraint and modest living. In addition some of the devices used to extract funds, such as the sale of letters of indulgence, was seen as excessive, and in no way supported by the Bible. It has therefore often been seen as a period of moral decay for the Church.

The wealth and power of the Church did create some resentment, and it was surely a main theme in the propaganda of Martin Luther and the Counter-Reformation a little later within the Catholic Church.

4. The size of the Church after the reformation 1550-1650

Section 4.1 gives some facts about the reformation. Section 4.2 considers the path of the church stock over the three centuries surrounding the reformation. Section 4.3 looks at the loss of income for the Church. For easy reference Table 3 lists the kings of the period.

Table 3. Kings in the period

	Name	Lived	Ruled	Start	End
			Catholic period before 1536		
(1)	Christian 1st	1426 - 1481	1448 - 1481	Appointed [a)]	Died in power
(2)	Hans	1455 - 1513	1481 - 1513	Son of (1)	Died in power
(3)	Christian 2nd	1481 - 1559	1513 - 1523	Son of (2)	Deposed later jailed
(4)	Frederik 1st	1471 - 1533	1523 - 1533	Son of (1)	Died in power
	Interregnum, 3 contenders		1533 - 1534	Mostly war	Victory of (5)
			Protestant period after 1536		
(5)	Christian 3rd	1503 - 1559	1534 - 1559	Son of (4)	Died in power
(6)	Frederik 2nd	1534 - 1588	1559 - 1588	Son of (5)	Died in power
(7)	Christian 4th	1577 -1648	1588 - 1648	Son of (6)	Died in power
(8)	Frederik 3rd	1609 -1670	1648 - 1670	Son of (7)	Died in power

Note a. Appointed after a search among distant family.

4.1 The Reformation

In the years 1517-36 the Lutheran movement spread rapidly in Denmark, and in 1533 no king could be appointed. From 1534 to 1536 it led to a civil war (the last one in Denmark) between several royal contenders supported by the two denominations, and with interference from the Hansa League (notably Lübeck), the Swedish King, and several peasant uprisings.[11]

After the war the victorious Lutheran side enacted a set of decrees to the 'wipe out' the Catholic Church in the country:

(i) The top clergy was jailed or expelled, as they had supported the losing side in the civil war, and all communication between the Church and 'Rome' was forbidden.

(ii) The parish priests were given three choices (1) to convert to Lutheranism and continue in their old job, (2) jail, or (3) exile. The great majority took the first option.

11. The great mass of (tenant) farmers played a small role in the politics of the country, most of the time, but during the war they emerged as an important factor. However, they did not manage to align themselves with another player, and they were defeated by the royal army.

(iii) All churches were converted to Lutheran and chapels to saints were closed.

(iv) All monasteries were, in principle, closed. In towns their churches were converted to Lutheran parish churches, but monasteries in thinly populated parts of the country were either used as stone quarries or converted to manor houses. Hospitals, schools, and poor-houses often continued as lay institutions, financed by the King.

(v) To finance these activities the King took over the 'bishop-part' of the tithe. This was, in principle, 1/3 of the tithe, but as mentioned, it was also the part had proven most difficult to extract from the peasants.

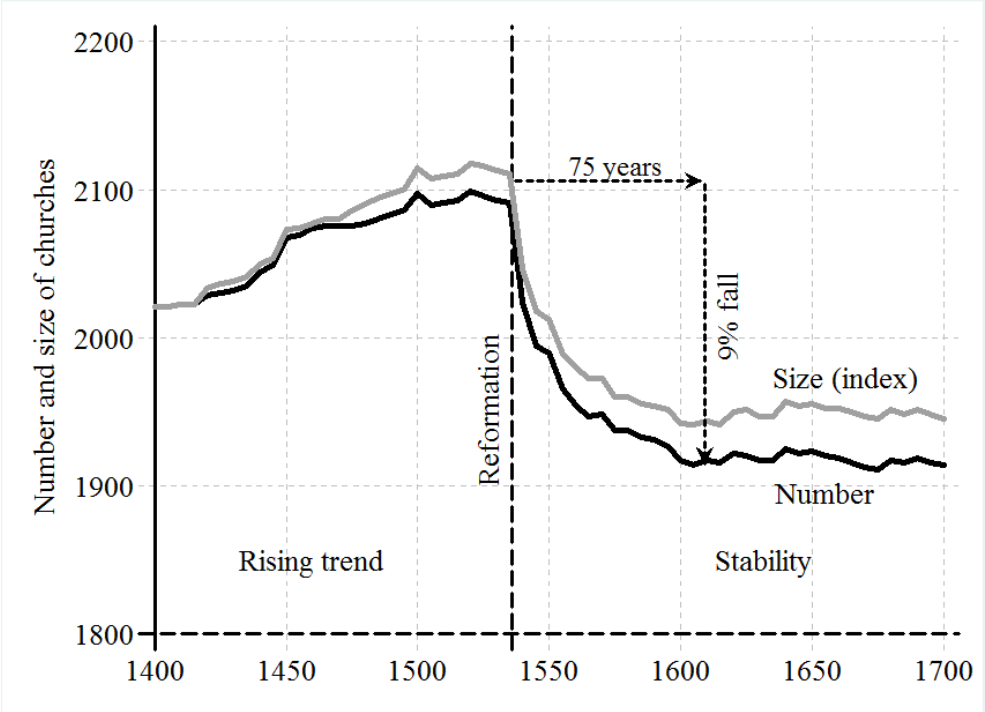
(vi) The Church lands were confiscated by the King, making him the largest landholder in the country.

The Reformation started from below in Denmark. However, at some stage it was taken over by the nobility and that the (future) King. With all the complex and dramatic events it is still not clear that most of the population really felt that they have changed religion.

4.2 The church stock: 1400-1700

Figure 1 shows how the church stock reacted to the Reformation

Figure 1. The church stock, 1400 to 1700



Source: Paldam and Paldam (2017a).

Figure 2. The changes in the church stock 1450-1650

Figure 2a. Churches built

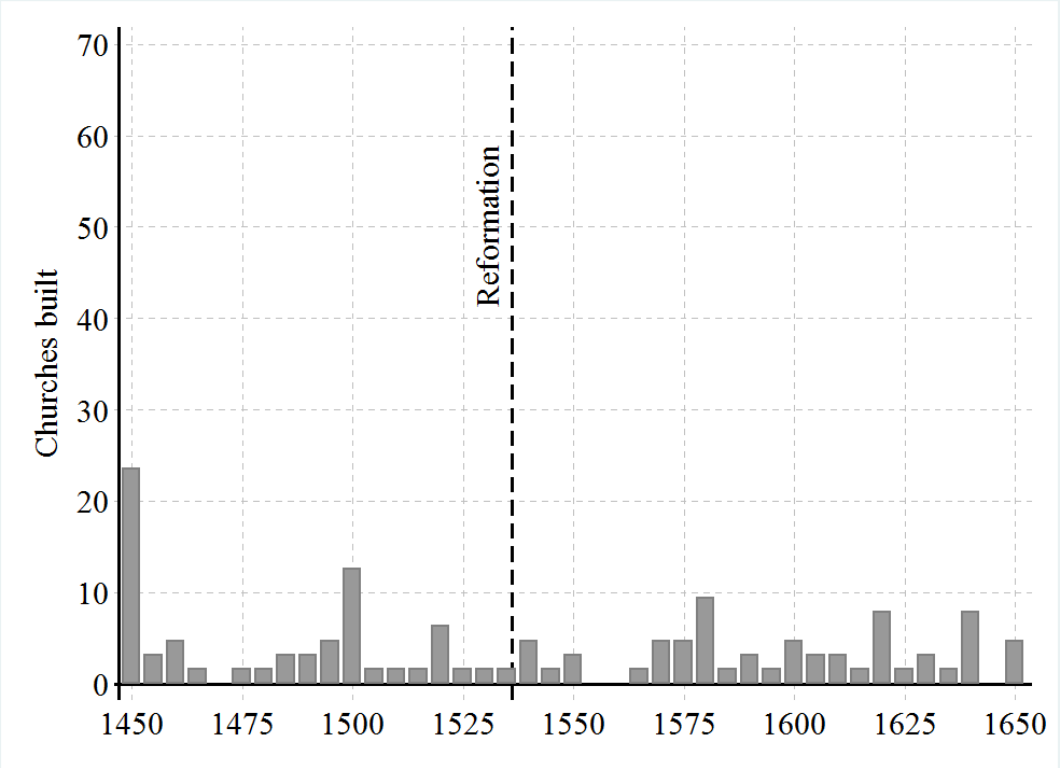


Figure 2b. Churches closed

Source: Paldam and Paldam (2017a).

Figures 1 and 2 show 5 points:

(1) The stock of churches was steadily growing before the Reformation, at least from 1300 where the stock of churches was 1,940. It rose to 2,100 in 1520, which is by 0.75 churches per year. This increase was almost linear.

(2) The Reformation gave a clean break with this growth, and even caused a fall of 9%. This is the only significant fall during the 715 years where the data are available.

(3) The fall took about 75 years to be complete. If the fall is understood as an adjustment to a new level it has the form where the fall is big in the beginning and then taper off gradually to the new level. This is very much as could be expected from the capital adjustment model. It is noteworthy that it took about 60 to 75 years before the new level was reached.

(4) From about 1610 the church stock was constant till about 1860. As seen from Figure 2 there was a small and rather similar number of churches closed and built.

(5) The correction for the size of churches is assessed by normalizing the size weighted stock to be the same as the unweighted stock in 1400. Thus, the gap between the two curves on Figure 1 shows the relative movement. It is modest, and will be disregarded from now.

4.3 Lost and retained income of the Church

The loss of the income from the Church lands was 5% of GDP or 40% of the incomes of the Church. And when the King took over the bishops third of the tithe this was a further loss. The additional loss was probably about 2% of GDP. Thus, it appears that the incomes of the Church fell from about 12% of GDP to 5%. Consequently, the Church had to be downsized.

Also, Luther stressed that personal belief was much more important than the worldly trappings and power of the Church. This argued for a large reduction in the expenditures of the Catholic Church. Notably, Luther argued against saints that acted as middlemen between the individual and God. This theology also caused a downsizing of the Church.

A part of the reduction was automatic: The monasteries and chapels to saints were closed, the top clergy was sacked, and the subsidy to Rome ceased. However, it would appear that the automatic reduction was smaller than the fall in incomes.

The Church was further downsized by the 9% reduction in the stock of churches. Also, the staff per church must have been reduced. Since there were no more saints the number of minor deities that needed masses were sharply reduced.

This gives two explanations of the downsizing of the Church after the reformation: One is the loss of funds. The other is the change in theology from the church intensive Catholic theology to the less church intensive Lutheran theology. It is difficult to know what weight to put on the two explanations. However, it is possible that the Lutheran Church made a virtue out of financial necessity, stressing that it was the belief of the individual that counted and that one church-service per week was enough.

Table 4 is an attempt to assess the size of the Church staff. Column (1) is the numbers from section 3.3. Column (2) assumes that the number of services is smaller than the number of masses used to be, and that schools and hospitals employed more lay people.

With the reduction in churches and in Church staff, which was particularly strong in the top hierarchy, it was probably possible to reduce the costs of Church staff to 2.5% of GDP and by a reduction in church building it might have been possible to reduce the Church expenditures to 5% of GDP leaving a little for alms. Thus, the assessments in Table 4 suggest how the fall in Church incomes could have been accommodated.

Table 4. An assessment of the Church staff in the years 1500 and 1600

	(1)	(2)
Year	1500	1600
Churches	2,100	1,915
Staff per church	4	3
Monasteries	100	0
Staff per monastery	15	0
Staff in total	10,000	6,000
Population	600,000	650,000
Labor force (50%)	300,000	325,000
Fraction Church staff	3.3%	1.8%

4.4 Some further developments

The story till now contains a big downsizing of the Church, reducing its economic power by 50%, and a corresponding increase in the economic power of the King. However, two additional economic factors came into play, both related to war financing.

The first reformed king, Christian 3rd had to finance the costs of the civil war that on the winner's side was largely fought with expensive mercenaries. With the great increase in the King's income from the former Church lands, the financial consolidation was accomplished within his time in power. Once the finances of the King were consolidated, the extra

incomes of the King allowed him to undertake great projects.

The King, who excelled in such endeavors, was Christian 4th. His many expensive buildings are still national treasure. However, he did also participate in the 30-years war 1618-48, with disastrous results. This caused a serious decline in the royal assets, so the King lost the land acquired from the Church at the Reformation. The winners were the nobility,[12] making Denmark an unusually feudal country. Nearly all European countries had Feudalism around year 1600, but it appears that the fraction of the land under freeholders was unusually low in Denmark.

In Catholic time churches were largely owned by the Church. It had adequate funds to maintain the existing churches and to build new ones at a slow, but steady pace. After the big reduction in the income of the Church due to the Reformation and the later reduction in the incomes of the King, the ownership of the churches and hereby the church-part of the tithe went to the landowners. In practice, the churches became private property.

It appears that the income from owning a church barely covered the costs, and the churches often occupied rather well situated land, which represented considerable opportunity costs. Thus, a private owner had a clear interest in closing 'superfluous' churches. A Royal permit was necessary to close a church, but the fact that somebody had a strong incentive to apply did mean something. The great majority of the 520 churches that was closed between 1300 and 2015 were closed in the period where the churches were private property, seen Figure 2b

[12] Some of the land was bought while other was obtained as forfeit collateral for non-performing royal loans.

5. Conclusion

The reformation caused a reduction of the share of the Church in the GDP to half. This turned the Church from being a large sector in the economy to becoming a more moderately sized one. Also, the large decrease in the top hierarchy of the Church reduced the links between the nobility and the Church, and the network at the top of the society came to include much fewer Church dignitaries.

The severance of the link to the Pope and his administration removed the possibility for the Church for calling for outside help, when disagreements occurred between the Church and the State (i.e., the King). Thus, both the economic and political balance between the Church and the State shifted to the advantage of the latter.

This all caused the Church to be much weaker in the national distribution of power. Furthermore, by the closing of the monasteries the control of the Church over the education and the health sectors was reduced. It was not, of course, a full secularization of these sectors, but it was the start of the process that has later been completed.

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Note. The ***church project*** of the author has the home page: http://www.martin.paldam.dk/GT-Religious.php.
It contains pre-print version of published papers and the newest version of (p.t.) unpublished papers plus data.

[13] 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.