

Why did religiosity decrease in the Western World during the twentieth century?

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Abstract

This article analyzes the decline in religiosity in the Western World during the twentieth century by using long-run data on church attendance. It tests the secularization hypothesis, which argues that economic growth depresses religiosity, and the religion-market model, which considers that governmental interventions in religious affairs have an impact on religiosity. The results provide scant evidence for the secularization hypothesis. They however validate the religion-market model by showing that the growth of the welfare state significantly diminished religiosity. Such findings therefore suggest that many individuals were historically observant because churches offered welfare services which were not provided by the State.

Keywords: Church Attendance, Economic Growth, Religiosity, Secularization, Welfare State.

JEL Classification: H53, N32, N34, Z12.

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1. Introduction

Contemporary debates over religiosity almost always focus on church attendance, even when the trends (or the data) scarcely exist.¹ In the United States, for example, church attendance rates display remarkable long-run stability, stretching back from the present through the earliest Gallup polls. Yet scholars continue sifting through these data, teasing out age, period, and cohort effects, and arguing over their meaning (Chaves 1989; Hout and Greeley 1987; Hout and Greeley 1990; Miller and Nakamura 1996; Sasaki and Suzuki 1987). Indeed, some scholars such as Hadaway et al. (1993) have gone so far as to hypothesize a form of *invisible* secularization in which America's "actual attendance rate has declined since World War II, despite the fact that the survey rate remained basically stable."² If controversy surrounds the relatively long and reliable record of attendance in America, how can we trust claims about secularization or the persistence of religiosity in Canada or Western Europe, where attendance data are sparse?

There are actually two major theories of religiosity: the religion-market model and the secularization hypothesis. The religion-market model, developed by Iannaccone (1991), Iannaccone and Stark (1994), Iannaccone et al. (1997) and Gill (1999) among others, argues that religious participation is mainly "supply-driven". They view

¹ Throughout this article, the term "church attendance" is used in place of the awkward, but more accurate, phrase "religious service attendance."

² As Hadaway and Marler (1998) emphasize, it was this hypothesis (that "Americans were reporting the same level of attendance to pollsters while their actual church participation was dropping") which led them to study "actual" versus "reported" rates of attendance. Likewise, it is this notion of a "growing gap" (whereby "consistent responses to the polls [have] masked declines in actual church attendance") which remains the most important and controversial feature of their work. For comments on Hadaway et al (1993), see Caplow (1998), Hout and Greeley (1998), Presser and Stinson (1998) and Woodberry (1996, 1998).

governmental interventions as major determinants of religiosity. As such, the existence of a state religion is expected to increase church participation (Barro and McCleary, 2005). A case in point is the policy of French King Louis XIV (1638-1715) who compelled the inhabitants of Paris to attend mass on Sundays lest they go to jail (Bluche, 1990). Conversely, the development of the welfare state is thought to decrease church attendance by crowding out the churches' charitable activities (Gruber and Hungerman, 2007; Hungerman, 2005, 2009) and reducing their ability to insure their members against adverse income shocks (see Dehejia et al., 2007).³ And indeed, Gill and Lundsgaarde (2004) find there is a negative relationship between public spending and church attendance in cross-sectional data for a sample of countries in 1995.

However, following Weber (1905), proponents of the secularization hypothesis such as Chaves (1994) and Bruce (2001) argue that religious participation is “demand-driven”. They consider that economic development, which includes industrialization, an increase in literacy and wealth, and a decrease in fertility rates, entails a decline in religiosity. This secularization process supposedly leads individuals to define themselves as less religious and decreases the influence of religion on social and political institutions. As a matter of fact, McCleary and Barro (2006a) find in a study of religiosity in 68 countries in the 1980s and 1990s that economic development has an overall negative effect on religiosity. Urbanization also makes individuals less observant but education and the presence of children are positively correlated with religiosity. Still, studies by

³ Dehejia et al. (2007) find that U.S. religious organizations reduce the effects of adverse income shocks on consumption by roughly 40% when using data between 1986 and 2000. If anything, this result suggests that the churches could offset more than 40% of income shocks before the welfare state crowded out their charity endeavors.

Finke and Stark (1992), Iannaccone and Stark (1994) and Stark (1999) among others, argue that there is no empirical evidence to support secularization theories.

This article provides a test of the secularization hypothesis, which argues that economic growth depresses church participation, and of the religion-market model, which considers that state interventions in religious affairs, such as the development of the welfare state, reduces church attendance. For this purpose, it focuses on the changes in religiosity in the Western World during the twentieth century and relies on a large, international database on religious activity spanning many decades based on the polls conducted by the International Social Survey Program (ISSP). As discussed by Iannaccone (2008), this dataset allows us to reconstruct long-run church attendance trends in the United States, Canada and most of Western Europe, thanks to a novel set of retrospective questions concerning the religious participation of the respondents and of their parents when the respondent was growing up. Because the childhood of older respondents occurred farther back in time, the ISSP functions as an intertemporal survey of religious involvement. Its 200,000 retrospective observations stretch from 1925 till 1990 – a longer and more detailed series of observations than we have ever had for any nation.

The ISSP data unequivocally show that church attendance decreased in the West during the twentieth century. The drop is particularly noticeable in some countries, like Great Britain, but less so in others like Ireland, which remains observant, or Norway, which already had a low level of religiosity in the 1920s. Nonetheless, the data show that the decline in church attendance was particularly pronounced after the 1960s, when most

Western countries experienced high growth rates and the development of the welfare state.

Our regression results suggest that the factors which are associated with the secularization hypothesis, e.g., lower fertility, higher wealth and increased urbanization, had little or no effect on church attendance in the Western World during the twentieth century. Instead, they relate the decline in religiosity to the growth of the welfare state. Before the 1960s, individuals would look to churches to obtain welfare services and insurance against adverse consumption shocks. Afterwards, those individuals for whom personal religion did not have any meaning stop attending church because the welfare state provided them with a secular alternative for receiving affordable education and healthcare benefits.

The remainder of this article is as follows. Section 2 presents the data. Section 3 discusses the empirical methodology. Section 4 presents our main results. Section 5 concludes.

2. Data

In this section, we first present the ISSP data on church attendance in the twentieth century. These data suggest that religiosity declined in Western European countries, as well as in the USA and in Canada.

We then discuss our explanatory variables in light of the secularization hypothesis and of the religion-market model. In the Appendix, Table A1 provides definitions for the variables used in this study, while Table A2 presents descriptive statistics.

2.1. Long-run data on church attendance

Recent polls conducted by the International Social Survey Program (ISSP) allow us to reconstruct long-run church attendance trends in 30 different countries between 1925 and 1990, including the ten countries which constitute the focus of this study: Canada, Denmark, France, Ireland, the Netherlands, Norway, Sweden, Switzerland, the UK and the USA.

The rationale for only using data from these ten countries is straightforward: they were democracies throughout the twentieth century.⁴ As such, they did not undertake policies to encourage or discourage church attendance, unlike some twentieth-century dictatorships.⁵ In addition, these ten countries have historically been Christian, i.e., Roman Catholic and Protestant, and we exclude from our study the respondents who

⁴ These ten countries obtain a positive score on the democracy index in the Polity IV-dataset (see Marshall and Jaggers, 2009). Still, it must be noted that four countries in our sample, i.e., Denmark, France, the Netherlands and Norway, came under the occupation of Nazi Germany between 1940 and 1944 and were governed during those years by puppet regimes. However, none of these governments, and not even the *Vichy* regime in France which had extensive ties to parts of the French Catholic clergy, launched major campaigns to either encourage or discourage church attendance (see Wormser, 1971, on the ideological links between the Catholic Church and the *Vichy* regime). Therefore, we consider that these four countries were democratic regimes throughout the twentieth century. In any case, it may be argued that all the democratic countries which took part in World War II were not “democratic” since they severely restricted civil liberties during the war. For instance, the British government suspended the *Habeas Corpus* while the US government interned Americans of Japanese origin. Note that in an appendix which is available upon request, we run the regressions without Denmark, France, Netherlands, Norway and find that the results are unchanged.

⁵ Twentieth-century dictatorships like Fascist Italy, Nazi Germany and Communist Russia all discouraged church attendance. The long-term effect of these anti-religious policies is unknown and it is best not to include these countries in our study. On the views of German Nazis and Italian Fascists vis-à-vis Christian churches, see among others Nolte (1963). See Conquest (1968) and Troyanovsky (1991) on religion in the USSR.

identified themselves with non-Christian denominations, e.g., Buddhism, Judaism or Islam. While few, if any, non-Christian countries were democracies throughout the twentieth century, it is important to grasp the rationale for such a restriction: church attendance is crucial to Christian identity, while in other religions, e.g., Judaism, service attendance can be less central to religious identity.

The retrospective approach in the 1991 and 1998 surveys asked the following:

- 1) “[W]hen you were around 11 or 12, how often did you attend religious services then?”
- 2) “When you were a child, how often did your father attend religious services?”
- 3) “When you were a child, how often did your mother attend religious services?”

Replies were coded into standard categories, ranging from “never” to “several times each week.” The respondents were also asked about their denominational affiliation and that of their parents’ when they were growing up.

When 41-year-old respondents answer these questions they are describing events that date back thirty years. More generally, the N-year-old respondents in the 1998 ISSP provide information for the year 1998-N+12 and those in the 1991 ISSP provide information for 1991-N+12. Taken as a whole, the ISSP data thus constitute a massive retrospective survey of church attendance running from the 1920s through the 1990s.

Before turning to the problems that may afflict retrospective data in general and the ISSP data in particular, it helps to examine the estimates for several different countries. As discussed in detail in the Appendix, these estimated attendance estimates are midpoint predictions derived from a series of overlapping regressions and are computed in each country for the respondents (the *Children* variable) and their parents

(the *Parents* variable) at 5-year intervals between 1925 and 1990. Figure 1 plots these attendance rates for the 10 countries in our sample.

[Figure 1 here]

Let us first examine the quality of our data by focusing on the USA, Ireland and Norway. These three countries are known for stable, but dramatically different, levels of attendance. America's reputation for religiosity dates back to the nineteenth century, and beginning with Gallup polls of the 1940's, U.S. surveys have consistently found attendance rates around 40% per week (Finke 1992; Greeley 1989). Repeated polls likewise confirm Ireland's status as Europe's most devoutly Catholic country – home to the only population with weekly attendance rates on the order of 90% (Barrett 1982). Norway is, by contrast, a bastion of *non*-observance, with current rates of attendance well below 10% and historical statistics that suggest only marginally higher rates earlier in the twentieth century (Barrett, 1982).⁶

Figure 1 captures the stable patterns described above while also extending them to decades that predate the earliest available surveys. At the same time, the U.S. data suggest an important *deviation* from stability – a downturn in childhood attendance starting in the mid-1960s and converging to parental rates by the mid-1980s. Because

⁶ The U.S. is blessed with three independent sets of annual (semi-annual) surveys that consistently poll people about their religious beliefs and behavior: Gallup Opinion Polls starting in 1939, the National Election Studies starting in 1952, and the General Social Surveys starting in 1972. Surveys of religion in Ireland and Norway begin later, occur less often, and employ less consistent questions and samples.

standard surveys only include adults, researchers have previously had little to say about attendance among children.⁷

Compared to the USA, Ireland, and Norway, the nations of Great Britain and the Netherlands provide more informative tests of the retrospective method. In Britain, for example, scattered surveys and church membership statistics suggest steady and substantial decline in rates of adult religious participation throughout the twentieth century (Bruce 1995; Gill, Hadaway, and Marler 1998; Smith 1993). And this is what we observe in Figure 1, coupled with a far more dramatic decline in childhood rates of participation. In the Netherlands, the decline arrived more suddenly and proceeded more rapidly. The data reviewed by Laeyendecker (1995), Lechner (1996), Sengers (2001), and others identify the 1960s as a period of crisis for the Catholic Church, after which Dutch religious activity trends sharply downward. Figure 1 shows that the retrospective data capture the both the timing and severity of this turning point. Moreover, by separately calculating the trends for Catholics and non-Catholics, one immediately discovers that Catholics do indeed account for more than three-quarters of the observed decline.

From what was previously deemed single-period data, the retrospective method has accurately derived five different historic profiles spanning sixty years or more. The

⁷ The October 2001 edition of *Religion Watch* (Cimino, 2001) cites recent studies that document large declines in Sunday school attendance in the United Church of Canada and the Church of England over the past few decades. The estimates of church attendance shown in Figure 1 confirm that the decline (both relative to parents and absolutely) has indeed been very sharp in these countries. The retrospective decline for U.S. youth is confirmed in part by Gallup and Lindsay (1999, 160), who report a teenage attendance rate of 70% for 1959-1961 in contrast to a 50% for 1988-1993. We find further evidence of ongoing decline in youth attendance rates based on my analysis of data from the 1976 – 1992 “Monitoring the Future” surveys of American High School seniors (Bachman 1997).

profiles include a decisive turning point (restricted to the Catholic portion of the Dutch population), a case of long term decline (in Great Britain), and examples of relatively long-term stability – at high, low, and intermediate levels of attendance.

We have thus seen that retrospective data capture an astonishing range of religious turns and trends, from the piety of Ireland to the secularity of Scandinavia. The estimates which we graph in Figure 1 vary too much to be artifacts of a simple bias; they mirror documented trends in the USA and Great Britain (and partially-documented trends in Scandinavia, Ireland, and most other Western nations).

Still, errors are known to influence survey responses and autobiographical memory ((Moss and Goldstein 1979; Rossi, Wright, and Anderson 1983; Rubin 1996; Schwarz and Sudman 1994). These potential problems, which are discussed in detail by Iannaccone (2008), include *social desirability*, where people portray themselves and their parents as both good and “spiritual”. *Conventional wisdom* may also be a problem: if majority opinion holds that people were more pious and religiously active in times past than today, survey respondents may be inclined to apply this image to their own past. *Projection* is also a problem: people may tend to project their current beliefs and behaviors into the past. *Biased recall*, i.e., forgetfulness, also introduces errors in all observations concerning past experience. Finally, it seems likely that all the problems described above tend to increase the retrospective attendance rates reported by older respondents relative to those reported by younger respondents.

Having dwelt upon the potential problems associated with retrospective responses, several advantages should also be noted. Access to times past is, of course, the

most obvious advantage. Low cost, relative to panel studies or repeated cross sections, is another. Consistency across time periods is yet another advantage.

In addition, retrospective responses are preferable to time series inferences from repeated cross-sections which are often marred by year-to-year variation in dozens of factors, including sampling procedures, interview methods, question wording, exogenous events, and socio-economic trends. Even minor changes in response categories or question order can substantially shift the aggregate results between split samples of an otherwise identical survey. In particular, recent studies confirm that relatively minor changes in question wording, context, or response categories substantially alter average responses to church attendance questions. Researchers likewise suspect that the long-run decline in survey response rates (from the high 80% range in the 1940s and 1950s, down to the 40% range today) may have induced some spurious trends in attendance estimates. Panel studies add to these problems a steady and non-random attrition in the pool of original respondents, making samples progressively less representative over time.

A retrospectively generated time-series is by contrast, derived from a single set of responses to a single survey administered during a single span of time. Particularly when seeking to estimate aggregate time trends, this consistency may more than offset the problems of age effects, memory lapses, projection, and so forth.

Moreover, Iannaccone (2008) demonstrates the accuracy of the ISSP data in five different ways: (1) by reviewing general findings from the large literature in psychology and survey research concerning autobiographical memory and retrospective reporting; (2) by reviewing the results of a specific study that uses retrospective survey questions to estimate trends in political affiliation; (3) by analyzing retrospective attendance data for

evidence of internal consistency; (4) by evaluating the intertemporal and cross-sample consistency of retrospective religious responses derived from different surveys and different periods; and (5) by comparing retrospective attendance rates to those obtained from non-retrospective sources. All five approaches strongly affirm the value of the ISSP data.

2.2. The causes of the decline in church attendance: the secularization hypothesis and the religion-market model

To test the competing explanations for the decline in church attendance during the twentieth century, we collected several explanatory variables from various sources, i.e., Carter et al. (2006), Flora (1983), Maddison (2003), Mitchell (2007a, 2007b), the Organization for Economic Cooperation and Development (OECD) statistics database as well as national databases made available by each country's bureau of statistics.

2.2.1. Income

The secularization hypothesis suggests that higher income entails a decrease in religiosity. Therefore we compute for each country the logarithm of the Gross Domestic Product (GDP) per capita, which we denote *GDP per capita*, and expect it to be negatively correlated with religious observance.

The religion-market model would however suggest that the growth in GDP per capita would have no effect on church attendance. This is because in democracies, individuals attend church services because they expect to benefit from social services, such as education or health care, which remain very expensive despite the increase in income per capita that occurred in Western countries during the twentieth century.

2.2.2. Human capital

The secularization hypothesis and the religion-market model suggest competing hypotheses to explain the effects of high human capital accumulation on religiosity. The secularization hypothesis predicts that an increase in human capital, measured by higher education levels and lower fertility, would decrease religiosity. It notably contends that individuals with high levels of education are unlikely to believe in the transcendental beliefs that are associated with Christianity – as well as with other religions. Furthermore, as individuals become more educated, they have fewer children: this decline in fertility should also decrease religiosity.

However, the religion-market model would suggest that there is no straightforward relationship between education, fertility and religiosity. For instance, McCleary and Barro (2006a) show that church attendance increases with education.

Besides, it is not clear whether the decline in religiosity during the twentieth century can be attributed to the technological advances and scientific discoveries which took place after 1900.⁸ It would indeed seem that Einstein's relativity theory and the personal computer are less of a challenge to faith than nineteenth century theories such as Darwin's evolution theory and the documentary hypothesis.⁹ In addition, it seems unlikely that these nineteenth-century discoveries, which some view as questioning the very basis of religion, would only have an impact after 1900.

⁸ See Benabou et al. (2009) for a different perspective on this issue.

⁹ The documentary hypothesis originates in the research of German scholar Julius Wellhausen (1844-1918) who suggested that the Pentateuch is not of the work of a single author (Moses) but is a compilation which draws on at least four different sources.

In this study, in order to test the competing hypotheses of secularization theory and of the religion-market model regarding human capital, we collected data on fertility and education. Our measure of fertility, denoted *Births*, is the number of births per women in each country, while our measure of education, denoted *Tertiary Education*, is the number of individuals attending each universities or equivalent post-secondary learning institutions.¹⁰ If the secularization hypothesis is correct, both the decrease in fertility and the rise in the number of college students should explain the decline in religiosity.

2.2.3. Urbanization and industrialization

If the secularization hypothesis is correct, so that economic development decreases religiosity, then countries where a growing share of the population works in the industry, which we assess with the *Industries* variable, should become. And since industries are usually located in urban areas, we should also find that countries with an increasing urbanization rate, which we measure with the *Urban* variable, become more secular.

The religion market model however makes opposite predictions. It points out that in rural areas, there are tightly-knit communities where individuals can rely on each other for support. However, in urban areas, individuals seeking relief would turn to religious institutions that provide charitable services.¹¹ This would increase church attendance.

¹⁰ We focus on college and university graduates because this is the group of individuals whose size significantly increased during the twentieth century. Indeed, it would not be relevant to use data on primary or secondary schooling which had already become mandatory in most of the countries in our sample by the end of the nineteenth century.

¹¹ The charitable activities of the churches towards workers in industrial areas can notably be seen in the “social tradition” of the Catholic Church, which can be traced back to the beginning of the nineteenth century, and which was given a new impetus when Pope Leo XIII published in 1891 the *De Rerum Novarum* encyclical. It laid out the so-called “social doctrine” of the Church, which encouraged Catholics

As such, the secularization hypothesis predicts that the coefficients of the *Urban* and *Industries* variables are negative while the religion-market model suggests they are positive.

2.2.4. The welfare state

While the secularization hypothesis, as a “demand-driven” theory of religiosity, does not have any specific predictions on the effects of public spending on church attendance, the religion-market model does. It suggests that the increase in public spending which took place during the twentieth century is the major cause of the decline in religiosity. It lowered charity donations to churches (Gruber and Hungerman, 2007, Hungerman, 2005, 2009) and as a result, limited their charity endeavors. Such an increase in public spending therefore made church attendance less valuable, all the more so as parishioners could henceforth obtain from the welfare state the health-, old-age and education-related services which they previously received from the churches.¹²

The religion-market model therefore predicts a negative relationship between religiosity and the four measures of public spending associated with the welfare state in our sample. On the one hand, we use the *Education* and *Health* variables, which

to help workers and alleviate their hardships in the new industrial era. This movement was particularly active in France as Duroselle (1951) and Rollet (1958) discuss.

¹² As a counter-argument to the religion-market model, Inglehart and Norris (2004) contend that an increase in welfare state spending, and the resulting decrease in religiosity, may be viewed as a vindication of the secularization hypothesis. They view the welfare state as a side-effect of economic growth which increases what they call “existential security”. However, this argument seems does not appear very sensible as the whole concept of “existential security” seems unrealistic. It might be acceptable if medicine had made such progress that there was no disease in this world, i.e., if there was not any need for the welfare services of the church or the state anymore. But it does not seem that individuals feel more secure when the State, rather than private firms, provides health care (and this can be seen in the current debate about health care reform in the U.S.).

respectively represent the share of education- and health-related expenditures in the country's total public expenditures. On the other hand, we employ the *Family* and *Old Age* variables, which measure the share of family- and old age-related expenditures in the country's GDP. These four variables capture the scope of public spending and allow us to assess its effects on church attendance in our econometric analysis.

3. Econometric methodology

3.1. Baseline specification

To find the determinants of the decline in religiosity during the twentieth century, we run the following regressions

$$Children_{c,t} = \alpha_c + \alpha_t + \beta X_{c,t} + \varepsilon_{c,t} \quad (1)$$

and

$$Parents_{c,t} = \alpha_c + \alpha_t + \beta X_{c,t} + \varepsilon_{c,t} \quad (2)$$

where the $Children_{c,t}$ and $Parents_{c,t}$ variables measure the church attendance of children and parents in country c in year t as computed from the ISSP survey, X is a vector of explanatory variables and ε is an error term such that $\varepsilon \rightarrow N(0, \sigma^2)$. Given the possibility of country-level time-invariant unobserved characteristics, which could be correlated with omitted factors, as well as to account for time trends, we include the country- and year-fixed effects α_c and α_t in Equations (1) and (2).

The specification of Equations (1) and (2) raises two issues: reverse causality and the persistence of religious attendance over time. This leads us to investigate endogeneity concerns and the possible existence of a lagged dependent variable in the regressions.

3.2. Reverse causality

Endogeneity, in the form of reverse causality, may be an issue in our regressions. This is because we assume that religiosity is influenced by the set of factors discussed in section 2.2, but it cannot be excluded that causality runs in the opposite direction (see Iannaccone 1998, McCleary and Barro, 2006b). Namely, Equations (1) and (2) are only valid if the following condition holds

$$\text{Cov}(X_{c,t}, \varepsilon_{c,t})=0, \forall t, \forall c \quad (3)$$

Reverse causality is however an issue for some, but not all the variables in this paper. There is indeed no study, to the best of our knowledge, which contends that the decrease in religiosity triggered urbanization and industrialization. Rather, both resulted from economic growth. Furthermore, it does not seem reasonable to argue that lower religiosity would lead individuals to attend university. Instead, economic growth and higher public spending likely entailed an increase in the number of college students.¹³

Still, our study posits that the *GDP per capita* and *Births* variables influence religiosity, but we cannot rule out that there is a causal relationship from religiosity to fertility and GDP per capita. For instance, Guiso et al. (2003) suggest that religious belief is positively correlated with behaviors conducive to economic growth while Gruber (2005) shows that higher church attendance in the U.S. is positively correlated with several economic outcomes, including higher levels of income.

Furthermore, we assume in this study that the growth in the welfare state, which we assess through the *Education*, *Family*, *Health* and *Old Age* variables, has an impact on

¹³ Since our regressions include a measure of wealth, i.e., GDP per capita, our regressions are not biased by another form of endogeneity, i.e., by an omitted variable bias.

church attendance. However it has also been argued that religiosity can have an impact on individual tastes for redistribution (see Scheve and Stasavage, 2006a, 2006b).¹⁴ Consequently, it is possible that a growing share of secular individuals wanted the State to play a greater role in the provision of welfare services at the expense of the churches.

To solve the problems raised by reverse causality, we rely on the Two-Stage Least Squares (2SLS) approach. This method overcomes the reverse causality issue provided that the instrumental variables (IVs) are correlated with the potentially endogenous variables and not correlated with the dependent variables (*Children* and *Parents*). Note however that there are many explanatory variables that are potentially endogenous in our regressions which can lead to unreliable estimates. As such, for our robustness checks, we will run two types of 2SLS regressions: in the first type, we assume that *Births* and *GDP per capita*, which influence the demand for religiosity, are endogenous while *Education*, *Family*, *Health* and *Old Age*, which assess the growth of the welfare state, are exogenous; in the second type of regressions, we consider that *Education*, *Family*, *Health* and *Old Age* are endogenous while *Births* and *GDP per capita* are exogenous.¹⁵

To instrument for the *GDP per capita* variable, we employ the *Tariff* and *Strike* variables. The *Tariff* variable is a ratio measuring the average tariff duties over imports as computed by Clemens and Williamson (2004). While their study shows that the

¹⁴ However studies on the development of the welfare state (see Barr, 1993, chap. 2, and the references therein) emphasize the Great Depression and WWII, rather than lower church attendance, as the driving forces behind the increase in public spending during the 1950s and 1960s. On the determinants of social redistribution across societies, see among others Alesina et al. (2001), Corneo and Gruner (2002) and Luttmer (2001).

¹⁵ As an additional limitation of our IV approach, some of the values for our IVs are missing, thus leading to a reduction of the number of observations in some of our robustness checks.

correlation between GDP growth and tariffs has changed over time, they do not suggest that this change may be explained by the decline in church attendance. Furthermore, religiosity is not a factor that is taken into account by both theoretical studies (Hillman, 1989, and Grossman and Helpman, 2002) and empirical research (Costa Tavares, 2007) on tariff formation.

Our additional IV for *GDP per capita* is *Strike*, which assesses the work days lost per worker as a result of strikes. While strikes obviously have a negative effect on GDP, they do not seem to be correlated with church attendance. Indeed, studies on the causes of strikes, e.g., Kennan (1987), Cramton and Tracy (1992), Cramton et al. (1999), suggest that demands for higher wages and better working conditions, rather than high or low religiosity, make workers go on strike.

Moreover, to instrument for the *Births* variable, we rely upon the *Interest Rate* and *Exchange Rate* variables from Bordo et al. (2001)'s dataset. These variables respectively assess the real interest rate on long-term government bonds and the exchange rate between the US dollar and the other countries' currency. Both variables have been shown to be correlated with fertility: Becker and Barro (1988) notably demonstrated how fertility would depend on the interest rate in an open economy while recent empirical research by Rose et al. (2009) found a link between fertility and the exchange rate. However, we are not aware of any instance where the interest rate, the exchange rate, and

more generally monetary policy, were influenced by religiosity or by the Churches in the countries which we study during the 20th century.¹⁶

Finally, we also instrument for the welfare state variables, i.e., *Education* and *Family* on the one hand and *Health* and *Old Age* on the other hand. First we employ the *Strike* variable which we defined above. This is because welfare states usually have rigid labor laws which boost the power of unions and increase the likelihood of strikes. Moreover, these rigid labor laws create inefficiencies in the labor market which increase unemployment. Therefore we use the *Unemployment* variable as an additional IV, which we define as the logarithm of the unemployment rate in each country. At the same time, it is unlikely that unemployment would be correlated with low or high religiosity in a systematic manner.¹⁷

In addition, we also use as an IV the *Net Immigration* variable which measures the difference between the number of immigrants and emigrants in a country. The presence of a developed welfare state is likely to encourage emigration from high-skilled workers and immigration from low-skilled workers in a given country. At the same time, it seems that *Net Immigration* is not correlated with religiosity. Indeed, in the countries in our sample, neither Catholics nor Protestants were persecuted during the twentieth century

¹⁶ In other words, if we were to carry out a study on religiosity in the Middle Ages, we could not use the interest rate as an IV because of the Churches' policies on interest rate loans. See Glaeser and Scheinkman (1998) and Rubin (2009) for analyses of interest rates bans.

¹⁷ A group of Orthodox Jews, called *Haredim*, constitute the exception to this rule. As documented by Berman (2000), they live in poverty in Israel because the Israeli government provides them with public subsidies to maintain their religious lifestyle. However, in the United States and Western Europe, *Haredim* do not live off the welfare state.

because of their religious beliefs. In other words, migration decisions resulted from economic motives, not religious ones.

3.3. *The persistence of religious attendance*

The second concern regarding Equations (1) and (2) pertains to the delay with which economic changes influence religiosity. Both Equations suggest that a change in economic circumstances has an immediate effect on church attendance. However, it is possible that changes in religiosity occur slowly. For instance, a sudden governmental increase in welfare spending may not have an impact on the religiosity of old parishioners who already benefit from the social services of churches. It may however have an effect on the level of church attendance of young individuals who could send their children to state-funded schools instead of parochial schools.

Therefore, to take into account the possibility that economic changes may have a delayed effect on church attendance, we introduce a lagged dependent variable in Equations (1) and (2)

$$Children_{c,t} = \alpha_c + \alpha_t + \beta X_{c,t} + \gamma Children_{c,t-1} + \varepsilon_{c,t} \quad (4)$$

and

$$Parents_{c,t} = \alpha_c + \alpha_t + \beta X_{c,t} + \gamma Parents_{c,t-1} + \varepsilon_{c,t} \quad (5)$$

where $Children_{c,t-1}$ and $Parents_{c,t-1}$ are the lagged dependent variables and the other variables were defined above in Equations (1) and (2).

While Equations (4) and (5) cannot be estimated with a pooled OLS estimator (Greene, 2008), the fixed effects OLS estimator can be consistent when the number of time periods in the sample increases, i.e., as $t \rightarrow \infty$ (Wooldridge, 2002). In other words, we can estimate Equations (4) and (5) provided that in Equation (4)

$$\text{Cov}(Children_{c,t-1}, \varepsilon_{c,t}) = \text{Cov}(X_{c,t}, \varepsilon_{c,t}) = 0 \text{ as } t \rightarrow \infty \quad (6)$$

and that in Equation (5)

$$\text{Cov}(Parents_{c,t-1}, \varepsilon_{c,t}) = \text{Cov}(X_{c,t}, \varepsilon_{c,t}) = 0 \text{ as } t \rightarrow \infty \quad (7)$$

But beyond these econometric concerns, it is possible that the fixed effects OLS estimator is not appropriate because of reverse causality, i.e., because $\text{Cov}(Children_{c,t-1}, \varepsilon_{c,t}) \neq 0$ or $\text{Cov}(Parents_{c,t-1}, \varepsilon_{c,t}) \neq 0$.

Therefore, to account for the potential endogeneity of $Children_{c,t-1}$ in Equation (4) and of $Parents_{c,t-1}$ in Equation (5), we use Anderson and Hsiao (1982)'s 2SLS approach. In practice, we use the IVs discussed in the previous section to estimate both Equations (4) and (5).

Still, if estimating Equations (4) and (5) with Anderson and Hsiao (1982)'s 2SLS approach provides consistent estimates, it does not always provide an efficient estimation (Wooldridge, 2002).

Consequently we also use the two-step robust variant of the Arellano-Bond (1991) GMM estimator which eliminates unobserved individual specific effects by taking first differences. In this specification, the lagged levels of the dependent and explanatory variables, which are consistent with the moment conditions, are the instruments for the regression in differences. But since the two-step estimator of the Arellano-Bond (1991) GMM estimator yields standard errors that are biased downwards, we rely upon the finite sample correction for the two-step covariance matrix developed by Windmeijer (2005) in order to obtain more accurate sample inference.

4. Results

This section analyzes the results of our regressions. Table 1 presents OLS estimates with year- and country-fixed effects of Equations (1) and (2) while Tables 2 and 3 provide 2SLS estimates of these two Equations. In Table 2 (respectively, Table 3), we assume that the variables driving the demand for religiosity, i.e., *Births* and *GDP per capita*, are endogenous (exogenous) while the variables assessing public spending, i.e., *Education*, *Family*, *Health* and *Old Age*, are exogenous (endogenous).

Furthermore, Tables 4 to 7 report estimates of Equations (4) and (5). Table 4 provides OLS estimates with year- and country-fixed effects while Tables 5 and 6 reports 2SLS estimates. In Table 5 (respectively, Table 6), it is assumed that the *Births* and *GDP per capita* variables are endogenous (exogenous) while in Table 6, the *Education*, *Family*, *Health* and *Old Age* variables are exogenous (endogenous).¹⁸ Finally, Table 7 presents Arellano-Bond (1991) GMM regressions of Equations (4) and (5) with the finite sample correction for the two-step covariance matrix of Windmeijer (2005). In these regressions, we only instrument for the endogeneity of the lagged dependent variable in Equations (4) and (5), i.e., $Children_{c,t-1}$ and $Parents_{c,t-1}$, and use the lagged levels of the dependent and explanatory variables, which are consistent with the moment conditions, as the instruments for the regression in differences.

¹⁸ Note that in Tables 5 and 6, we report Anderson and Hsiao (1982)'s 2SLS estimates where we employ the *Exchange Rate*, *Interest Rate*, *Tariff*, *Strike*, *Unemployment* and *Net Immigration* IVs to which we add $Children_{c,t-2}$ and $Parents_{c,t-2}$, i.e., the $Children_{c,t-1}$ and $Parents_{c,t-1}$ variables which are lagged one period, in line with Acemoglu et al. (2008)'s estimation strategy. It is not clear however whether $Children_{c,t-2}$ and $Parents_{c,t-2}$ are fully uncorrelated with $Children_{c,t-1}$ and $Parents_{c,t-1}$. Therefore, in additional regressions, we also use Anderson and Hsiao (1982)'s 2SLS method to estimate Equations (4) and (5) but without $Children_{c,t-2}$ and $Parents_{c,t-2}$, and find identical results.

It must be noted that in all the Tables, *Children* is the dependent variable in Columns (1) to (4) while *Parents* is the dependent variable in Columns (5) to (8).

[Table 1] [Table 2 here] [Table 3 here]

[Table 4 here] [Table 5 here] [Table 6 here] [Table 7 here]

4.1 Wealth and human capital

In all but five regressions, the *GDP per capita* variable does not have any effect on religiosity. In those five regressions where it is significant (in the OLS regressions shown in Columns 3, 7 and 8 of Table 1 and in the 2SLS regressions in Column 3 of Tables 2 and 5), *GDP per capita* is shown to have a positive impact on religiosity. Such a finding obviously constitutes a major invalidation of the secularization hypothesis.

This result also suggests that McCleary and Barro (2006a)'s finding on the negative relationship between GDP growth and religious observance, which they obtained by using data on church attendance in the 1980s and 1990s, does not hold when data going back to the 1920s are included in a panel data specification. In other words, individuals in rich and democratic countries may currently be secular, but there is no reason to believe that they became less observant as their income grew between 1925 and 1990. Actually, such a result would be in line with the historical studies which showed that the dechristianization of Western Europe occurred during the eighteenth and the nineteenth century, i.e., before the rapid growth in GDP per capita that took place during the twentieth century. For instance, the dechristianization of France occurred during the nineteenth century, mainly as a reaction against the political and fiscal powers of the Catholic Church in the wake of the 1789 French Revolution (see Franck, 2009).

Secularization theories also suggest that higher education levels would lead to less church participation. But McCleary and Barro (2006a) had already remarked that higher levels of education could be associated with higher religiosity. However, in our study, the *Tertiary Education* variable is not significant in the OLS regressions shown in Table 1. It is positive and significant in the 2SLS regression in Column 3 of Table 2 – a finding which corroborates McCleary and Barro (2006a)’s result. But it is negative and significant in four other robustness checks (in Columns 1 and 2 of Tables 3 and 6) – a result which is in line with the secularization hypothesis. As such, the results pertaining to the *Tertiary Education* variable are not robust enough to suggest that they either confirm or invalidate another prediction of the secularization hypothesis.

Actually, only one result in our regressions is in line with the claims of the secularization hypothesis on the relation between high human capital and low religiosity, though the evidence is weak: the *Births* variable has a significant and positive coefficient in only one of our baseline OLS regressions (in Column 8 of Table 1), and in only a limited number of our robustness checks (in Columns 1 and 2 of Tables 3 and 6, as well as in Columns 6 and 8 of Table 7).¹⁹ However, this result, which suggests that a decrease in fertility depresses church attendance, does not necessarily invalidate the religion-market model. This is because proponents of the religion-market model would suggest that individuals with either few or no children would not attend church since they do not need its social services, such as child day care.

¹⁹ Besides, in the robustness check shown in Column 6 of Table 3, the *Births* variable has a negative and significant sign.

4.2 Urbanization and Industrialization

The secularization hypothesis has traditionally argued that increased industrialization and urbanization have reduced church attendance. However, the *Industries* variable, which assesses the share of the population working in the industrial sector, has a positive and significant coefficient in almost all the OLS regressions in Table 1. Most of our robustness checks in the other Tables confirm the positive and significant sign of *Industries* (the exception is the Arellano-Bond GMM regression reported in Column 7 of Table 7 where *Industries* has a negative and significant sign).

Furthermore, the *Urban* variable is not significant in the OLS regressions of Table 1; it is only significant in two of our robustness checks (it has a positive coefficient in the 2SLS regression shown in Column 7 of Table 6 and a negative one in the Arellano-Bond GMM regression in Column 1 of Table 7).

Hence, these results fail to confirm the predictions of secularization theories, which contend that urbanization and industrialization have a negative effect on religiosity. At the same time, they do not fully vindicate the claims of the religion-market model, although most regressions suggest that industrialization increased church attendance. In any case, the main vindication for the religion-market model should come from the regression results on the effects of welfare spending on religiosity.

4.3 Public spending on welfare services

While the OLS regressions in Table 1 suggest that church attendance was not influenced by the increase in health- or family-related public expenditures, they show that the growth in public spending on education and the growth in old-age expenditures led to a decline in religiosity. More precisely, our regressions indicate that a one percent

increase in the share of education-related expenditures in the country's total public expenditures (*Education*) decreased the religiosity of our survey respondents by an estimated 0.399% to 0.722% on average. Furthermore, a one percent increase in the share of old age-related expenditures in the country's GDP (*Old Age*) lowered it by an estimated 1.4% to 2.6% percent on average.²⁰

These results are confirmed in nearly all the additional 2SLS and Arellano-Bond GMM regressions that we run in Tables 2 to 7. They thus provide a clear vindication of the religion-market model which considers that religious participation is supply-driven.

At this point, it is important to emphasize that our results do not suggest that religious participation is never demand-driven. Instead, they imply that in the countries which were democracies during the twentieth century, and where religious participation was neither encouraged nor discouraged, the decline in religious participation cannot be attributed to a decrease in the demand for religiosity.

Indeed, what changed in Western countries during the twentieth century was the development of the welfare state. It crowded out the charitable activities of the churches and made religious participation less valuable.²¹ It changed the supply conditions of religious activities which became less complementary, if not fully orthogonal in some countries like France and Norway, to the provision of welfare services.

²⁰ Interestingly enough, our results regarding the impact of public spending on education (but not on old age-related expenditures) are in the same order of magnitude with the findings of Gill and Lundsgaarde (2004). In a cross-section of countries in 1995, they found that a one-percent increase in the share of government social welfare expenditures in the GDP on a per capita basis decreases church attendance by an estimated 0.275% to 0.626%.

²¹ Churches would not exclude non-parishioners from their hospitals and schools, but undoubtedly granted preferential access to attendees and their children.

Obviously, such a perspective on religiosity implies an instrumental view of religious participation. This is not to say that all the individuals who ever went to Church only did so because of the welfare services which they expected to receive in return.²² Nonetheless, our results do suggest that a sizeable fraction of religious participants were motivated by the churches' provisions of education and health, and left when the welfare state crowded them out.

5. Conclusion

This article provides a test of the secularization hypothesis and of the religion-market model by relying upon the retrospective questions of the 1991 and 1998 ISSP surveys which yield detailed estimates of religious trends across dozens of countries. They span the 1925-1990 period, fit what we already know about America and greatly extend our statistics on Europe. As such, they allow us to examine the roots of the decline in church attendance which occurred during the twentieth century in the Western World.

Our results provide scant evidence for the secularization hypothesis. They invalidate the claims that the growth in income had a negative effect on religiosity. In addition, they fail to find any systematic effect of education, industrialization and urbanization on church attendance.

Conversely, our findings vindicate the religion market model, which argues that there is a "supply-side" to religious participation results, by showing that the development of the welfare state significantly depressed religiosity. In other words, many individuals were observant because churches funded welfare services which the State did

²² Stark and Finke (2000) argue that individuals attend church because churches offer spiritual goods that no secular firm can provide. Nonetheless, it would seem that many (secular) political parties provide goods which rivaled those of the churches in terms of transcendental beliefs, leaps of faith and personality cults.

not provide and became secular when the welfare state crowded out religious charity organizations.

All in all, our results suggest two avenues of research: the first one is policy-orientated while the second is more theoretical in nature. First, there are still regions of the world, notably the Muslim countries in the Middle East and in Central Asia, where extremist religious movements are pointed out as a major source of political instability and violence. This paper thus suggests that the promotion of a secular welfare state may represent the best way to undermine these movements. How this secular welfare state would be financed is an altogether different issue.

Second, while this paper shows that the growth of the welfare state explains the decline in church participation during the twentieth century, it also calls into question the relevance of the factors, like education and wealth, which have traditionally been used to explain the demand for religiosity. As such, this study suggests that other factors, such as habit formation, may perhaps provide a better explanation of religious behavior.

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Table 1. Determinants of church attendance in the twentieth century: baseline specification.

	OLS Fixed Effects (1)	OLS Fixed Effects (2)	OLS Fixed Effects (3)	OLS Fixed Effects (4)	OLS Fixed Effects (5)	OLS Fixed Effects (6)	OLS Fixed Effects (7)	OLS Fixed Effects (8)
	<i>Dependent variable is Children</i>				<i>Dependent variable is Parents</i>			
Births	0.013 [0.009]	0.013 [0.009]	0.011 [0.008]	0.011 [0.007]	0.003 [0.003]	0.003 [0.003]	0.006 [0.004]	0.007 [0.003]*
GDP per inhabitant	0.049 [0.049]	0.05 [0.049]	0.095 [0.034]**	0.07 [0.040]	0.017 [0.021]	0.018 [0.019]	0.056 [0.024]**	0.039 [0.020]*
Industries	0.921 [0.274]***	0.829 [0.297]**	0.731 [0.263]**	0.636 [0.288]*	0.378 [0.111]***	0.322 [0.096]***	0.217 [0.202]	0.093 [0.176]
Urban	-0.689 [0.529]	-0.69 [0.502]	-0.596 [0.523]	-0.517 [0.524]	-0.212 [0.194]	-0.213 [0.152]	0.127 [0.233]	0.149 [0.217]
Tertiary Education	0.463 [0.378]	0.466 [0.362]	0.474 [0.361]	0.408 [0.357]	0.193 [0.137]	0.195 [0.107]	0.069 [0.170]	0.045 [0.155]
Education	-0.722 [0.199]***	-0.664 [0.234]**			-0.435 [0.187]**	-0.399 [0.182]*		
Health		-0.114 [0.128]				-0.07 [0.069]		
Old Age			-2.632 [1.124]**	-2.65 [0.903]**			-1.493 [0.543]**	-1.404 [0.406]***
Family				2.234 [1.728]				0.96 [0.782]
Constant	15.359 [12.855]	20.809 [16.396]	34.836 [11.641]**	30.037 [13.371]*	25.228 [5.284]***	28.556 [4.796]***	45.17 [7.934]***	45.499 [8.607]***
Observations	133	133	92	88	133	133	92	88
Within R2	0.771	0.779	0.766	0.76	0.682	0.691	0.611	0.585
F-stat	9.095	5.639	29.437	10.924	41.838	11.614	24.425	10.376
Prob > F	0.000	0.003	0.000	0.000	0.000	0.000	0.000	0.000
Number of clusters	10	10	10	10	10	10	10	10
Time fixed-effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Country fixed-effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Notes:

- OLS regressions with time-fixed effects and robust standard errors clustered by countries. Robust standard errors are given in brackets.
- * indicates significance at the 10%-level; ** indicates significance at the 5%-level; *** indicates significance at the 1%-level.

Table 2. Determinants of church attendance in the twentieth century: accounting for the endogeneity of the variables

driving the demand for religiosity.

	2SLS Fixed Effects (1)	2SLS Fixed Effects (2)	2SLS Fixed Effects (3)	2SLS Fixed Effects (4)	2SLS Fixed Effects (5)	2SLS Fixed Effects (6)	2SLS Fixed Effects (7)	2SLS Fixed Effects (8)
	<i>Dependent variable is Children</i>				<i>Dependent variable is Parents</i>			
Births	0.0059 [0.0151]	0.0085 [0.0146]	0.0206 [0.0154]	0.0172 [0.0168]	-0.0022 [0.0143]	-0.0001 [0.0133]	0.0076 [0.0136]	-0.0015 [0.0140]
GDP per inhabitant	0.059 [0.129]	0.097 [0.0842]	0.127* [0.0700]	0.0837 [0.0929]	-0.00269 [0.0656]	0.027 [0.0558]	0.060 [0.0524]	0.004 [0.0642]
Industries	0.896*** [0.316]	0.773*** [0.268]	0.685*** [0.236]	0.602** [0.267]	0.401** [0.165]	0.307** [0.132]	0.137 [0.176]	-0.00203 [0.131]
Urban	-0.336 [0.685]	-0.43 [0.666]	-0.779** [0.371]	-0.595 [0.378]	0.0107 [0.561]	-0.0653 [0.514]	0.0959 [0.308]	0.296 [0.292]
Tertiary Education	0.230 [0.496]	0.312 [0.467]	0.643*** [0.310]	0.486 [0.338]	0.035 [0.374]	0.101 [0.341]	0.096 [0.260]	-0.096 [0.254]
Education	-0.911*** [0.261]	-0.791*** [0.223]			-0.554*** [0.159]	-0.463*** [0.130]		
Health		-0.0723 [0.113]				-0.0514 [0.0599]		
Old Age			-2.922*** [0.820]	-2.874*** [0.934]			-1.368** [0.568]	-0.779 [0.713]
Family				2.463* [1.439]				1.361** [0.618]
Observations	111	111	84	80	111	111	84	80
Hansen J-test	1.43	1.505	1.585	1.984	1.27	1.345	1.196	2.035
Prob J-test	0.489	0.471	0.453	0.371	0.53	0.511	0.55	0.362
Number of clusters	10	10	10	10	10	10	10	10
Time fixed-effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Country fixed-effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Notes:

- 2SLS regressions with time-fixed effects and robust standard errors clustered by countries. Robust standard errors are given in brackets.
- * indicates significance at the 10%-level; ** indicates significance at the 5%-level; *** indicates significance at the 1%-level.
- In these regressions, the *Births* and *GDP per capita* variables are endogenous. We employ the *Interest rate*, *Exchange rate*, *Tariff*, and *Strike* variables as IVs.

Table 3. Determinants of church attendance in the twentieth century: accounting for the endogeneity of the variables

driving the supply of religiosity.

	2SLS Fixed Effects (1)	2SLS Fixed Effects (2)	2SLS Fixed Effects (3)	2SLS Fixed Effects (4)	2SLS Fixed Effects (5)	2SLS Fixed Effects (6)	2SLS Fixed Effects (7)	2SLS Fixed Effects (8)
	<i>Dependent variable is Children</i>				<i>Dependent variable is Parents</i>			
Births	0.0217*** [0.00507]	0.0227*** [0.00606]	0.139 [0.207]	0.0184 [0.312]	-0.0021 [0.00418]	-0.0072* [0.00382]	0.0747 [0.133]	-0.143 [0.598]
GDP per inhabitant	0.004 [0.0418]	0.007 [0.0387]	-0.108 [0.314]	-0.040 [0.230]	0.034 [0.0259]	0.021 [0.0371]	-0.046 [0.210]	0.078 [0.430]
Industries	0.997*** [0.344]	0.978*** [0.369]	0.509 [1.454]	0.263 [0.806]	-0.0972 [0.222]	0.00672 [0.356]	0.0724 [0.915]	-0.371 [1.627]
Urban	-0.192 [0.426]	-0.211 [0.422]	-3.642 [6.154]	-0.0713 [9.332]	0.244 [0.350]	0.345 [0.248]	-1.924 [3.936]	4.51 [18.12]
Tertiary Education	-0.0170** [0.00755]	-0.0170** [0.00760]	-0.0158 [0.0188]	-0.0126 [0.0145]	-0.788 [0.652]	-0.762 [0.598]	-0.657 [1.139]	-0.080 [2.024]
Education	-1.036** [0.424]	-0.986*** [0.367]			0.188 [0.348]	-0.0752 [0.582]		
Health		0.0305 [0.145]				-0.160* [0.0897]		
Old Age			18.68 [34.54]	3.073 [41.91]			11.74 [21.51]	-16.39 [84.61]
Family				5.8 [15.91]				10.45 [28.40]
Observations	65	65	55	55	65	65	55	55
Hansen J-test	1.766	1.478	0.062	0.138	2.403	1.603	0.33	0.037
Prob J-test	0.414	0.224	0.97	0.711	0.301	0.206	0.848	0.848
Number of clusters	10	10	10	10	10	10	10	10
Time fixed-effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Country fixed-effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Notes:

- 2SLS regressions with time-fixed effects and robust standard errors clustered by countries. Robust standard errors are given in brackets.
- * indicates significance at the 10%-level; ** indicates significance at the 5%-level; *** indicates significance at the 1%-level.
- In these regressions, the *Education*, *Health*, *Old Age* and *Family* variables are endogenous. We use the *Strike*, *Unemployment* and *Net Immigration* variables as IV.

Table 4. Determinants of church attendance in the twentieth century: testing for the persistence of religiosity

	OLS Fixed Effects (1)	OLS Fixed Effects (2)	OLS Fixed Effects (3)	OLS Fixed Effects (4)	OLS Fixed Effects (5)	OLS Fixed Effects (6)	OLS Fixed Effects (7)	OLS Fixed Effects (8)
	<i>Dependent variable is Children</i>				<i>Dependent variable is Parents</i>			
Births	0.006 [0.004]	0.006 [0.005]	-1.66E-05 [0.003]	-1.58E-05 [0.004]	-0.0002 [0.002]	-0.0003 [0.002]	0.004 [0.002]	0.004 [0.003]
GDP per inhabitant	0.019 [0.037]	0.019 [0.038]	0.022 [0.040]	0.019 [0.038]	0.008 [0.021]	0.009 [0.022]	0.027 [0.019]	0.027 [0.019]
Industries	0.589 [0.107]***	0.595 [0.134]***	0.096 [0.137]	0.062 [0.182]	0.305 [0.090]***	0.27 [0.081]***	0.038 [0.089]	-0.044 [0.101]
Urban	-0.393 [0.324]	-0.389 [0.328]	0.038 [0.217]	0.009 [0.223]	0.027 [0.163]	0.024 [0.136]	0.193 [0.128]	0.149 [0.130]
Tertiary Education	0.223 [0.224]	0.219 [0.229]	-0.026 [0.164]	-0.007 [0.166]	-0.002 [0.124]	0.003 [0.104]	-0.045 [0.099]	-0.010 [0.097]
Education	-0.542 [0.194]**	-0.546 [0.209]**			-0.397 [0.164]**	-0.373 [0.170]*		
Health		0.011 [0.093]				-0.042 [0.059]		
Old Age			-1.658 [0.639]**	-1.644 [0.628]**			-1.351 [0.430]**	-1.249 [0.417]**
Family				0.096 [1.342]				-0.433 [1.022]
Children _{t-1}	0.573 [0.119]***	0.579 [0.129]***	0.873 [0.182]***	0.861 [0.215]***				
Parents _{t-1}					0.476 [0.057]***	0.444 [0.071]***	0.671 [0.159]***	0.613 [0.164]***
Constant	4.717 [9.968]	4.053 [9.912]	2.742 [8.568]	4.447 [9.027]	10.387 [5.642]*	13.343 [3.546]***	16.616 [9.749]	22.917 [8.700]**
Observations	124	124	92	88	124	124	92	88
Within R2	0.87	0.87	0.864	0.854	0.719	0.723	0.717	0.667
F-stat	9.098	8.408	12.545	4.28	3.342	39.367	34.583	48.752
Prob > F	0.000	0.001	0.000	0.011	0.030	0.000	0.000	0.000
Number of clusters	10	10	10	10	10	10	10	10
Time fixed-effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Country fixed-effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Notes:

- OLS regressions with time-fixed effects and robust standard errors clustered by countries. Robust standard errors are given in brackets.
- * indicates significance at the 10%-level; ** indicates significance at the 5%-level; *** indicates significance at the 1%-level.

Table 5. Determinants of church attendance in the twentieth century: testing for the persistence of religiosity and the endogeneity of the demand variables.

	2SLS Fixed Effects (1)	2SLS Fixed Effects (2)	2SLS Fixed Effects (3)	2SLS Fixed Effects (4)	2SLS Fixed Effects (5)	2SLS Fixed Effects (6)	2SLS Fixed Effects (7)	2SLS Fixed Effects (8)
	<i>Dependent variable is Children</i>				<i>Dependent variable is Parents</i>			
Births	0.0186 [0.0131]	0.0207 [0.0138]	0.0156 [0.0129]	0.0152 [0.0134]	-0.0042 [0.0109]	-0.0024 [0.0110]	0.0075 [0.0106]	-0.0003 [0.0125]
GDP per inhabitant	0.0253 [0.0617]	0.04 [0.0466]	0.107* [0.0635]	0.0912 [0.0647]	-0.0180 [0.0704]	0.0287 [0.0694]	0.0423 [0.0317]	0.0077 [0.0508]
Industries	0.766*** [0.268]	0.785*** [0.288]	0.474** [0.234]	0.407** [0.172]	0.434* [0.253]	0.292 [0.190]	0.0528 [0.132]	-0.0397 [0.114]
Urban	-0.899 [0.613]	-1.008 [0.635]	-0.531 [0.368]	-0.448 [0.337]	0.185 [0.476]	0.107 [0.472]	0.107 [0.232]	0.253 [0.266]
Tertiary Education	0.561 [0.417]	0.643 [0.418]	0.451 [0.308]	0.386 [0.293]	-0.095 [0.304]	-0.004 [0.305]	0.054 [0.189]	-0.073 [0.220]
Education	-0.824** [0.399]	-0.828** [0.422]			-0.572* [0.299]	-0.445* [0.252]		
Health		-0.0289 [0.0911]				-0.0841 [0.0874]		
Old Age			-2.637*** [0.618]	-2.772*** [0.739]			-1.352*** [0.477]	-0.839 [0.552]
Family				1.414 [1.210]				0.805 [0.594]
Children _{t-1}	0.333 [0.249]	0.254 [0.265]	0.297 [0.262]	0.295 [0.296]				
Parents _{t-1}					0.127 [0.355]	-0.0747 [0.511]	0.371 [0.312]	0.198 [0.236]
Observations	97	97	83	79	97	97	83	79
Hansen J-test	1.25	1.198	1.926	2.279	1.587	1.767	1.195	2.018
Prob J-test	0.535	0.549	0.382	0.32	0.452	0.413	0.55	0.365
Number of clusters	10	10	10	10	10	10	10	10
Time fixed-effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Country fixed-effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

- Notes:
- Anderson and Hsiao (1982)'s 2SLS regressions with time-fixed effects and robust standard errors clustered by countries.
 - Robust standard errors are given in brackets.
 - * indicates significance at the 10%-level; ** indicates significance at the 5%-level; *** indicates significance at the 1%-level.
 - In these regressions, the $Children_{t-1}$, $Parents_{t-1}$, $Births$ and $GDP\ per\ capita$ variables are endogenous. We use the $Children_{t-2}$, $Parents_{t-2}$, $Interest\ rate$, $Exchange\ rate$, $Tariff$, and $Strike$ as IV.

Table 6. Determinants of church attendance in the twentieth century: testing for the persistence of religiosity and the endogeneity of the supply variables.

	2SLS Fixed Effects (1)	2SLS Fixed Effects (2)	2SLS Fixed Effects (3)	2SLS Fixed Effects (4)	2SLS Fixed Effects (5)	2SLS Fixed Effects (6)	2SLS Fixed Effects (7)	2SLS Fixed Effects (8)
	<i>Dependent variable is Children</i>				<i>Dependent variable is Parents</i>			
Births	0.0342*** [0.00832]	0.0340*** [0.00813]	-0.0517 [0.0508]	-0.0862 [0.105]	-0.0021 [0.00396]	-0.0048 [0.00560]	-0.0522 [0.0478]	-0.0486 [0.0864]
GDP per inhabitant	0.0473 [0.0444]	0.0437 [0.0479]	0.0771 [0.0796]	0.012 [0.140]	0.033 [0.0333]	0.052 [0.0562]	0.028 [0.0624]	0.028 [0.0694]
Industries	1.773*** [0.662]	1.868** [0.810]	-0.454 [0.742]	0.363 [1.473]	0.172 [0.350]	0.21 [0.501]	-0.557 [0.403]	-0.605 [1.410]
Urban	-0.781 [0.556]	-0.797 [0.543]	2.246 [1.417]	3.113 [2.642]	0.286 [0.353]	0.223 [0.475]	1.959* [1.118]	1.883 [2.044]
Tertiary Education	-2.103** [0.892]	-2.153** [0.934]	-1.017 [0.781]	-1.120 [0.898]	-0.826 [0.673]	-0.934 [0.801]	-0.612 [0.458]	-0.668 [1.266]
Education	-1.195* [0.683]	-1.317 [0.836]			-0.211 [0.529]	-0.221 [0.830]		
Health		-0.0698 [0.127]				-0.29 [0.223]		
Old Age			-10.49** [4.275]	-10.68*** [3.124]			-7.114** [3.061]	-7.163** [3.309]
Family				14.78 [25.84]				-1.148 [28.96]
Children _{t-1}	-0.613* [0.321]	-0.691* [0.409]	0.8 [1.064]	-0.524 [2.247]				
Parents _{t-1}					-0.186 [0.270]	-1.08 [0.979]	1.259 [1.194]	1.436 [4.537]
Observations	60	60	54	54	60	60	54	54
Hansen J-test	0.636	0.196	0.901	0.069	2.435	0.8	0.312	0.162
Prob J-test	0.728	0.658	0.637	0.792	0.296	0.371	0.856	0.687
Number of clusters	10	10	10	10	10	10	10	10
Time fixed-effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Country fixed-effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Notes:

- Anderson and Hsiao (1982)'s 2SLS regressions with time-fixed effects and robust standard errors clustered by countries.
- Robust standard errors are given in brackets.
- * indicates significance at the 10%-level; ** indicates significance at the 5%-level; *** indicates significance at the 1%-level.
- In these regressions, the *Children_{t-1}*, *Parents_{t-1}*, *Education*, *Health*, *Old Age* and *Family* variables are endogenous. We use the *Children_{t-2}*, *Parents_{t-2}*, *Strike*, *Unemployment* and *Net Immigration* variables as IV.

Table 7. Determinants of church attendance in the twentieth century: testing for the persistence of religiosity with the Arellano-Bond GMM estimator.

	Arellano-Bond GMM (1)	Arellano-Bond GMM (2)	Arellano-Bond GMM (3)	Arellano-Bond GMM (4)	Arellano-Bond GMM (5)	Arellano-Bond GMM (6)	Arellano-Bond GMM (7)	Arellano- Bond GMM (8)
	<i>Dependent variable is Children</i>				<i>Dependent variable is Parents</i>			
Births	-0.04 [0.026]	0.01 [0.008]	-0.02 [0.029]	-0.001 [0.007]	0.005 [0.004]	0.01 [0.003]***	0.002 [0.007]	0.007 [0.004]*
GDP per inhabitant	0.014 [0.020]	0.036 [0.076]	-0.009 [0.036]	0.024 [0.045]	-0.13 [0.127]	-0.017 [0.029]	-0.015 [0.027]	0.001 [0.033]
Industries	0.382 [0.224]*	0.797 [0.697]	-0.262 [0.639]	-0.1 [0.299]	-1.175 [1.512]	0.314 [0.329]	-0.437 [0.256]*	-0.337 [0.302]
Urban	-0.357 [0.214]*	-0.513 [0.508]	0.194 [0.242]	0.219 [0.363]	0.275 [0.354]	-0.085 [0.336]	0.123 [0.109]	0.176 [0.234]
Tertiary Education	0.542 [0.343]	0.287 [0.475]	-0.0617 [0.345]	-0.205 [0.281]	-0.307 [0.306]	-0.002 [0.309]	-0.035 [0.0858]	-0.128 [0.156]
Education	0.148 [0.172]	-0.505 [0.191]***			-0.154 [0.495]	-0.568 [0.156]***		
Health		0.572 [0.262]**				0.145 [0.234]		
Old Age			-2.429 [0.832]***	-2.075 [1.036]**			-1.462 [0.483]***	-1.124 [1.380]
Family				2.26 [1.654]				-0.067 [0.652]
Children _{t-1}	0.687 [0.171]***	1.00 [0.202]***	0.568 [0.411]	0.901 [0.352]**				
Parents _{t-1}					1.184 [0.376]***	0.764 [0.203]***	0.679 [0.319]**	0.767 [0.714]
Observations	114	114	82	78	114	114	82	78
Hansen J-test	0.569	0.195	4.22	3.824	2.312	1.972	0.614	1.046
Prob J-test	0.904	0.978	0.239	0.575	0.679	0.578	0.893	0.959
AR(1) test	1.778	-0.094	1.201	-0.519	-1.989	-1.093	-0.709	-0.486
Prob. of AR(1) test	0.075	0.925	0.23	0.604	0.047	0.274	0.478	0.627
AR(2) test	-0.469	-1.625	-1.063	-1.937	-0.977	-0.933	-1.602	-1.288
Prob. of AR(2) test	0.639	0.104	0.288	0.053	0.328	0.351	0.109	0.198
Number of clusters	10	10	10	10	10	10	10	10
Time fixed-effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Country fixed-effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Notes:

- Arellano-Bond (1991) GMM regressions with Windmeijer (2005)'s finite sample correction for the two-step covariance matrix with time-fixed effects and robust standard errors clustered by countries.
- Robust standard errors are given in brackets.
- * indicates significance at the 10%-level; ** indicates significance at the 5%-level; *** indicates significance at the 1%-level.
- In these regressions, the *Children_{t-1}* and *Parents_{t-1}* variables are endogenous. The lagged levels of the dependent and explanatory variables, which are consistent with the moment conditions, are the instruments for the regression in differences.

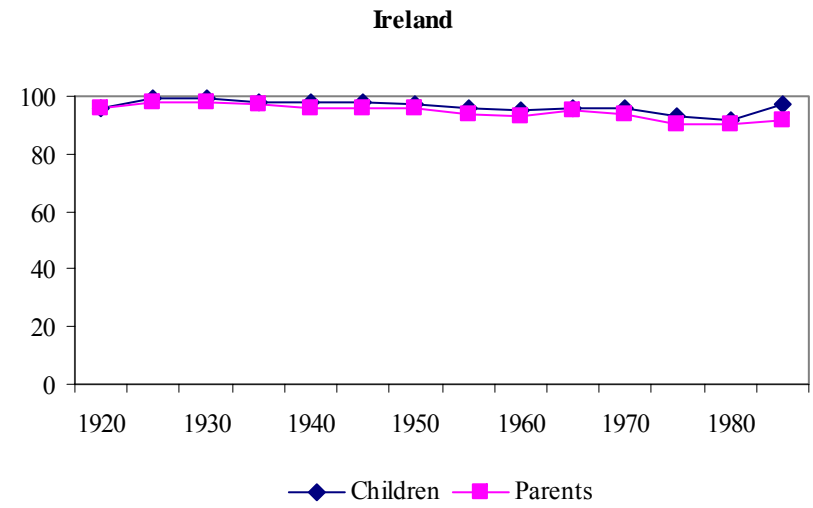
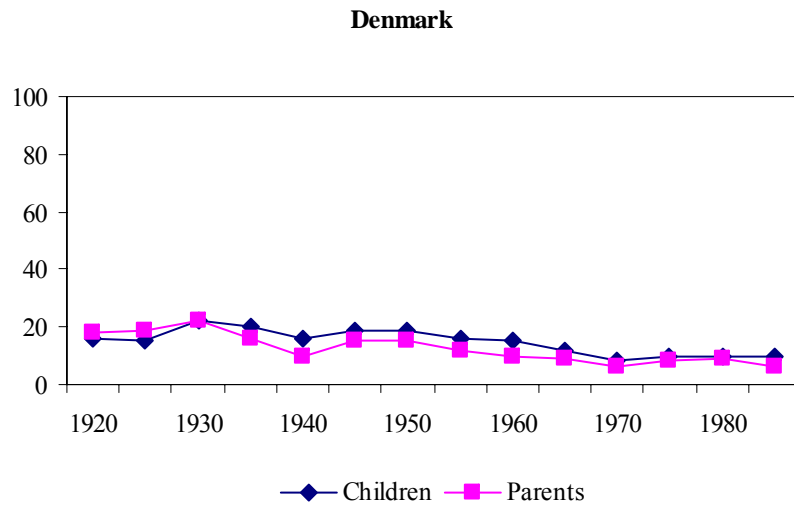
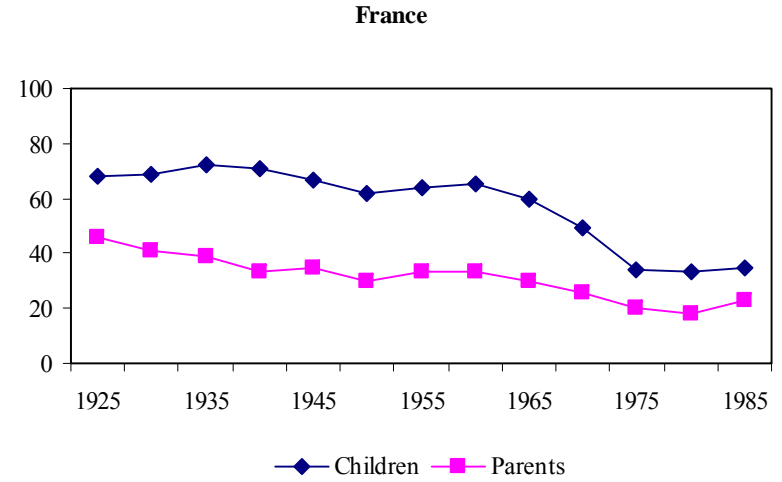
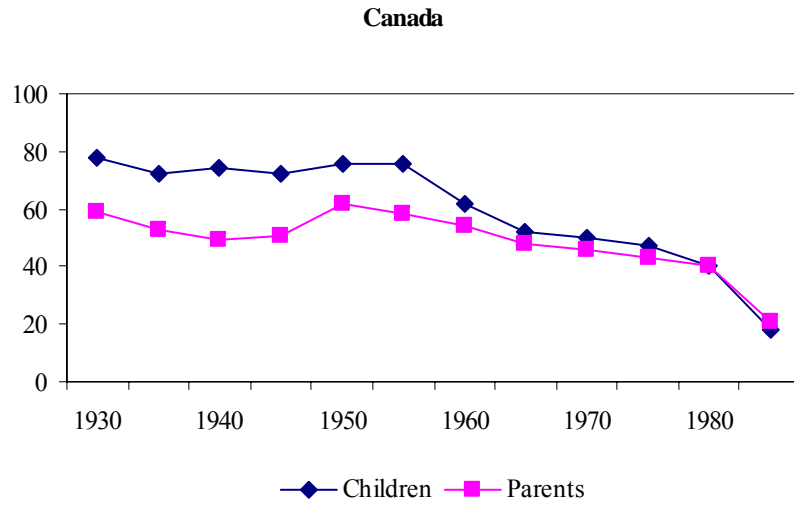
Table A1. List of variables.

Variables	Definition
<i>Dependent variables</i>	
Children	Children's church attendance
Parents	Parents' church attendance
<i>Explanatory variables</i>	
GDP per capita	Gross Domestic Product per capita (in log)
Industries	Share of the population working in the industrial sector
Tertiary Education	Individuals in universities and equivalent post-secondary educational institutions (in 100,000)
Urban	Population living in urban areas (in 1,000,000)
Births	Ratio of births per women in the population
Education	Share of education-related expenditures in the country's total public expenditures
Health	Share of health-related expenditures in the country's total public expenditures
Family	Share of family-related expenditures in the country's GDP
Old Age	Share of old age-related expenditures in the country's GDP
<i>Instrumental variables</i>	
Interest rate	Interest rate on the government's long-term bonds
Exchange rate	Exchange rate between the country's currency and the US dollar
Tariff	Import duties over exports
Strike	Days of work lost per worker as a result of strikes
Unemployment	Log of the unemployment rate
Net Immigration	Difference between the number of immigrants and emigrants

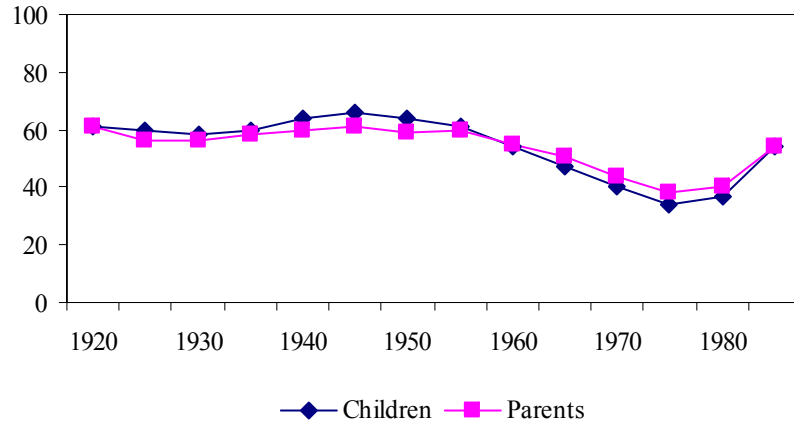
Table A2. Descriptive statistics

	Observations	Mean	Std. Dev.	Minimum	Maximum
<i>Dependent variables</i>					
Children	134	49.19	26.84	8	99
Parents	134	39.23	25.36	6	98
<i>Explanatory variables</i>					
GDP per inhabitant	134	1.12	1.81	-2.18	5.16
Industries	134	35.28	7.40	14.50	50.40
Tertiary Education	134	7.61	22.96	0.03	138.00
Urban	134	224.00	383.03	7.70	1870.54
Births	134	600.78	1016.18	41.32	4350.00
Education	133	10.86	6.96	0	27
Health	133	23.38	14.58	0.65	60.34
Old Age	92	4.07	2.63	0	9.25
Family	88	1.47	1.08	0	4.46
<i>Instrumental variables</i>					
Interest rate	140	6.338	3.496	2.51	19.88
Exchange rate	139	2.969	2.461	0.020	10.596
Tariff	117	0.069	0.062	0.008	0.382
Strike	133	3919515	9262921	163	66400000
Unemployment	133	1.365	1.168	-2.303	3.456
Net Immigration	95	27903.21	92370.05	-28000	334000

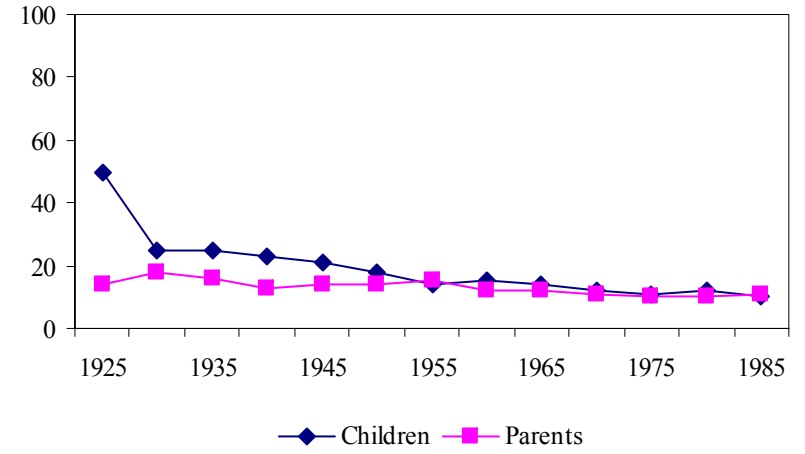
Figure 1. Church attendance, 1920-1990



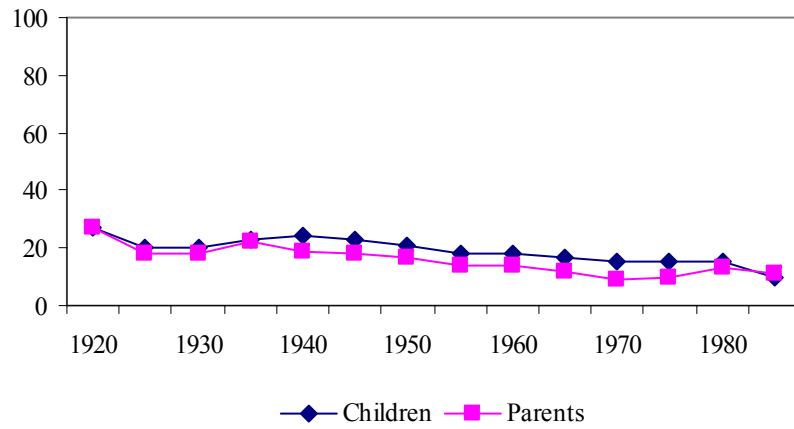
Netherlands



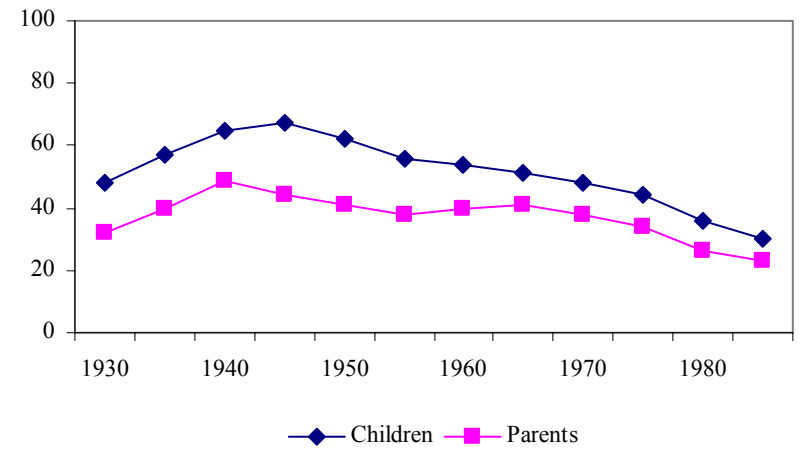
Sweden



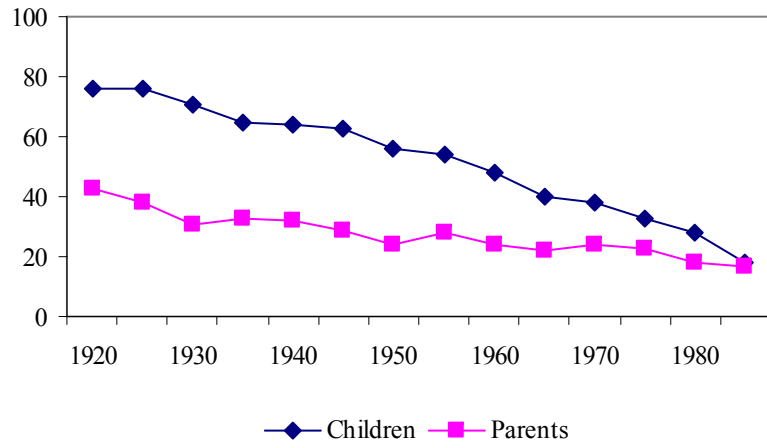
Norway



Switzerland



United Kingdom



USA

