Does the State Expand Schooling? A Study Based on Five Nordic Countries

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Introduction

Bruce Fuller and Richard Rubinson, in concert with a number of colleagues in a work group on school expansion, have sought an answer to the question, "What forces are driving the spread of mass schooling?"[1] They were faced with the ubiquitous expansion of educational attendance seen all over the world at all levels and wanted to understand why this had taken place.[2] In particular, they posed the more specific question, "Does the state expand schooling?"[3] This article addresses this question, attempting to eschew some of the problems discussed by Fuller and Rubinson by using data that may be free of some of the complications that they have pointed out.

The basic question is a simple one. Can one or more mechanisms be identified, which can be held accountable for the massive expansion of education that is manifested at all levels of education all over the world? In particular, can the state be singled out as primary causal agent? The consensus is that the answer is necessarily a complex one and may vary along a number of dimensions. In particular, the variation between different education systems and the levels of education may be great. On the one hand, primary education was gradually developing into mass education during the nineteenth century in Europe and the Americas, with the Asian regions, the Middle East, and Africa following somewhat behind. On the other hand, tertiary education, let alone university education, has been turning into mass education in a limited number of countries, and only toward the very end of the twentieth century. To the extent that the status of compulsory education can be used as an indicator, the difference in development is sub-

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[1] Bruce Fuller and Richard Rubinson, "Preface," in *The Political Construction of Education: The State, School Expansion, and Economic Change,* ed. Bruce Fuller and Richard Rubinson (New York: Praeger, 1992), pp. ix–xiii.

[2] This can be seen in a host of statistical compendia, most clearly in recent years in UNESCO's statistical sources, which are available on the Internet.

[3] Bruce Fuller and Richard Rubinson, "Does the State Expand Schooling? Review of the Evidence," in Fuller and Rubinson eds., pp. 1–28.

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stantial.[4] Thus, this expansion is happening at very different times and under very different circumstances. It is not necessarily true, and even unlikely, that the same basic mechanisms can be used to account for educational expansion at all levels at all times.

Fuller and Rubinson place the major theoretical frameworks that can be used to account for the expansion of education into three categories: the technical-functional, class-conflict, and world-institution models.[5] The status-conflict (or credential account) must be presented as a separate category of theoretical framework.[6] According to Andy Green, two categories might be added: one is the theoretical frame proposed by Margaret Archer, with the emphasis on the way that the educational system changes, and the other is what he terms the liberal account.[7] The reviews by Fuller and Rubison and by Green spell out a number of problems with these theoretical frameworks. On the one hand, the models may be somewhat underspecified in terms of the principal actors (e.g., individuals, families, or central authorities), and they may apply unequally to different social conditions (such as different systems of governments or different national economic standing). They may apply differently to different social classes, and they may apply well only during some periods. On the other hand, the models may be overspecified to the extent of being mutually exclusive, but ingredients from more than one may simultaneously provide important explanatory power. The principal actor problem becomes especially entangled when primary education becomes compulsory. This both changes the possible explicit role of individuals and social classes, as the state necessarily becomes the principal actor and itself the compulsory mechanism. This is an unusually clear signal to transmit between different systems, which in turn may be crucial for the applicability

[4] See, e.g., fig. 1.1 in ibid., and fig. 3.1 in Francisco O. Ramirez and Marc J. Ventresca, "Building the Institution of Mass Schooling: Isomorphism in the Modern World," in Fuller and Rubinson eds., pp. 47–59. John E. Craig points out that when education is made compulsory, this does not normally alter very much per se—in most cases attendance was very high before the laws were passed ("The Expansion of Education," in *Review of Research in Education,* ed. David C. Berliner [Itasca, Ill.: Peacock, 1981], pp. 151–213, see esp. p. 184).

[5] Fuller and Rubinson, "Does the State Expand Schooling?" p. 10.

[6] See discussions by John Boli, "Institutions, Citizenship, and Schooling in Sweden," in Fuller and Rubinson eds., pp. 61–74; Randall Collins, *The Credential Society: An Historical Sociology of Education and Stratification* (New York: Academic Press, 1979), and "Comparative and Historical Patterns of Education," in *Handbook of the Sociology of Education,* ed. Maureen T. Hallinan (Dortrecht: Kluwer Academic/Plenum, 2000), pp. 213–39; Pamela Barnhouse Walters, "The Limits of Growth: School Expansion and School Reform in Historical Perspective," in Hallinan ed., pp. 241–61. An elaborated version of the credential theory is presented in David K. Brown, *Degrees of Control: A Sociology of Educational Expansion and Occupational Credentialism* (New York: Teachers College Press, 1995).

[7] Andy Green, *Education and State Formation: The Rise of Education Systems in England and the USA* (New York: St. Martin's, 1990). See esp. chap. 2, "The Social Origins of National Education Systems," p. 27. Green is concerned with the rise of educational systems, but here I will be dealing with periods in which the systems have already taken shape. But both the views presented by Archer and the liberal view may be relevant to understand the interplay between the corpus seeking education and the actions of governments in the five Nordic countries. Margaret Scotford Archer, "Introduction: Theorizing about the Expansion of Educational Systems," in *The Sociology of Educational Expansion,* ed. Margaret Scotford Archer (London: Sage, 1982), pp. 3–64, and *Social Origins of Educational Systems* (London: Sage, 1979).

of the institutional models. These factors may substantially affect the fit of the different models.

The Role of the State

The role of the state is not made explicit in the theoretical frameworks referred to above. According to the technical-functional view, it may be assumed that industry, the state, or both in concert control the buildup of education and that the young people respond. But the onus may also be put on the consumer, the students, or their families, who want to become economically independent. The class-conflict model presumes that the state is instrumental in molding the system. So does the world-institutional model. But both accept that the population at large is an important dynamic force and, thus, that the state should be seen as an agent, or an intermediary, of change. The credential model puts the ball in the court of the individuals and the market and assumes a lesser role for the state. The liberal account proposed by Green is not specific as to the role of the state but again presumes a dynamic interaction between authorities and the various social groups. The role of the state in Archer's framework is substantial as a coordinating agent, and she places the emphasis on the interaction, or negotiation, between the educational system and the various actors that may influence it.[8] Thus, apart from the status-conflict and credential frameworks, the state is generally seen as an important actor.

The interactive relationship between education as a formalized activity and the modern state seems to have been very complex, especially in the nineteenth century when both were being formed in many countries, including the Nordic countries.[9] The role of the state vis-à-vis education can be either proactive or reactive. It can be directive in both a positive and a negative way, enhancing or promoting certain types of education and perhaps holding others at bay. But it can also be reactive or facilitatory, in the sense of responding to the existing trends or tendencies and thereby allowing these to take their course. To the extent that its effects are of the former type,

[8] Archer analyses four countries, Denmark and England (characterized by substitution) and France and Russia (characterized by restriction). She places Denmark in the substitutive category but notes that the influence of some groups may be characterized by substitution and others by restriction.

[9] This is discussed at some length in Archer, *Social Origins of Educational Systems*; Green; Francisco O. Ramirez, "The Nation-State, Citizenship, and Educational Change: Institutionalization and Globalization," in *International Handbook of Education and Development: Preparing Schools, Students and Nations for the Twenty-First Century*, ed. W. K. Cummings and N. F. McGinn (New York: Pergamon, 1997), pp. 47–62; a number of papers in Fuller and Rubinson, eds.; and a number of papers in John W. Meyer and Michael T. Hannan, eds., *National Development and the World System* (Chicago: University of Chicago Press, 1979). See also Detlef K. Müller, Fritz Ringer, and Brian Simon, eds., *The Rise of the Modern Educational System: Structural Change and Social Reproduction, 1870–1920* (Cambridge: Cambridge University Press, 1987). For the purposes of this article, the five Nordic countries are Denmark, Finland, Iceland, Norway, and Sweden.

some discontinuities might be detected in the development of educational systems, but probably less so if the effects are of the latter type.

The State and Gender Differences

The issue of gender equality has been very prominent in Nordic policies, especially in the latter part of the twentieth century. This has primarily involved ensuring that females were not disadvantaged in any way in comparison with males, which used to be the situation, even when using a variety of criteria. Thus, seeing some differential developments in the expansion of participation of the two sexes might be expected, as long as the differential was to the disadvantage of females, but not after parity was reached according to the measures in question. Thus, because of very strong egalitarian policies promoted by the Nordic governments, especially in the latter half of the twentieth century, one would expect that many of the gender differences seen in the first half of the century would have disappeared toward the latter half. This would be taken as evidence of effective state intervention. If, however, some differential growth were detected after parity had been reached, this might be taken to indicate that the state was not the principal actor.

The Change after the Second World War

"But since World War II the growth has been dramatic."[10] This phrase seems to reflect a fairly typical view that something quite new happened in many spheres of society after World War II.[11] It is sometimes suggested that Western governments attended much more seriously to education after World War II than they had done before. Thus, there was perhaps a turning point of a sort, sometime in the 1950s or 1960s (at least in a number of Western countries). But even though the official interest in education was growing, this was essentially on human capital terms, which would put the emphasis on education for employment or industry-related education. Thus, one might expect the growth of the academic sector to dampen, at least in relative terms, because of an emphasis on vocational education. The answer to the questions about state influence and continuity in the process of development will be examined using two methods; the first looks for continuity from the first to the second half of the century, and the second looks more closely for deviations from the basic growth curves.

[10] Craig, "The Expansion of Education," p. 185. A somewhat similar phrase is frequently seen in the literature.

[11] This point is extensively discussed by Jorge Reina Schement, "Porat, Bell, and the Information Society Reconsidered: The Growth of Information Work in the Early Twentieth Century," *Information Processing and Management* 26, no. 4 (1990): 449–65. He argues that several authors have erroneously assigned novelty to changes occurring after World War II, neglecting evidence of developments in the first half of the century.

The Nordic Countries and Their Academic Secondary Tracks

In the Nordic countries, education has been a high-priority policy issue for a long time, and it has been accepted that the state's responsibility is enormous.[12] It has also been a common Nordic belief that to move toward equality between citizens, such as equality between the sexes, is among the top government priorities and that education is a powerful tool for achieving that goal. Traditionally, there has been an extensive and fairly prominent discussion about these issues in all the Nordic countries, and the role of those governments in building up and controlling (encouraging) education has possibly been exemplary in their influence on such issues. Therefore, it should be possible to discern this influence in changing patterns of educational expansion using qualitative as well as quantitative indicators. In the following discussion, I will select the expansion of academic secondary education in the five Nordic countries for a close analysis.

In these countries, this secondary education track was attended by approximately 1 percent relative to a cohort near the beginning of the twentieth century, but the average was near to 50 percent relative to a cohort toward the end. Thus, it proceeded from what has been termed elite to mass education during this time.[13] For the purpose of the present analysis, this part of the education arena has the advantages of being state run, but noncompulsory; it used to have a well-acknowledged high status, and it is strictly nonvocational in the sense that the curriculum is not defined with reference to any vocation or profession. The only rights or certification that it confers are for further study, namely, university education, which admittedly may lead to a variety of professional degrees. Furthermore, because of its status and simplicity, it is on the whole easily defined and well documented in statistical sources. I will consider the development of this educational track during the whole of the twentieth century. During this period, there have been considerable fluctuations in the economies of the Nordic countries and also in the political climate, but with reference to the international scene, the situation has been relatively stable.

But as far as the impact of the state is concerned, it should be noted that this strand of the education sector has not been a government priority; in some sense the opposite has been true, as governments have had some reservations about the robust expansion of the academic stream. They have certainly wanted to give more impetus to secondary education in general terms, but with special emphasis on vocational education. Thus, I am in-

[12] Nevertheless, it has not been an issue that has been very prominent on the political agenda as there has been a relatively strong consensus about the major steps to be taken between the different political parties.

[13] See, e.g., a discussion on such a shift in Martin Trow, "Problems in the Transition from Elite to Mass Higher Education," in *Policies for Higher Education: General Report* (Paris: Organisation for Economic Co-operation and Development, 1974), pp. 55–101.

specting the growth of a sector that has, as such, not been a government priority, but I am covering a period in which there has been a growing appreciation of the importance of education.

This sector has a number of special and rather interesting features. It is a legacy of the Catholic gymnasia and, later, the Lutheran Latin schools, which were intended for the education of the clergy and state officials in Northern Europe. The curriculum was greatly influenced first by the humanists but, more important, by the neohumanists in the late eighteenth and early nineteenth centuries, whose approach had classical and linguistic overtones and were under the influence of an aristocratic notion of *Bildung*. During the nineteenth century, the final examination from these schools replaced the entrance examination to the universities, reiterating the fact that the gymnasia were in fact stepping-stones to the universities and had no explicit independent role. Since the Reformation, these institutions were run and controlled by the state and have always been postcompulsory. Long after compulsory education extended equally to both sexes, these schools were still mainly attended by young men.[14] Toward the latter part of the twentieth century, however, this section of the school system, in all the Nordic countries, was attended by both girls and boys on an equal footing, and now girls seem to be on course to dominate the sector. These schools can still be characterized as noncompulsory, if not elitist, or at least with a high status; they are nonvocational institutions, which only serve an intermediary goal. This sector has not been explicitly carried or fostered by any particular vocal ideology, nor has it been strengthened by reference to an explicit rationale similar to the one voiced when primary education became compulsory. Nor has it enjoyed the support given by explicit references to human capital arguments or the needs of industry, as the vocational secondary and even university education have enjoyed. Nevertheless, the sector has certainly expanded dramatically.

These are the reasons why a study of this part of the school system may throw important light on questions of educational expansion. Even though it is run by the state, the attendance is not compulsory, and thus a variety of political and social conflicts can easily be reflected in its development. In fact, as the state started to take more initiative with regard to the development of secondary education during the twentieth century, the emphasis was often on the vocational tracks, with the constant concern that the influx into the academic tracks was too great.

This article will focus on the following question: Can one delineate the role of the state in the expansion of secondary academic education in the

[14] This refers to actual or practical equality, which came later than formal equality.

Nordic countries during the twentieth century?[15] In order to answer this question, I will first look at the continuity of the development throughout this period, and especially at the deviations that might be found. Then I will look at the gender differences, as these may present an important clue to the answer; finally, I will consider the continuity across the middle of the century, in particular comparing the pre– as with the post–World War II periods with reference to the ideas that such differences of attitudes toward the welfare society, toward education in general, and toward the importance of academic versus vocational education in particular should show some important deviations at that stage.

The Data

Let us first consider the data from the individual countries and, in particular, the problematic aspects of the data. The data are the numbers of students completing the university matriculation examinations in the Nordic countries. The definition of the range of exams to include as university matriculation or entrance examinations is central to this article and thus presents perhaps the most difficult problem.[16] In the early days, from the turn of the twentieth century and well into its second half, the situation was fairly simple, as, in all the Nordic countries, a particular university entrance examination, the *examen artium,* was used as the criterion.[17] The program leading up to this examination was originally a very academic preparatory course for any field of study at the university. It used to be dominated by classical studies but gradually adapted to the changing times, and at the beginning of the twentieth century students could normally select among different lines or programs. But the situation gradually became more complex. First, the addition of special examinations opened up admissions to some special institutions of higher education, and then various exceptions were made from the general rule. In the 1970s and 1980s, radical changes were made in some of the Nordic education systems, accompanied by changes in the nomenclature such that continuity in the system became difficult to discern. For all the Nordic countries, what should be included within the

[15] In discussions about educational expansion, it is sometimes difficult to differentiate between the expansion of educational attendance and the expansion of an educational system (or the rise of such a system), which are different issues but normally coincide, e.g., in the buildup of primary education. When primary education becomes compulsory, the state is explicitly involved in both expanding the system and ensuring the expansion of the attendance rates. In this article the discussion focuses on the former. A similar distinction can be made with reference to mass schooling. It is possible to have mass education as a phenomenon, i.e., very high attendance rates in noncompulsory sectors, and mass education as an institution, such as compulsory education (perhaps with relatively low attendance rates).

[16] See a more detailed description of the data in Jón Torfi Jónasson, "The Predictability of Educational Expansion: Examples from Secondary and Higher Education," in *Higher Education at the Crossroads: Tradition or Transformation?* ed. Ingemar Fägerlind, Icara Holmesland, and Görel Strömqvist (Stockholm: Institute of International Education, Stockholm University, 1999), pp. 113–31.

[17] In Denmark, this was the *studentereksamen,* in Finland the *ylioppilastutkinto/studentexamen,* in Iceland the *stúdentspróf,* in Norway the *studenteksamen,* and in Sweden the *studentexamen.*

category of general university preparatory examination was inferred from the definitions, clarifications, and organization in the official statistics.

In all cases, I will consider the growth curves for the twentieth century.[18] Here there are also methodological issues with which to grapple. The first is to correct for the population growth. The standard way to do this is to use a reference cohort, and this is done here using the 19- or 20-year-old cohorts as reference groups, depending on which age students are ideally expected to graduate in the different countries.[19] This correction is very important because it is of little interest to inspect absolute growth in participation in education that is simply a reflection of increased population. What is of primary interest is relative expansion.

The Stability and Continuity of Secondary Academic Expansion

It is clear from the data presented in figure 1 that an exponential curve describes very well the growth of the secondary sector. But there are also a number of interesting deviations from this regularity. Consider first the regularity itself. It would be noteworthy if a unitary function would be best suited to describe such an apparently important part of the education system for a whole century in five different, but kindred, education systems. It stands to reason that it may be possible to find short-range fits to the different parts of the curves, which, when combined, would provide a better overall fit, even though it may be somewhat difficult to improve the situation when the present functions account for upward of 96 percent of the variance, as shown by table 1.[20] But neither a split into two linear functions nor into two exponential functions explains a higher proportion of the variance. It may be rather difficult to find parsimonious alternatives that account for more than the variance already accounted for. Thus, it would appear that a single function describes the growth of this part of the secondary system in all the Nordic countries for a whole century.

But the curve that fits so well is not just any arbitrary mathematical curve. It is the solution to the differential equation that describes fixed growth, where the increment is always the same proportion relative to the current amount. And if the mechanism controlling the growth being investigated in this instance is fixed, it is implausible that the state is implicated in any

[18] Such curves are often used in describing growth of various phenomena, and Brown suggests that "growth analysis appears to be highly applicable to two kinds of educational processes: the size of educational systems, and the diffusion of innovations" (Daniel J. Brown, "Educational Trend Analysis Methods," in *Futurism in Education,* ed. Stephan P. Hencley and James R. Yates [Berkeley: McCutchan, 1974], pp. 251–82, quote on p. 279).

[19] In all the countries, the group taking this examination every year has a wide age range, even though the largest proportion is in mode age, which is used as a reference cohort. The age distribution in secondary and higher education in recent years can be seen in Eva-Marie Befring and Allan Nordin, eds., *Nordisk utbildning i fokus: Indikatorer,* Nord 1999 no. 13 (Copenhagen: Nordisk Ministerråd, 1999).

[20] There are technical difficulties as well. When using such a large number of data points, it is relatively easy to obtain a good fit. A straight line fit to most of the curves in the overall country data gives R^2 between 0.8 and 0.9.

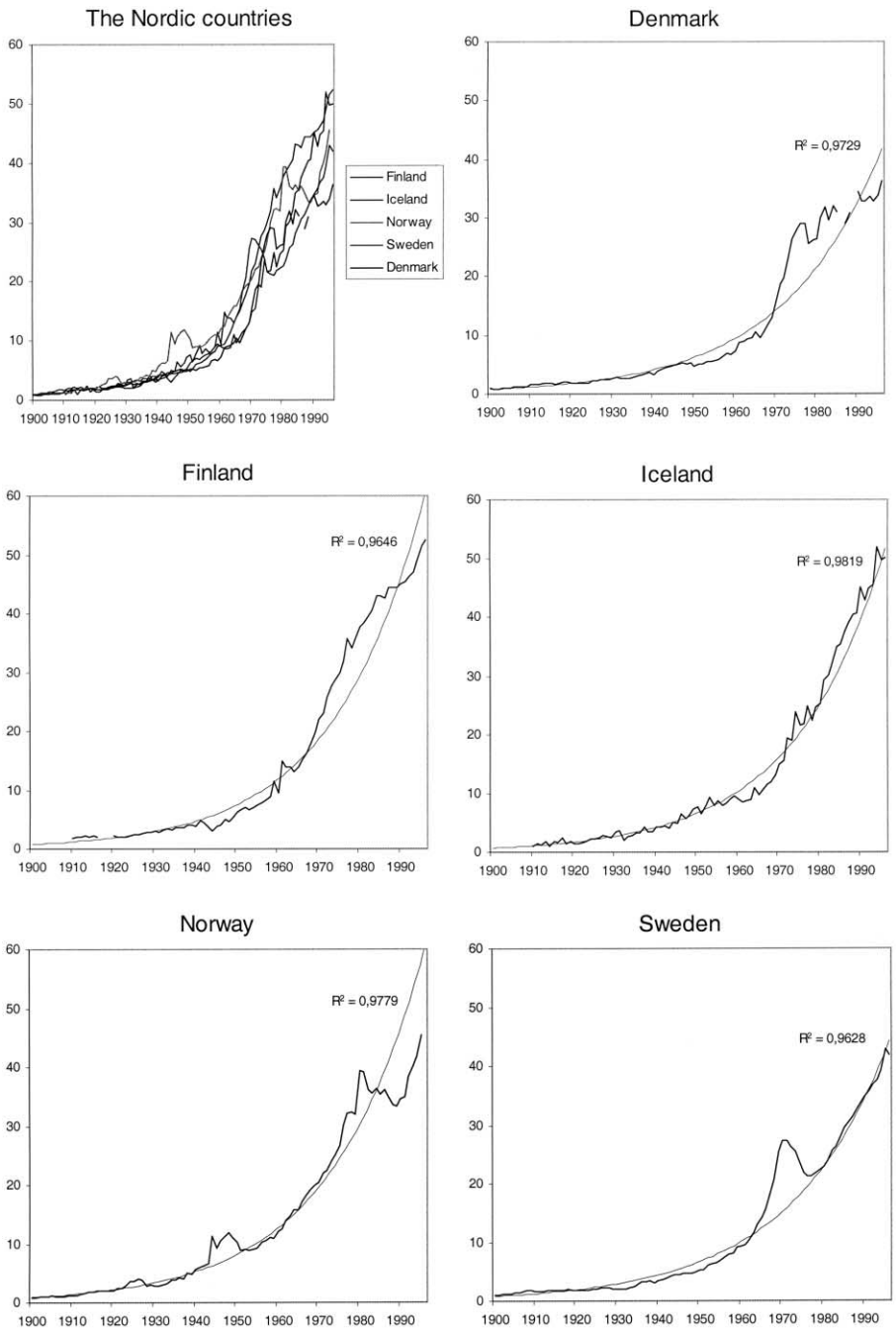

FIG. 1.—The basis for each plot in the panel is the growth in completion rates for the university entrance examination (relative to cohort size) for the years 1910–96. The first plot shows the growth for all the Nordic countries, and then there is a separate plot for each country. An exponential curve is fitted to the data in each case.

TABLE 1
EXPONENTS AND REGRESSION COEFFICIENTS (FOR THE EXPONENTIAL CURVE) FOR MALES AND FEMALES FOR THE UNIVERSITY ENTRANCE EXAMINATIONS IN THE FIVE NORDIC COUNTRIES: DENMARK, FINLAND, ICELAND, NORWAY, AND SWEDEN

	All students		Females		Males		Equity by the Sexes Reached in Year
	Exponent	R^2	Exponent	R^2	Exponent	R^2	
Denmark	.0413	.973	.060	.973	.032	.959	1970
Finland	.0454	.965	.051	.980	.039	.963	1941
Iceland	.0446	.983	.080	.950	.032	.967	1979
Norway	.0434	.978	.056	.968	.036	.966	1973
Sweden	.0412	.963	.061	.983	.033	.937	1977
Average	.04306		.0614		.0342		

NOTE.—The crossover points, as estimated from the best fits, seen in fig. 2, are also presented.

discontinuous way, for instance, by being very active during some periods and less so during others. It can only be implicated by either assuming that its effect has been of a very constant nature for the whole period or that some other forces cause the expansion, with the state perhaps acting as the facilitator of the changes.

There are a number of reasons to assume that the state has not been a causal agent of these changes. First of all, this part of the education system has never been a part of the compulsory system in any way and, thus, not a priority even within education. Second, even if governments had attended to it, this would have happened mainly in the latter part of the century, as will be discussed presently, and we should see different growth characteristics during that period. Third, to the extent that governments have shown interest, they have not been particularly concerned with the programs being investigated here. These programs, which seemed to retain a high status, were seen as nonvocational, whereas the governments seemed to have preferences for elevating vocational education and, thus, should not have given any particular priority to these programs. Governments in all the Nordic countries, judging by their rhetoric, wanted to equalize the status of all programs at the secondary level, inter alia to facilitate the inflow of high-ability students to vocational secondary programs.

Thus, the present evidence is taken to imply that an underlying mechanism other than the state spurred the growth displayed by the curves in figure 1. Further support for this conclusion is the similarity of the growth exponents irrespective of the state policies, the differing economies, and, most important, the differing education systems in these five countries. The Nordic data are summarized in table 1, in order to emphasize the internal consistency of the data. It is clear from figure 1 and table 1 that the overall harmony between the plots is considerable. The first column of the table

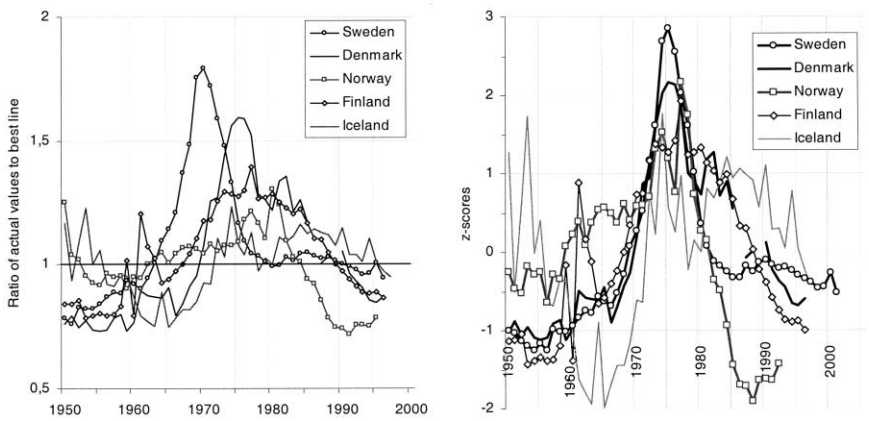

FIG. 2.—The plots in the panel show the deviations from the underlying expansion. The plot on the left shows the ratio between the actual completion rates and the best-fitted exponential growth curve for the twentieth century, i.e., the ratio between the two curves in the country plots in fig. 1. The plot on the right shows the same data being standardized for each country and then shifted in two cases: 5 years to the right for Sweden and 3 years to the left in the case of Norway.

shows the exponent to be between 4.1 percent and 4.5 percent in these countries, which shows considerable overall similarity.[21]

The Effects of Government Policies

The data have been discussed as if the only concern has been to investigate the extent to which they fitted a very robust exponential curve. The figures show, however, very clearly that there are not only irregularities but also very significant and in fact orderly deviations in the expansion patterns. This is perhaps most notable in the Norwegian and Swedish data, but a kindred pattern may also be seen in the Danish data. The Finnish and Icelandic data show fewer abrupt deviations. None of these deviations seem to be of the cyclical type that was discussed by Paul Windolf.[22] What is notable about these deviations is that they represent an impressive upsurge in the completion rates, which then relapses to the underlying growth curve. It is very difficult to explain such a pattern, except with recourse to forces external to the stable situation that manage to alter it dramatically. But two facets of these deviations are worth noting. One is the apparent explosive expansion for a brief period, and the other is the abrupt discontinuation of the growth, which even leads to an effective recession in the completion rates for this part of the education system.

Figure 2 describes the deviation from the basic exponential growth. It shows that there are fluctuations around this curve, but with an apparent

[21] Here I equate the percentage growth and the exponential constant, even though there is a very slight difference.

[22] Paul Windolf, *Expansion and Structural Change: Higher Education in Germany, the United States and Japan, 1870–1990* (Oxford: Westview, 1998).

sturdy upswing in all the countries in the 1960s or 1970s. This is most notable for Sweden and Denmark, but it is clear also for Finland and Norway, and it is least distinctive for Iceland. It is clear from the left plot in the panel of figure 2 that the upswing occurs earlier for Sweden than for the other countries and somewhat later for Norway. The data for Finland and Iceland fit somewhere in between. This can be seen most clearly by the shifts shown in the right plot in figure 2, where the peaks of all the countries coincide after shifting the data for Sweden and Norway. This would indicate that kindred changes were taking place in the Nordic countries, led by Sweden.[23] These rather robust changes are most plausibly accounted for by referring to government intervention, and the harmony, or synchrony, seen in the data may be taken to support the world-institutional view, operating on the governmental level.

Two Systems of Education? Sex Differences in the Growth of Academic Secondary Education

At the turn of the twentieth century, academic secondary and higher education in the Nordic countries was effectively for males. There were already some female students in the gymnasia, but they were a small minority. This changed gradually, but except for early development in Finland, parity was achieved in the Nordic countries only well after the middle of the century (see table 1). On the basis of general governmental policy and action, one might have expected to see a gradual move toward equality in all major sections within the education system, and once parity had been reached, the development from then on should have shown the two sexes moving in unison, at least to the extent that the developments were under the influence of the state. There was certainly no a priori reason why this should not materialize for the secondary academic system. Yet this was not the case. A similar pattern transpires in all the Nordic countries (see fig. 3).

The growth rate is somewhat higher for females than for males in all cases. And this is not simply because of the low initial rates at the beginning of the century. There is a clear crossover in all the countries, with a brief relapse in Sweden. It is also clear that, generally speaking, there is no pause or discontinuity at the crossover point, but the faster growth for females continues with little hinderance after parity has been reached. Two related conclusions may be drawn from these data. The first is that the gender pattern in the expansion data supports the view that the state did not cause or control this very regular expansion in the completion of the academic secondary track. It was never the intention of the Nordic governments to differentiate

[23] The changes can be characterized as opening up the systems and making them more flexible. See, e.g., discussions on the Swedish system in Urban Dahllöf, "Changes within the Swedish School System and Their Effects," in *The Comprehensive School Experiment Revisited: Evidence from Western Europe,* ed. Achim Leschinsky and Karl Ulrich Mayer (Frankfurt am Main: Lang, 1990), pp. 174–209; and Gunnar Richardson, *Svensk utbildningshistoria: Skola og samhälle förr og nu,* 6th ed. (Lund: Studentlitteratur, 1999); and on the Norwegian system in Reidar Myhre, *Den norske skoles utvikling,* 7th ed. (Oslo: Ad Notam Gyldendal, 1997).

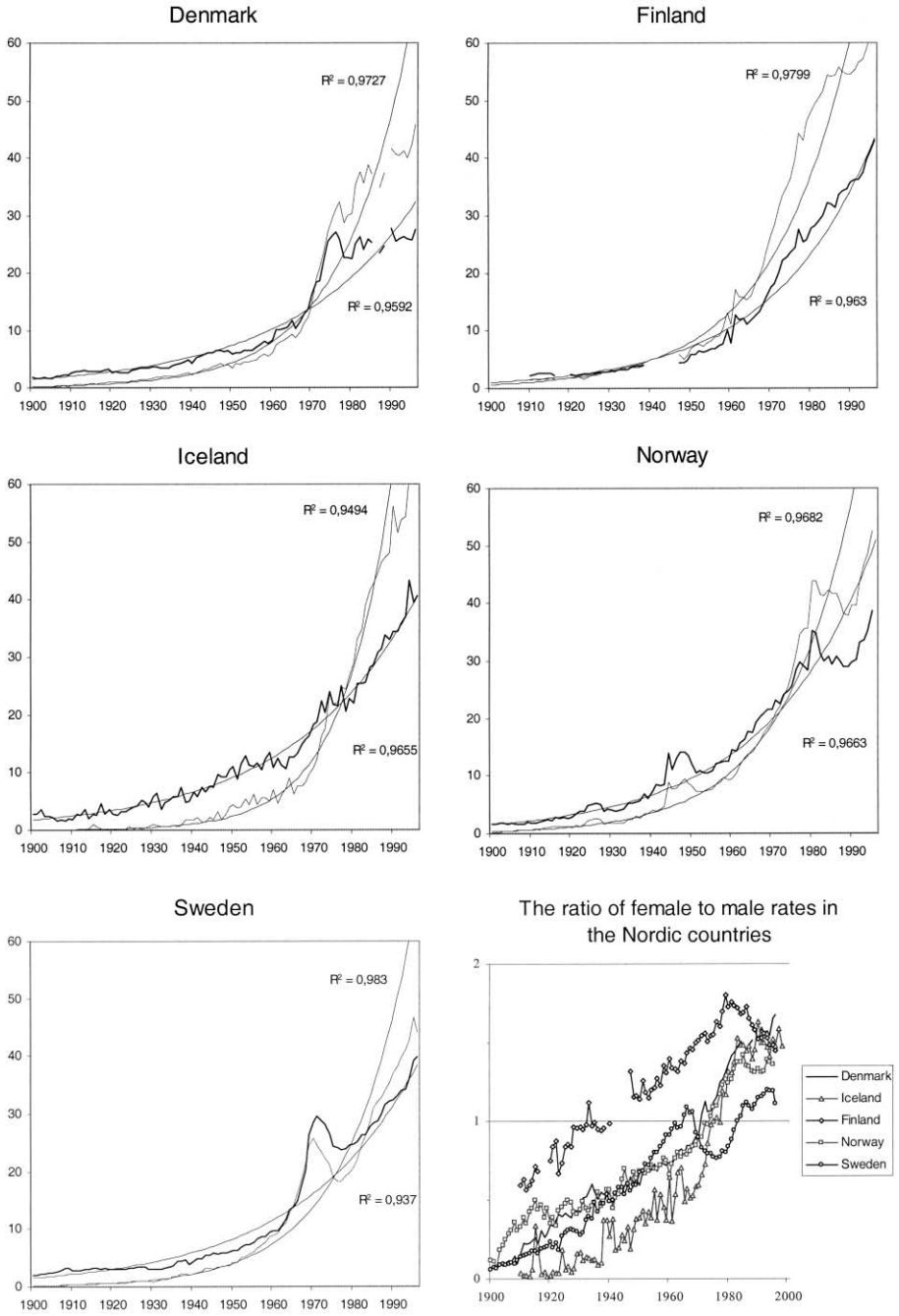

FIG. 3.—The basis for each plot in the panel is the growth in completion rates, shown separately for males and females, for the university entrance examination (relative to cohort size) for the years 1910–66. An exponential curve is fitted to the data in each case, one curve for females and another one for males. The last plot shows the ratio of female-to-male ratios for all the Nordic countries.

between the sexes to the extent that has transpired. Furthermore, the regularity already seen in the combined data is further reinforced in the gender data, thus strengthening the conclusion that governments did not meddle with the underlying expansion of the secondary academic tracks. But a second and perhaps a more dramatic conclusion is that there are signs that the two sexes in some sense existed in two different systems, which expanded at stable, though different, rates.[24] And in some sense, these two systems did not interact; at least there is little sign that the growth of one much affected the growth of the other. What is meant by two different systems is that to a certain extent the structure or even the appeal of the education system seem to have been different from the point of view of the two sexes even though the system did not differentiate between males and females from any formal point of view. Thus, despite the fact that the schools, by and large, are coeducational, the educational environment is, and has been, different and has been changing differently for males and females. At the beginning of the twentieth century, secondary and tertiary education were clearly not for females, and women acquired this education in very limited numbers. A variety of educational opportunities were then developed, partly initiated by the state, first mainly at the secondary level and later at the tertiary level. Opportunities at the secondary level apparently tended to appeal more to boys than to girls. Educational options that appealed more to girls tended to be at the upper secondary or tertiary levels, and for these and, perhaps, a combination of other reasons, the girls were attracted at an increasing rate to the academic secondary programs.[25]

A Turning Point in the Period after World War II?

One way to search for differential effects of state intervention is to look at the differential growth rates or characteristics around the middle of the twentieth century, or near the period after World War II, which in many ways marked a break with the past and the beginning of a new era. I will now explore this question of discontinuity or stability of the expansion of education by the following method: it will be assumed that the growth of the system is exponential for the first half of the century, and on that basis I will predict the development throughout the second half of the century. The basic prediction is based on the exponential curve, even though the logistic

[24] See discussion on this possibility in Jón Torfi Jónasson, "Students Passing the Icelandic University Entrance Examination (UEE), 1911–1994," *European Journal of Education* 32, no. 2 (1997): 209–20.

[25] It seems that females are doing better on important scales used to measure general academic performance at the end of compulsory education; see, e.g., the difference in literacy levels in the recent Organisation for Economic Co-operation and Development Programme for International Student Assessment (PISA) 2000 studies (http://www.pisa.oecd.org).

curve will also be used as a correction.[26] The regularity or stability of this growth will be assessed by how well this extrapolation, on the basis of the first half of the twentieth century, predicts the growth actually seen during the latter half. This method is interesting even though only one fixed window is used.[27] Data for male and female completion ratios from the Nordic countries will be used and analyzed separately, but the data in table 1 showed that the exponents vary considerably between the two sexes.

In figures 4 and 5 the estimates of exponential growth and estimated logistic growth are shown for females and males. In order to assess the predictive value, these figures are based on data from the years 1910–50, with the exceptions explained in the figure captions.[28] Thus, the predictions, or forecasts, are based on data prior to the postwar era but certainly extending right across it. For the females, the best exponential and logistic curves are fitted to the data from 1910 to 1950 (see fig. 4). In all the plots a vertical line is meant to remind the reader that the fitted lines are not based on data later than 1950 and can therefore be regarded as forecasts for the latter half of the century. Thus, I am figuring out to what extent the development of the first half of the twentieth century is reflected in the second half. It is very clear from the figures that the qualitative expansion is quite well predicted by the extrapolated curves, to the extent that the expansion in the female completion rates during the latter part of the twentieth century is essentially inherent in the pattern obtained in the first half.

Similar data for males do not show the same continuity (see 5). In order to show, nevertheless, that continuity across the middle of the century may be inferred, a different window was chosen, that is, the one based on the period 1930–50.[29] This need to change perspective means that the expo-

[26] It is assumed that the nature of the growth is exponential. The scale used, i.e., the proportion of a cohort, necessarily involves a theoretical upper limit, 100 percent. In the long run no more than the whole cohort can obtain the credentials being investigated. In the short run, however, the figure can overrun the 100 percent ceiling as older people may return to school and obtain the matriculation certificate. In order to take account of this ceiling, a dampening of the exponential growth must be assumed, and it is parsimonious to assume that the dampening is proportional to the proportion of the cohort that has already passed the exam. Such an assumption leads to the logistic curve, which should perhaps be used as the predictive function in preference to the underlying exponential curve, which is still assumed to describe the basic process or mechanism of expansion. The curves only begin to diverge significantly after the 50 percent level has been reached. The logistic curve will be shown only in fig. 4, and only to demonstrate the way in which it deviates from the exponential curve.

[27] The window refers to the range on which the prediction is based. A moving window implies that predictions could be made on the basis of varying periods, which would give slightly varying predictions.

[28] The year 1910 is chosen as a starting point because for most of the countries, the graduation rates for both males and females are becoming solid enough to use as a basis for calculations; they are around 0.5 percent of a cohort for females and higher for males. The year 1950 is therefore chosen here as the end of the previous era, assuming that the year 1951 counts as the first year of the postwar era. Note that those who started their gymnasium studies around the conclusion of World War II are concluding their university entrance examinations just before or around 1950.

[29] The deviations from this 20-year period are described in the figure text.

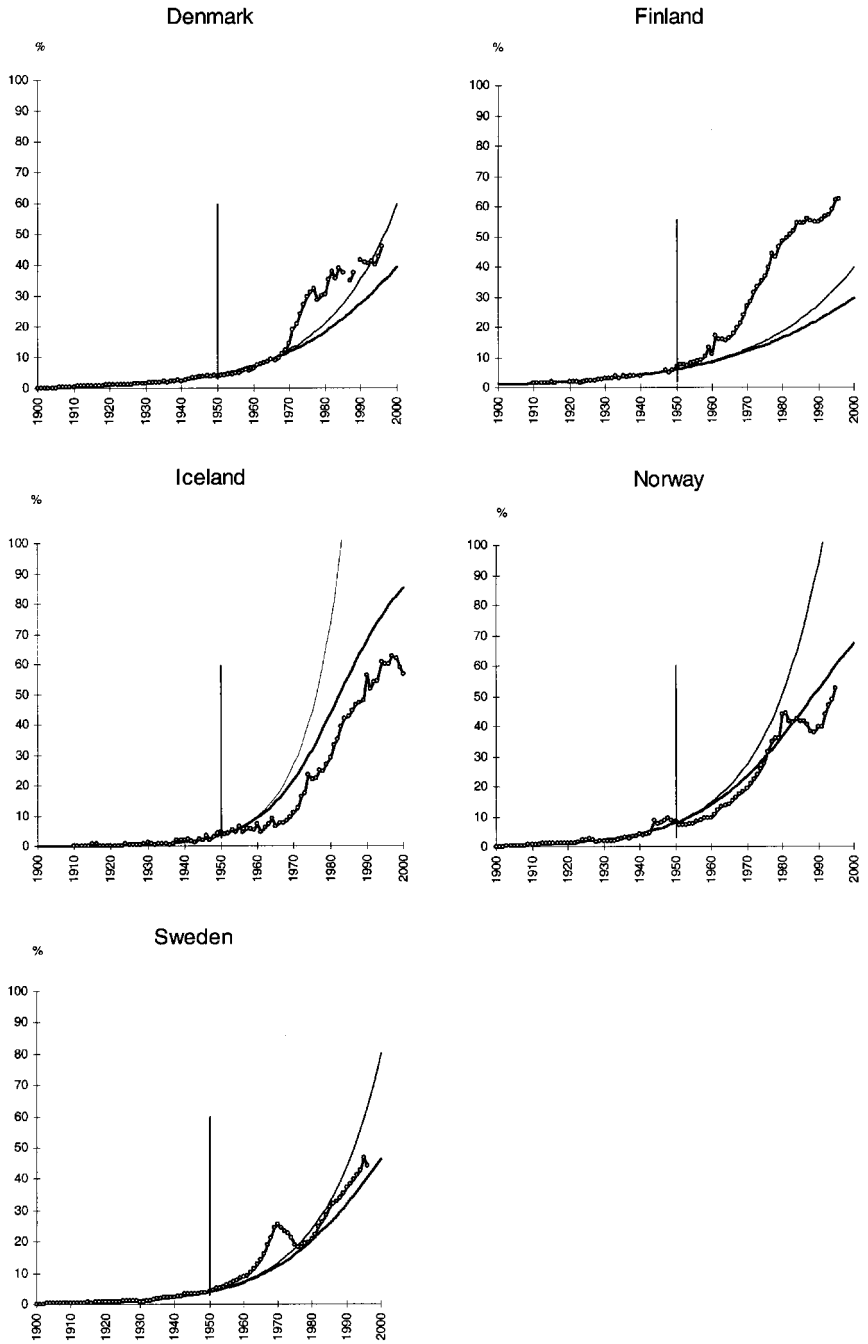

FIG. 4.—Data for females. The basis for each plot in the panel is the growth in completion rates for the university entrance examination (relative to cohort size) for the years 1910–50. The vertical line indicates the end of this period. The exponential (thin line) and logistic (thick line) curves are fitted to these data and are then extrapolated to the 1950 and later period. The fit between the curves and the actual completion rates for the years 1951–96 indicates how well the curves predict the later developments.

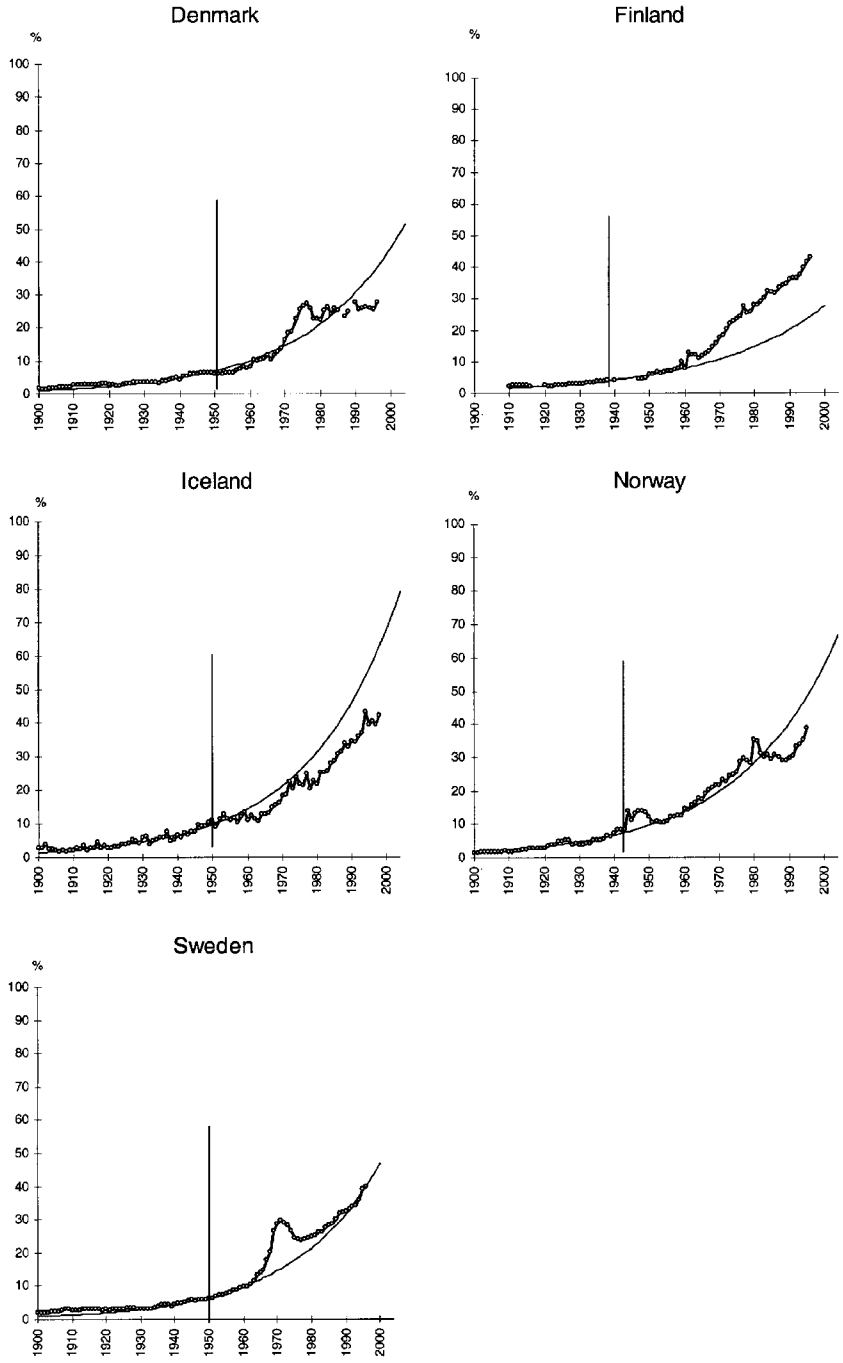

FIG. 5.—Data for males. As before, the basis for each plot is the growth in completion rates for the university entrance examination, but as in fig. 4, the fitted line is based on data for a period before the middle of the century. Here, however, the base period for each plot varies. For Denmark, Iceland,

nential growth was not inherent in the data on males during the first third of the century to the same extent as it was for the data on females.[30]

The data for males and females again tell similar stories and suggest on the whole that the inherent developments seen during the first part of the twentieth century continue unabated into the second half. A different perspective may be even clearer. The developments in the second half were qualitatively no different from those already seen in the first half. The Danish and Swedish curves relax to what might have been predicted. The Norwegian data are approaching that level as well. The Icelandic expansion is qualitatively predicted but occurs a few years behind what the prediction anticipates. Only the Finnish developments are different from the predictions. In Finland, the expansion during the second half of the century is not already seen in the first half. It is very clear that, from the data already presented that for both the female and male populations, only in Finland was there a lack of continuation between the two halves of the century.

Thus, it must be concluded, taking all the evidence from figures 4 and 5 together, that on the whole there was not a discontinuity at the midpoint of the century, except perhaps in Finland.[31] On the contrary, the pre– and post–World War II growth rates were essentially the same.

Discussion

By showing both the figures and the best fits, evidence has been presented to justify the view that the growth of what I have termed general academic education in the Nordic countries is well described by exponential curves. But already one must deal with several obvious and substantial deviations. Only in the Icelandic data were there no single glaring deviations from the fitted curve. In the Finnish data, the rise, especially in the data on females

[30] It was not necessary to change the perspective for the male data in all the countries, but the difference between the countries is not at issue in this particular context; what is at issue concerns whether continuity across the middle of century could be demonstrated generally.

[31] But the definition of discontinuity depends heavily on the periods on either side that are used in the calculations. Even for Finland, had I only used the 10-year period 1928–38 for prediction, this would have shown a nearly perfect prediction for the post–World War II period.

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and Sweden, the basis for the extrapolation is the period 1930–50. For Finland, it is 1920–38, because the data on the differentiation for the sexes was solid only during this period. For Norway, it is 1920–43, stopping at a period of considerable upsurge in the period after the war. Both in Finland and Norway, there are some discontinuities in the postwar years. In Norway, there is a temporary relative upsurge, and in Finland, a pause in the expansion. If only the data for the years 1920–38 are used for Finland and 1920–43 for Norway, the postwar developments follow the predictions exactly. Thus, sizable windows (i.e., between the periods from which the predictions can be calculated) can be found for all the countries that show a very good correspondence between the two halves of the century. The fit between the curves and the actual completion rates for the years from the period on which the numbers are based, and until 1996 it indicates how well the curves predict the later developments. The logistic curves are not shown here, as in the previous figures, as they coincide to a large extent for the completion rates below 50 percent and, thus, more than for the data on females.

in the 1970s, clearly exceeds what the overall curve demands, but there is no obvious abrupt break with the general trend. But in the Danish, Norwegian, and Swedish data, there are clearly substantial but apparently temporary deviations. In Denmark, there is an upsurge in the 1970s with a substantial leveling off, especially in the data on males. In Norway, apart from the anomaly in the late 1940s, there is similarly an upsurge in the late 1970s with a sudden decrease in the 1980s and then a recovery in the 1990s. In Sweden, there is the most dramatic upsurge in the 1960s, culminating around 1970 with a reduction in the early 1970s, but again taking off in the late 1970s. Thus, the contention that this growth can in fact usefully be described by exponential curves does not hold in all cases, but it seems to fit to such an extent that the exceptions rather than the rule may deserve explanations. The exceptions may simply be taken to underpin the overall exponential character of the expansion.

Is the State Responsible for the Overall Expansion in Secondary Academic Education?

No, the state is not responsible for the overall expansion in this sector of the education system. Three lines of evidence presented here support this conclusion. The first is the long-term regularity of the expansion, which is repeatedly and consistently exhibited by the data. It is implausible to expect that such a stable pattern would be obtained due to forces that tend to fluctuate because of different emphases in different periods, even though this is conceivable. A second line of evidence is the differential growth curve for the two sexes. This is not consistent with a harmonious government responsibility for the expansion, which would be expected to ensure more parity in the growth, especially after equality of attendance was obtained. The third line of evidence is that the deviations seen in the data are almost certainly to be explained by government intervention, and thus the influence of the state can be seen in the data, but only in the deviations from the underlying regularity.

But this certainly does not mean that the state has no role to play in the basic expansion. On the contrary, it is very unlikely that it could have taken place without considerable facilitatory efforts on behalf of the respective governments. Fuller and Rubinson note that the state certainly can react to a variety of pressures.[32] Thus, both the world institutional view proposed by

[32] Fuller and Rubinson (n. 3 above) note that the "pressures from employers, families, churches, and civic groups, however, can sweep back with a vengeance. Then the state must react to, and express, the social ideals and economic interests originating from outside the political apparatus per se. School construction continues. But state actors are no longer the master craftsmen" ("Does the State Expand Schooling?" p. 27). This is similar to the conclusion reached by Detlef K. Müller, after an analysis of the expansion of secondary German education in the nineteenth century: "At the same time, the consequences of state intervention must not be overestimated. The actions of states made the institutionalisation of the modern educational system possible: they established the frameworks and they increasingly ordered and controlled the process of education development. But they did not determine that process" ("The Process of Systematisation: The Case of German Secondary Education," in Müller, Ringer, and Simon eds. [n. 9 above], pp. 15–52, quote on pp. 16–17).

John Meyer and Francisco Ramirez and their colleagues and the intrastructural mechanisms discussed by Archer can be used to explain how the governments acted to adjust their respective systems.[33] The latter explains how governments adjusted the system to a steadily greater degree in order to allow this expansion to go on, but the former explains the relative harmony in the responses, which was also constrained by the similar welfare-oriented political emphasis in these countries.[34] It is also very important to acknowledge, as Pamela Walters argues, that government actions that facilitate schooling, even if they are largely reactions to public pressure, should be seen as school reforms.[35]

Furthermore, these frameworks can be usefully applied to explain the harmony between the Nordic countries in the changes made, especially in the 1960s and 1970s. The institutional views discussed presume that essentially the same ideas apply irrespective of the sizes of the units in question. Even though the five countries discussed here differ in size, there is nothing that indicates that this is a crucial variable, and thus there is no reason why the results obtained here will not generalize to both larger and smaller units.[36]

So What Is the Mechanism of Expansion?

Thus, the basic mechanism underlying the growth must be explained by referring to some combination of the credential, technical-functional, and liberal theories, but with clear reference to the views or aspirations of the students or their families rather than the employers or the state. The completion rate grows exponentially, and thus it is sufficient to refer to its own

[33] See, e.g., Meyer and Hannan, eds. (n. 9 above); Francisco O. Ramirez, "The Political Construction of Mass Schooling: European Origins and Worldwide Institutionalization," *Sociology of Education* 60 (January 1987): 2–17; Archer, *Social Origins of Educational Systems* (n. 7 above), pp. 173–74. Here it is perhaps most useful to consider Archer's phases of unification and systematization.

[34] This also is in keeping with Brown's (n. 6 above) second enabling condition for expansion, i.e., a "suitable collective belief system" (chap. 3).

[35] Walters (n. 6 above); see, e.g., the discussion on pp. 251–52. It is also possible to argue that the growth pattern reflected in the data presented here supports her contention that in some sense school expansion can be seen as a counterreform (p. 258). Her suggestion that educational reform often seems to allow increased access for disadvantaged groups while retaining the advantage for the upper social groups seems to be dramatically supported in the Nordic countries in the field of adult education, where this seems to have occurred in recent years; see Jón Torfi Jónasson and Albert Tuijnman, "The Nordic Model of Adult Education: Issues for Discussion," in *Curious Minds: Nordic Adult Education Compared,* ed. Albert Tuijnman and Zenia Hellström (Copenhagen: TemaNord and Nordic Council of Ministers, 2001), pp. 116–28.

[36] Editors Mark Bray and Steve Parker state "that certain features of small states are indeed generalisable despite differences in culture, geography and economic development, . . . [but] some features and processes . . . are exaggerated and assume greater significance in small states" ("Introduction," in *Education in Small States: Concepts, Challenges and Strategies,* vol. 13 of *Comparative and International Education,* ed. Philip G. Altbach [Oxford: Pergamon, 1993], p. xxiii). Furthermore, a conclusion, very similar to what I have reached here (with similar parameters), is reached when one applies this methodology to Thomas F. Green, David P. Ericson, and Robert Seidman's data on high school graduates in the United States. Using these data, it can be shown that a logistic curve fitted to the data from 1870 to 1930 predicts quite well the growth for the next 45 years (Thomas F. Green, David P. Ericson, and Robert Seidman, *Predicting the Behavior of the Educational System* [Syracuse, N.Y.: Syracuse University Press, 1980], app. A, p. 172).

nature when seeking an explanation: the more people have obtained this type of a credential, the more people seek it.[37] The growth being discussed here is seen in a credential that does not have a specific technical or functional role in the traditional sense of these terms. The choice of this venue is nevertheless a very pragmatic one for the students, in the sense that it tends to keep all their options open, especially as it allows the possibility of entrance to the normally high-status and expanding university sector. Furthermore, it is a part of the traditionally elitist liberal education program, which gives a high-status credential that may turn out to be useful on its own anyway.

Yet again, it might be argued that this program of study has gradually come to be seen as perhaps the most vocational of all options, concentrating on skills that have gradually been accepted as generally practical, such as language skills; substantial if not deep knowledge in the mathematical, natural, and social sciences; and general computer skills. Finally, it may be argued that the choice of the academic track is a deferment of a decision; the student makes a sensible choice, without really having to choose, at that time. Sometimes this is partly a positive decision; the student genuinely wants to pursue a number of lines even though no definite aim has been set. It can also be a negative decision in the sense that there is no option but to continue school; because of a total lack of interest, the most general option is chosen. The conclusion is that there may be a combination of reasons for a student corpus to choose the general academic track, and no single theoretical framework would suffice to provide a comprehensive explanation. Thus, even though this conclusion is to some extent in keeping with the credential theory, it suggests a very weak version of it, as the expansion seems to be driven by many diffuse aims that may change over time.

Even though it is perhaps not unexpected, it is still noteworthy to see how gradually and surely the high-status general preparatory program wins ground. All the curves here show a steady academic drift from a strong vocational dominance to a very strong position for general academic education in the secondary schools, a drift from fairly specific, well-defined programs in terms of content and aims toward the much more diffuse, less directional, academic programs.[38] This drift may also be seen as a drift toward unification of the secondary schools. It seems to be enormously robust and powerful.

[37] It is noteworthy that the growth is not much different in a country with a very open university system (e.g., Iceland) than in a country with a much more closed, or restricted, system (e.g., Finland), with the other Nordic countries being in between; see, e.g., a comparison in Jette Kirstein, "Trends in Learning Structures in Higher Education. II. Information on Learning Structures of Higher Education in the EU/EEA Countries," available at Danish Rectors Conference Website 1999 (http://www.rks.dk/sider/publikationer/english/edutrends.htm), see esp. table 3 (last accessed May 30, 2003).

[38] The balance between vocational and academic subjects within the secondary schools in the Nordic countries is quite good; see fig. 5.4 in Petra Packalén, "Deltagende i utbildning" (Participants in education), in Befring and Nordin, eds., pp. 57–68.

This is a conclusion that fits well within the idea of a system that has its own law of behavior, as is suggested by Thomas F. Green, David P. Ericson, and Robert Seidman.[39] They claim that the education system has a life of its own and grows at a uniform rate. A crucial point is made by Archer that even though this can be accepted, "it is a life which was endowed by social interaction" and continues to be so.[40] The behavior of the corpus seeking education, its interaction with the system, and the consequent adaptation of the system to the steadily growing quest for this type of education are more realistic foci of attention than seeing the system as an independent phenomenon.[41]

The time course of the academic drift is different for males and females. It is strong for females in the early parts of the century but seems to dampen slowly, even though it is always stronger than for males. It develops more slowly for males. From this point of view, the academic drift has been inherent in the educational development investigated here for a whole century—at least for females. The development of tertiary education should be studied from this point of view. There are many reasons to believe that the same or similar trends will be evidenced there.

The Importance of the Long-Term Perspective

The nature of educational growth derived from this analysis would be difficult to obtain from short-term data, and this certainly raises the question of whether we are not normally prone to look at educational development from too short a perspective, thereby hiding important features of the pattern of development. The impression of the developments in secondary general education in the Nordic countries would have been qualitatively very different if we had only used data extending from 1970 to 1995.

The long-term perspective presented here indicates that more can be predicted in the field of educational development than is often expected. We have witnessed not only considerable and dominating regularity but also important and apparently fairly abrupt deviations. Thus, it may be difficult to predict what will happen in the short run, but it is easier to discern the development over the long run.[42]

[39] Green et al.

[40] Margaret Archer, "On Predicting the Behaviour of the Educational System: Extended Review," *British Journal of Sociology of Education* 2, no. 2 (1981): 211–19, quote on 218. See also her discussion on the issue in Archer, "Introduction" (n. 7 above), pp. 54–57.

[41] It is also important to note that in this article I am discussing the behavior of a subsystem but not the educational system as a whole, even though it is implied that the behavior of this part of the system determines what happens to the rest.

[42] The same conclusion is reached by Claude Diebolt concerning the growth of public expenditure on education ("Towards a Theory of Systemic Regulation? The Case of France and Germany in the Nineteenth and Twentieth Centuries," in *Discourse Formation in Comparative Education*, ed. Jürgen Scriewer [Frankfurt am Main: Lang, Europäischer Verlag der Wissenschaften, 2000], p. 79). A somewhat kindred view is presented by Collins in his discussion about qualitative changes in education ("Comparative and Historical Patterns of Education" [n. 6 above]).

Was There a Post–World War II Educational Explosion or Revolution?

This question can be answered in three ways. The first answer is yes; growth, which is best described by an exponential fit, is slow at first but continuously speeds up as if it is exploding. The second answer is no because the growth is characterized by more or less the same exponent, so there was nothing in particular that happened after World War II that was not happening before. The form of exponential growth is but an illusion of an explosion, and the explosive part is always the last part, practically irrespective of how far the growth has gone. The third answer is yes because in some countries, notably Norway and Sweden but perhaps also Denmark, something apparently dramatic happened for a short while, like an explosion or a short-lived eruption. In Finland, there was probably a discontinuity in the growth curves between the two halves of the century. This was not the case, however, for Iceland. The general conclusion is that the changes in this part of the educational system are quite smooth, exhibiting noteworthy continuity.

Are There Two Educational Systems?

The data support the conclusion that the growth functions for males and females are independent of each other to an important extent. From that point of view, there are two different systems for males and females, which have been different throughout the century. In fact, an important clue to the nature of the growth may be found in the differential growth of the completion rates for the two sexes. It moves the focus from the overall system to the two groups in question. And there is not necessarily anything mysterious about this difference. It is probably true that in all the Nordic countries, the vocational component of secondary education has always been stronger for males than for females—given the different choices or inclinations of the two sexes—generally speaking. When this is added to the robust expansion of tertiary education, especially for females in all these countries, it is quite understandable that the female attendance rates in the general programs are different than those for males.[43]

Conclusions

This article has demonstrated that expansion of at least parts of the education system is notably regular over extended periods and should not be attributed to governments, except to the extent that they are facilitatory agents. It has also been demonstrated that one should tread carefully when discussing diminishing gender differences or when assuming qualitative alternations to the evolution of a system, even though the rhetoric apparently changes rather dramatically, such as in the period after World War II. The data also lend credence to the claim that qualitatively similar forces are at

[43] Jónasson, "The Predictability of Educational Expansion" (n. 16 above).

play irrespective of the size of the system, though this needs further analysis. But the rather uniform nature of the political and economic structure of the societies analyzed calls for further probing into the interaction of educational development and other social forces operating in order to understand better the nature and generalizability of these results. Further research is also required in order to understand better the nature of the expansion, in particular the age distribution in the population that completes the university entrance examination. This would help to show to what extent striving for credentials attracts candidates outside the normal age ranges who complete the examination under investigation. The effects of academic drift in the secondary sector on the vocational part of the same sector are also of particular interest. At first glance, the growing strength of the academic strand appears, consequently, to weaken the vocational options at the same level, and thus the long-term development of the latter should be investigated in this light. In this sense, the article addresses the development of vocational education, if only very indirectly. It is also clear that the development of the tertiary sector is in many important respects reminiscent of the development of the secondary sector, and thus the development of higher education could fruitfully be analyzed from the perspective presented here.