The Global Expansion of Primary Education

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Introduction

The last two hundred years has seen a spectacular expansion in enrollments in basic education. In 1830, near-universal primary education was limited to a few states in the United States, and the great majority of the World's children received no formal education at all. By 1870, somewhere between 12 and 23 percent of the World's children aged 5-14 were enrolled in a school, and by 1950 this figure had increased to 47 percent (Benavot and Riddle, 1988). By 2002, global net primary enrollment was around 87 percent, with a gross enrollment ratio of around 100 percent (World Bank, 2007). For countries in Western Europe and Western offshoots including the US and Canada, the period of rapid growth began as early as the 1800s, while for much of the rest of the World, it would take at least another 100-150 years to see the takeoff towards universal primary education. The rest of this paper discusses the timing and speed of the transition around the World and discusses the causal mechanisms behind the growth to global ubiquity of basic education.

The Pace and Timing of Global Educational Expansion

The idea of basic universal education stretches back at least as far as the Reformation, with the Protestant focus on lay reading of the Bible an important spur. In Scotland in 1561, John Knox called for the "virtuous education and godly upbringing of the youth of this Realm" involving a schoolmaster to be appointed to every church. "For the poor," he argued "if need be, education may be given free; for the rich, it is only necessary to see that education is given under proper supervision." By 1633, such a schooling system was being supported by a tax on local landowners, although compulsory primary education was only introduced in Scotland in 1872.

In terms of legally requiring the education of all children, perhaps the first cases were in the New World, where Connecticut and the Massachusetts Bay Colony mandated universal elementary schooling in the 1640s and 50s. Nearly two centuries after the first mandated universal education, the North-East states of the United States became the first to achieve it amongst white children, at least, with enrollments as a proportion of the white child population aged 5-14 in 1830 at 106 percent. This compared to rates averaging 21 percent in Virginia, South Carolina and Kentucky.

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In England, a number of radicals during the English Civil War called for universal education until the age of 18 for both boys and girls, with 'literary workhouses' for poor children, but the scheme was not introduced (Hill, 1991). Again, one of the early acts of the French Revolutionary government was to mandate a system of universal education to 18 paid for by the state –sadly, however, funds were not allocated (Barzun, 2000). As with Scotland, it took France and England until the later Nineteenth Century to provide free and universal primary education. German imperial edicts requiring universal education paid for by the community were issued in the 1760s with significantly greater, but far from full, success. As to the rest of the World, at the turn of the Twentieth Century, Lord Curzon mandated that all governments in India must educate children (Go and Lindert, 2007), but universal primary education remains to be achieved.

This brief summary of early intent against outcome suggests that there are at least two steps between the legal mandate and actual achievement of universal primary enrollment –from edict to the funding and capacity to provide universal education, and from there to a universal demand for education. Both steps –perhaps in particular the latter—turned out to be long ones, and this is a finding that applies as much to the postwar period as it did in the Nineteenth Century.

By 1840 the enrollment figure for the US as a whole was around 49 percent, compared to 74 percent in Prussia, 51 percent in France and 35 percent in England and Wales.[2] The first half of the Nineteenth Century was a period of rapidly expanding primary education in Europe and North America as a whole, with enrollments rising from 27 to 50 percent in England and Wales 1830-1850, and 39 to 52 percent in France, for example (Go and Lindert, 2007).[3] By 1870, Canada and Switzerland both had unadjusted primary enrollment ratios of 75 percent or above, suggesting considerable progress towards the goal of universal education. In Northern Europe as a whole, enrollment rates were already 56 percent in 1870, and had climbed to over 70 percent on the eve of World War II.

Compare this European and North American takeoff starting early in the Nineteenth Century to other parts of the World. In South America, Benavot and Riddle note that

[2] In 1840, Arkansas, the District of Columbia, Florida, Georgia, Iowa, Kentucky, Louisiana, Mississippi, Missouri, North Carolina, South Carolina, Tennessee and Virginia all saw enrollments below 20 percent of white children aged 5-14 while Connecticut, Maine, Massachusetts, New Hampshire and Vermont saw enrollments above 90 percent. Change in some states was very rapid over the next twenty years, with Illinois, Indiana, Iowa, Michigan, North Carolina, and Wisconsin seeing enrollments increase by over 50 percentage points. (In every case but North Carolina this was surely linked to a rapid population influx which ranged from doubling the population in Illinois to an (approximate) thirty-fold increase in Wisconsin). The US average enrollment over that period increased from 50 to 75 percent.

[3] In comparison, US (white only) literacy rates were 85-90 percent in 1850, and they were 67-70 percent in England and Wales, 80 percent in Prussia, and 55-60 percent in France (Cameron, 1989). In 1870, 86 percent of US whites were literate, compared to 21 percent of blacks. Between 1870 and 1910, the proportion of blacks who were literate in the US increased from 21 to 70 percent (the figure for whites in 1910 was 95 percent). African Americans in the US saw similar rates of progress over that period as did South American populations as a whole. In Argentina as a whole between 1869 and 1925, literacy increased from 24 to 73 percent. In Chile, 1865-1925 the increase was from 18 to 66 percent (Engerman and Sokoloff, 2001).

over 1870-1940, "Educational expansion was especially pronounced in the more urbanized states with predominantly 'white' populations… and in many British colonies" although even here, expansion began notably later than in Europe. Furthermore, note Benavot and Riddle, low rates of educational enrollment and even educational decline were noticeable in nations with large Indian populations (Bolivia, El Salvador, Guatemala, Honduras, Nicaragua, and Peru).

In colonial territories elsewhere in the world, progress was very slow prior to the First World War, but progress did begin to pick up at that point. Benavot and Riddle note that the average level of primary enrollment attained in the French colonies of Africa in 1940 was about the same as had been attained in the British colonies 50 years earlier. In 1930 Cameroon's enrollment stood at 4.1%, Kenya's at 35% and Malawi's at 37%. In Asia, the percentage of all Indians in school was 0.5 percent in 1870, reached 2 percent 1911 and 3.5 percent 1931 (Ferguson, 2003), --this last translates into an 11 percent primary enrollment rate according to Benavot and Riddle (1988). This suggests a notable takeoff beginning prior to the First World War, but not particularly spectacular expansion.

What about independent nations in Asia and Africa? Iran's enrollment rate was 3.8 percent in 1930, China's was 10 percent and Thailand's 24 percent. Japan led the pack at 61 percent. All now have universal, or close to universal, levels of primary schooling. Ethiopia's current gross enrollment of 63 percent rate suggests very low levels indeed in 1930 and prior, also suggested by the lack of any data for 1930.

What accounts for this global expansion in education, and its differential timing around the world? A further analysis of available data and studies of post-war educational expansion suggests the role for institutional change in launching the transition, and demand-side factors in maintaining it.

Analyzing Enrollment Data

Our data sources for primary enrollment analysis come from Benavot and Riddle (1988) for the 1870 and 1930 data and the World Bank (2007) for 2000 data. The Benavot and Riddle data in turn is collected from a range of public and private sources including censuses, reports by colonial officials and so forth. In 1870 and 1930, the enrollments measured are unadjusted, in 2000 the data is for gross enrollment. An unadjusted enrollment ratio divides total primary school enrollment by the population of a constant school age category (5-14) for all countries. A gross enrollment ratio takes national variations in the duration of schooling into account, so that the school age category varies across countries according to national standards regarding the start and end date of primary education. Our data for income and population is from Maddison (2001).

The data comes with some caveats. Over time, we are comparing unadjusted with gross enrollments, and neither enrollment numbers allow for under and over-age populations in primary schools (which are factored out in net enrollment figures). Benavot and Riddle's data, predating the standardizing and collection efforts of UNESCO, relies on underlying

sources usually reporting enrollment but sometimes attendance (the two figures can vary by as much as 30 percent), which sometimes includes secondary education, and which inconsistently includes missionary and indigenous schools in colonial reporting. Again, their data on school-aged population numbers are often based on estimates generated using cross-country analysis.

The country coverage of the data will be biased towards those countries which had more extensive education systems in place. For example, in Benavot and Riddle's 1940 data, the independent countries not covered are Afghanistan, Bhutan, Ethiopia, Nepal, Yemen, Mongolia and Saudi Arabia, none of which had extensive educational systems in place. This is considerably less of a problem in the 2000 data, where country coverage is far broader.[4] At the same time, Benavot and Riddle demonstrate that the data is by and large reliable where multiple sources are available, and coverage is already at nearly 90 percent of the global population by 1930. This suggests that while data concerns should be born in mind, the data is likely to be robust enough to uncover patterns given the dramatic shifts towards universal education we have seen over the 130 year period covered.

Table One reports on fixed and floating sample data on average and standard deviations of enrollment. The data suggests some progress in extending education in the period 1870-1930, with the global average enrollment rate for available data rising from 23 to 33 percent –a figure that almost certainly underestimates the true rate of progress given that a number of countries with low enrollments were added to the sample over that time.[5] For 33 countries in the full Benavot and Riddle dataset with data available from 1870 to 1910, primary enrollments increased from 35 to 53 percent. For the 66 countries in the dataset with data available from 1890 to 1930, enrollments increased from 33 to 48 percent –a very similar performance over decades –an increase of about 15-18 percentage points over a forty-year period. There is evidence of perhaps even more dramatic progress in the period 1930-2000, with the weighted average gross enrollment reaching 100 percent. In both the 1870 to 1930 and the 1930 to 2000 periods, a declining coefficient of variation suggests convergence –countries with low initial enrollments saw more rapid expansion in schooling.

Figures One and Two further examine the role of convergence over time, plotting 1870 enrollment rates against 1930 rates and 1930 against 2000 rates. In the earlier period, there is clear evidence of progress, with countries increasing average enrollments by perhaps 23 percent, but also clear evidence of a first mover advantage –countries with higher enrollments in 1870 remained countries with higher enrollments in 1930. There is evidence of considerable flattening over the later period (1930-2000), with the great majority of countries in the dataset reaching near 100 percent enrollments –suggesting far more rapid progress 1930-2000 amongst countries with low enrollments in 1930. Indeed, only at very low rates of 1930s enrollments does there appear to be any relationship with

[4] The reason that the population coverage as a percentage of the global population remains comparatively low is the exclusion of China from this data. Official statistics suggest the country has 100 percent enrollment, but this data is not included in the World Development Report.

[5] Assuming that countries without data had no enrollment in formal education (an underestimate, especially for later periods) enrollments climb from 12 to 29 percent 1870-1930 and to 72 percent in 2000

2000 enrollments, suggesting that this 70 year period was long enough to allow for countries even at the very start of the process of expanding enrollments to go from limited to close to universal primary enrollment.[6] Only one country in the dataset with greater than ten percent enrollment in 1930 remained below 90 percent grow enrollment in 2000 –Burma. For the countries with below ten percent enrollment in 1930, four had managed to increase rates to above 100 percent by 2000 –Togo, Vietnam, Jordan and Algeria. Another six --Sudan, Sierra Leone, Mozambique, Zambia, Ghana and Tanzania-- remained at 80 percent gross enrollment or below.

Low income appears to have been little barrier to expanded enrollment over the past 70 years. Figure Two plots enrollment versus income figures for the three periods 1870, 1930 and 2000. As can be seen from the figure and Table Two, in 1870 and 1930, richer countries saw significantly higher enrollment rates, and the link between the two was strong. By 2000, even very poor countries were seeing high enrollments at low income levels, and the explanatory power of income to predict low or high enrollment had fallen considerably. The regression analysis suggests that a country with a GDP per capita of $800 in 1930 would typically have a nine percent enrollment rate while a country with the same GDP per capita in 2000 would expect an 84 percent enrollment rate.[7] The figure suggests effectively no relationship between income and enrollment at a GDP per capita of $1,000 or above.

If Not Primarily Income, Then What?

It is clear from a number of studies that institutional and political factors can play a significant role in determining when the takeoff towards mass schooling began. Go and Lindert (2007) argue that high enrollment rates in New England in the early Nineteenth Century can be accounted for by: (i) higher suffrage rates which extended political power to a mass of citizens who supported publicly-financed education; (ii) decentralized government which tended to favor educational spending (iii) more equitable income distribution, which meant that poor (white) people could more easily afford to send their children to school and (iv) the use of women teachers, which considerably reduced the cost of education. Within a US sample, Go and Lindert can find little robust role for religious factors such as Protestantism versus Catholicism in determining enrollment levels by the 1840s, but it is surely telling that the North East states home to the original Protestant colonies were the first to reach universal levels of education. Similarly, the

[6] This broadly fits with the pattern observed by Clemens (2004) which suggests that in seventy years the average country which began at approximately 20 percent net enrollment would reach 80 percent net enrollment.

[7] Clemens (2004) does report a secondary influence of income levels on the speed of the education transition, and notes that numerous studies suggest wealthier parents are more likely to send their children to school. Nonetheless, given that Clemens can explain ninety percent of the variation in enrollment rates using a global model based on standard transition speeds, the role of income in educational outcomes is clearly secondary to factors such as the educational levels of parents and social learning.

early Scottish lead in education has been linked to John Knox, as we have seen (as late as 1850, Scotland's enrollment levels were still ten percent ahead of England and Wales).[8]

Of Go and Lindert's factors, equality, suffrage and decentralization have been highlighted in cross-country analyses of the spread of education (see, for example, Gallego, 2006). We have seen that one of the early acts of the French Revolutionary government was to mandate a system of universal education to 18 paid for by the state –this occurred very shortly after the institution of universal suffrage. In Britain, the repeated extension of the franchise in the mid-Nineteenth Century was followed by extension of publicly-funded education –the Education Acts of 1870 and 1891 committed the government to the free provision of universal education to the age of eleven, for example (Acemoglu and Robinson, 2000).

For the Americas and other colonized nations, the form of colonial institutions may have determined outcomes. Engerman and Sokoloff (2005) argue that the soils and climates of Southern colonies in the Americas were better suited to lucrative crops best grown on large farms with plentiful cheap labor. Further North, climates and soils favored mixed farming best suited the smallholder model. In the South, this led to the development of a small European elite ruling over a mass of slave or unpropertied labor, in the North it led to a larger population of smallholder European farmers who replaced (usurped) native peoples on the land. As a result, according to Engerman and Sokoloff, in the South "expenditures on education and other public services tended to be miniscule" compared to the North, "reflecting (and contributing to) the magnitude of the inequality that existed between those of European descent and others."

Across the World, it does appear that initially unequal colonies (economies with a small non-native elite ruling over a large native or slave population) were indeed much slower to roll out educational opportunities. Rajan (2006), suggests that 50 percent of the variation in primary enrollments in 1900 is related to variation in the percentage of European settlers in the population in that year, and rates of settler mortality are also an important determinant of early enrollment levels (see also Easterly, 2007). Rajan also finds that variation in the percentage of European settlers in the population in 1900 and gross primary enrollments in 1900 are still related to education levels in 2000.

It is worth noting that Rajan finds no evidence of an impact of democracy on enrollments once the percentage of Europeans is allowed for, which is what we might expect given what we will see is a 'path dependency' of enrollment levels. As an example, early self-rule in terms of educational policy in the Indian Subcontinent than in African colonies does not appear to have led to particularly rapid growth in the inter-war period.

Having said that, this may only point up a delayed response of education to decentralization. The Colebrooke-Cameron Reforms instituted in Sri Lanka in the early 1800s gave considerable power to local participatory structures, and this may help to explain enrollment rates of 20 percent by 1900 compared to India's 5 percent rate

[8] Again, rising enrollments in South America in the pre-war period may have been linked with the struggle to wrest power from the Catholic Church.

(Gallego, 2006). In the earlier period of British rule in India, the approach had been similar to later French colonial approaches regarding the creation of a francophone elite rather than the spread of mass basic education –which we have seen led to comparatively low primary enrolments in Francophone colonies. In Indian administrator Thomas Macaulay's words (in 1835) "we must at present do our best to form a class who may be interpreters between us and the millions whom we govern; a class of persons, Indian in blood and colour, but English in taste, in opinions, in morals…" (quoted in Ferguson, 2003).

Revolution or the approach towards independence created regimes that were far more committed to mass education than were the monarchs or colonial rulers who had come before (Easterlin, 1981). Figure Three presents ex-colonies in the dataset by date of independence and primary enrollments in 2000.[9] It appears clear that longer independence is associated with higher enrollments. Recent independence does not doom a country to low enrollments, but early independence (unlike permanent independence) does appear to almost guarantee high enrollment.

Once the transition to more widespread primary education began, post-war evidence suggests the importance of demand-side factors to enrollment levels. Path dependence in educational outcomes still delayed progress towards universal primary schooling, even in countries where the political will and funding were there.[10] This political will, alongside education infrastructure, is now ubiquitous, but enrollments remain depressed in many countries. Clemens (2004) cites a number of recent studies suggesting that neither proximity to a school nor public education spending has a significant influence on decisions to enroll children in school in developing countries, which are determined considerably more by parental income and education levels.

As further evidence of a demand-side process at work, Clemens (2004) illustrates a very strong global pattern of change in rates of school enrolment. Around ninety percent of the variation in net primary enrollment in all countries for the postwar period can be accounted for by a common global pattern of transition. This transition suggests that a country which reaches 50 percent net enrollment today will reach 70 percent enrolment after 22 years and 90 percent after 58 years. Clemens suggests the recent transition path has been steeper than that in the later Nineteenth and early Twentieth century, and the data presented here suggests that the 1890-1930 transition speed appears to have been about two thirds as fast as is suggested by Clemens for more recent periods. This may reflect the comparative relaxation of supply-side constraints in the post-war period.

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[9] Independence potentially unreliably sourced from www.wikipedia.org

[10] For example, Julius Nyerere's first speech to the colonial Legislative Council in Tanganyika in 1954 focused on education and noted that "in 1947, when the Ten Year Plan came out, we had 13 _ percent of our children of primary school age at school. Since then we have done well. I am told that this year we may have about 30 or 31 percent of the children of the same age group at school. I am told also that Government is also aiming, by 1956, to attain the target of 36 percent of our children of primary school age. That is a great achievement and Government is to be congratulated on carrying out this plan according to schedule. It is a great success, but is it enough? By 1956 we shall still have 64 percent of our children of primary school age outside the schools…" (quoted in Lema et. al., 2004). Tanzania's gross primary enrollment was 66% in 2000 and reported as 106% in 2005 (World Bank, 2007).

Nonetheless, there are still clear limits to the progress which can be made towards universal enrollment.

Some countries *have* managed rapid increases in enrollment rates when pent up demand was satisfied by a new regime which extended schooling opportunities –this was the case in the post-colonial period in a number of countries, or more recently when Uganda introduced free schooling, for example. And while building more schools appears to have little influence on attendance, demand for education can be stimulated –it appears that payments for attendance under schemes such as Mexico's PROGRESA has increased school attendance (Schultz, 2004). Nonetheless, transition speeds are limited by the desire of parents to school their children –a desire that depends in great part on the generational transmission of the idea of the importance of education. This suggests that, for those countries of the World that are still some way from universal education levels, progress is (almost) certain, but growth is unlikely to be instantaneous.

The Next Challenge: Improving the Quality of Education

For the great majority of the World's primary-age children (around 87 percent of them), the challenge is no longer finding a school or even staying in school, but actually learning something while there. Recent surveys have suggested that of tested Indian students who had completed the lower primary cycle, 31 percent could not read a simple story and 29 percent could not do two-digit math problems. In Ghana, only one quarter of 15-19 year olds score more than 50 percent on a test of one and two digit math questions. The average reading ability of Indonesian school students is equivalent to that of the lowest seven percent of French students, and the average math ability of Brazilian school students was equal to the abilities of the bottom two percent of Danish students. And so on (Filmer et. al., 2006)

Improving the quality of education should be a priority even where enrollment has not yet reached universal levels. For example, PROGRESA can improve attendance, but it does not improve school quality, which is still low in many Mexican schools. Forty percent of fifteen year old Mexican students fail an internationally comparable reading test passed by all but five percent of students in the average OECD country (Filmer et. al., 2006). It is a question worthy of consideration: how high are the economic and social returns to financial inducements to stay in school if they encourage students to attend classes where they will learn so little? Perhaps the most important global policy agenda for primary education may no longer be more schools or more students but instead better teaching.

Conclusion

Universal enrollment clearly takes political will –no country has achieved 100 percent enrollment without a government commitment to that goal. But at the same time, no country which has made such a commitment from an initial position of low enrollment levels has achieved its goal overnight. Prior to the Second World War, it may be that the

greatest barrier to universal global primary education was political will –the supply side. Since then the greatest barrier has become time –the time it takes to expand demand for education. The good news is that, as time moves on, this barrier is falling –perhaps not fast enough to achieve the Millennium Development Goal of universal primary completion by 2015, but still at a historically unprecedented pace. The barrier behind –that of ensuring universal access to quality education-- may take longer to fall.

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Table One: Database Description

	1870	1930	2000
Floating			
Average	33	35	98
Weighted Average	23	33	100
Standard Deviation	25	26	19
Count	37	96	141
(Ave log income)	7.20	7.71	8.18
(Std Dev log income)	0.55	0.62	1.15
% Global Population	52	87	72
Fixed			
Average	36	59	106
Weighted Average	26	47	105
Standard Deviation	25	24	11
Count	33	33	33
% Global Population	45	45	38

Table Two: The Relationship Between Income and Primary Education

	1870	1930	2000
C	-225	-218	37
	0.00	0.00	0.00
log income	36	34	7
	0.00	0.00	0.00
R	0.68	0.66	0.20
N	32	51	141

Figure One: Correlation of Enrollments 1930-2000

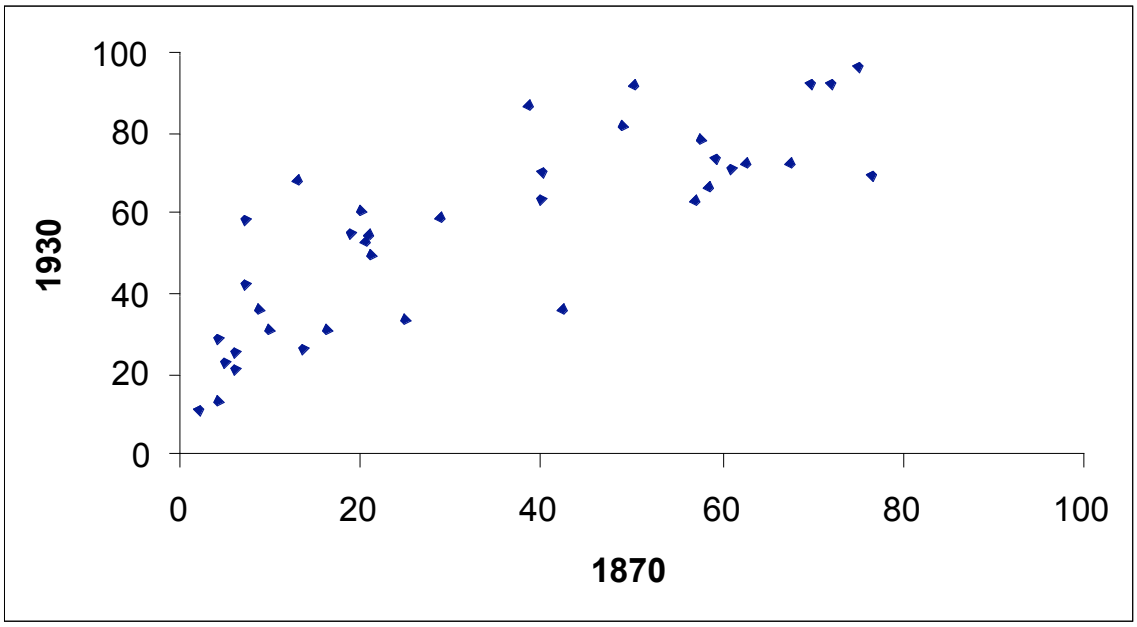

Figure Two: Correlation of Enrollments 1930-2000

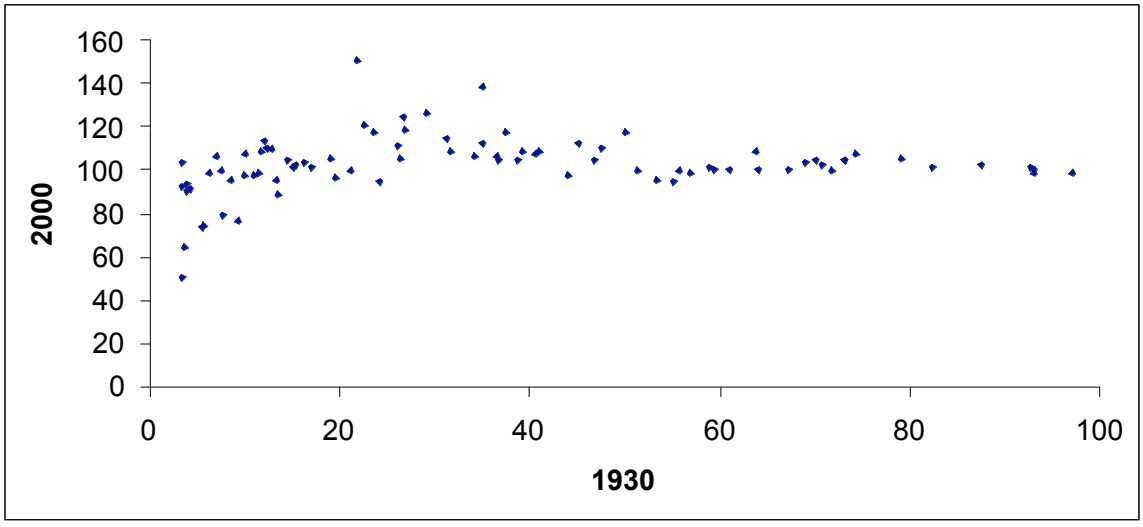

Figure Three: Income and Primary Enrollment Over Time

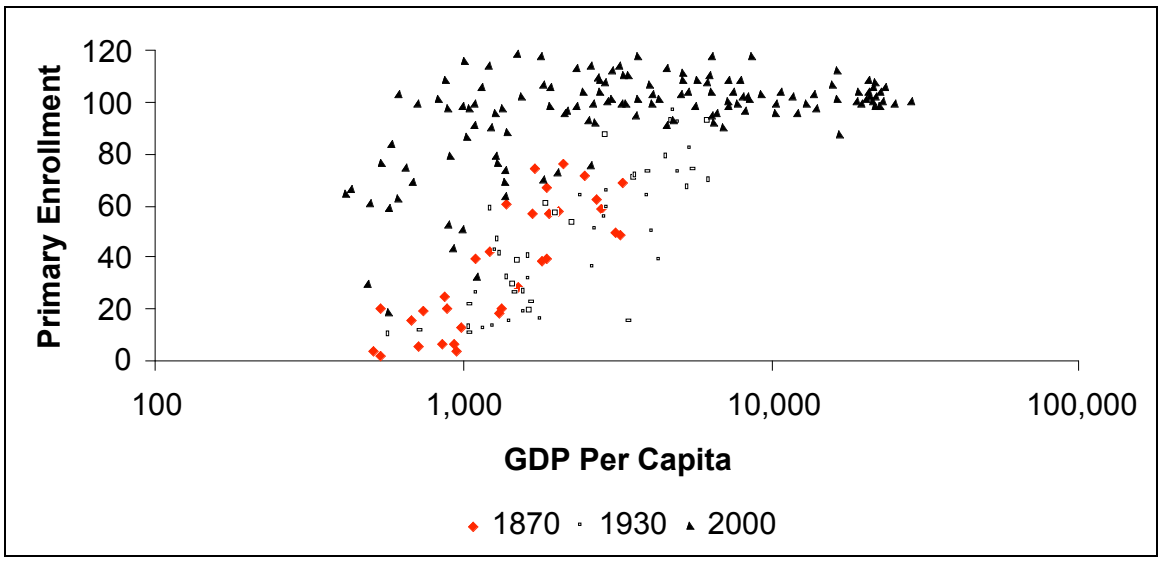

Figure Four: Independence and Enrollment