The Unexpected Long-Run Impact of the Minimum Wage: An Educational Cascade

Richard Sutch

University of California, Riverside,
University of California, Washington Center,
and
National Bureau of Economic Research

Prepared for the Conference on Historical Aproaches to Economics
In Honor of Gavin Wright
Stanford University – September 26-27, 2008
Preliminary Draft – 17 September 2008

ABSTRACT

Neglected, but significant, the long-run consequence of the minimum wage requirement – which was made national policy in the United States in 1938 – is its stimulation of capital deepening. This took two forms. First, the engineered shortage of low-skill, low-paying jobs induced teenagers to invest in additional human capital – primarily by extending their schooling – in an attempt to raise their productivity to the level required to gain employment. Second, employers faced with an inability to legally hire low-wage workers, rearranged their production processes to substitute capital for low-skill labor and to innovate new technologies. This preliminary report explores the impact of the minimum wage on enrollments between 1950 and 2003. I describe an upward ratcheting mechanism which triggers an "educational cascade." My preliminary estimate is that the average number of years of high school enrollment would have risen to only 3.5 years, rather than 3.7 years, for men born in 1951 (17 in 1968). Thereafter, enrollment rates would have trended down to about 3.2 years for the cohort born in 1986, rather than slowly rising to around 3.9 years. The cumulative effect of the minimum wage increases beginning in 1950 was to add 0.7 years to the average high school experience of men born in 1986.

I have benefited from the suggestions offered by participants at the Washington Area Economic History Seminar in March who indulged me by entertaining an early version of my argument. Additional comments received at an early stage were offered at the University of California Washington Center Faculty Colloquium were particularly helpful because the participants were for the most part neither economists nor historians. The comments and suggestions of those who attended the NBER's "Development of the American Economy" Summer Institute in July were helpful and very encouraging. Todd Sorensen made many useful suggestions after a close reading of an early draft. Susan B. Carter has followed this project from its inception. Her advice and encouragement are especially appreciated.

Except perhaps for the Social Security Act, [the Fair Labor Standards Act] is the most far-reaching, the most far-sighted program for the benefit of workers ever adopted here or in any other country.

Franklin D. Roosevelt, "Fireside Chat," June 24, 1938.[1]

What kind of a person would try to wipe out every program since Roosevelt? … He'd have to be a person who believes, and I quote, get this: "The minimum wage has caused more misery and unemployment than anything since the Great Depression." Who on earth would say anything like that? Ronald Reagan.

Walter Mondale, accepting renomination for the Vice Presidency, August 14, 1980[2]

Senator Edward M. Kennedy called an increase in the $4.25 minimum hourly wage "the overarching issue of our time and the election." The Republican House Majority Leader, Richard K. Armey … vowed to fight an increase "with every fiber of my being."

New York Times, April 6, 1997[3]

[1] Montrose J. Moses, editor, *The Fireside Chats of Franklin Delano Roosevelt*, Project Gutenberg, 2002.

[2] "Mondale's Address," *New York Times*, August 15, 1980, Section: Democrats '80: p. B4. The quotation from Ronald Reagan has been widely cited (and ridiculed) but rarely has a source been provided. The *Washington Post*, attributed it to a Reagan news conference in West Orange, New Jersey in January 1980 [Landner 1981]. The *New York Times* reported the source as the *Wall Street Journal* [Clines 1980]. *Time* magazine verified the accuracy of the quote ["They've Got a Little List," 1980], but I was unable to locate a 1980 citation in the *Wall Street Journal*'s data base. However, the *Journal* repeated the quotation on several occasions [Trost 1987 and Wartzman 2001]. The exact date of the West Orange news conference was reported as 29 January 1980 in the *New York Times* [Lindsey 1980].

[3] Peter T. Kilborn, "A Minimal-Impact Minimum Wage," *New York Times*, April 6, 1997.

The minimum wage is a contentious and emotional issue in the United States and it has been for almost a century.[4] A short-hand version of the issue at stake was famously stated by Milton Friedman in *Playboy* magazine: "A minimum-wage law is, in reality, a law that makes it illegal for an employer to hire a person with limited skills" [1973].[5] Proponents, of course, argue that the purpose of a minimum wage is to ensure that every (covered) worker earns an income that can purchase at least the bare necessities of good health and a "living decent according to the standard of the time," a living, in the words of Franklin Roosevelt, "which gives man not only enough to live by, but something to live for."[6] Framed in this way, the minimum wage has been a cause for political battle between Democrats (pro) and Republicans (con) whenever it has been raised at the federal, state, or local level.[7] That means it has been almost continuously the object of heated debate. This political passion is a bit curious since most experts for many years have regarded the minimum wage as a largely irrelevant institutional hangover from the New Deal.[8]

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[4] Massachusetts was the first state to adopt a minimum wage law in 1912. It was a "recommendatory" law that applied only to women and minors [Kelley 1912]. In 1935 this was replaced with a mandatory law and in 1946 the law was amended to apply to men [US Department of Labor 1967: 93-95]. The minimum wage became federal law with the passage of the Fair Labor Standards Act of 1938. The federal minimum wage applied uniformly to all covered employees (male and female) in all regions of the country.

[5] Geoffrey Norman, "*Playboy* Interview: Milton Friedman," *Playboy* 28(2), February 1973: 51- 68 and 74. Reprinted in Milton Friedman [1983: 9- 59]; the quote is from page 16. The Friedman quote is famous enough to be an entry in the *Yale Book of Quotations* [Shapiro 2006: 292].

[6] Franklin D. Roosevelt, "Speech before the 1936 Democratic National Convention," Philadelphia, Pennsylvania, June 27, 1936. The speech is more famously titled "A Rendezvous With Destiny."

[7] For the political and legal history of the minimum wage through 1996 see Jerold Waltman [2000: Chapters 2 and 5]. Also see U.S. Department of Labor [1967: 69-100] and Nordlund [1997].

[8] Charles Brown, a University of Michigan labor economist and a veteran of the minimum wage debates in the academy, stated the case for relative unimportance twenty years ago in his paper "Minimum Wage Laws: Are they Overrated?" [1988]. David Card and Alan Krueger forcefully and persuasively argued that increases in the minimum wage did not lead to a corresponding loss of jobs nor an increase in unemployment [1995]. David Neumark and William Wascher are associated with the argument that minimum wages reduce job opportunities for teenagers, yet they report that their 1992 article did "not reveal disemployment effects of minimum wages for teenagers" [1995a: 199]. For a sampling of journalistic reports see the following, all from the *New York Times* and all suggesting that the minimum wage has or would have minimal economic consequences: Peter Passell [1989]; Susan Raskey, "The

The legislated minimum has frequently been so low relative to prevailing wages that few workers or occupations are affected. The U.S. Bureau of Labor Statistics estimated the fraction of employed wage and salary workers with earnings at or below the Federal minimum wage in 2005 at only 2.5 percent [U.S. BLS 2006: Table 1, also see Haugen and Mellor 1990].[9] In 1938 the national minimum wage was set at 25 cents per hour which was raised to 30 cents the following year and, according to Gavin Wright, had a major impact in the South particularly for blacks working in textiles and tobacco [1986: 219-220], but soon thereafter the minimum wage was "repealed by inflation," as George Stigler remarked in 1946 [p. 358]. From time to time, Congress has increased the nominal minimum wage (and expanded the coverage of the law). In 1950 it was increased from 40 to 75 cents per hour. In July of 2008 it became $6.55 with a scheduled increase for July 2009 to $7.25. See Table 1 for a tabulation of all of the changes. These periodic decisions by Congress succeeded in increasing the real value of the wage floor until 1968, but thereafter the legislated increases have failed to catch up or keep up with inflation. See Figure 1 which plots the federal minimum wage measured in terms of the prices of 2007.

In early studies econometricans who attempted to measure the impact of the minimum wage on employment generally reported only a small effect and that only for teenagers. A careful review by Charles Brown, Curtis Gilroy, and Andrew Kohen considered 18 pre-1982 studies each of which employed a time-series analysis of published data derived from the Current Population Surveys (CPS). All 18 reported a

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Minimum-Wage Fight Isn't Really About Pay" [1989]; Louis Uchitelle [1990 and 1995]; Robyn Meredith, "Politics Aside, Economy Is Shrugging Off Rise to $4.75" [1996]; and Peter Kilborn, "A Minimal-Impact Minimum Wage" [1997]. Passell, an economic historian before he became a journalist, cites the research of Alison Wellington, who found little or no impact of the minimum wage on employment [Wellington 1991]. Raskey attributed to Isabel Sawhill, an labor economist at the Urban Institute, the opinion that the minimum wage "isn't going to make a big difference one way or the other." Uchitelle [1995] quotes Nobel laureate Robert Solow: "The main thing about this research is that the evidence of job loss is weak, and the fact that the evidence is weak suggests that the impact on jobs is small." Meredith quotes Barry Bosworth, an economist at the Brookings Institution: "The whole issue is overblown."

[9] The incidence is much higher for teenagers, the focus of this report. The 2005 estimate for teenagers is 8.8 percent.

negative impact on teenage employment. The point estimates suggested that a 10-percent minimum wage increase would reduce teenage employment by between 0.5 and 3.0 percent [Brown, Gilroy, and Kohen 1982: 505; also see the update in Brown 1999].[10] The reported impact averaged over the 18 studies was 1.5 percent; however, Brown and his coauthors regard the lower part of the range as most plausible because they regard the tests that produced the lower numbers to be the better specified. The few cross-section studies examined produced estimates of an employment reduction between zero and 0.75 percent as the most plausible impact [p. 524].

Studies conducted in the 1980s and early 1990s reduced the estimate of the negative impact on teenage employment induced by a 10-percent increase in the minimum wage to less than 1 percent [Solon 1985, Adams 1989, Wellington 1991; Card and Kruger 1995: 180-182, 194-204]. Because the teenage employment rate averages about 45 percent, a reduction of 1 percent corresponds to a reduction of 0.45 percentage points in the employment rate, a small effect [see Card and Kruger 1995: Figure 6.4, p. 196]. Moreover, taken together these studies do not allow us to reject the proposition that the true effect is zero. There seems to be no discernable evidence of an impact on employment overall.

David Card and Alan Kruger launched a devastating critique of the empirical literature I have just summarized [1995: Chapters 6 and 7]. They conclude that the previous estimates are not robust and that "the conventional view that increases in the minimum wage necessarily have an adverse effect on employment has very weak empirical foundations" [pp. 236-237].

[10] The low estimate is that of James Ragan [1981, 22-23]. The high estimate is based on Marvin Kosters and Finis Welch [1972: 329]. However, I note that in subsequent work Finis Welch reported much lower elasticities [Welch 1976, and Al-Salam, Quester and Welch 1981]; see Brown, Gilroy, and Kohen [1982, Table 2, p. 504].

Quite apart from the issue of whether the minimum wage leads to job loss, I suggest that a neglected, but significant, consequence of the minimum wage requirement is its stimulation of capital deepening. This took two forms. First, the engineered shortage of low-skill, low-paying jobs induced teenagers to invest in additional human capital – primarily by extending their schooling – in an attempt to raise their productivity to the level required for employment. Second, employers faced with an inability to legally hire low-wage workers, rearranged their production processes to innovate new technology and substitute capital for low-skill labor. This essay will focus on the first phenomenon, the impact on educational attainment.

I begin from the premise that the debate over the employment effects of the minimum wage has been misfocused. A labor market with a binding minimum wage is out of equilibrium. In that situation, the alternative to employment for many teenagers is to stay in school. Thus the long-run impact of the minimum wage might well be to increase the stock of human capital: a clearly beneficial, if unexpected, consequence of the minimum wage policy. Yet the impact of the minimum wage on employment is in any case agreed to be rather slight, so one might suggest that any supposed impact on increasing the level of educational attainment is likely to be slight as well. I suggest, however, that there are two reasons to believe that the effect might be strong. First, the minimum wage does have a significant bite for teenagers. I propose an additional point. There is a ratchet mechanism through which the initial response to a change in the minimum wage can trigger an "educational cascade" producing a sustained increase in educational attainment.

To visualize how a cascade might operate, consider a cohort of 15-year old high-school students most of whom would be enrolled in the tenth grade. Each must make a decision about whether to continue to the eleventh grade. The alternative to school is to join the labor force or to voluntarily join the non-employed.[11] One economic factor that

[11] For the student who decides to stay enrolled, part-time (after-school) employment is also a possibility. As a possible motive to drop out, an alternative to a legitimate job is to join the underground economy and

would influence this decision would be the local unemployment rate of teenagers. Since 15-year olds are not likely to look these statistics up at the library or even read about them in the newspaper, we suppose they form an impression of employment possibilities by observation of the experiences of those like themselves in the local job market. Thus the relevant unemployed rates would be those for individuals of the same race, gender, and locality – those of the individual's likely "role-model" group. Thus a black 15-year old male would be likely to consider the job-market experiences of the 16- to 19-year old black men who were not in school in his locality.

There would be another peer-effect on the school-versus-labor-force decision coming directly from the student's classmates. Dropping out would be a significant and probably difficult decision. For most it will be irreversible [Card and Lemieux 2000: 8-9 and Table 1]. In such a situation it is natural that the student would consult and often mimic his peers. If more of the high school students our 15-year-old knows stay in school and go on to the next grade, he will be encouraged to continue as well.

Role-model and peer effects are not the only influences on the school attendance decision. I presume that the opportunity cost of going to school will influence the decision. The opportunity cost will be largely driven by the wage the student can expect if he takes a job. What a binding minimum wage will do is to dramatically lower the opportunity cost of schooling for those whose skills do not yet warrant receiving the minimum wage. In a job market with a high minimum wage, the earning prospects of a student with sub-minimum skills are nil.[12] Thus an increase in the minimum wage should

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to engage in criminal activities with a pecuniary reward (drug dealing, prostitution, theft) [Freeman 1996]. My focus is on the enrollment decision, not the labor-force status or occupation of the teenager.

[12] I am skirting the issue that not all jobs are covered by the federal minimum wage law. The original law covered workers in private industries engaged in interstate commerce or the production of goods for commerce. It excluded such major sectors as agriculture, retail trade, and service [Douglas and Hackman 1939: 29-33]. Effective in 1950 coverage was reduced by narrowing the meaning of production for interstate commerce. In 1961 employees of retail establishments with sales over $1 million were added. In 1967 employees of schools, colleges, hospitals, hotels, restaurants, and laundries and employees of large farms were added. In addition the retail sales volume test was reduced to $250,000 [Frankel 1966, Waltman 2000: 46]. By 1968 coverage of wage workers by the federal law was reasonably complete and many states had their own minimum wage laws that extended protection to those not covered by the federal

reduce the dropout rate for this cohort by lowering the opportunity cost of staying in school.

As I envision this mechanism moving forward in time, a feedback would then produce a ratchet effect operating on the next cohort. If the minimum wage increase causes a greater fraction of the tenth-grade class to stay in school, then the next year's tenth graders will see a greater number of their peers staying in school than would have been the case without the minimum wage increase. Thus even without further minimum wage increases the dropout rate will remain lower than it would have been otherwise. In principle this ratchet effect can influence educational trends for several, perhaps many, years. However, if inflation and productivity increases begin to erode the bite the minimum wage takes out of the lower tail of the wage distribution, the forces supporting the reduction in dropout rates would become attenuated. Another increase in the minimum wage would be necessary to revive the effect.

As educational attainment rises over time, it will generate a scarcity of low-skilled laborers whose employment would be warranted at the minimum wage relative to the skill distributions that characterized the past. One consequence is that this relative shortage would induce employers to substitute capital for low-skilled workers. Think about the computer-assisted order kiosk in a fast-food restaurant. The take-out clerk can punch in the customer's order which immediately flashes on a computer screen in the kitchen and automatically computes the bill and the amount of change to return and even prompts the clerk to ask if the customer would like the order "super-sized" or to suggest a side of fries. A consequence of the capital-labor substitution is to raise the productivity

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law. Moreover, there is some evidence that many (most?) employers who are not required to pay the minimum wage do so nonetheless [Card and Krueger 1995: 158, Fritsch 1981, Uchitelle 1990, Katz and Krueger 1991, 1992].

of workers with limited skills. Thus, increasing the minimum wage should work to increase the productivity of those at the bottom of the skill distribution.[13]

If not counteracted, a shortage of low-skilled workers combined with a rising productivity of low-skilled workers operating with more sophisticated capital might drive up the market-clearing wage for low-skilled workers and thus erode the bite of the minimum wage and slow down or even halt the educational cascade. However, in a global economy with open boarders the shortage of low-skilled domestically-educated workers would stimulate the immigration of such workers from abroad, thus widening the wage distribution and increasing the returns to additional education of the native born. Immigration (documented or not) then will serve to prevent a stifling of the long-run educational impact of a minimum wage increase. Another possibility is that the shortage of low-skilled workers will induce producers to import goods and services with low skill content from suppliers abroad, thus producing much the same beneficial impact on school attendance as immigration.

Too much of the theoretical literature on the minimum wage has assumed that low-skilled workers are homogeneous. In the scenario I have just sketched, I assume – as seems realistic – that high school students are heterogeneous in the distribution of their job-relevant skills. I illustrate the point in Figure 3. The red line represents the hypothesized distribution of skills (in real terms) of students still enrolled in high school in period t facing an increase in the minimum wage from MW_t to MW_{t+1}. For ease of reference, I will place high school students into three groups. Some, who I will call "the relative skillful," have skills such that – in a suitable job – would contribute sufficient product at the margin to warrant more than the proposed minimum wage. Others, who I label as "sub-minimal," have skills (or a maturity) so low that they could not be productively employed at any job paying the current minimum wage. At an intermediate position, the "marginal group" would be able to secure productive employment at the current minimum but unable to do so at the higher minimum.

[13] The argument that a minimum wage would stimulate technological innovation was made by Sydney Webb [1912: 981-983].

The enrollment decision of the skillful and sub-minimal students would be unaffected by the proposed change in the minimum wage. It would be marginal students who would be shut out of the labor market by an increase in the minimum wage and thus see the opportunity cost of their schooling fall. Note that in periods where the nominal minimum wage is constant, the marginal group collapses to a razor thin slice.

This distribution of job-relevant skills is not the same as the distribution of academically-relevant abilities. An individual student's position in the distribution depicted in Figure 3 would not be static. It will shift rightward as time goes on. Additional schooling will enhance job-related skills and move the individual to the right. How effective additional schooling will be in moving the student to higher skill levels will depend – presumably – upon the student's academic abilities. The higher those attributes, the higher the perceived return to continued enrollment. That is why not every relatively-skillful student will take a job. Some will, of course, but their lower academic promise may be the cause.[14]

I can also illustrate the influence of the introduction of new technologies and higher capital-labor ratios on the three groups. Labor productivity would be raised by those phenomena, shifting the entire distribution to the right (relative to the MW_t and MW_{t+1} lines) and caring every student with it. That would sweep some marginal students into the relatively-skillful group where those with low academic potential will be tempted to drop out. To prevent the consequent decline in enrollments, the minimum wage would have to be adjusted upward to at least keep up with productivity advances.

The educational cascade I am describing is not incompatible with the proposition that a minimum wage increase would have no negative employment consequences. If everyone employed before the increase retained his or her job and if every vacancy created by voluntary attrition were filled, it would still remain the case that a law that

[14] Poverty or a temporary setback might force some academically promising students in the skillful group to drop out. If so, the fault would be imperfect capital markets that make it impossible or prohibitively expensive to borrow with only academic promise as collateral.

makes it illegal for an employer to hire a person with sub-minimal skills would shut the student in the marginal group just described out of the market and thus lower the opportunity cost of remaining in school.

This report will explore the connections linking the minimum wage and educational attainment using a variety of data sources. It will set aside for another project the impact of the minimum wage on inducing investments in physical capital, spurring technological innovation, or stimulating an increase in low-skilled immigration. Compared to the quite extensive literature on the employment effects of the minimum wage, there has been very little empirical work on the impact of the minimum wage on schooling. I know of only a few prior studies.

James Ragan in a passing footnote reported a time-series regression in which the unemployment rate and the minimum wage rate had no impact on school enrollment to justify an assumption to that end [1977: fn 17].

Peter Mattila has made an argument that is in part similar to mine [1981]. "There is good reason to believe that school enrollment may be affected. If minimum wages create barriers to employment, then additional schooling may be one strategy for overcoming that barrier …" [1981: 61]. Using a time-series analysis of the published CPS statistics for 1947 through 1977,[15] he found "considerable support for [his] thesis that minimum wages have increased school enrollments. … [T]his suggests that the major adjustment made by displaced teenagers is to continue their schooling rather than to drop out or to join the ranks of the full-time unemployed" [pp. 76-77]. Mattila did not make the educational cascade argument.

David Neumark and William Wascher [1995a, 1995b, and 2003] reach an opposite conclusion. They report that "the minimum wage reduces the proportion of teenagers in school" and that their evidence is "most consistent with minimum wages

[15] Mattila's data on enrollments is based on the October education and school enrolment supplements to the Current Population Survey. This choice of data is important and appropriate, as we will argue below.

reducing the skill acquisition among the young." However, they emphasize the preliminary nature of their results and suggest that the topic "merits further scrutiny" [Neumark and Wascher 2003: 9]. [16]

Neumark and Wascher explain their findings by arguing that the effect of an increase of the minimum wage on educational attainment is ambiguous. Countering and presumably swamping the positive effect on enrollments generated by the marginal group of students they postulate that a modest increase in the minimum wage would induce some of the skillful students to leave school prematurely to take the now more-remunerative minimum wage jobs [Neumark and Wascher 1995: 204]. From the neo-classical perspective, this is a curious argument. These skillful students presumably could earn their marginal product by taking a job at any time. Why these students would not have been attracted to a wage equal to their marginal product before the minimum wage increase is not explained. Implicit, I gather, in the Neumark-Wascher mechanism is the idea that relatively skillful teenagers paid the minimum wage are being exploited and that an increase in the minimum forces the employers to raise the wage closer to their true marginal product. But this assumption is implicit and thus is not defended.

One possible mechanism that could generate the exploitation of skillful students is market signaling, the "lemons model," which leads to a form of "statistical discrimination" [Akerloff 1970, Arrow 1972, Spence 1974]. Suppose that employers cannot adequately judge the potential productivity of a job applicant ex ante and that they are unwilling to engage in a costly investigation of each. The employer might then use age and education as signals of skill. Thus all teenagers of a given age would be offered the same wage. The skillful students would be underpaid relative to their productivity

[16] In the 1995 incarnation of their enrollment research Neumark and Wascher used a panel of state-level time series based on the May CPS following up on their earlier work on the employment effects of the minimum wage [1992]. However, their enrollment variable was too narrowly defined because of the limitations of the May survey [Card and Krueger 1995: 211-215]. The 2003 article, however, switched to the more appropriate October survey data. See also the supporting companion article to Neumark and Wascher [2003] by Duncan Chaplin, Mark Turner, and Andreas Pape [2003], which examines school enrollment data from the U.S. Department of Education.

and thus disadvantaged, like a non-lemon on the used car market. The underpayment might prompt them to remain in school. An increase in the minimum wage would make employment more attractive to these students and produce the Neumark-Wascher effect.

The exploitation model and mine are not mutually exclusive; the Neumark-Wascher effect works to induce high-skilled teenagers to leave school early while the effect Mattila and I suggest works to induce marginally-skilled teenagers to stay in school. The empirical work needs to consider both possibilities. Note however that if the minimum wage increase were large, there would be very few students subject to the Neumark-Wascher effect, most of them would be swept into the marginal group with its corresponding inducement to stay in school. If a negative effect on enrollment for the relatively skilled is accepted for the period 1980-1998, the correct conclusion is that the minimum wage increases in that period were not large enough.

In what follows I depart from the previous literature in several dimensions. I am rather skeptical of the time-series regression approach taken by others partly for the general methodological reasons discussed by Card and Krueger [1995: 183-186], but also because the equations specified by Mattila and Neumark and Wascher take the enrollment rate of teenagers – the percent of the 16-19 year old population enrolled in school – as the dependent variable. Thus a given cohort of teenagers will appear in four successive annual observations, first as 16-year olds, the next year as 17-year olds, and then as 18- and again as 19-year olds. Apart from the serial correlation such a specification might introduce, it ignores the constraining fact that the enrollment rate can only go down as the cohort ages from 15 to 20.[17] This calendar-year dependent variable can also change in magnitude from year to year as one cohort is dropped and a new one added and is thus not free from cohort composition effects.

By focusing on teenagers aged 16-19, the approach of previous researchers examines a group that is not identical to potential high-school students, the bulk of whom

[17] Few students who have dropped out of school before graduating return to school at a later date.

are aged 14 to 17. They do this, presumably, because legislation designed to prohibit child labor has set 16 as the minimum wage for employment, but it may well be that significant numbers of 14- and 15-year olds are particularly vulnerable to lure of the job market which will open for them within the school year.[18] I am also concerned that most 18- and 19-year olds have successfully graduated from high school. These individuals might seek employment after graduation; they might choose to enroll in higher education. Their choice in this regard is much less likely to be influenced by a change in the minimum wage since I presume that with four years of high school most graduates have already passed into the relatively-skilled group at the right-hand side of the distribution of job-relevant skills. On the other hand, if the decision to attend college *is* directly influenced by a change in the minimum wage, it is likely to be affected in quite a different fashion than the choice to forgo high school graduation.[19] Both Mattila and Neumark and Wascher include enrollment in institutions of higher learning in their enrollment rate variable. The approach that I take is to focus attention on cohorts rather than calendar years and to examine high school attendance only, but not higher education.[20] Of course, college attendance is predicated on high school completion and thus will be indirectly influenced by an increase in the minimum wage.

The previous literature has used some measure of the "real" minimum wage – the nominal minimum deflated by a price or a wage index – as the treatment variable.[21] Another problem, as I see it, with the traditional regression approach is that it treats

[18] I plan to take account of the fact that the compulsory education laws of some states require enrollment past the age of 16. I am in the process of gathering the required data. It is worth noting that Chaplin, Turner, and Pape report that higher minimum wages reduce teen enrollment only in states where students can drop out before age 18 [2003: 11].

[19] In American society dropping out of high school is generally counseled against and often characterized as a sign of failure. Deciding to pursue a college education is seen as more of a "free choice" of an open option and thus it is less subject to peer or family pressure. College attendance also requires outlays for tuition, fees, and books that are significant compared to those for high school.

[20] Another advantage of the cohort approach is that the results are not effected by the gradual increase in the average age children begin school which is a trend documented by Deming and Dynarski [2008].

[21] Often in the minimum wage literature the relative minimum wage is adjusted for coverage.

legislated changes in the minimum wage (which are always a nominal increase) symmetrically with changes produced by inflation of wages or prices (which are generally downward).[22] My model, however, assumes that legislative increases in the minimum wage will be a "shock" that induces some of the marginal students to enroll in school when they otherwise would have dropped out. The gradual erosion of the real minimum wage by inflation or rising productivity produces no such shock, it simply reduces the size of the sub-marginal group, increases the size of the skillful group (both of which I assume are insensitive to changes in the minimum wage), and enlarges the group that could be potentially shocked by the next legislated increase in the minimum.[23]

To explore the enrollment consequences of an increase in the minimum wage I turn to two different sources of data. For the period 1968 to the present I use the micro-level data drawn from the public-use files of the October Survey of Current Population [Unicon Research 2007]. Although the school enrollment questions associated with the October surveys date back to 1947, only the published summaries are available for the years before 1968. For the period before 1972, I use the micro-level data in the Integrated Public Use Microdata Series (IPUMS) drawn from the enumerators' manuscripts of 1980, 1970, and 1960 censuses of the U.S. population [Ruggles et al 2008]. The two data sources are quite different. They pose unique complications and offer unique opportunities. I will treat them separately, beginning with the more recent. This partition by data source is unfortunate because coincidentally the general trend of the national real minimum wage has been downward since 1968, while it was generally rising between 1950 and 1968 [see Figure 1]. In what follows I make my best effort to adjust for the changes in my evidentiary bases.

It should also be noted that throughout the entire period some states enacted minimum wage laws that exceeded the federal minimum established by the Fair Labor

[22] It is this fact that generates the saw-toothed appearance of the real-minimum wage plotted in Figure 1.

[23] As already mentioned, increasing the size of the relatively-skillful group increases the number of students who could drop out if they so wished.

Standards Act and its amendments. See Figure 2 and Appendix A. When the state law established a minimum wage that exceeded the federal minimum, the state law takes precedence. We will exploit the information inherent in the interstate variance in the legal minimum in what follows.

Post-1971 Tests for Impact of Changes in the Federal and State Minimum Wage Laws

For parsimony's sake – I begin with a look at changes in the federal minimum wage rate before turning to the variation in state laws. Before the latest (and still uncompleted) round of minimum wage increases, there are four episodes that we can examine with the October CPS data. For ease of identification, I label them with the name of the President who signed the corresponding minimum wage bill:[24]

Nixon Round – 1974-1976		Enacted: April 1974
1 May 1974	from \$1.60	to \$2.00
1 January 1975		to \$2.10
1 January 1976		to \$2.30
Carter Four Step – 1978-1981		Enacted: November 1977
1 January 1978	from \$2.30	to \$2.65
1 January 1979		to \$2.90
1 January 1980		to \$3.10
1 January 1981		to \$3.35
Bush I Round – 1990-1991		Enacted: November 1989
1 April 1990	from \$3.35	to \$3.80
1 October 1991		to \$4.25
Clinton Round – 1996-1997		Enacted: August 1996
1 October 1996	from \$4.25	to \$4.75
1 September 1997		to \$5.15
Bush II Round – 2007-2009		Enacted: May 2007
24 July 2007	from \$5.15	to \$5.85
24 July 2008		to \$6.55
24 July 2009		to \$7.25

[24] This nomenclature is a bit misleading because each of the five minimum wage bills emerged as a compromise between the supporters of a raise (most Democratic congress members and Presidents Clinton and Carter) and opponents (Republican legislators). The dates of enactment are reported in the New York Times [Apple 1974, "Carter Signs" 1977, Rosenbaum 1989, Stevenson 1996, and Labaton 2007].

It is important to examine these federal changes by rounds since the second, third, and fourth steps can be anticipated as of the date the first step is enacted. Thus forewarned, the impact of the subsequent steps may influence student decisions before they actually take effect.

I use the October surveys from the CPS because they contain detailed questions about education; in particular there is the response recorded to a question about the school grade attended.[25] This information was recorded for everyone aged 3 and older.[26] The CPS surveys recognized four grades of "high school" defined as 9th through 12th grade. By merging the October results for all the available years (1968-2006) I can follow a birth cohort from year to year. A student who was 15-years old in October 1968 would be 16 in 1969, 17 in 1970, and so on. A birth cohort series assembled in this manner describes a "statistical" rather than a true cohort since we have a sample of 15 year-olds in 1968 and a separate sample of 16 year olds in 1969 composed of individuals not surveyed in the previous year.[27] But if the samples are representative, then the time series identified as the birth cohort of 1953 can be said to represent the experience of those who were born between 15 October 1952 and 14 October 1953 (1953 + 13 = 1968) and who survived into the following year.

For each cohort I calculate the average number of years of high school enrollment experienced between ages 13 and 20. A time series of this statistic for males is displayed as a blue line in Figure 4. The shaded bars indicate the cohorts that experienced a change

[25] No distinction is made in the CPS between enrollment and attendance.

[26] This is reported in two variables. One is named *grdatt* and labeled "Grade attending" in the Unicon version of the October data files. The other is named *chgrd* and labeled "Grade or year child is attending." For ages 15 and up the information is recorded in *grdatt*. For ages 13 and 14 the information is recorded in *grdatt* for 1968-1983 and in *chgrd* for 1989-2006. For the period 1984-1988 the information for 13-year olds is recorded in *chgrd* while that for 14-year olds is in *grdatt*. Producing a consistent time series is complicated for 1968-1983 since children (age 3-13) recorded in grdatt are coded with a different set of codes than used for adults (14 and up). The incarcerated population is excluded and beginning in 1994 the universe excludes members of the military.

[27] A statistical cohort is not quite the same as a "synthetic" cohort since the latter is derived from a cross-section. The statistical cohort follows an actual birth cohort but draws a different (random) sample from that cohort each year.

in the minimum wage while of high school age. In Table 2 I give an example based on the Nixon round of minimum wage increases to illustrate how the affected cohorts were determined. Recall that the Nixon round consisted of three increases in the minimum wage; the first on 1 May 1974, the second on 1 January 1975, and the third on 1 January 1976. Note first that the typical ages of high school attendees in October was 14 to 17, though a significant fraction of 18-year olds (21.3 percent) were also still in high school. The table gives the birth cohort for each age class, 13 through 20, beginning with the October survey taken before the first rate change (and before President Nixon signed the wage bill[28]) continuing through the October that followed the third increase. I consider the cohorts of 1958 and 1959 to be the most directly affected by the Nixon round. The cohort born in 1957 aged from 16 to 17 years over the year that the first minimum wage change took place. But most 17-year olds would be seniors (12^{th} graders) in 1974, so this cohort had only a brush with the Nixon round. The 1958 cohort on the other hand experienced both the first and second increases before they reached 17. The 1959 cohort experienced all three boosts in the minimum during their high school years. [29]

I would expect the 1959 cohort to experience more years of high school education than either the 1957 or 1958 cohorts. This is, indeed, what we find. The 1959 cohort (they were 17 in 1976) reported 3.78 years. The 1958 cohort logged on average 3.69 years of high school enrollment by the time they were 20. The 1957 cohort reported 3.68 years. The three other rounds of minimum wage increases appear to have produced a similar ratcheting up in school attendance. All four episodes coincide with a noticeable increase in the average amount of high school experienced.[30] Moreover, much of the

[28] President Nixon had vetoed the bill the previous September and his change of heart was somewhat of a surprise. "But politicians in both parties suggested that, with possible impeachment hanging over his head, Mr. Nixon could not afford to risk a second veto" [Apple 1974].

[29] Recall that the 1958 birth cohort is calculated by subtracting the age of the respondent in October from the year that the survey was conducted. Thus the two cohorts of 1958-1959 consist of those born between 15 October 1957 and 14 October 1959.

[30] For the Carter four-step round the four cohorts born 1961-1964 were the most effected. The cohort of 1961 experienced two Carter steps between age 16 and 18. Those in the cohort of 1962 experienced three steps between age 15 and 18. The cohort of 1963 experienced all four steps during their high school years.

gain from each episode persisted. According to my argument this effect can be attributed to the educational cascade caused by peer emulation. Indeed, the entire upward trend in male high school attachment during the period since 1972 can plausibly be attributed to minimum wage increases. We can illustrate this by removing the gains observed for the treated cohorts and then splice together the changes that remain. This is illustrated diagrammatically by constructing the lower time trend in the figure. Remarkably, that line shows a downward trend.

As Figure 5 illustrates, the pattern for women is much the same as that for men. Women also reported increases in attendance at all four rounds. The magnitude of the increase for the Nixon round is less dramatic compared with that for men, but the magnitudes are roughly the same for the following three rounds.[31] An exercise that deletes the periods of minimum wage exposure and splices the remaining years together for women is also presented in the figure. This demonstrates that the upward drift in high school exposure for women since the mid-1970s can be eliminated by removing the ratcheting influence of the cohorts treated by the minimum wage.

Testing for the Impact of State Minimum Wage Increases, 1968-2003

One objection to the foregoing analysis is that a number of the states had set minimum wages higher than the federal rate during this period. In those states the relevant rate is the state minimum, not the federal. Moreover, the changes in these state minimums often took place at different dates than the federal changes. I will deal with this concern in two ways. First, I compute the time series on the number of years of high

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Those from the cohort of 1964 experienced the last three Carter steps between age 14 and 17. The Bush I round had two steps. The cohorts of 1973 and 1974 experienced both of those changes between ages 15 and 18. The Clinton round also had two steps, but the first step took place on 1 October 1996 only a few days before the October CPS survey of that year. I take the cohorts of 1980 and 1981 as those that were most affected. Considering the simultaneity of the first step and the October survey, the cohort of 1979 experienced only one upward tick and that was between age 17 and 18. The cohort of 1982 witnessed the first step between age 13 and 14 and the second between 14 and 15.

[31] Interestingly, during the Nixon era the graduation rates for women and men measured at age 20 were roughly equal, but following 1975 female graduation rates were consistently higher then that for men.

school experienced including only states in which the federal law dominated. Second, I repeat the analysis above for several states that set minimums at a higher level than the federal government and which changed their minimums on dates that differed from the federal changes. Among this set of state demonstrations it is possible to compare the state change(s) under examination with the experience of states that had no changes in either federal or state law.

The first approach to accounting for the differences in the effective date of state laws when they superceed the federal minimum calculate the number of years of high school enrollment experienced by each cohort only for states that did not exceed the federal standard. Appendix B indicates the states that were included in each of the four tests.[32] Figures 6 and 7 present the results for men. In two of the cases examined, the Nixon round and the Bush I round, the results are clearly stronger than in the original. In the Carter round the result is somewhat weaker than measured without excluding any states, but is still quite substantial. During the Clinton round the expansion of high school experience is measured at approximately the same magnitude.

As illustrated in Figure 2 there have been five episodes since 1950 when a significant number of states raised the minimum wage above the federal level. These five episodes preceded five rounds of increases legislated by Congress beginning with the Nixon round of 1974-1976. It would seem at first that this implies that there should be many cases that could be examined individually. However, due to limitations of the CPS data set a number of the possible cases cannot be examined. The last cohort we can observe fully at the time writing was born in 1986 and was 20 in 2006, the last year for which the CPS data is presently available. That cutoff date, a year before the Bush II round, makes the examination of that episode premature. We are constrained when considering the first episode of state increases as well. For the years 1968-1973 the variable indicating the state of residence is aggregated in the public-use data source into

[32] For the Nixon Round test some states were also excluded because of the aggregated geocoding in the CPS files for 1968-1976.

regional groupings for most states. Of the 12 states that raised their minimum above the federal level prior to the Nixon round, only four, Connecticut, New York, New Jersey, and Illinois, can be individually examined. Only one additional state, California, is individually identified during the years prior to the Carter four step round of increases.

An additional limitation is produced by the annual nature of the CPS surveys, conducted in October of each year. Some states raised their rates less than a year before the subsequent change in the federal minimum. Illinois, for example, raised its rate in January 1974 only a few months before the federal increase in May of that year. Thus in our annual data source, Illinois' change would appear coincident with the federal change. That leaves only three states for our pre-Nixon test: New York, which changed its law in July 1970; Connecticut, October 1971;[33] and New Jersey, October 1972. The left-hand panel of Figure 8 graphically displays the minimum wage history of these three states for the 1970's. The lower black line in each case is the federal minimum; the upper black line displays the state's minimum wage when it exceeds the federal rate. The blue shading indicates the periods when the state minimum exceeded the federal. Note that the vertical scale is logarithmic and measures the wage rates in nominal dollars.

The right-hand panel of Figure 8 presents the results for these three states taken together and compares them with the results for a selection of states where federal law dominates.[34] As anticipated, the three-state aggregate displays a prominent spike in high school attendance before the Nixon round. And that spike was larger than the reaction to

[33] Connecticut officially raised its minimum allowable rate above the federal level in May 1971 but it was only by a symbolic one cent. In October the state raised its minimum to 25 cents above the federal level of $1.60. See Appendix A for details.

[34] I have aggregated the three states because of the low number of observations in Connecticut and New Jersey. The data for the states that did not have a state law that exceed the federal law is the same as displayed in the left panel of Figure 6. See Appendix B for a list.

the Nixon round in those states. This makes sense, of course, since the impact of the May 1974 federal increase was muted in those states.[35]

Four states raised their rates above the federal level prior to the Carter four-step round initiated in 1978. Two of those were New York and New Jersey. The other two were California and Hawai'i. None of the four can be separately analyized.[36] The best episode of the four for testing the impact of state increases is the period of the late 1980s. Eleven states raised their rates above the federal level. However, the last of the 11, Iowa, timed the effective date of its increase only four months before the federal change. Three others, Wisconsin, North Dakota, and Oregon, raised rates less than a year before the first hick of the Bush I round. The remaining seven can be divided into three distinct groups, Maine, Vermont, and Rhode Island increased their standards between October 1984 and October 1986. Hawai'i and California moved between October 1987 and October 1988. Those two were followed by Washington and Pennsylvania, both increasing their minimum rates on January 1989.

Figures 9, 10, and 11 display the results for these three sets of states. The vertical bar in each figure indictes the time period during which we expect to observe a spike in high school enrollments by cohort. In each case the spike is evident and substantially larger than the movement shown for the states that did not raise their minimums above the federal level.

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[35] We might also note that these three states were all states that experienced high enrollment rates compared with the rest of the county (see Addendum Figure 1, right panel) making proportional increases in the enrollment rate less likely.

[36] Unfortunately, Hawaii's data can not be separated from the data for Washington and Alaska. New Jersey's pre-Carter increase was in January 1975 during the middle of the Nixon round. New York and California's increases in October and November 1976 came directly between the Nixon round (May 1974-January 1976) and the Carter four step (January 1978-January 1981). Thus California and New York experienced an increase every single year from 1974 to 1981. For New Jersey and the states that did not exceed the federal standard there were also changes every year with the exception of 1977. Thus it would be difficult to discern a distinctly different pattern for these three states.

Pre-1972 Tests for Impact of Changes in the Federal Minimum Wage Law

The micro-level CPS data used for the post-1971 tests is unavailable before 1968. Thus I need to switch data sets and adopt a different approach to study the impacts of changes in the federal minimum wage during this earlier period.[37] Rather than surveying each cohort annually as they progress through the U.S. school system, I turn to retrospective reports of educational attainment. For this information I use the 1-percent samples drawn from the 1980, 1970, and 1960 decennial censuses available from the University of Minnesota's IPUMS project [Ruggles et al 2008].[38] Each individual was asked to report to the Census Bureau the highest grade of school ever attended. The micro-level data files report the highest grade of school completed and also identify respondents who began but did not finish the grade.[39] From these reports I can calculate the number of years of high school attended by each respondent. Constraining attention to native-born individuals greater than 20 years old and less than 66 at each `census, I was able to produce the cohort data displayed in Figure 12.[40] The blue line at the right, reproduces the CPS data for males shown earlier in Figure 4. The red line presents the data for males constructed from the responses to the 1980 census for the high school cohorts of 1938 to 1976. The black line is constructed from the 1970 census and the green line, pushing the series back to the high school class of 1918, is based on responses to the 1960 census.

[37] There were few states with minimum wage increases that exceeded the federal minimum before 1970. See Figure 2.

[38] I cannot use the 1990 or subsequent census samples because they define educational attainment differently than the earlier censuses. In particular they consider the Generalized Educational Development (GED) degree (or high-school equivalency diploma) to be equivalent to graduating from twelfth grade and earning a high school diploma. For a discussion of the problems this change created see Heckman, LaFontaine, and Rodriguez [2008].

[39] The variable is called *higraded* and is labeled "highest grade of schooling, detailed version."

[40] The foreign born are excluded because I cannot know whether they attended high school in the United States or a foreign country. When examining the CPS data this was not a concern since we were examining residents of the U.S. attending school (or not) in October of each year.

Two things are obvious from this graph. First, there was a very rapid rise in high school attendance between 1918 and 1968 (from 1.47 years at the earlier date to 3.73 years at the later date) which was followed by the relatively slower growth evident after 1968. The dramatic educational advance associated with the spread of the high school after World War I is well known and it suggests that a long-run secular process was at work [Goldin and Katz 2008: Chapter 1]. The other point that the plot illustrates is that as each cohort aged from one census to the next its members seem to have reported more high school experience than they did at the previous census. Some of this upward drift of the trend line measured at different census dates might be due to selective mortality. At least, we might suppose that the better educated are healthier and live longer than less-educated members of their cohort. But surely most of this educational attainment inflation is caused by selective memory (not to say prevarication) as one is further removed from one's high school days. For this reason we tend to favor the census reports from the respondents when they were younger.

In this analysis I focus on the minimum wage increases between 1950 and 1968. Because of the sharp upward gradient of the lines in Figure 12, it is clear that there is more influencing high school attendance than the increases in the minimum wage. To better highlight the impact of the minimum wage changes, I have removed the trend from the data and display in Figure 13 only the residuals from the trend.[41] Also I focus on the data from the census sample immediately following each increase. The red line presents the residuals based on the 1980 IPUMS data set (continuing back in time with a dashed red line). The black line uses the 1970 data. The green line is from the 1960 sample. With the exception of the results between 1949 and 1955 based on the 1970 IPUMS, the patterns displayed from the three censuses are closely correlated. I suspect that the anomalous pattern displayed by the 1970 IPUMS is an artifact of the Vietnam War. The draft was instituted in 1970 and this may have affected both the number of draft-age men

[41] The trends were estimated separately for each IPUMS sample. They are piecewise linear and pass through the observations for 1951, 1957, 1962, and 1974. The first three dates were chosen to coincide with the first cohort to experience one of the three minimum wage increases while 14- to 16-years old.

who were enumerated and the responses they gave to the educational attainment question [U.S. Selective Service System 2002, Card and Lemieux 2000: 11-12].

I examine four rounds of federal minimum wage increases between 1947 and 1974.[42] As before, I shall label them with the name of the President who signed the bill.

Truman Increase – 1950			Enacted: October 1949
	25 January 1950	from \$0.40	to \$0.75
Eisenhower Increase – 1956			Enacted: August 1955
	1 March 1956	from \$0.75	to \$1.00
Kennedy Round – 1961-1963			Enacted: May 1961
	3 September 1961	from \$1.00	to \$1.15
	3 September 1963		to \$1.25
Johnson Round – 1967-1968			Enacted: September 1966
	1 February 1967	from \$1.25	to \$1.40
	1 February 1968		to \$1.60

In Figure 13, as before, the vertical bars identify the cohorts that experienced a minimum wage increase. For the Truman, Eisenhower, and Kennedy treatments the residuals from trend show a marked increase above the trend, supporting the hypothesis of a positive impact of these changes on school attendance. The Johnson round is less clear. If the treated cohorts were thought to be 1967-1970, rather than 1968-1971, then the fit would be better. I could rationalize that by noting that the Johnson bill was signed in September 1966 so it might be that the cohort that was 17 (largely seniors) in 1967 knew that the increase was coming. However, I also should note that there was a significant break in the trends rates displayed in Figure 12 sometime in the mid-1960s and the results are sensitive to the way in which I have modeled the trend.

[42] See Table 1. For a discussion of the political and legislative history of these episodes see Waltman [2000: 34-41]. For the dates of enactment and other details see Stark [1949], "Eisenhower Signs" [1955], "Kennedy Signs" [1961], and Frankel [1966].

Conclusion

I can approximate the magnitude of the educational cascade induced by changes in the minimum wage between 1950 and 1972 by sequentially subtracting the estimated residuals from the IPUMS series on the number of years of high school attended. This is done at the left side of Figure 14. The red line is the original data based on the 1980 IPUMS and the black line indicates what the trend might have been had there been no minimum wage changes. At the right-hand side of the figure the actual and the counterfactual series are extended to 2003 using the CPS data illustrated in Figure 4. If our approximations to the magnitude of the minimum-wage ratchet is accepted, then the average number of years of high school enrollment would have risen to only 3.52 years, rather than 3.73 years, for men born in 1951 (17 in 1968). Thereafter enrollment rates would have trended down to about 3.2 years for the cohort born in 1986 (17 in 2003), rather than slowly rising to around 3.9 years. This is an astonishing result. The cumulative effect of the minimum wage increases beginning in 1950 was to add 0.7 years to the average high school experience of men born in 1986.

The downward trend of the counterfactual enrollment measure after 1968 coincides with the downward trend in the real minimum wage displayed in Figure 1. I also note that the sharply declining portion that begins in the late 1960s and continues through the 1970s coincides with a doubling of the property crime rate [U.S. Department of Justice 2004: Table 3]. The two trends are interrelated. As Andrew Kallem has shown, legislated increases in the nominal minimum wage reduce youth pecuniary crime and erosion of the real minimum wage increases it. He suggested that this was because the higher pay with a legitimate job becomes more attractive than the (risk adjusted) illicit gains [Kallem 2004].[43] This would generate a flow from the underground sector to legitimate jobs. The decline in crime associated with an increase in the minimum wage might also be produced by a reduced flow from enrollment into the underground sector.

[43] Note that this logic assumes that the labor market discriminates against the relatively skillful group (perhaps because of the lemons effect mentioned earlier) so that the increase in the minimum wage actually increases the wage offered to members of this group.

I also note that the incarceration rate of teenagers has soared particularly since 1981[Bonczar 2003: 4]. This may be relevant since the forgone income when incarcerated is increased if available wages are pushed higher by the increases in the minimum wage. Post-incarceration job prospects are diminished because of employer discrimination [Raphael 2006]. That too would make illicit employment less attractive. By the same token, illicit activities would become relatively more attractive when inflation reduces the value of the minimum wage.

Of course, my measure of the impact of the educational cascade induced by increases in the minimum wage is only approximate since it is based on several strong assumptions. My procedures for controlling for the underlying trend in the pre-1972 data and the assumption that there are no omitted variables that would influence the results are the most obvious issues that need to be addressed. On the other hand, my own hunch is that my preliminary results are likely to underestimate the full effect. High on my list of omitted variables to add are proper controls for changes in state minimum wages when they dominate the federal law, controls for state differences in compulsory education laws, and a variable to measure the impact of unemployment rates on the decision to remain in school. Omission of these variables is likely to attenuate the effect I am trying to assess.

I also note that all of the tests reported here examine the full national samples of high-school aged individuals. Since the size of the group of marginal students – those who are affected by the reduction of the opportunity cost of continued enrollment – will depend, not just on the size of the nominal change in the minimum wage, but also on the local wage structure, we should see stronger effects in low-wage states than in high-wage states. So this too is on the schedule for future research.

Finally, I intend to examine the impact of minimum wage changes on the enrollment decisions of blacks. To the extent that black students have evolved a different culture with regard to high school completion than white students as a consequence of past or current discrimination in school systems and local job markets we might be able

to discern the strong impact of peer effects on this population. I also suspect that the lure of illegitimate pursuits (drug dealing, prostitution and pimping, property crimes) may be stronger for blacks than whites. This could be due to their family's relative poverty, the increased likelihood of having a single parent (in part a consequence of the very high incarceration rate of black men), and the persistent effects of racism. The very high incarceration rates of young blacks seems to be associated with lower employment rates for the non-incarcerated members of this group. It has been suggested that those without a criminal history may face statistical discrimination in the labor market [Raphael 2004:26].

The main contribution of this essay, as I see it, is to demonstrate the plausibility of the argument that increases in the minimum wage would increase the amount of schooling attained by a cohort that experiences the increases while in high school. If my preliminary empirical estimates are near correct, the impact is numerically significant and likely to be economically important. This is not to say that the manipulation of the minimum wage is the most effective, efficient, or fair policy to achieve an increase in high school attendance. But, further increases in the minimum wage large enough to counteract the decline in the real value of the minimum wage are likely to be beneficial and (Republicans willing) likely to be politically achievable.

An Historical Aside: The Origins and Motivations for the Fair Labor Standards Act

The current manifestation of the federal minimum wage dates to the New Deal. The Fair Labor Standards Act of 1938 (FLSA) established a national minimum wage – initially it was 25 cents per hour – for workers engaged in interstate commerce or the production of goods for commerce. The act also established a standard work week (44 hours the first year, 42 hours the second, and 40 hours thereafter) and required that overtime hours be paid at "time and a half."[44] The thinking at the time was that a minimum wage would set a floor below which competition among employers could not force labor. Particularly in the context of the Great Depression, it was argued, the pressure on business to reduce costs in order to lower price was intense. Thus employers sought to lower wages and individual workers often felt powerless to resist when the likely alternative was unemployment. The depressed labor market was experiencing record unemployment and competition between employers in the market for goods also intensified because of weak demand. As a consequence, it was claimed in the language of the Act that the wages of some were forced below "the minimum standard of living necessary for health, efficiency, and general well-being of workers."[45]

The Chicago economist, Paul Douglas, explained the logic of the argument thusly:[46]

> Even though only a relatively few firms start the practice and cut wages below what is regarded as a decent or an irreducible minimum, this will

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[44] FLSA also banned most child labor (below age 16 in most cases and below 18 for occupations deemed hazardous or detrimental). For a detailed description of FLSA see Douglas and Hackman [1939].

[45] The quotation is the language of the preamble to FLSA [US Code 29(8)§202]. The current law (as amended) can be found at: http://www4.law.cornell.edu/uscode/29/usc_sec_29_00000201----000-.html.

[46] An excellent discussion of the economic case put forward at the time for a minimum wage is that by Paul Douglas [1938]. This is the same Douglas famous for the Cobb-Douglas production function. He was at the time an economics professor at the University of Chicago. He latter served as U.S. Senator from Illinois from 1949 to 1967. I met Senator Douglas in 1968 and discussed among other issues the logic of the minimum wage.

> give them a competitive advantage over their more scrupulous fellows, which if continued will enable the "meaner" men to capture the market. The more conscientious employers, in order to survive, are then reluctantly forced to cut wages down to the level fixed by the less scrupulous. … In this way, the meanest men set the terms of competition under which the struggle for survival takes place; and the result is a progressive deterioration of the standard of life of the working classes [Douglas 1938: 184].

The only alternative to a statutory remedy for workers caught in this situation was thought to be unionization. Powerful and effective unions might counter the downward pressure on wages induced by the competition between producers. But collective action would likely lead to "labor disputes burdening and obstructing commerce" [The Fair Labor Standards Act 29(8)§202]. Strikes and lockouts were accompanied on occasion by violence and other extralegal actions. The resolution of labor disputes between employers and unions would depend more upon the relative economic power of the two sides than upon the merits of the respective cases. Proponents of the minimum wage argued that it would reduce labor unrest [Douglas 1938: 189-191].

Apart from the concern for the personal health and family well-being of the workers unable to find employment at a "decent" wage, it was thought that the minimum wage would increase efficiency since the lower paid workers would be able to obtain better food and thus build up their strength and reduce absences due to illness. This logic would not appeal to an individual employer since he could not be sure that the workers would remain in his employ and because he could always and easily replace any worker who performed poorly or became ill. Only a uniform and industry-wide minimum would have the desirable effect of increasing efficiency. Although it was not mentioned in the official declaration of policy, supporters also argued that the minimum wage would lead to capital deepening since "every increase in wages will increase the possibility of substituting machinery for labor" [Douglas 1938: 187].

Finally it was argued by some that the minimum wage would increase purchasing power and help restore prosperity. President Roosevelt made reference to that point in a

"fireside chat" on the eve of signing FLSA although Douglas was skeptical [Roosevelt 1938; Douglas 1938: 191-194]. Support for shorter hours was defended primarily by the idea that it would add more names to the payroll and thus "share the work" at a time of high unemployment [Douglas and Hackman 1938: 491].[47]

To counter the argument that some firms would not survive if forced to pay higher wages, the supporters suggested that firms that were so poorly managed and inefficient that they could not afford to pay a living wage, ought not to exist in a just society. But Roosevelt thought such employers were few in number:

> Do not let any calamity-howling executive with an income of $1,000 a day, who has been turning his employees over to the Government relief rolls in order to preserve his company's undistributed reserves, tell you … that a wage of $11 a week is going to have a disastrous effect on all American industry. Fortunately for business as a whole, and therefore for the Nation, that type of executive is a rarity with whom most business executives heartily disagree [Roosevelt 1938].

Whatever the merits of the case for a floor on wages and a ceiling on hours, the Fair Labor Standards Act is a landmark in labor legislation and was the capstone to President Roosevelt's New Deal. The regulation of wages was highly contentious at the time, but the path had been cleared for the legislation by a surprising reversal of judicial opinion. For at least a half century, the Supreme Court had not looked kindly on legislative attempts to enact social and economic reform. In 1918 and again in 1922 the court invalidated separate Federal child labor laws. The first act the court struck down had outlawed child labor outright. The second act imposed a tax on employers who employed children. This formulation was intended to circumvent the court's reasoning in

[47] I have found little evidence that the minimum wage was advocated on the ground that it would reduce wage inequality. In any case, there is scant evidence that the minimum wage restrictions have had a major impact on the wage distribution. The extensive review of what is known about the American wage structure during the last four decades of the twentieth century by Lawrence Katz and David Autor mentions the minimum wage only in a brief afterthought that is equivocal and rather dismissive [Katz and Autor 1999: 1545-1546]. Other papers that review the wage structure during the period of interest here either fail to mention minimum wage laws [Bound and Johnson 1992, Murphy and Welch 1993, Lawrence and Slaughter 1993, Burtless 1995], dismiss their relevance as "minor" or unimportant either explicitly [Juhn 1999] or implicitly [Katz and Murphy 1992; Margo 1999 and 2006; Goldin and Katz 2008].

the first case. But it too failed to pass court scrutiny [US Department of Labor 1967: 34-35]. Since 1923, when the Supreme Court struck down a minimum wage law for women and minors written by Congress for the District of Columbia, the court ruled consistently against the constitutionality of minimum wage legislation on the grounds that such laws interfered with the freedom of contract. [48]

A minimum wage provision had been part of the National Industrial Recovery Act (NIRA, 1933). That act – and in particular the minimum wage provision – was highly popular. Despite this broad public support, in 1935 the Supreme Court declared in a unanimous decision that the NIRA was unconstitutional. The following year the Court invalidated by a five-to-four decision a New York law which had established a minimum wage for women and children as a violation of the freedom to contract. The court's decision generated a storm of criticism and proved very unpopular with the public. Not surprisingly, labor legislation became an issue in the 1936 presidential election. Roosevelt promised a new wage and hours law. Following the Roosevelt landslide victory in that election, Supreme Court Justice Owen J. Roberts reversed himself to join a new five-to-four majority which upheld the minimum wage law of Washington State. The decision was announced in March of 1937. [49]

The opinion in the Washington State case, written by Chief Justice Charles Evans Hughes, not only overturned the Washington DC case but invalidated the doctrine of freedom of contract. "What is this freedom?" Hughes asked. "The Constitution does not speak of the freedom to contract. It speaks of liberty and prohibits the deprivation of liberty without due process of law. … and regulation which is reasonable in relation to its

[48] For discussions of FLSA's political and legislative history see Douglas and Hackman [1938], Grossman [1978], and Waltman [2000: Chapter 2].

[49] For a discussion of Roberts' reversal and an analysis of the Supreme Court's handling of minimum wage cases see Chambers [1969]. President Roosevelt was frustrated by the courts opposition. They had invalidated the Agricultural Adjustment Act as well as NIRA and the minimum wage laws. In 1937 he proposed increasing the number of justices on the court, the "Court-packing" scheme [McKenna 2002]. Chambers argues that it was the overwhelming election victory, rather than Roosevelt's Court-packing scheme that induced Roberts to change sides. Nevertheless, Roberts' decision remains known as the "switch in time that saved nine."

subject and is adopted in the interests of the community is due process" [quoted by Chambers 1969: 61]. The court's revised attitude toward New Deal reforms was not confined to the minimum wage cases. In short order the court upheld the Social Security Act [1935] and the National Labor Relations Act [Wagner Act 1935].[50] Both had been considered in constitutional jeopardy before the court's change of heart in 1937.

After the ruling in the Washington State case Roosevelt proposed a minimum wage bill to Congress. It had been drafted by his Secretary of Labor Francis Perkins.[51] The court's about face and strong public support not withstanding, the bill faced stiff opposition. It was denounced as tyrannical dictatorship and a piece of socialist planning [Grossman 1978]. The administrative provisions proposed in Perkins draft faced opposition from organized labor who feared the arbitrariness of administrative boards who would have the power to set minimum wages. After the bill was weakened and the list of exemptions was expanded it passed in the Senate by a vote of 56 to 28. According to observers, it would have passed easily in the House but was instead bottled up in the Rules Committee blocked by a coalition of Republicans and southern Democrats and thus failed to pass in the 1937 session. Roosevelt, apparently furious, called Congress back into special session and listed the wage and hours bill as a top priority. But again the Rules Committee failed to release it to the floor. It was not until the regular session of 1938 that supporters were able to discharge the bill from the Rules Committee by petition. It then passed easily by a vote of 314 to 97.

The most important change made by Congress was to replace a five-member board that would have been given the power to set minimum wages with a fixed statutory rate to be uniformly applied in all regions and to all industries.

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[50] Both of these decisions were announced before Justice Willis Van Devanter announced his intention to resign. He was replaced by Hugo Black. The New Deal was then safe and the Court-packing scheme was dead.

[51] Perkins, the first woman in a Presidential cabinet, was also the primary author of the Social Security Act [Pasachoff 1999].

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Table 1: Federal minimum wage rates under the Fair Labor Standards Act and amendments: 1938-2009

					1966 and subsequent amendments		1989 and 1996 amendments
			1938 Fair Labor Standards Act	1961 amendments	Nonfarm workers	Farm workers	90-day youth subminimum
			1.1	1.2	1.3	1.4	1.5
Year	Month	Day	Dollars per hour	Dollars per hour	Dollars per hour	Dollars per hour	Dollars per hour
1938	Oct	24	0.25	----	----	----	----
1939	Oct	24	0.30	----	----	----	----
1945	Oct	24	0.40	----	----	----	----
1950	Jan	25	0.75	----	----	----	----
1956	Mar	1	1.00	----	----	----	----
1961	Sep	3	1.15	1.00	----	----	----
1963	Sep	3	1.25	1.00	----	----	----
1964	Sep	3	1.25	1.15	----	----	----
1965	Sep	3	1.25	1.25	----	----	----
1967	Feb	1	1.40	1.40	1.00	1.00	----
1968	Feb	1	1.60	1.60	1.15	1.15	----
1969	Feb	1	1.60	1.60	1.30	1.30	----
1970	Feb	1	1.60	1.60	1.45	1.30	----
1971	Feb	1	1.60	1.60	1.60	1.30	----
1974	May	1	2.00	2.00	1.90	1.60	----
1975	Jan	1	2.10	2.10	2.00	1.80	----
1976	Jan	1	2.30	2.30	2.20	2.00	----
1977	Jan	1	2.30	2.30	2.30	2.20	----
1978	Jan	1	2.65	2.65	2.65	2.65	----
1979	Jan	1	2.90	2.90	2.90	2.90	----
1980	Jan	1	3.10	3.10	3.10	3.10	----
1981	Jan	1	3.35	3.35	3.35	3.35	----
1990	Apr	1	3.80	3.80	3.80	3.80	3.35
1991	Apr	1	4.25	4.25	4.25	4.25	3.61
1993	Apr	1	4.25	4.25	4.25	4.25	---
1996	Oct	1	4.75	4.75	4.75	4.75	4.25
1997	Sep	1	5.15	5.15	5.15	5.15	4.25
2007	July	24	5.85	5.85	5.85	5.85	4.25
2008	July	24	6.55	6.55	6.55	6.55	4.25
2008	July	24	7.25	7.25	7.25	7.25	4.25

Table 1: Federal minimum wage rates under the Fair Labor Standards Act and amendments: 1938-2009

This table revises and updates the table presented in *Historical Statistics of the United States* [Carter et al 2006: Table Ba4422-4425. The original table was contributed by Susan B. Carter

Sources
U.S. Department of Labor, Employment Standards Administration, "Federal Minimum Wage Rates under the Fair Labor Standards Act," http://www.dol.gov/esa/minwage/chart.htm

U.S. Department of Labor, Employment Standards Administration, "History of Changes to the Minimum Wage Law," http://www.dol.gov/esa/minwage/coverage.htm

Documentation
The federal minimum wage was established with the passage of the Fair Labor Standards Act (FLSA) of 1938. The FSLA was the capstone of the New Deal legislation designed to end the Great Depression of the 1930s. The 1938 Act applied to workers engaged in interstate commerce or in the production of goods for interstate commerce.

Series 1.1. Indicates the new minimum level at each successive change. All increases in the minimum wage rate beginning in 1978 covered all non-exempt workers.

Series 1.2. The 1961 amendments to the FLSA extended coverage to employees in large retail and service enterprises as well as to local transit, construction, and to gasoline service station employees. The level of the minimum for these workers is shown in this series. After January 30, 1968 the rate for these employees matched that for all covered, nonexempt workers under the 1938 Act. In 1990, the new law raised the annual dollar volume test for enterprise coverage. A grandfather clause was established to protect employees who no longer met the tests for individual coverage, whose employers were covered as of March 31, 1990, but who would have become exempt from coverage with the new volume test.

Series 1.3-1.4. The 1966 amendments to the FSLA extended coverage to state and local government employees of hospitals, nursing homes, and schools, and to laundries, dry cleaners, and large hotels, motels, restaurants, and farms. Subsequent amendments extended coverage to the remaining federal, state, and local government employees who were not protected in 1966, to certain workers in retail and service trades previously exempted, and to certain domestic workers in private household employment. After December 31, 1976 the minimum for non-farm workers covered by the 1966 amendments matched that for all covered, non-exempt workers under the 1938 Act. The minimum for farm workers matched that for all covered, nonexempt workers after December 31, 1977.

Series 1.5. Beginning April 1, 1990 a youth subminimum wage ("training wage") was established by the 1989 amendments at 85 percent of the statutory minimum wage (but not less than $3.35 per hour) that applied to employees under 20 years of age during their first 90 continuous days of employment. This provision expired after March 31, 1993. Under the 1996 amendments a youth subminimum wage of $4.25 per hour was established beginning October 1,996 that applied to employees under 20 years ofage during their first 90 consecutive calendar days of employment. The terms of the two youth subminimum wage plans were confirmed by newspaper accounts at the time. See David E. Rosenbaum, "Bush and Congress Reach Accord Raising Minimum Wage to $4.25," *New York Times*, November 1, 1989, and Eric Schmitt, "Bill to Increase Minimum Pay Clears Hurdle In a New Deal," *New York Times*, August 1, 1996.

Table 2. Specifying the Affected Cohorts

Example: the Nixon Round of Minimum Wage Increases: May 1974-January 1976

	13-years	14-years	15-years	16-years	17-years	18-years	19-years	20-years
Percent of Age Class Attending High School - Average for Birth Cohorts of 1957-1959	8.0	73.0	91.5	92.6	79.9	21.3	4.4	1.3

Month	Year	Federal Minimum Wage	Year of Birth of Individual in October of Indicated Year							
October	1973	$1.60	1960	1959	1958	1957	1956	1955	1954	1953
May	1974	$2.00								
October	1974	$2.00	1961	1960	1959	1958	1957	1956	1955	1954
January	1975	$2.10								
October	1975	$2.10	1962	1961	1960	1959	1958	1957	1956	1955
January	1976	$2.30								
October	1976	$2.30	1963	1962	1961	1960	1959	1958	1957	1956

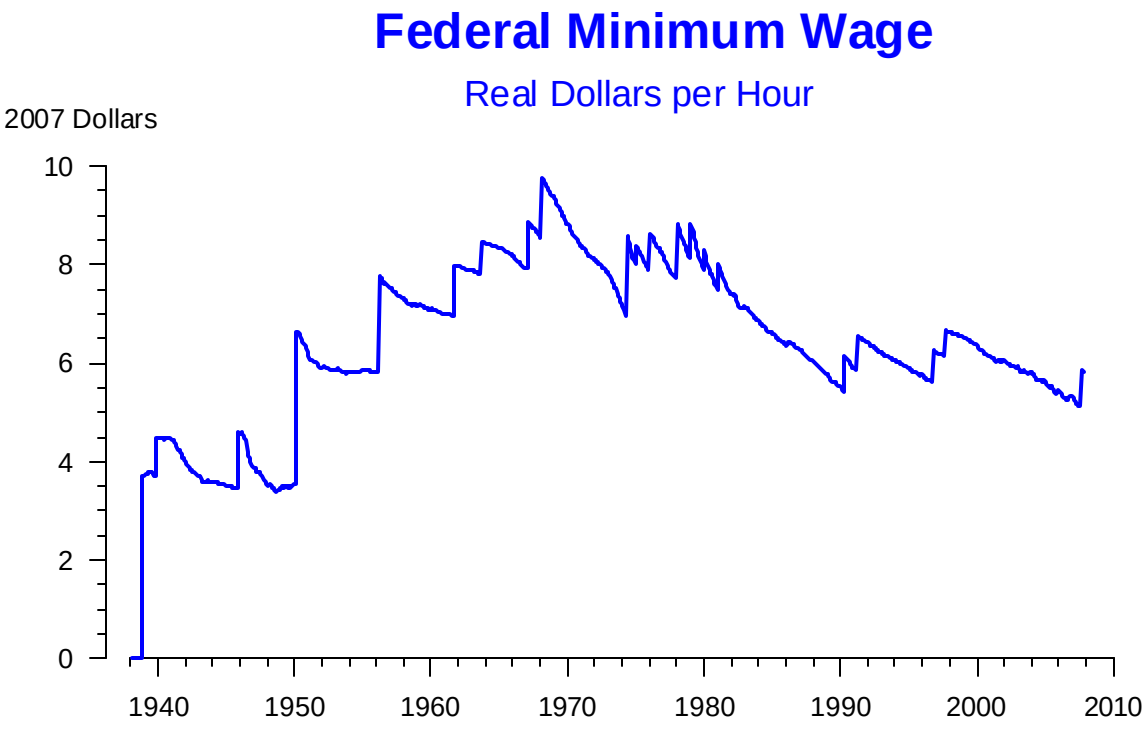


Figure 1
Source: Table 1 and U.S. Bureau of Labor Statistics, Consumer Price Index [on line].

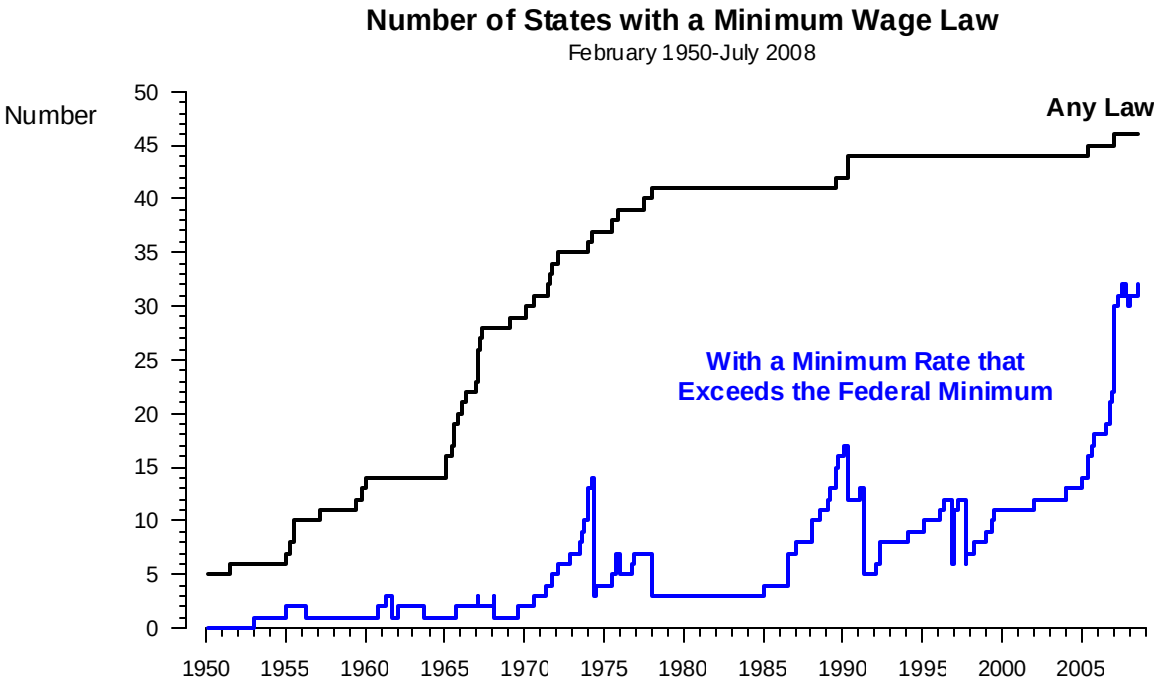


Figure 2
Source: Appendix A.

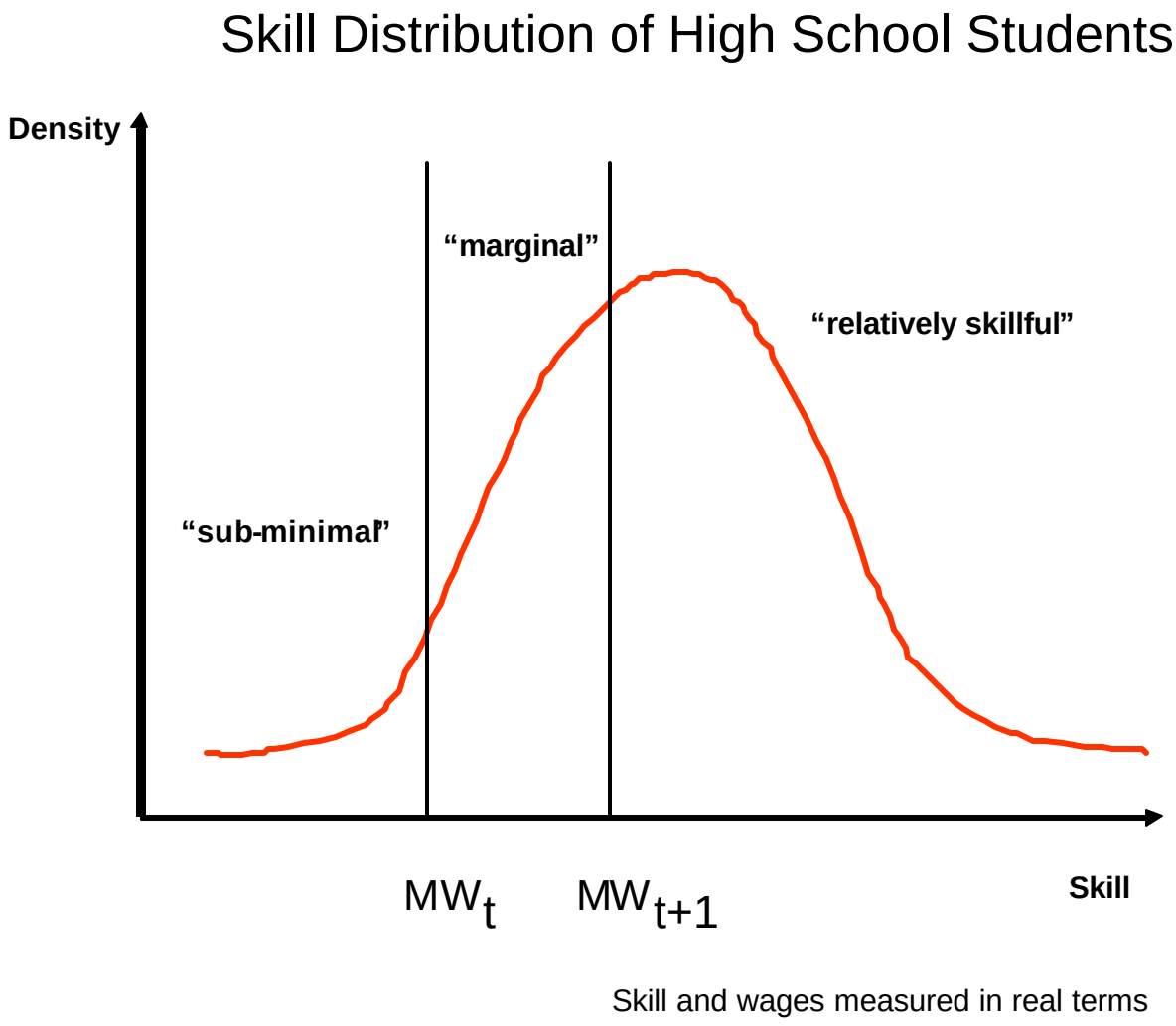

Skill Distribution of High School Students
Density
"marginal"
"relatively skillful"
"sub-minimal"
MW_t
MW_{t+1}
Skill
Skill and wages measured in real terms

Figure 3

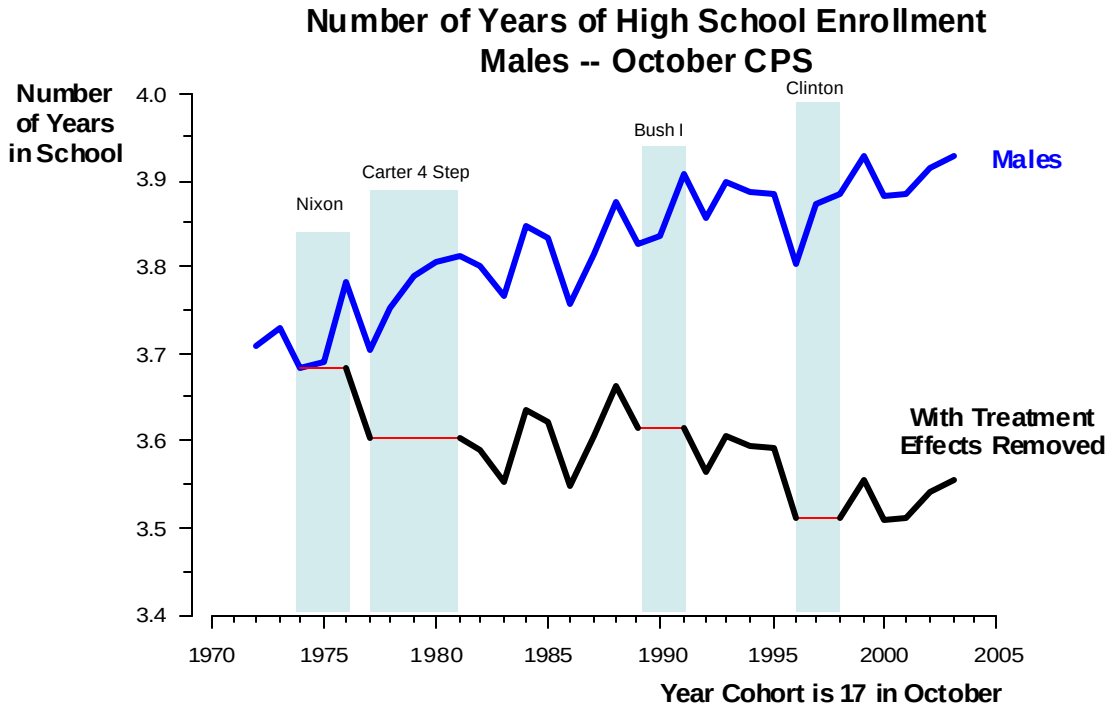


Figure 4
Source:: Author's calculations based on Unicon, *October CPS Utilities* [2007].

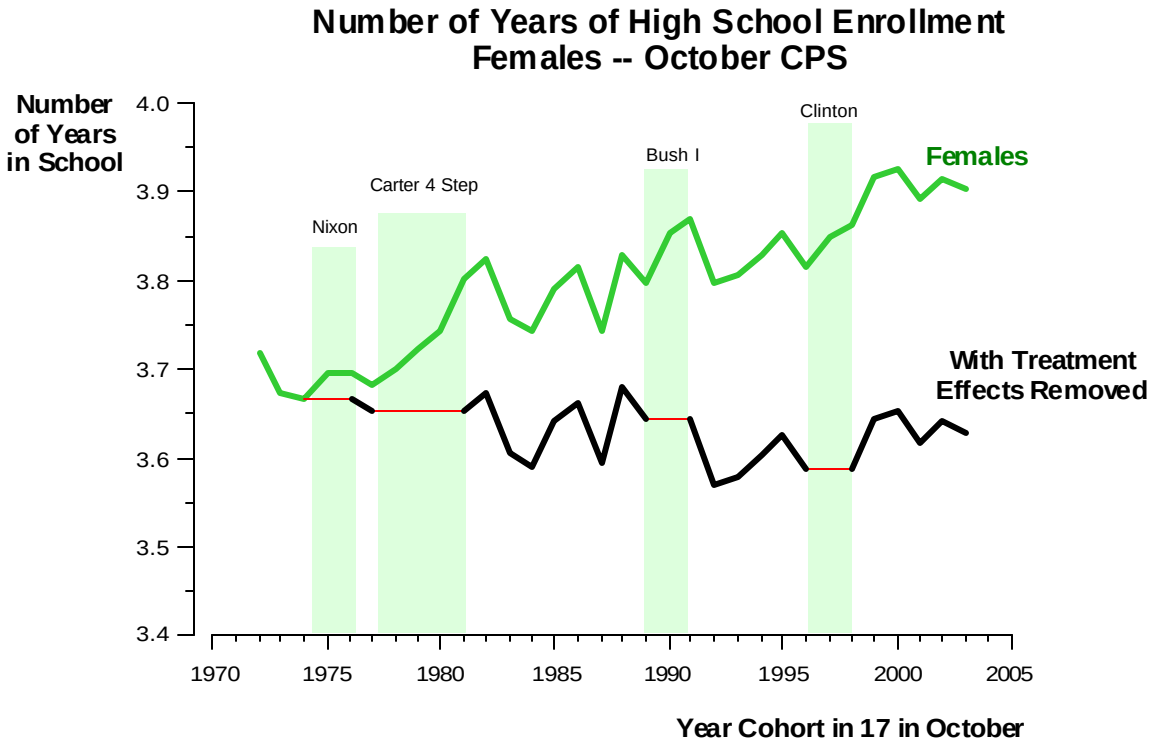


Figure 5
Source: Author's calculations based on Unicon, *October CPS Utilities* [2007].

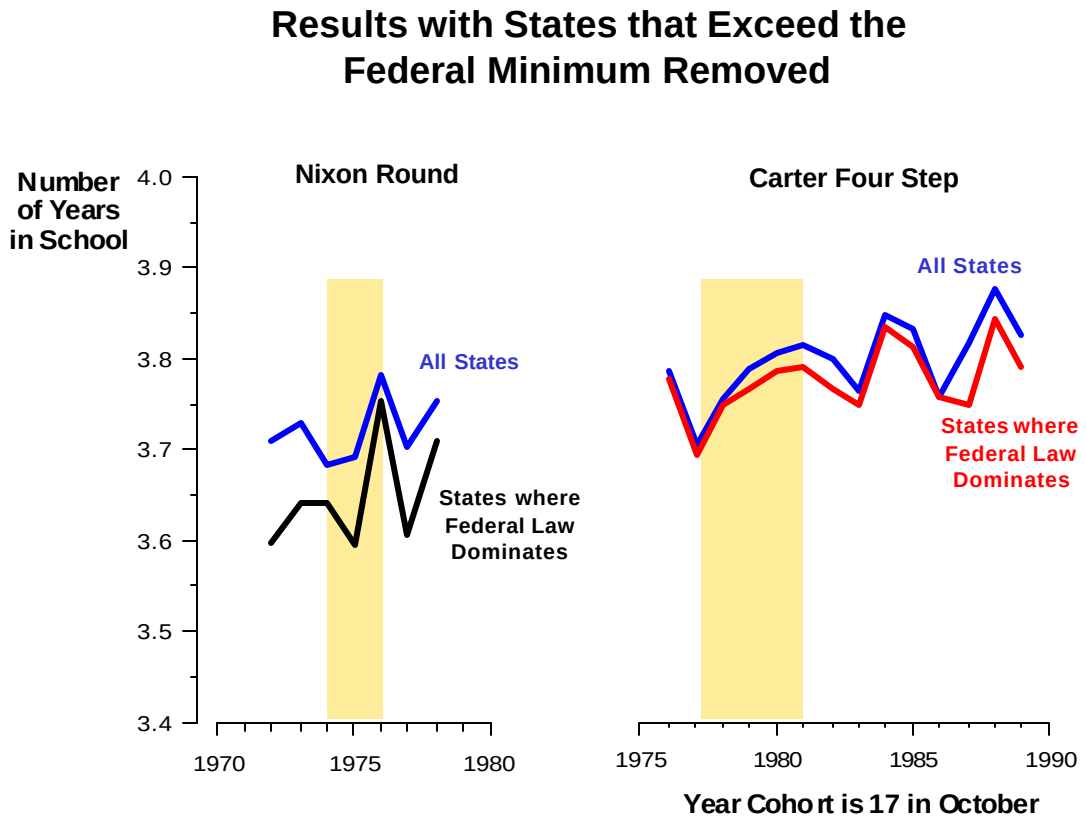


Figure 6
Source: Author's calculations, See text.

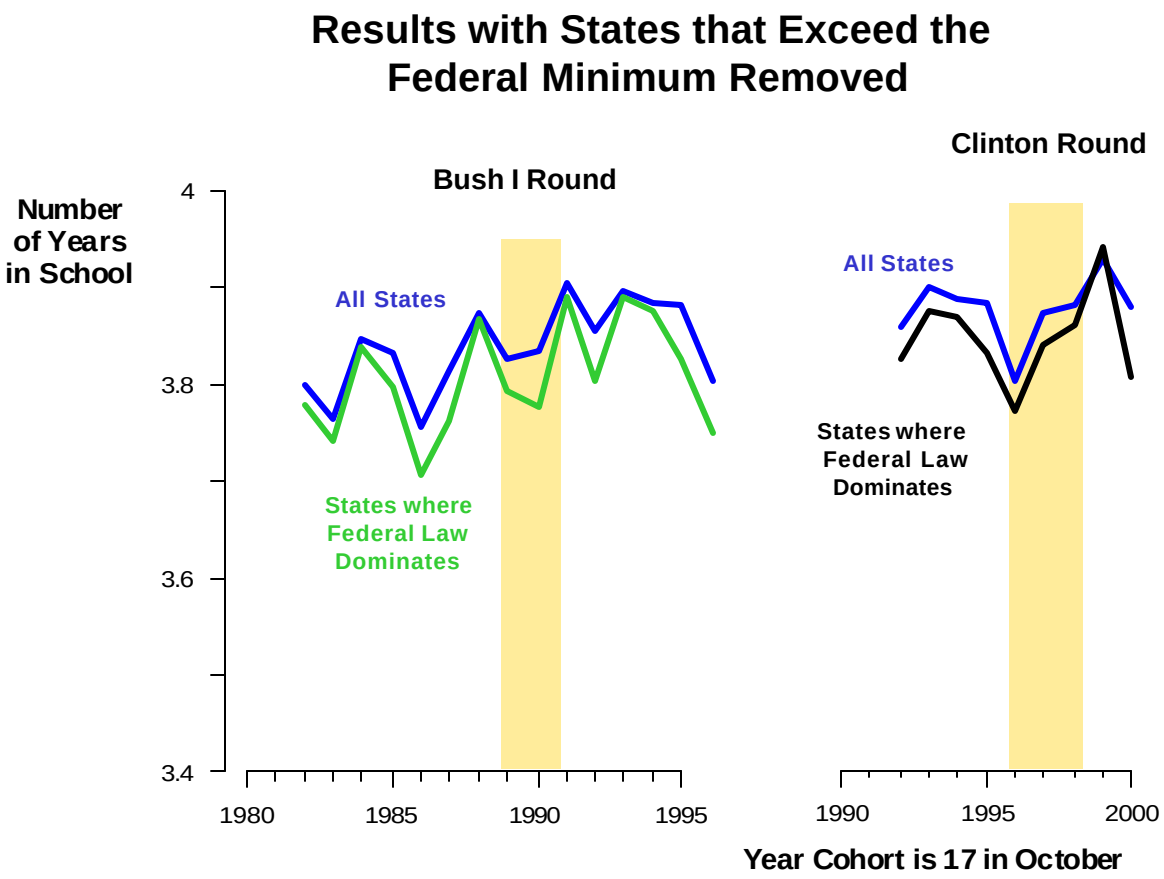
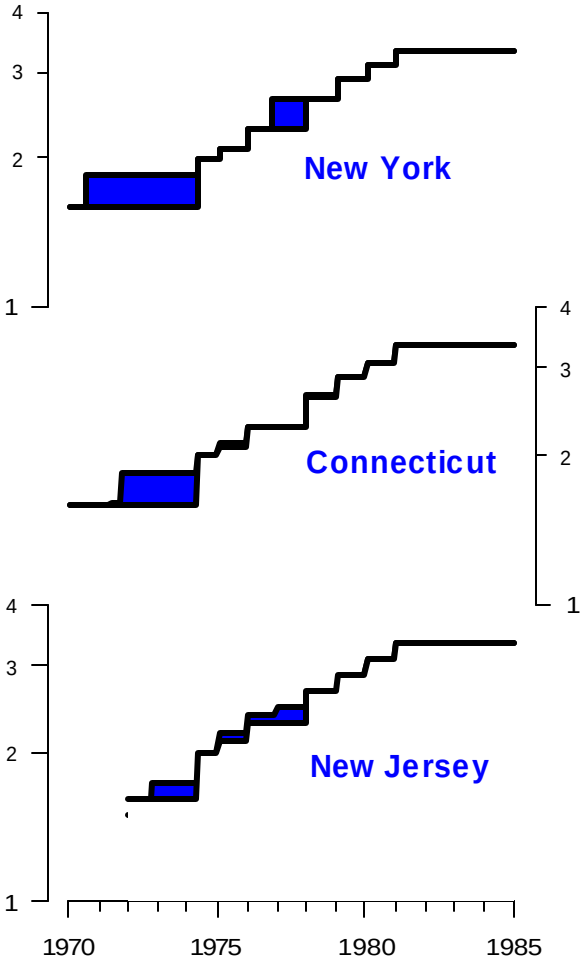
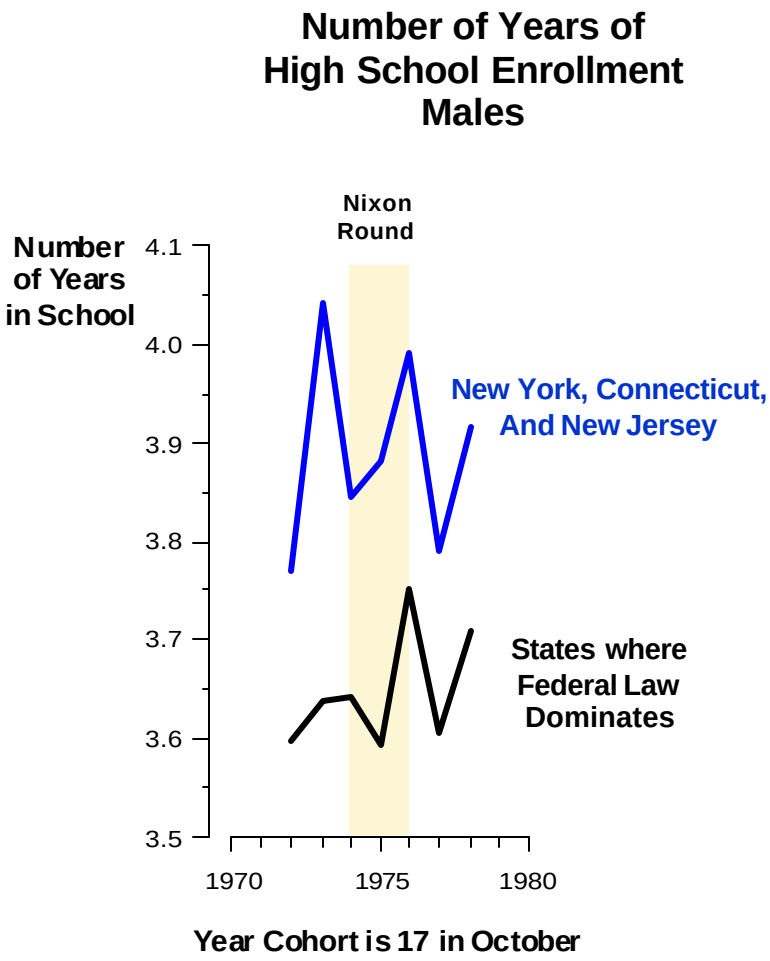


Figure 7
Source: Author's calculations. See text.

Figure 8


4
3
2
1
New York
Connecticut
New Jersey
1970
1975
1980
1985


Number of Years of
High School Enrollment
Males
Nixon
Round
Number
of Years
in School
4.1
4.0
3.9
3.8
3.7
3.6
3.5
New York, Connecticut,
And New Jersey
States where
Federal Law
Dominates
1970
1975
1980
Year Cohort is 17 in October

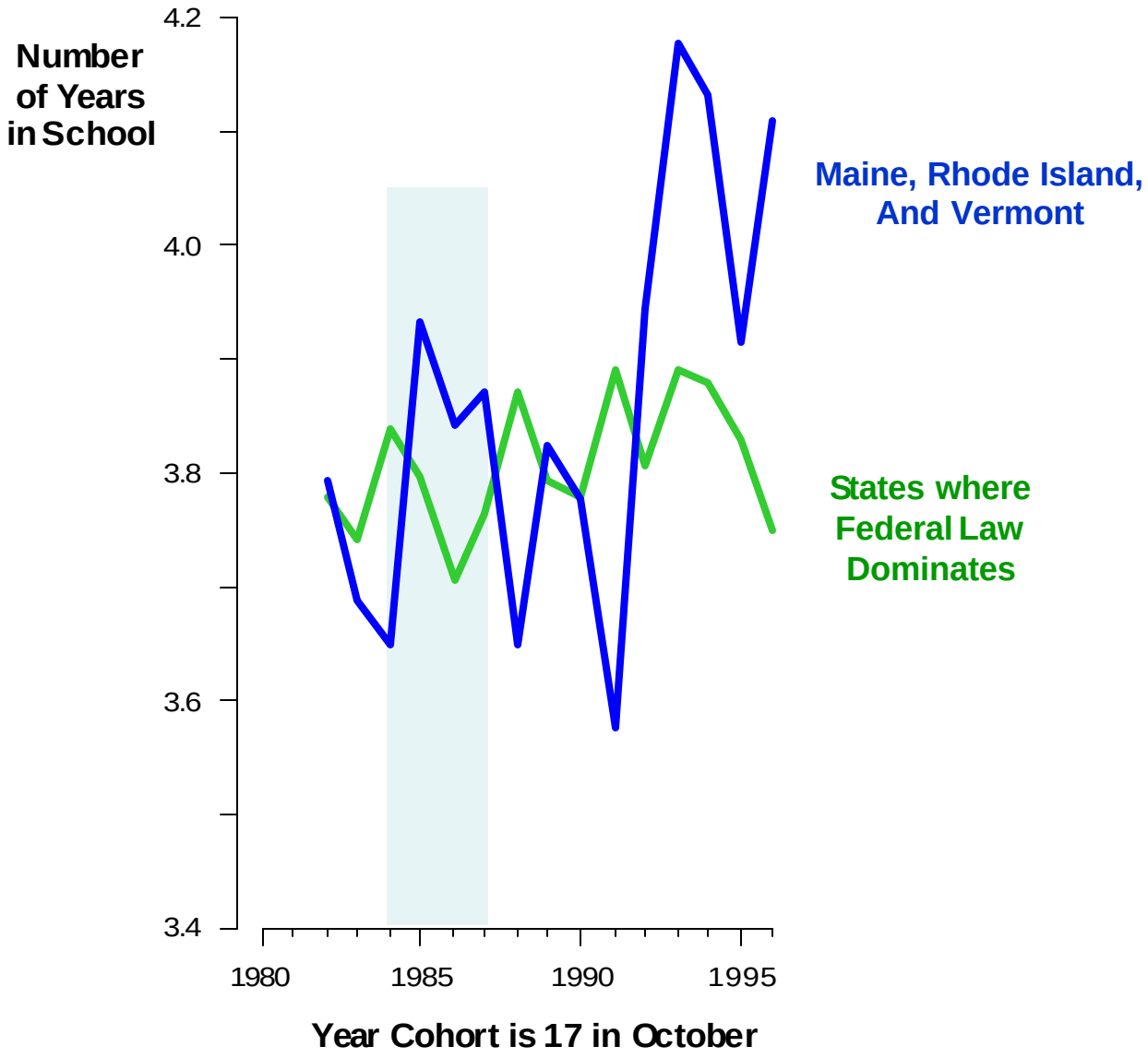

Number of Years in School
4.2
4.0
3.8
3.6
3.4
1980
1985
1990
1995
Year Cohort is 17 in October
Maine, Rhode Island, And Vermont
States where Federal Law Dominates

Figure 9

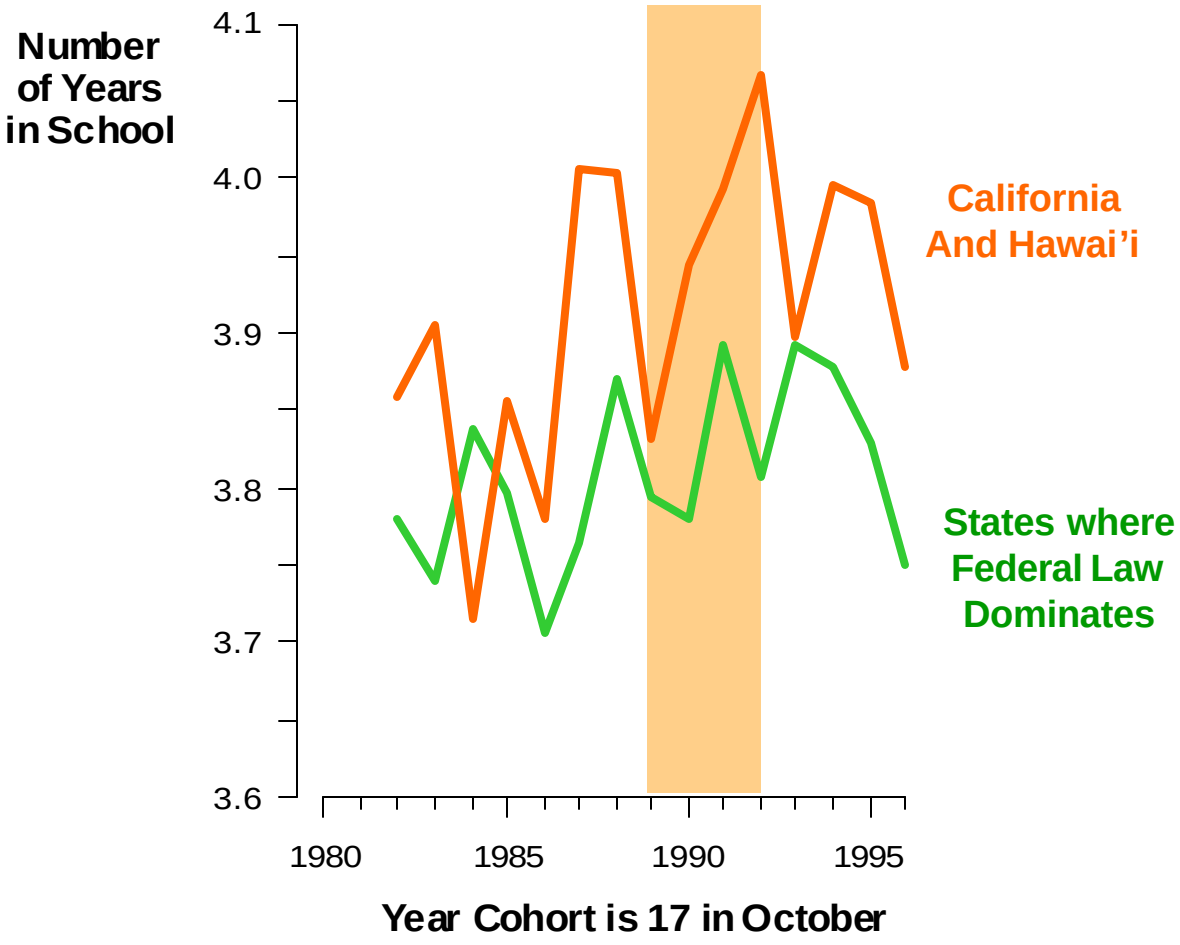

Number of Years in School
4.1
4.0
3.9
3.8
3.7
3.6
1980
1985
1990
1995
Year Cohort is 17 in October
California And Hawai'i
States where Federal Law Dominates

Figure 10

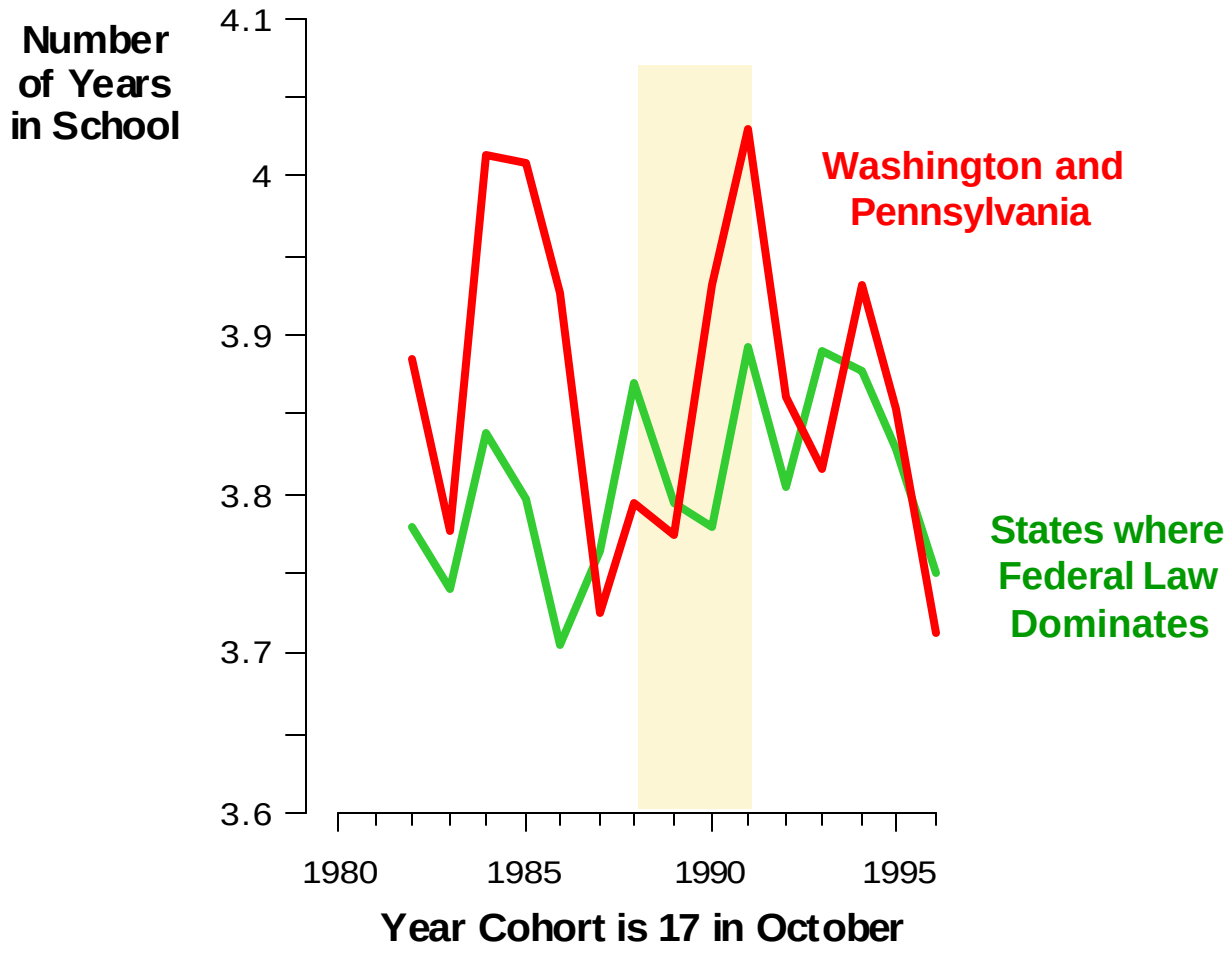

Number of Years in School
4.1
4
3.9
3.8
3.7
3.6
1980
1985
1990
1995
Year Cohort is 17 in October
Washington and Pennsylvania
States where Federal Law Dominates

Figure11.

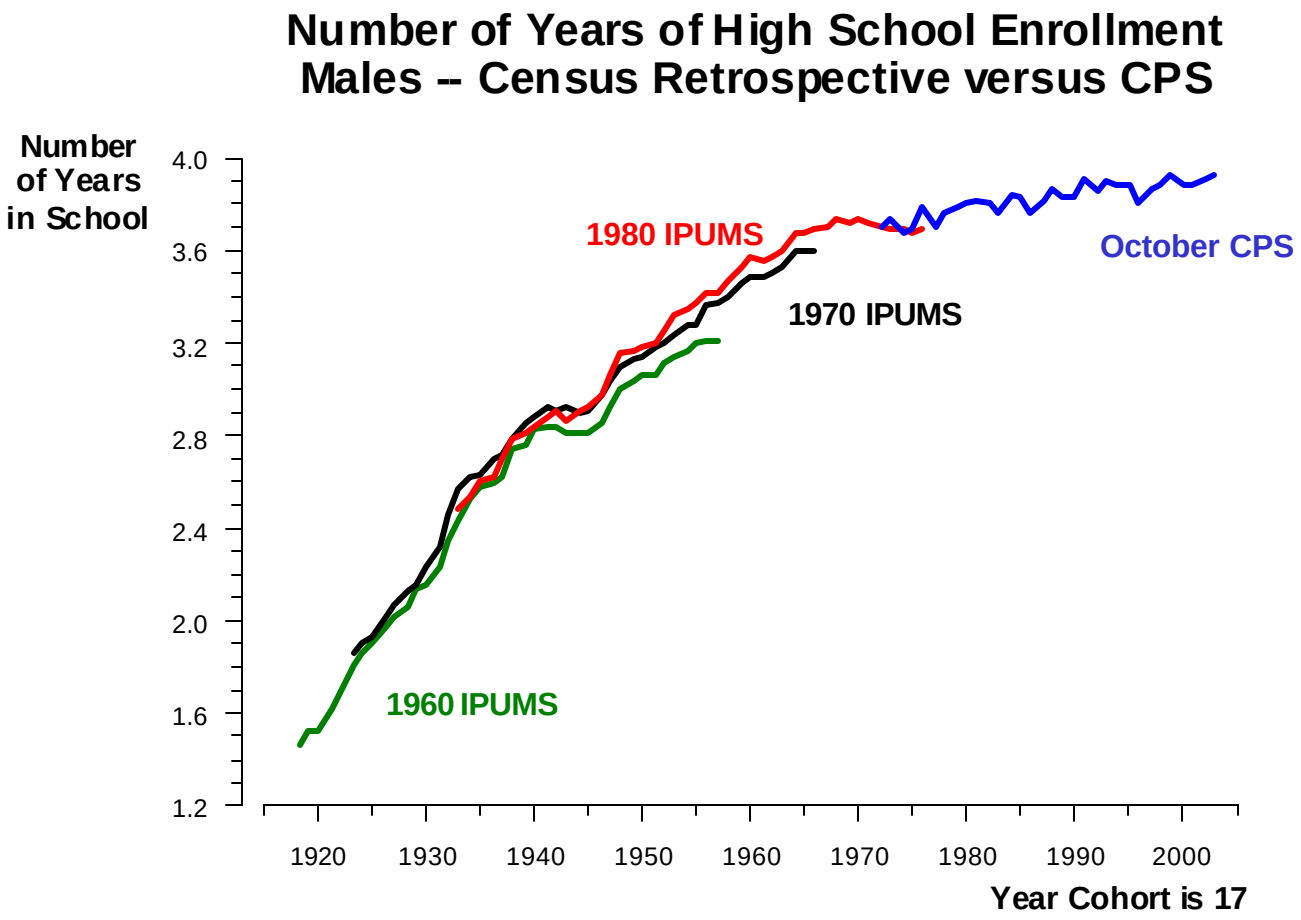


Figure 12
Source: Author's calculations based on the IPUMS samples [Ruggles et al 2008] and the October CPS [Unicon 2007]. See text. For the IPUMS samples the cohort is aged 17 in April. For the CPS sample the cohort is aged 17 in October.

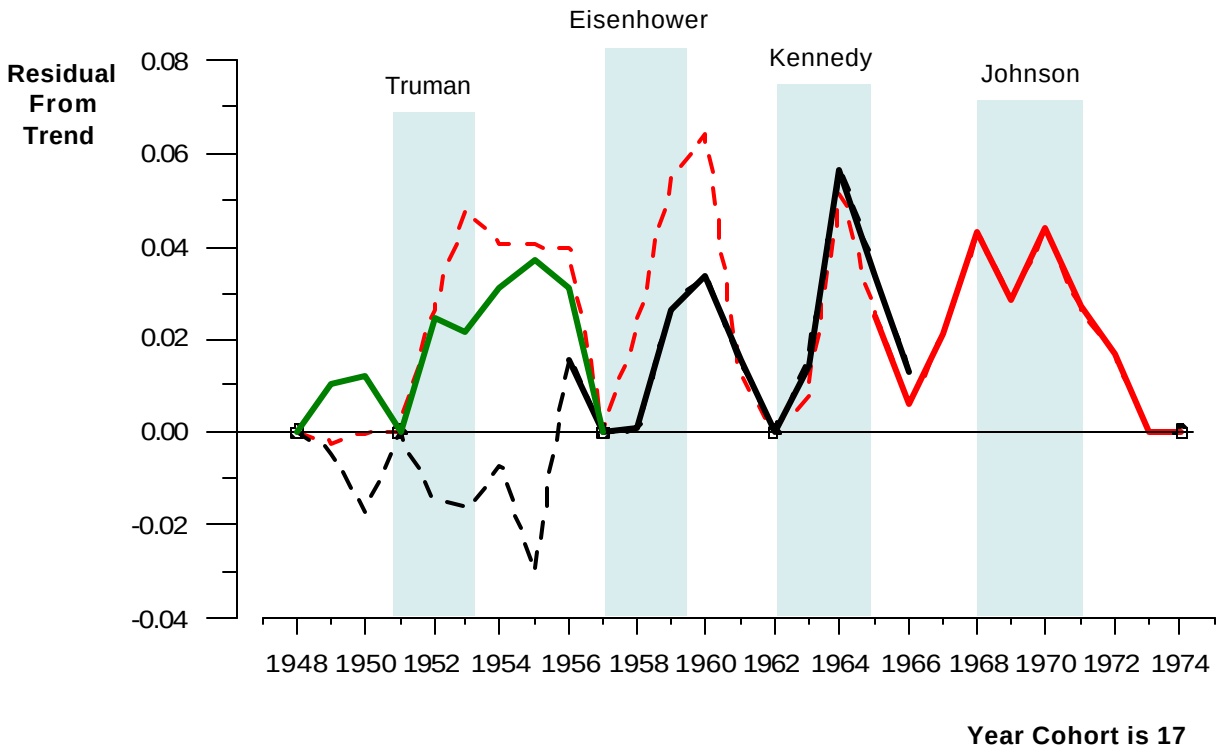


Figure 13
Source: Author's calculations based on IPUMS 1960 (green line), IPUMS 1970 (black), and IPUMS 1980 (red). See text.

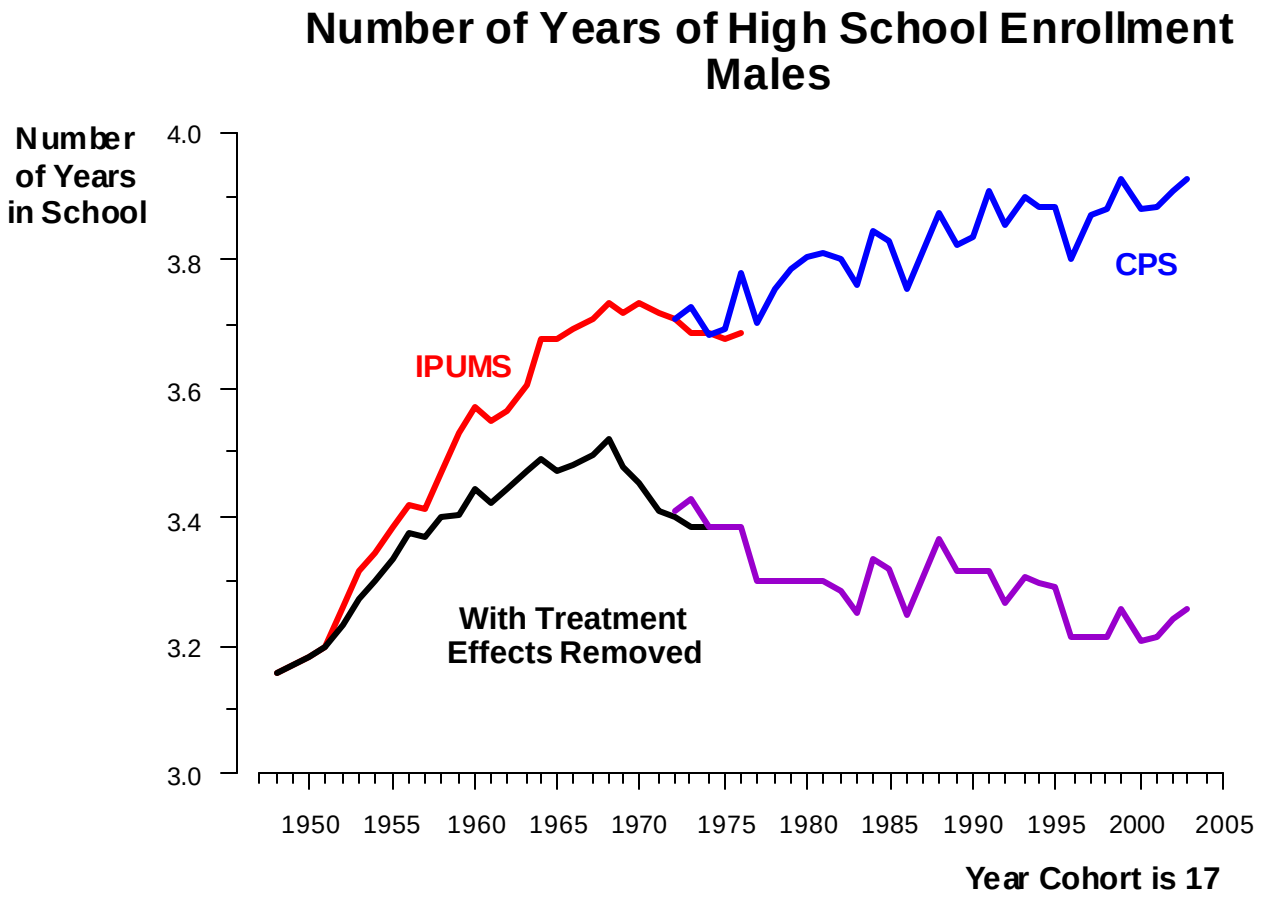


Figure 14.
Source: Author's calculations based on IPUMS 1980 (red and black lines) and October CPS (blue and purple). See text.