Making Sect Life Better: Amish Prohibition of High School Education[*]

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Abstract

Given the positive returns to education, the Amish prohibition of high school education appears puzzling from a rational choice perspective. I extend Iannaccone's (1992) religious club model to explain why the Amish would collectively object to high school education and refuse to comply with compulsory schooling laws. Because the Amish speak Pennsylvania Dutch, I can identify them from the U.S. Census and use the surprising 1972 U.S. Supreme Court's decision in *Wisconsin vs. Yoder*, which exempts Amish children from compulsory high school education, as a policy shock to test the predictions of the Amish religious club model. The model's predictions are empirically supported: I find that successful prohibition of high school education (1) led to higher Amish attrition rates immediately following the Supreme Court's decision; and (2) helped the Amish sect exclude individuals who would lower the quality of the sect.

1. Introduction

The Amish had stirred heated debates in the United States in the mid-20th century by stubbornly refusing to comply with compulsory school attendance laws beyond the eighth grade. Their insistence on the eighth grade as the final year of formal schooling, on the basis of their religious belief, had frequently led to fines, prosecutions, and even imprisonment. After numerous court cases and decades of struggles against the state, the Amish were eventually exempted from compulsory schooling beyond the eighth grade on the grounds of religious liberty by the 1972 U.S. Supreme Court's decision in "State of Wisconsin v. Jonas Yoder et al" (*Wisconsin v. Yoder*). Given the positive returns to education documented in the literature, it is puzzling why Amish would collectively prohibit choices that would seemingly make their sect members better off.

This paper uses a modified version of Iannaccone's (1992) religious club model to explain the apparently puzzling behavior of the Amish sect. Iannaccone's (1992) religious club model was previously applied and tested in a number of settings, including Berman's (2000) application to Israeli Ultra-Orthodox Jews, Berman, Iannaccone, and Ragusa's (2007) study of low European Catholic fertility, and Berman and Laitin's (2008) study of religious terrorists. This paper provides further evidence of the usefulness of the religious club model in explaining behavior of religious sects and shows how public policies can influence outcomes of religious sect members. Given the increasing tension between religious groups and states around the globe, understanding how public policies affect the Amish may also shed light on policy debates pertaining to the freedom to exercise religious beliefs.

The religious club model presented in this paper provides two explanations as to why the Amish would forbid their children from attending high school and refuse to comply with compulsory schooling laws. First, the model posits that religious activities among Amish members generate positive externality, which is not achieved in a competitive equilibrium. By prohibiting high school education, the Amish can internalize the positive externality of their religious activities. Second, in the presence of unobserved

heterogeneity, the sect can use the prohibition on high school education to prevent Amish individuals who would otherwise lower the positive externality in the club from joining the club. Specifically, the prohibition is set to the extent that "free-riders" with high labor market return to education and low religious commitment would choose higher level of education and not join the sect. According to the religious club model, the Amish clashed with the government because compulsory schooling laws impose a level of schooling exceeding their social optimum. The Amish also react to economic incentives and their choice of educational prohibition is rational under the religious club interpretation.

The religious club model yields a set of testable assumptions and predictions. First, the model predicts that the Supreme Court's ruling would lead to lower educational attainment among the Amish because the prohibition on high school education was no longer interfered by the government. Second, the model predicts that during the time when government enforced compulsory schooling laws, the Amish sect were admitting members who would otherwise be excluded from joining the sect if the prohibition on high school were successfully enforced. This means that (1) by permitting Amish youths to drop out of school upon finishing the eighth grade, the Supreme Court's decision would lead to a jump in the fraction of Amish youths leaving the sect; and (2) the jump in attrition would be driven by individuals who have high labor market return to education and do not benefit from staying Amish.

Because the Amish speak Pennsylvania Dutch, I am able to use U.S census data to test the model predictions. A simple comparison of the characteristics of adult Amish, former Amish, and non-Amish individuals shows that Amish individuals tend to be less educated and have lower earnings than former Amish and non-Amish individuals. Since compulsory schooling laws were applied differently to Amish cohorts born before 1958 and to those born in 1958 and after, we would expect sharp differences between these Amish cohorts. Because compulsory schooling laws were consistently applied to non-Amish cohorts born during the period, I also estimate the effects of the exemption on educational attainment and earnings in a differences-in-differences estimator framework to control for cohort differences not influenced by the exemption. I find that the

exemption decreased the average years of completed schooling of the Amish by roughly 10 to 13 months. The attrition rate associated with the prohibition on high school education is estimated to be 7 to 9 percent. The exemption lowered hourly wages by about 20 to 34 percent. The return to education inferred from the estimated effects of the exemption on educational attainment and log hourly earnings is 23 percent using Census 1990 data and 32 percent using Census 2000 data. The lowest implied return to education is 50 percent to 100 percent higher than the point estimates documented in the literature on the return to education. I argue that the high implied return to education is an evidence of Amish with relatively high return to education leaving the sect subsequent to the U.S. Supreme Court's decision.

2.   Background: Amish Society and Educational Conflicts with the State

The Amish are a religious sect that was split from the Swiss Anabaptist Mennonites in Alsace in the 1690s when its founder, Jacob Ammann, advocated shunning of excommunicated members in daily life.[3] The followers of Ammann gradually became known as the Amish. Social and political instability and religious persecution in Europe prompted the Amish to immigrate to America and to settle in Lancaster, Pennsylvania, in the eighteenth and nineteenth century (Hostetler 1993, pp. 31-34). In 2000, there were approximately 200,000 Amish living in the United States and roughly 70 percent of them lived in Pennsylvania, Indiana, and Ohio (Kraybill and Hostetter 2001, pp. 75-77).[4]

There are four major branches within the Amish sect – Old Oder, New Order, Beachy Amish, and Amish Mennonite, each with their own subgroups. Eighty-five percent of Amish are Old Order Amish, who follow more traditional practices, while other Amish groups are more progressive (Kraybill and Hostetter 2001, pp. 66-67). Each Amish community is organized around a church district, which typically consists of 30 families with 60 baptized adults and 75 unbaptized youths. Amish youths aged 16 and above will participate in *Rumspringa*, which allows them a chance to experience the outside world

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[3] Other Anabaptist groups that are similar to the Amish include conservative Mennonites and the Hutterites.
[4] There are also Amish settlements in the Canadian province of Ontario and Latin America.

before they decide whether or not to be baptized into the Church. [5] The small congregation size facilitates mutual aids and insurance in the forms of providing helping hands to each other in barn raisings, harvesting, quilting, births, weddings, and funerals and assistance in the events of drought, disease, death, injury, bankruptcy, and medical emergency (Kraybill and Bowman 2001, p.113).

The Amish and other Anabaptists strive to maintain a simple Christian life that objects to material success and seek to separate themselves from the world and worldly influences. The conduct of an Amish person is regulated by the *Ordnung* of each congregation, which can be understood as a set of standards of or expectations for behavior (Kraybill 2001, p.112). The emphasis on separation from the world governs many of Amish customs, including dress codes, the use of technology, attitudes towards education, and the choice of school.

The Amish believe that eight years of formal schooling is adequate to equip their children with basic skills in reading, writing, and arithmetic, to be good famers and citizens, and to deal with non-Amish people in general. The Amish object to formal education beyond the eighth grade because high school education exposes their children to worldly influences in conflict with their beliefs. Specifically, they believe that typical high school curricula and activities not only ill prepare Amish youths for successful careers in Amish life, but will also stir aspirations and raise occupational hopes that turn Amish youths away from farm and family (Kraybill 2001, pp.175-176).

The Amish preferred one-room schoolhouses, common in rural America throughout the middle of the twentieth Century, because small-scale rural schools allowed the community to monitor school activities, parents to pay unexpected visit, the school board to hire Amish teachers (or teachers sympathetic to them), and the community to adjust class schedules when special occasion arose (Meyers 1993). The small local public schools gave the Amish limited contact with non-Amish people and taught the basic

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[5] The Amish and other Anabaptists practice adult baptism. The typical age of baptism ranges from sixteen to the early twenties for the Old Order Amish, and roughly sixty percent join the church before they reach twenty-one (Kraybill 2001, p.117).

skills needed (Huntington 1994).[6] As state authorities consolidated rural public schools and enforced high school attendance, especially during the post-WWII period, the Amish resisted and formed parochial schools.

The first recorded conflict between the Amish and school officials occurred in 1914 in Geauga County, Ohio, when Amish fathers were fined for not sending their children under sixteen to public high school (Meyers 1993). Over the next sixty years, Amish people continued to face opposition over schooling related issues from state and local school authorities. The refusal to comply with compulsory attendance laws frequently led to fines and imprisonments of Amish fathers. Similarly, Amish parochial schools hiring noncertified teachers, who typically had eight years of education, also faced repeated shut-down attempts by state authorities.

After numerous conflicts between the Amish and school authorities, a compromise was finally reached between the Amish and the state of Pennsylvania in 1956, and later in parts of Ohio and Indiana. The concession allowed Amish children who were at least fourteen and passed the eighth grade to attend a special vocational school until they were at least fifteen years old. The children would work at home under parental guidance and keep a journal of their daily activities (Meyers 1993). Once a week, the children would meet for a minimum of three hours with an Amish teacher to report on their week's work and to study English, mathematics, health, and social studies, supplemented by home projects in agriculture and homemaking (Hostetler and Huntington 1971, p.71). Attendance record was kept and forwarded to the state. In 1958, Ohio followed suit.[7] Nevertheless, Ohio state authorities repeatedly attempted to shut down "substandard" Amish vocational schools and forced Amish children to attend public high schools throughout the 1960s (Meyers 1993). In 1967, a similar vocational training program was also established for Amish children younger than sixteen in Indiana (Hostetler and

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[6] The Amish call non-Amish people the English.
[7] In Ohio, students would continue school until the tenth grade (Hostetler and Huntington 1971, p.72).

Huntington 1971, p.99).[8] However, conflicts between the Amish and school authorities continued in other states throughout the 1960s.

In 1969, three Amish parents were found guilty of violating the State of Wisconsin's compulsory attendance laws for declining to send their children aged 14 and 15 to public high school after finishing the eighth grade in Green County (Keim 1975, p.151).[9] Subsequent appeal to the circuit court failed. In 1971, the Amish brought the case to the Supreme Court of Wisconsin, which reversed the lower courts' decision. Unsatisfied with the result, the State of Wisconsin pressed on to the Supreme Court of the United States. On 15 May 1972, the Supreme Court of the United States unanimously ruled that the Amish had a right to refuse to send their children to school beyond the eighth grade (Meyers 1993). Because of the U.S. Supreme Court's decision, Amish are finally able to enforce the prohibition on high school education without governmental interference.

3.   The Religious Club Model

In this section, I present a modified version of Iannaccone's (1992) religious club model to explain why the Amish would prohibit high school education and refuse to comply with compulsory schooling laws. According to the religious club model, the prohibition on high school education would help the Amish: (1) internalize the positive externality generated from the social interaction among sect members; and (2) restrict sect membership only to those who would not lower the positive externality in the club.

3.1.   The Model

Consider a two-period model, where an Amish person lives for two periods. In period 1, the Amish person is young and not an Amish sect member. In period 2, the Amish person becomes an adult and can become an Amish sect member. A forward looking Amish

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[8] The vocational school program was never started in other states and had been discontinued in Ohio and Indiana, but was still functioning in Pennsylvania in 1994 (Huntington 1994, endnote 13).
[9] The Amish parents are Jonas Yoder, Adin Yutzy, and Wallace Miller. Yoder and Yutzy are Old Order Amish, while Miller is an Amish Mennonite.

youth would solve the constraint optimization problem backward. The utility of a baptized adult Amish is:

$$u_{2i} = u\big(S_i, R_i, Q\big), \text{ where } Q = \sum_{j \neq i} R_j \big/ N$$

An adult Amish derives utility from time spent in religious activities, R, as well as from the consumption of secular goods, S. Religious activities include time spent mingling with other sect members. These activities are more satisfying when there are more committed members engaged in. The average amount of religious time spent by other adult Amish members, Q, is a positive externality and can be thought as the quality of the club. Mutual aids in the form of Amish members giving each other helping hands in barn raisings, quilt making, harvesting, weddings, and so on are typical examples of Q. For simplicity, assume the number of members in the sect, N, is exogenously given.

The adult Amish person can participate in the labor force and faces the budget constraints of the form:

$$w_i T_2 = p S_i + w_i R_i$$

Total time T in adulthood is spent on religious activity R and work hours h (i.e., $T_2 = R_i + h_i$). Income is earned at wage rate w_i per hour worked and spent on consumption of the secular good S, at price p.

The wage rate, w_i, that an adult Amish receives is determined by the level of education chosen when the Amish person was young (i.e., period 1):[10]

$$w_i = F\big(E_i\big), \text{ where } F'(E) > 0.$$

When the Amish person was young, the person derived utility from leisure only:

$$u_{1i} = u\big(l_i\big)$$

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[10] I do not impose whether the return to education is due to human capital or signaling of ability in the (secular) labor market in the spirit of Spence (1973).

The young Amish could not work and must allocate total time T between leisure l and education E:

$$T_1 = l_i + E_i$$

Since a rational and forward looking young Amish person would maximize life-time utility subject to the time constraint in period 1, the problem is solved by backward induction. The period 2 problem is:

$$\underset{S_i, R_i}{\text{Max}} \ u_{2i} = u(S_i, R_i, Q),$$

$$\text{Subject to } w(E_i)T_2 = pS_i + w(E_i)R_i$$

Notice that the adult Amish individual would take the wage rate, w and the quality of the club, Q, as given in period 2.

Because the Amish individual does not take into consideration the positive externality created by his religious activities, the chosen level of R and S will only satisfy the following condition:

$$\frac{w(E_i)}{p} = MRS_{RS}$$

The Amish person ignores the external benefit of his religious participation, MRS_{QS}, that a social planner would consider in the following condition:

$$\frac{w(E_i)}{p} = MRS_{RS} + MRS_{QS}$$

Solving the period 2 problem will yield the optimal secular good consumption $S_i^*(p, w(E_i))$, the optimal religious activities $R_i^*(p, w(E_i))$, and the indirect utility $v_{2i}(p, w(E_i))$. $R_i^*(p, w(E_i))$ and $v_{2i}(p, w(E_i))$ will be lower than the socially desired level.

In period 1, the Amish person's problem is:

$$\underset{E_i}{\text{Max}}\, V_i = u_{1i}\left(l_i\right) + v_{2i}\left(p, w\left(E_i\right), Q\right)$$

$$\text{Subject to } T_1 = l_i + E_i$$

The first order condition yields:

$$\frac{\partial v_{2i}}{\partial w_i} \frac{\partial w_i}{\partial E_i} = -\frac{\partial u_{1i}}{\partial E_i}$$

The right hand side term is the marginal benefit of education and the left hand side term is the marginal cost of education.[11] Since the Amish person will only select R and S such that the condition $\dfrac{w\left(E_i\right)}{p} = MRS_{RS}$ holds (ignoring the term MRS_{QS}) in period 2, the optimal E will be much higher than the socially optimal level.

Using the Amish religious club model, we can explain why the Amish would prohibit education beyond the eighth grade. According to the religious club interpretation, by imposing a level of education lower than the privately chosen level, the Amish sect can make labor market participation relatively less attractive and achieve the socially optimally level of religious participation.

3.2. Unobserved Heterogeneity

It is likely that there exist unobserved heterogeneous types of Amish individuals. When the types of Amish persons are unobserved, the sect can improve social welfare by requesting members a signal in order to exclude free-riders from joining the club. Following Berman's (2000) exposition, assume two unobserved types of individuals: high-type (H) Amish and low-type (L) Amish. For each birth cohort, the fraction of high-type Amish is θ_H and the fraction of low-type Amish is θ_L. High-type Amish enjoys higher return to education than low-type Amish in the labor market:

$$F_H'\left(E\right) > F_L'\left(E\right)$$

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[11] The term $\partial v_{2i}/\partial w_i = \left[\partial v_{2i}/\partial\left(w_i/p\right)\right]\left[\partial\left(w_i/p\right)/\partial w_i\right]$ is non-negative by the property of an indirect utility function, which is non-increasing in (p/w) and (p/w) is decreasing in w. To obtain an interior solution, we need to assume that the Hessian matrix of the objective function is negative semi-definite.

Furthermore, assume that $F_H(0) \geq F_L(0)$.

Given that high-type Amish will have higher marginal benefit of education than low-type Amish will, and that both types of Amish face the same marginal cost of education, high-type Amish will optimally select more education than low-type Amish will. This means that a high-type Amish person will earn higher wage and participate less in religious activities than a low-type Amish person.[12]

An Amish sect with predominantly low-type Amish persons will not gain from admitting a high-type Amish person because the high-type Amish person will lower the average level of religious participation in the sect and decrease the welfare of existing sect members. As a result, the sect has an incentive to keep high-type Amish persons from joining the sect. To exclude high-type Amish persons from joining the sect, the Amish can enforce a low level of schooling from which high-type Amish cannot benefit. In other words, the Amish can set a relatively low level of education that high-type Amish persons are indifferent between whether to join the sect or not. This relatively low level of education imposed is incentive compatible for high-type Amish persons and will lead to only the low-type Amish joining the sect. Hence, the fraction of Amish joining is θ_L.

3.3. Governmental Enforcement of Compulsory Schooling Laws

When the government enforced compulsory education beyond the eighth grade on the Amish, the Amish lost the control over their socially efficient level of education. Governmental enforcement of compulsory high school education means that (1) the Amish could not internalize the positive externality of religious participation by effectively prohibiting high school education; and (2) the Amish could no longer separate the high-type Amish from the low-type Amish by imposing the prohibition on high school education.

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[12] As long as the substitution effect of a change in wage is greater than the income effect of a change in wage, the labor supply curve is upward sloping and religious participation is decreasing in wages.

When the government enforced compulsory education beyond the eighth grade, the Amish sect would end up admitting members who would participate in religious activities at a level lower than the socially optimal level. When compulsory schooling laws were enforced on the Amish, the Amish sect would admit less committed members and the fraction of admitted members among each Amish birth cohort will be greater than θ_L. The cohorts on which compulsory high school attendance were enforced would include a fraction of high-type Amish persons, θ_H, who have higher return to education and lower level of religious participation than low-type Amish persons. This explains why the Amish would refuse to comply with compulsory schooling laws.

3.4. Testable Implications

According to the Amish religious club model, the U.S. Supreme Court's decision exempting the Amish from compulsory schooling laws permitted the Amish to enforce their socially optimal level of education. This policy shock allowed the Amish to improve the welfare of their sect members. The U.S. Supreme Court's decision switched the Amish from an environment in which they were constrained to set their optimal level of educational prohibition to one in which they were unconstrained. Thus, the Amish religious club model predicts that:

(1) The Supreme Court decision would increase the fraction of Amish leaving the sect, because high-type Amish who would prefer to attend high school would be excluded from joining the sect after the Supreme Court ruling.

(2) The policy-shock-induced attrition would be driven by Amish who have relatively higher return to education.

4. Data

The Census Bureau has been collecting information of the language spoken at home in recent census years. According to Meyers and Nolt (2005, p.61), the Amish and conservative Mennonites represent almost all of the current speakers of Pennsylvania

Dutch, which is a German Dialect.[13] Pollack (1981) reports that as the Amish people shifted to more liberal Mennonite denominations, they ceased to use Pennsylvania Dutch as their primary language, indicating that speaking Pennsylvania Dutch signals attachment to the Amish Church.[14] Therefore, even though religious information is not directly observed in the censuses, we can reasonably identify the Amish and conservative Mennonites according to whether Pennsylvania Dutch is spoken at home.[15]

The Applied Population Laboratory at the University of Wisconsin, Madison (2002) reports that the distribution of Pennsylvania German ancestry responses in the census is highly correlated with the distribution of known Amish communities in Wisconsin. However, given that changes in religious affiliation occur, using ancestry responses may lead to the false identification of Amish-born individuals or their descendents who are no longer Amish.[16] As a result, the approach taken in this paper is to use whether Pennsylvania Dutch is spoken at home as the indication of being Amish or not. Since I cannot directly identify the religious denominations of Pennsylvania Dutch speakers in the censuses, the Amish referred to in this paper would include some Conservative Mennonites who speak Pennsylvania Dutch. Specifically, I define a person as an Amish individual when the person resides in a non-single-member household that has at least two Pennsylvania Dutch speakers.[17] For those who report to speak Pennsylvania Dutch,

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[13] Dutch comes from "Deutsch", meaning German. There are also a number of Amish who speak a Swiss-German dialect (Meyers and Nolt 2005, p.61). Since the 1980 Census, the Census Bureau began collecting information of the language spoken at home for persons above a certain age.

[14] In 1977, 100% of Old Order Amish families living in Plain City, Ohio, used Pennsylvania Dutch as their primary language, but only 11.8% of Mennonite families used it as their primary language.

[15] Conservative Mennonites (Old Order Mennonites) are similar with the Amish in many aspects, such as their plain clothing, horse-and-buggy mode of transportation, preference for one-room parochial schooling, and prohibition on high school education (Kraybill and Bowman 2001).

[16] My cross-tabulation of ancestry of respondents that speak Pennsylvania Dutch at home shows ancestry responses of American, Swiss, French, or German, which are consistent with the migration history of the Amish and Mennonites.

[17] In this paper, Pennsylvania Dutch speakers include those who speak Pennsylvania Dutch at home and those with Pennsylvanian German ancestry and speak German at home. I coded a household as a Pennsylvania Dutch household when the household has at least one Pennsylvania Dutch speaker while all other household members speak Pennsylvania Dutch, German, or Dutch. For those who are Dutch or German speaking, they must be native-born to be included. Pennsylvania Dutch speaking people living in single-member households are coded as Amish. If a person is the sole-speaker of Pennsylvania Dutch in a non-single-member household, I code the person as a former Amish person.

but live in a non-Pennsylvania Dutch household, I define them as former Amish individuals.[18]

Table 1 compares the distributions of Amish population estimates based on different sources of data. The distributions of Amish population estimates across the United States using the decennial censuses are fairly similar to the distributions of Amish population estimated by Kraybill and Hostetter (2001) and Hostetler (1993) based on Amish Church membership data, although the decennial censuses tend to undercount the Amish population.[19] Since 70 percent of the Amish population resides in Pennsylvania, Ohio, and Indiana, I will focus my analysis mostly on individuals living in Pennsylvania, Ohio, and Indiana.

Table 2 and Table 3 compare the characteristics of the Amish, former Amish, and non-Amish adult population aged 18 to 64 living in Pennsylvania, Ohio, and Indiana, in 1990 and 2000 respectively. Table 3 and Table 4 show that the Amish are more likely to drop out of school upon finishing grade eight, to be farmers, to have bigger family size, and to find employment than former Amish persons and non-Amish persons. A high fraction of adult Amish males and females have no more than an eighth-grade education. The fraction of eighth-grade dropouts is less than 5 percent for non-Amish population and around 15 percent for former Amish persons, but as much as two-thirds for the Amish.[20] Furthermore, the trend in educational attainment is decreasing for the Amish population, but increasing for the non-Amish and former Amish population. The low educational attainment reported here for the Amish is consistent with their objection to high school education. The educational attainment of the Amish is also much lower than members of other religious sects in the United States reported by Iannaccone (1992). The reason that

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[18] A person must communicate with other household members using the same language. Individuals who are the sole-speakers of Pennsylvania Dutch at home are likely identifying Pennsylvania Dutch as their mother tongue, instead of "language spoken at home" per se.

[19] Since both methods provide estimates, it is not known which one is closer to the truth. It is also not clear whether non-responses will bias the estimates of the characteristics of Amish. The undercount may to some extent due to the fact that some Amish are "Swiss Amish" who do not speak Pennsylvania Dutch. Furthermore, the high percentage of children and young adults and the use of non-English language of the Amish are characteristics associated with census undercount. For detailed discussions of census undercount and the extent of undercount, see Edmonston and Schultze (1995) and Edmonston (2002).

[20] In this paper, eighth-grade dropout means having less than a ninth-grade education.

Amish people have higher employment rates is perhaps because they refuse any form of government assistance such that they cannot afford to search longer for better job when unemployed. It may also because the Amish have strong social network, which makes finding employment relatively easier than non-Amish people.[21] The observation that Amish have larger family size is consistent with previous findings regarding the high fertility rates of the Amish.[22]

Table 3 and Table 4 also show that the Amish participate less in the labor force, have lower earnings, and work fewer hours on average than former Amish persons and non-Amish persons. The contrast in incomes between the Amish and non-Amish populations is much larger than the relative differences in incomes between adherents to most Church-like religious groups and sect members in the United States reported by Iannaccone (1992), but similar to those between Israeli Ultra-Orthodox Jews and non-Ultra-Orthodox Jews reported by Berman (2000).[23] However, the differences documented here do not imply that the Amish are disadvantaged. Indeed, the Amish eschew material wealth and many of the Amish utility generating activities are non-monetary.

The simple comparison between Amish, former Amish, and non-Amish population shows that former Amish persons earn relatively higher wage and are less likely to drop out of school than the Amish. The differences are consistent with the Amish religious club model's predictions. I will exploit the policy shock induced by the U.S. Supreme Court's decision to assess the model's predictions in the next section.

5.   Empirical Results

5.1.   The Exemption from Compulsory Schooling Laws and The Prohibition on High School Education

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[21] Amish work for Amish employers, as well as non-Amish employers. For example, Kraybill (2001, p.247) reports that 11 percent of Old Order Amish adult men aged 21-30 living in Lancaster work for non-Amish employers.

[22] Amish total fertility rates were estimated to be between 6-8 (see Ericksen et al. 1979 and Greksa 2002).

[23] Comparisons based on household incomes reported in Table 1 and Table 2 in Iannaccone (1992) and Table 1 in Berman (2000).

5.1.1.   Cohort Differences in Eighth-Grade Dropout Rates

I argue that the U.S. Supreme Court's ruling in *Wisconsin v. Yoder* was a policy shock allowing the Amish to enforce the prohibition on high school education. For the U.S. Supreme Court's decision to be a shock, it would lead to a jump in the fraction of eighth-grade dropout rates among the Amish. Based on the pooled sample of 1990 and 2000 censuses, Figure 1 shows the fraction of eighth-grade dropouts by Amish and non-Amish male birth cohorts. [24] The figure clearly reveals that the cohorts born in 1958, who reached age 14 before 1972 and were affected by compulsory schooling laws, are significantly more likely to have more than an eighth-grade education. In contrast, there is no discernible jump in the fraction of dropouts for non-Amish cohorts who are not exempted by the U.S. Supreme Court's decision.

5.1.2.   Cohort Differences in Completed Years of Education

In this section, I estimate the effects of compulsory school attendance exemption on the completed years of education of Amish males, using data from Census 1990 and Census 2000. To further control for potential unobserved influences that may confound cohort differences in educational attainment, I also estimate cohort differences in the completed years of education of non-Amish males in order to construct differences-in-differences estimates of the effects of compulsory school attendance exemption on years of education.

The cohort difference in educational attainment is estimated using the following regression model:

$$Education_i = \beta_0 + \beta_1 Post_i + \beta_2 X_i + \varepsilon_i$$

Education is the number of years of schooling individual *i* completed; *Post* indicates whether individual *i* was born in 1958 and after or not; *X* is a set of control variables, including metropolitan indicator, marital status indicator, and state dummies; and ε is the

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[24] The analysis is restricted to adult males living in Pennsylvania, Ohio, and Indiana, born between 1956 and 1959.

error term. The above regression model is estimated separately for Amish and non-Amish males. The estimated β_1 for the sample of Amish males and the sample of non-Amish males are then used to construct the difference-in-difference estimate of the effect of the exemption.

Table 4 and Table 5 report the estimated differences in completed years of schooling between pre-Supreme Court exemption cohorts and pos-Supreme Court exemption cohorts, using data from Census 1990 and Census 2000 respectively. The education attainment for post-Supreme Court exemption Amish cohorts is estimated to be between 0.95 to 1.2 years lower than for pre-Supreme Court exemption Amish cohorts using Census 1990 data, and between 0.67 and 1.08 years using Census 2000 data. The estimated cohort differences using the preferred specification (column 4), which includes a set of state dummies, metropolitan indicator, and marital status indicator, are similar for Census 1990 and Census 2000 data.

On the other hand, the cohort differences in completed years of schooling are estimated to be between 0.02 and 0.1 years for the non-Amish population depending on model specifications and census years. Although the non-Amish cohort differences are statistically significant, they are economically (numerically) negligible. In particular, cohort differences are smallest according to the preferred specification (column 4). Because the U.S. Supreme Court's ruling does not apply to the non-Amish population, we may interpret the non-Amish cohort differences in years of education as cohort differences due to other unobserved influences.

The differences-in-differences estimate of the effect of the compulsory schooling exemption on years of education is -0.85 using Census 1990 data (Table 4) and -1.06 using Census 2000 data (Table 5). In other words, the U.S. Supreme Court's decision enabled the Amish to practice their prohibition on education and led the education attainment of younger Amish cohorts to fall by roughly 10 to 13 months.

5.2. Cohort Differences in the Likelihood of Attrition from the Amish Sect

As the U.S. Supreme Court exempted the Amish from compulsory schooling laws, it became easier for the Amish to enforce prohibition on high school education, evident in the jump in Amish grade-eight dropout rates (Figure 1) and lower average educational attainment (Table 4 and Table 5). The religious club model predicts that with successful enforcement of educational prohibition, attrition would also jump, as a result of high-type Amish leaving the sect.

I use the following linear probability model to test whether this prediction is empirically supported:[25]

$$Attrite_i = \alpha_0 + \alpha_2 Post_i + \alpha_3 X_i + u_i$$

The dependent variable *Attrite* takes the value of 0 if a person is Amish and 1 if a person is a former Amish person; *Post* indicates whether individual *i* was born in 1958 and after or not; and *X* is a set of control variables, such as state dummies, metropolitan status, and marital status. Because of the relatively small sample of former Amish persons, I include all Amish and former Amish persons living in the United States in the analysis.[26] As I code people who are the sole-speaker of Pennsylvania Dutch in non-single-member households as former Amish persons, it is likely that many former Amish individuals who no longer claim to speak Pennsylvania Dutch at home would be undercounted. Nevertheless, as long as the measurement error is unrelated to the U.S. Supreme Court's ruling, the coefficient α_2 will provide a consistent estimate of the effect of the Supreme Court ruling on the likelihood of attrition.

Table 6 presents the effect of the U.S. Supreme Court's decision on the probability of an Amish male leaving the sect. Cohorts affected by the Supreme Court decision were roughly 7 percentage points to 10 percentage points more likely to leave the sect than older cohorts not affected by the Supreme Court decision. The estimates are not particularly sensitive to the adding of metropolitan indicator, marital status indicator, or state dummies. The results support the idea that by preventing the Amish from attending

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[25] The results are robust to using a Probit specification. Results are available from author upon request.
[26] The coefficients are similar using the more restricted sample, although less precisely estimated.

high school, the sect ensures that individuals who would prefer to have more education would eventually leave the sect.

The above results appear to contradict previous findings by Meyers (1994a, 1994b) and Greksa and Korbin (2002), which show a long-term downward trend in attrition rates. Although attrition increased for the cohorts reaching 14 years of age immediately following the U.S. Supreme Court's decision, the census data reveal a long term downward trend in attrition rates (Figure 2).

One explanation for the downward trend in attrition is the rise in Amish parochial schooling (Meyers 1994a). Figure 3 shows the upward trends in the number of Amish schools and the number of students attending Amish schools. Parochial schooling as an explanation for the falling attrition is consistent with the religious club interpretation. The consolidation of rural public schools and the enforcement of compulsory schooling laws drove the Amish into parochial schools. Amish schools are typically one-room operations with a single teacher, hire teachers who have no more than eight years of education, and eschew science and modern technology. Given the significance of teacher quality and course taking in explaining the labor market return to education, it is reasonable to expect that the labor market return to an Amish education is likely lower than other types of schooling.[27] Therefore, we may argue that the switch towards Amish parochial schooling has the effect of dampening the return to education and raising the religious participation, especially among high-type Amish. The increase in the quality of the sect will make joining the sect more attractive to high-type Amish and lead to a lower rate of attrition. As long as the gain from greater religious participation of high-type Amish outweighs the cost of increased free-riding from the joining of these high-type Amish, the switch towards Amish parochial schooling can be welfare enhancing for the Amish sect. Without information on the types of schools that Amish individuals actually attended when young, I cannot empirically test this claim.

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[27] Alternatively, we may also argue that Amish education signals lower ability than public education does in the secular labor market.

5.3. Cohort Differences in Log Hourly Earnings and Return to Education

The U.S. Supreme Court's ruling granted the Amish the right to prohibit their children from attending high school. The religious club model predicts that the prohibition on education will lead to high-type Amish leaving the sect. In previous sections, I show that the Supreme Court ruling led to lower educational attainment of the Amish and higher attrition. To test the key prediction of the Amish religious club model, we need to be able to identify whether the court ruling led to high-type Amish leaving the sect. One simple way to infer whether compulsory-schooling-exempted Amish cohorts are lower type than non-compulsory-schooling-exempted Amish cohorts are is to assess to what extent the exemption affected the earnings of the compulsory-schooling-exempted Amish relative to the earnings of the non-compulsory-schooling-exempted Amish. Specifically, if the fall in earnings associated with the decrease in educational attainment is much larger than the estimated causal return to education, then we have evidence that the U.S. Supreme Court's ruling helped the Amish exclude high-type individuals from joining.

5.3.1. Cohort Differences in Log Hourly Earnings

Similar to the estimation of cohort differences in educational attainment, I will separately estimate the cohort differences in log hourly earnings of Amish and non-Amish males, as well as the differences-in-differences estimate of the effect of the exemption. Table 7 and Table 8 report the estimated cohort differences in the log hourly earnings of Amish males and non-Amish males and the differences-in-differences estimates of the effect of the U.S. Supreme Court's ruling on the log hourly earnings of Amish males.

The results show that the older Amish cohorts earned between 23 percent and 34 percent depending on census years. The differences are not particularly sensitive to the exclusion of control variables. According to the preferred specification, the differences-in-differences estimate of the effect of the exemption on log hourly earnings is negative 20 percent using Census 1990 data and negative 34 percent using Census 2000 data. In other words, the estimates are robust to the use of non-Amish males as the control group.

5.3.2. Implied Return to Education

Using the information about the effects of the compulsory schooling exemption on education (Table 4 and Table 5) and on log hourly earnings (Table 7 and Table 8), we can calculate the implied return to education. The implied return to education can be written as:

$$\frac{d \ln w}{dE} = \frac{d \ln w / d\Delta}{dE / d\Delta}$$

Δ represents the surprising Supreme Court decision. The numerator on the left hand side term is the estimated effect of the exemption on log hourly earnings, while the denominator on the left hand side term is the estimated effect of the exemption on years of education.

Table 9 presents the implied return to education. According to the preferred specification (column 4), where state dummies, metropolitan status, and marital status are controlled for, the implied return to education for the Amish is 23% using Census 1990 data and 31.8% using Census 2000 data. Previous literature on the return to education shows that point estimates of the causal return to education range between 7 percent and 15 percent (Card 1999). The return to education of the Amish implied by the difference-in-difference estimates presented above is roughly 50% to 100% higher than the largest point estimate previously reported. It is difficult to conceive that the majority of non-exempted Amish who attended classes once a week for one additional year could possibly get as much as a 23 percent to 32 percent return on education. The findings are consistent with Amish individuals who have high labor market return to education leaving the sect as a result of the U.S. Supreme Court's decision.

6. Conclusion

Given the positive returns to education, the Amish prohibition of high school education appears puzzling from a rational choice perspective. This paper extends Iannaccone's

(1992) religious club model to explain why the Amish would collectively prohibit their children from attending high school. According to the religious club interpretation, the prohibition on high school education helps the Amish internalize the positive externality of religious participation and prevent less committed individuals from joining the sect. Because the enforcement of compulsory high school attendance by the government interfered with Amish socially efficient level of education, the Amish refused to comply. When the government was enforcing compulsory schooling laws on the Amish, Amish born individuals who had higher labor market return to education and low religious participation (high-type Amish) could legitimately attend high school and joined the sect, leading to a low level of attrition among Amish youths. Thus, the Amish religious club model predicts that the surprising U.S. Supreme Court's decision would lead to increased Amish attrition rates, driven mainly by the attrition of high-type Amish.

I use U.S. Census data and exploit the surprising U.S. Supreme Court's decision in 1972, which exempts the Amish from compulsory education beyond the eighth grade, as a policy shock to test the predictions of the Amish religious club model. First, I find that former Amish persons are more educated and enjoy relatively higher earnings than Amish persons. Second, Amish male cohorts exempted from compulsory schooling laws have significantly lower educational attainment than older Amish male cohorts. Difference-in-difference estimates, using non-Amish males as the control group, show that the exemption from compulsory schooling laws decreased Amish educational attainment by roughly 10 to 13 months. The associated loss in earnings is estimated to be 23 percent using Census 1990 data and 34 percent using Census 2000 data. The exemption increased the likelihood of an Amish male leaving the sect by roughly 7 to 9 percent. The return to education implied by the estimated effects of the exemption on educational attainment and earnings, which is approximately 23 percent using Census 1990 data and 32 percent using Census 2000 data, suggests that the increased attrition was driven by Amish with high return to education.

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Appendix

Table 1: Pennsylvania Dutch Speakers and Amish Population Estimates by States

States	(1) All Amish Groups 2000	(2) Penn Dutch Speakers 2000	(3) Old Order Amish 1992	(4) Penn Dutch Speakers 1990
Ohio	51,302	22,321	43,200	16,705
Pennsylvania	47,860	47,137	35,200	51,394
Indiana	34,786	11,081	25,200	10,118
Wisconsin	9,561	4,994	7,800	1,583
Michigan	8,591	2,698	6,500	1,595
Missouri	6,701	3,230	5,200	2,474
Kentucky	6,042	2,306	1,500	1,207
Illinois	4,849	1,749	3,200	1,002
Iowa	4,775	1,683	3,700	1,299
New York	4,748	3,694	4,700	2,477
Tennessee	2,248	755	800	882
Kansas	1,599	478	800	848
Minnesota	1,574	490	1,500	691
Virginia	1,390	265	0	675
Maryland	1,127	1,097	1,000	1,740
Other states	5,199	4,590	1,600	3,606
Total	192,352	108,568	141,900	98,296

Notes: (1) Kraybill and Hostetter's (2001) estimates of Old Order Amish, New Order Amish, Beachy Amish, and Amish Mennonites; (2) Pennsylvania Dutch speaking households in Census 2000; (3) Hostetler's (1993) estimates of Old Order Amish; (4) Pennsylvania Dutch speaking households in Census 1990.

Table 2: Characteristics of the Amish, Former Amish, and Non-Amish Population – Census 1990

Variables	Non-Amish		Amish		Former Amish		Amish - Former Amish
	Obs	Mean	Obs	Mean	Obs	Mean	Difference
Male	16,570,325	0.49	34,610	0.49	6,514	0.54	-0.05
		(0.0001)		(0.003)		(0.006)	(0.007) **
Metropolitan	16,570,325	0.74	34,610	0.59	6,514	0.72	-0.13
		(0.0001)		(0.003)		(0.006)	(0.006) **
Married	16,570,325	0.61	34,610	0.70	6,514	0.81	-0.11
		(0.0001)		(0.002)		(0.005)	(0.005) **
Family size	16,570,325	3.01	34,610	5.32	6,514	3.10	2.22
		(0.0004)		(0.016)		(0.017)	(0.023) **
8th grade dropout	16,570,325	0.03	34,610	0.62	6,514	0.17	0.44
		(0.00005)		(0.003)		(0.005)	(0.005) **
Years of Education	16,570,325	12.78	34,610	8.55	6,514	11.43	-2.88
		(0.0006)		(0.014)		(0.034)	(0.037) **
Labor force participation	16,570,325	0.77	34,610	0.68	6,514	0.77	-0.09
		(0.0001)		(0.002)		(0.005)	(0.006) **
Employment rate	12,753,379	0.94	23,685	0.99	5,029	0.98	0.01
		(0.00007)		(0.001)		(0.002)	(0.002) **
Farmers	14,652,305	0.02	27,581	0.24	5,706	0.06	0.17
		(0.00004)		(0.003)		(0.003)	(0.004) **
Weekly earnings	13,497,262	468.32	24,258	419.65	5,309	467.03	-47.38
		(0.197)		(6.441)		(6.161)	(8.914) **
Hourly earnings	13,497,262	12.18	24,258	10.88	5,309	11.24	-0.36
		(0.0162)		(0.177)		(0.139)	(0.225)
Log hourly earnings	13,419,402	2.19	23,415	1.93	5,288	2.22	-0.30
		(0.0002)		(0.006)		(0.008)	(0.010) **
Weeks worked per year	16,570,325	36.02	34,610	32.09	6,514	37.71	-5.62
		(0.005)		(0.126)		(0.257)	(0.286) **
Hours worked per week	16,570,325	31.82	34,610	30.62	6,514	33.48	-2.85
		(0.005)		(0.134)		(0.236)	(0.271) **

Note: Native-born adult population aged 18 to 64 living in Pennsylvania, Indiana, and Ohio. Eighth grade dropout means having no more than an eighth-grade education. Years of education was coded according to Park (1994). Former Amish are sole speakers of Pennsylvania Dutch in non-single-member households. Standard errors are reported in parentheses. ** denotes 1% level of significance; * denotes 5% level of significance

Table 3: Characteristics of the Amish, Former Amish, and Non-Amish Population – Census 2000

Variables	Non-Amish Obs	Non-Amish Mean	Amish Obs	Amish Mean	Former Amish Obs	Former Amish Mean	Amish - Former Amish Difference
Male	17,122,208	0.49	35,538	0.50	5,598	0.49	0.01
		(0.0001)		(0.003)		(0.007)	(0.007)
Metropolitan	17,122,208	0.79	35,538	0.52	5,598	0.69	-0.17
		(0.0001)		(0.003)		(0.006)	(0.007) **
Married	17,122,208	0.58	35,538	0.70	5,598	0.81	-0.11
		(0.0001)		(0.002)		(0.005)	(0.006) **
Family size	17,122,208	2.82	35,538	5.54	5,598	2.94	2.59
		(0.0004)		(0.015)		(0.019)	(0.024) **
8th grade dropout	17,122,208	0.02	35,538	0.65	5,598	0.12	0.53
		(0.00003)		(0.003)		(0.004)	(0.005) **
Years of Education	17,122,208	13.14	35,538	8.35	5,598	11.97	-3.62
		(0.0006)		(0.013)		(0.034)	(0.036) **
Labor force participation	17,122,208	0.78	35,538	0.66	5,598	0.78	-0.12
		(0.0001)		(0.003)		(0.006)	(0.006) **
Employment rate	13,354,908	0.95	23,448	0.98	4,342	0.99	-0.02
		(0.0001)		(0.001)		(0.001)	(0.002) **
Farmers	15,473,019	0.02	27,310	0.19	5,019	0.02	0.17
		(0.00003)		(0.002)		(0.002)	(0.003) **
Weekly earnings	14,294,170	702.95	23,974	599.49	4,732	714.86	-115.37
		(0.341)		(6.124)		(18.083)	(19.092) **
Hourly earnings	14,294,170	17.58	23,974	15.80	4,732	16.24	-0.44
		(0.0212)		(0.265)		(0.408)	(0.486)
Log hourly earnings	14,257,417	2.54	23,699	2.30	4,671	2.54	-0.24
		(0.0002)		(0.006)		(0.010)	(0.012) **
Weeks worked per year	17,122,208	38.02	35,538	31.24	5,598	39.72	-8.48
		(0.0049)		(0.125)		(0.267)	(0.295) **
Hours worked per week	17,122,208	33.27	35,538	28.51	5,598	35.17	-6.66
		(0.0044)		(0.123)		(0.262)	(0.292) **

Note: Native-born adult population aged 18 to 64 living in Pennsylvania, Indiana, and Ohio. Eighth grade dropout means having no more than an eighth-grade education. Years of education was coded according to Park (1994). Former Amish are sole speakers of Pennsylvania Dutch in non-single-member households. Standard errors are reported in parentheses. ** denotes 1% level of significance; * denotes 5% level of significance

Table 4: The Effects of Exemption on Years of Education – Census 1990

	Cohort Differences			
	(1)	(2)	(3)	(4)
I. Amish (n = 1650)				
$Educ_{exempt}$ - $Educ_{non-exempt}$	-1.20	-1.06	-1.06	-0.94
	(0.11)**	(0.11)**	(0.11)**	(0.11)**
II. Non-Amish (n = 843102)				
$Educ_{exempt}$ - $Educ_{non-exempt}$	-0.09	-0.09	-0.10	-0.08
	(0.005)**	(0.005)**	(0.005)**	(0.005)**
Control variables included				
State dummies	No	Yes	Yes	Yes
Metropolitan indicator	No	No	Yes	Yes
Married dummy	No	No	No	Yes
Differences-in-differences Estimates	-1.11	-0.96	-0.96	-0.85
	(0.11)**	(0.14)**	(0.19)**	(0.11)**

All regressions include an intercept term and use only males with positive earnings living in Pennsylvania, Indiana, and Ohio.
Reported sample sizes are weighted. Robust standard errors in parantheses. ** 1% level of significance;* 5% level of significance.
Exempted cohorts used are those born in 1958 and 1959. Non-exempted cohorts used are those born in 1956 and 1957.

Table 5: The Effects of Exemption on Years of Education – Census 2000

	Cohort Differences			
	(1)	(2)	(3)	(4)
I. Amish (n = 1172)				
$Educ_{exempt}$ - $Educ_{non-exempt}$	-0.67	-0.67	-0.68	-1.08
	(0.14)**	(0.15)**	(0.15)**	(0.14)**
II. Non-Amish (n = 839652)				
$Educ_{exempt}$ - $Educ_{non-exempt}$	-0.03	-0.03	-0.03	-0.02
	(0.005)**	(0.005)**	(0.005)**	(0.005)**
Control variables included				
State dummies	No	Yes	Yes	Yes
Metropolitan indicator	No	No	Yes	Yes
Married dummy	No	No	No	Yes
Differences-in-differences Estimates	-0.65	-0.64	-0.65	-1.06
	(0.11)**	(0.14)**	(0.19)**	(0.11)**

All regressions include an intercept term and use only males with positive earnings living in Pennsylvania, Indiana, and Ohio.
Reported sample sizes are weighted. Robust standard errors in parantheses. ** 1% level of significance;* 5% level of significance.
Exempted cohorts used are those born in 1958 and 1959. Non-exempted cohorts used are those born in 1956 and 1957.

Table 6: Cohort Differences in Attrition

	Census 1990				Census 2000			
	(1)	(2)	(3)	(4)	(1)	(2)	(3)	(4)
Post Exemption	0.06	0.07	0.07	0.07	0.08	0.09	0.09	0.10
	(0.014)**	(0.015)**	(0.015)**	(0.015)**	(0.014)**	(0.014)**	(0.014)**	(0.015)**
Control variables included								
State dummies	No	Yes	Yes	Yes	No	Yes	Yes	Yes
Metropolitan indicator	No	No	Yes	Yes	No	No	Yes	Yes
Married dummy	No	No	No	Yes	No	No	No	Yes
Sample size	2564	2564	2564	2564	1889	1889	1889	1889

All regressions include an intercept term and use only males. All states are included in the analysis. Reported sample sizes are weighted.

Exempted cohorts used are those born in 1958 and 1959. Non-exempted cohorts used are those born in 1956 and 1957.

Robust standard errors in parantheses. ** 1% level of significance;* 5% level of significance.

Table 7: Cohort Differences in Log Hourly Earnings – Census 1990

	Cohort Differences			
	(1)	(2)	(3)	(4)
I. Amish (n = 1650)				
LnEarning$_{exempt}$ - LnEarning$_{non-exempt}$	-0.23	-0.22	-0.22	-0.23
	(0.05)**	(0.05)**	(0.05)**	(0.05)**
II. Non-Amish (n = 843102)				
LnEarning$_{exempt}$ - LnEarning$_{non-exempt}$	-0.05	-0.05	-0.05	-0.04
	(0.001)**	(0.001)**	(0.001)**	(0.001)**
Control variables included				
State dummies	No	Yes	Yes	Yes
Metropolitan indicator	No	No	Yes	Yes
Married dummy	No	No	No	Yes
Differences-in-differences Estimates	-0.19	-0.17	-0.17	-0.20
	(0.05)**	(0.05)**	(0.09)	(0.11)**

All regressions include an intercept term and use only males with positive earnings living in Pennsylvania, Indiana, and Ohio.

Reported sample sizes are weighted. Robust standard errors in parantheses. ** 1% level of significance;* 5% level of significance.

Exempted cohorts used are those born in 1958 and 1959. Non-exempted cohorts used are those born in 1956 and 1957.

Table 8: Cohort Differences in Log Hourly Earnings – Census 2000

	Cohort Differences			
	(1)	(2)	(3)	(4)
I. Amish (n = 1172)				
LnEarning$_{exempt}$ - LnEarning$_{non-exempt}$	-0.32	-0.35	-0.35	-0.34
	(0.04)**	(0.04)**	(0.04)**	(0.05)**
II. Non-Amish (n = 839652)				
LnEarning$_{exempt}$ - LnEarning$_{non-exempt}$	-0.01	-0.01	-0.01	-0.01
	(0.002)**	(0.002)**	(0.002)**	(0.002)**
Control variables included				
State dummies	No	Yes	Yes	Yes
Metropolitan indicator	No	No	Yes	Yes
Married dummy	No	No	No	Yes
Differences-in-differences Estimates	-0.31	-0.34	-0.34	-0.34
	(0.05)**	(0.05)**	(0.09)	(0.11)**

All regressions include an intercept term and use only males with positive earnings living in Pennsylvania, Indiana, and Ohio.
Reported sample sizes are weighted. Robust standard errors in parantheses. ** 1% level of significance;* 5% level of significance.
Exempted cohorts used are those born in 1958 and 1959. Non-exempted cohorts used are those born in 1956 and 1957.

Table 9: Implied Return to Education

	(1)	(2)	(3)	(4)
Implied return to education				
Census 1990	16.8%	17.6%	17.8%	23.0%
Census 2000	48.3%	52.7%	52.1%	31.8%
Regressions included				
State dummies	No	Yes	Yes	Yes
Metropolitan indicator	No	No	Yes	Yes
Married dummy	No	No	No	Yes

All regressions include an intercept term and use only males with positive earnings living in Pennsylvania, Indiana, and Ohio.
Reported sample sizes are weighted. Robust standard errors in parantheses. ** 1% level of significance;* 5% level of significance.
Exempted cohorts used are those born in 1958 and 1959. Non-exempted cohorts used are those born in 1956 and 1957.

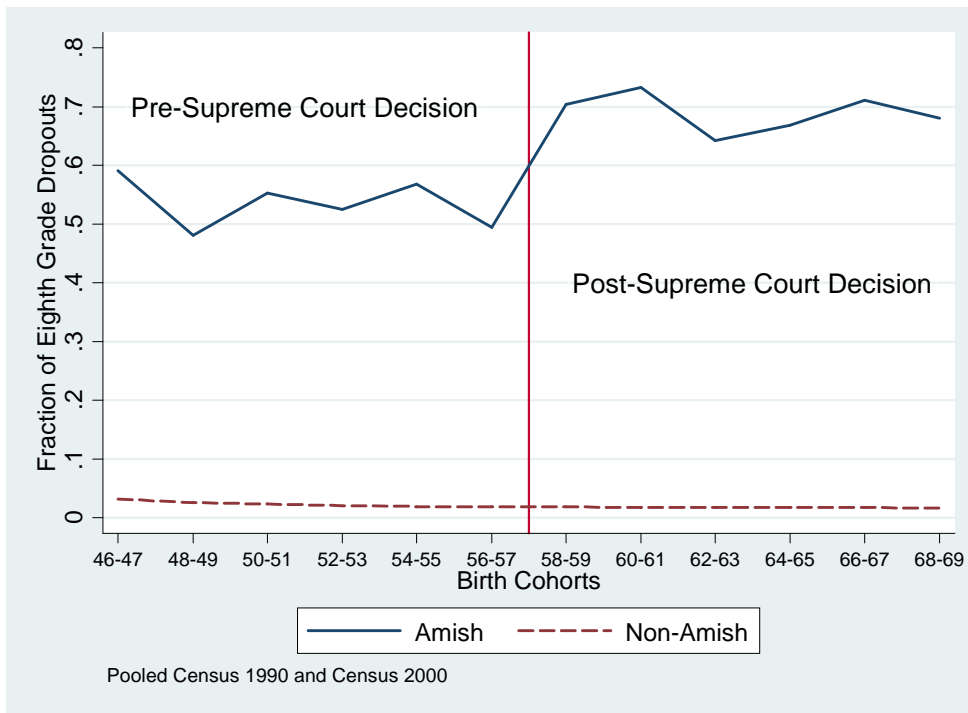**Figure 1: Cohort Differences in Eighth Grade Dropout**

Pre-Supreme Court Decision

Post-Supreme Court Decision

Amish ——— Non-Amish −−−−−

Pooled Census 1990 and Census 2000

Figure 2: Cohort Differences in Attrition Rates from the Amish Sect

Post-Supreme Court Decision

Pre-Supreme Court Decision
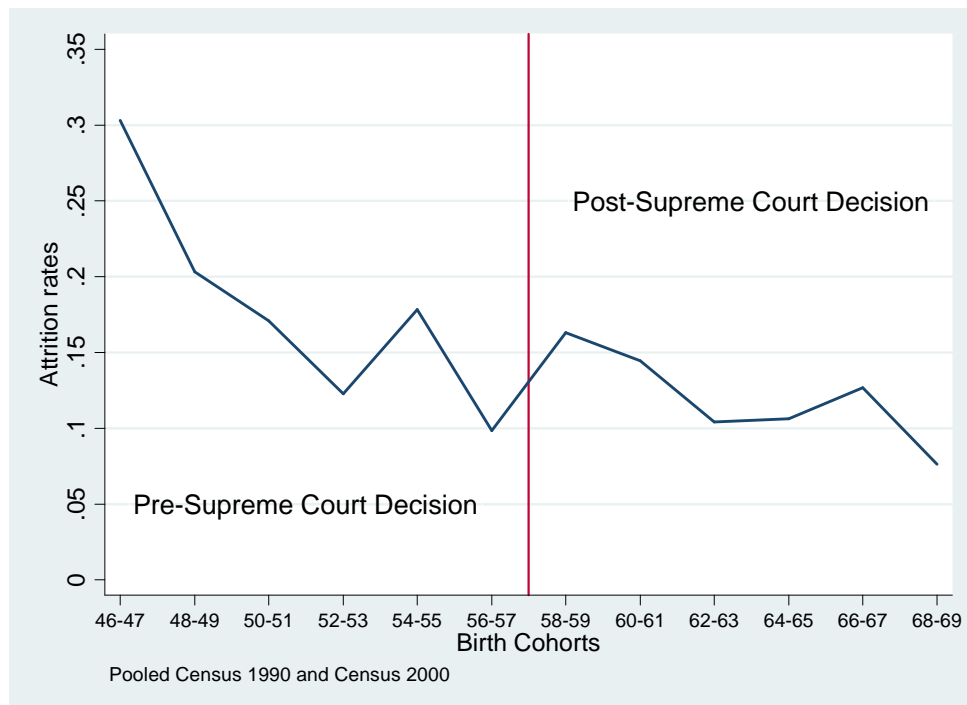
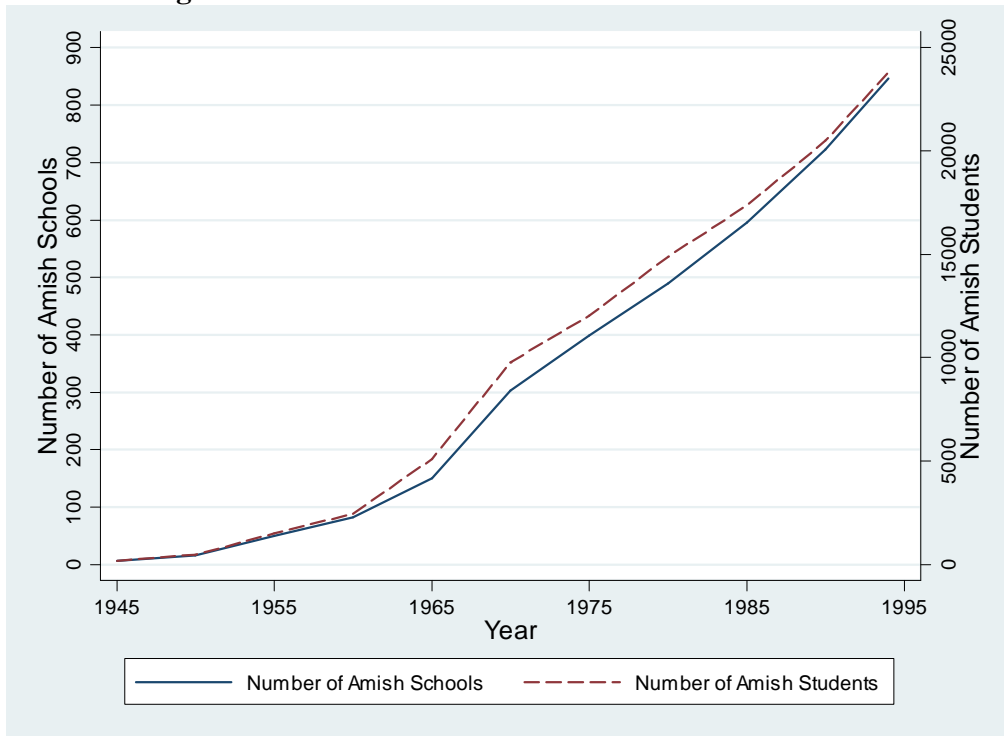Pooled Census 1990 and Census 2000

Figure 3: Trend in Amish Schools and Amish Students

Data source: Huntington (1994, pp.85-86)