Educational Attainment and Income Inequality: Evidence from the Earned Income Tax Credit

Katherine Michelmore*

Draft September 2012

As of the early 2000s, the gap in college enrollment between the highest income quartile and the lowest income quartile was over 40 percentage points (Lovenheim 2011). While there have been many studies analyzing the impact of various programs aimed at increasing college enrollment among low and moderate-income households such as the Hope Tax Credit and the Lifetime Learning Credit, the Earned Income Tax Credit (EITC) has largely been overlooked as a potential source for financial aid. As of 2011, the EITC was worth up to $5,751- higher than the Hope Tax Credit and the Lifetime Learning Credit combined. In this paper, I use variation in the timing and size of state EITC benefits to analyze how an increase in household income affects the educational attainment of low-income children. Preliminary results suggest that with the introduction of a 10% state EITC (worth up to $600 per year), low-income 18-20 year old children are 2 percentage points more likely to finish high school and 1.5 percentage points more likely to enroll in college.

*Ph.D. student in Policy Analysis and Management (email: km459@cornell.edu). I would like to thank Martha Bailey, Michael Lovenheim, Kelly Musick, Sharon Sassler, and Desmond Toohey for helpful advice and comments. Any remaining errors are my own.

1 Introduction

The gap in college enrollment rates between low-income and high-income households has been well documented in the literature (Bailey and Dynarski forthcoming; Long 2008). Calculations from the Current Population Survey suggest that the gap in enrollment between the highest income quartile and the lowest between 2000-2005 was over 40 percentage points (Lovenheim 2011). In addition, there has been evidence that financial constraints play an increasingly important role in college enrollment (Belley and Lochner 2007). Financial aid programs such as the Pell grant, the Hope tax credit, and the Lifetime Learning credit are designed to help low and moderate-income households gain access to higher education. There is a large literature on how these programs have affected access to higher education (Dynarski 2000; Long 2004; LaLumia 2012), generally finding moderate effects. The federal earned income tax credit (EITC), while not specifically designed to help low-income children gain access to higher education, provides households with up to nearly $6,000 in refundable tax credits, which may help low-income families pay for college. This may provide incentives for children to work harder in high school if they expect to be able to afford college. Extra income in the household might also allow parents to spend more time helping their children with homework, or may allow teens to spend fewer hours working outside the household and more time on schoolwork. There has been some evidence suggesting that the EITC improves short-term test scores of children aged 5 to 15 (Dahl and Lochner 2012), but there is no evidence that test score increases lead to improvements in other outcomes such as high school graduation or college enrollment. Using variation in the implementation and generosity of EITC benefits across states over time, I investigate how larger EITCs impact various educational outcomes such as high school completion, years of schooling, and college enrollment.

Preliminary results suggest that following the implementation of an EITC, states have

higher high school graduation rates and increased college enrollment among 18-20 year old children. Results looking specifically at likely EITC recipients before and after states implement EITCs suggest that effects are slightly stronger for girls: low-income 18-20 year old girls are 2.5 percentage points more likely to have completed high school, have .07 more years of schooling, and are 1.5 percentage points more likely to enroll in college after states implement a 10% federal EITC supplement, compared to low-income girls who were 18-20 before the implementation. I find similar magnitudes for low-income boys, though I am unable to attain significance on any of the three outcomes. In some specifications, however, I find that low-income boys who do enroll in college are 4 percentage points less likely to receive outside financial aid after the implementation of a 10% state EITC, suggesting that the EITC may allow low-income boys to rely less on other forms of financial aid.

The paper is structured as follows. In Section 2, I discuss the structure of the EITC, in Section 3, I discuss previous literature on financial aid and college enrollment. Section 4 discusses data, Section 5 discusses the empirical strategy, and Section 6 discusses preliminary results. Section 7 concludes.

2 EITC

The earned income tax credit is the largest cash-transfer program in the United States. In 2009 it redistributed over $50 billion dollars in benefits to low-income households, surpassing food stamps and the traditional welfare program, Temporary Aid to Needy Families (TANF). It also has a fairly high participation rate compared to TANF and other welfare programs, at over 80% of eligible taxpayers (Tax Policy Center 2012). Since its inception in the 1970s, the EITC has undergone several expansions at both the federal and state level. The current benefit structure subsidizes up to 40% of earnings up to a threshold for households with two or more children. Currently 24 states and the District of Columbia have their own EITCs,

which generally increase the total benefit by 5-40% of the federal benefit. States implemented their own EITCs beginning in the late 1980s, but the majority of states with EITCs were implemented in the late 1990s and early 2000s.

The EITC is a refundable tax credit that is calculated based on the earnings of the head of household and spouse (if married) and the number of children living in the household. While there is a small benefit for households with no children, the vast majority of dollars spent on the EITC go to households with at least one child (Tax Policy Center 2012). A family can claim up to two (three for tax years 2009-2012) qualifying children on their tax form. Qualifying children are defined as related children under the age of 19 that live in the household for at least 6 months of the year. Children over the age of 18 are also eligible up until age 23 if they are enrolled as full-time students. There are no restrictions on the type of institution, as long as the child is a full-time student. Because of this program feature, low-income households may have an incentive to encourage their children to go to college in order to maintain their EITC benefits. While maximum EITC benefits are over $5,000 for households with two or more children, childless individuals are eligible for less than $500. Claiming children as dependents could increase EITC benefits, and tax refunds as a whole, by thousands of dollars. For example, a couple earning $16,000 in 2009 would be eligible for the maximum benefit of $3,000 claiming one child, but would be ineligible for any EITC benefit without a dependent. If that household lived in a state that supplemented the federal EITC, the family could earn up to an additional $1,200, bringing the total gain in EITC benefits to $4,200 (2009$) if their child remained in school after age 18. The added benefits from claiming the child as a dependent could more than pay for a semester of tuition to a public four-year institution, or a full year of public two-year college tuition [1].

The EITC may work in a few different ways to promote college enrollment among children.

[1]Public four-year institution in-state tuition and fees for 2008-2009 school year were $6,400; public two-year institution tuition and fees were $2,600 for 2008-2009 school year according to National Center for Education Statistics 2012

First, the EITC provides a cash transfer that may relax the financial constraint of attending college for some households. If one of the reasons why low-income children do not attend college at the same rates as high-income children is due to financial constraints, the EITC benefit may help families to pay for college without taking as many loans. Second, the EITC may help younger children by providing more resources to the family that allows the child to invest more in education when young to better prepare her for college. There is some literature that suggests that low-income children do not attend college at the same rate as high-income children not because of short-term financial constraints, but because they lack sufficient academic preparation to attend college (Carneiro and Heckman 2002). Carneiro and Heckman (2002) argue that obtaining loans to pay for college in the short-run are relatively easy to find, but rather the so-called 'long-term' credit constraints-the inability of parents to pay for better schooling throughout their children's lives, are what limits college enrollment among low-income households. Addressing the long-term credit constraint issues, the EITC may promote education if it allows parents to spend more time and money helping their children succeed in school at younger ages. If schooling is a normal good, extra income in the household may allow families to 'consume' more of it. Parents may be able to hire a tutor for struggling children, or the extra income may allow family members to reduce their work hours. Parents may have more time to spend helping their children with homework, or older children who may have been working part-time to earn extra money for the family may be able to reduce their hours and spend more time on school work. Recent work by Dahl and Lochner (2012) has shown that the EITC does, in fact, raise the test scores of low-income children by a moderate degree, suggesting that the EITC does improve the quality of education for low-income children. It remains to be seen whether these moderate increases in test scores alone are enough to increase college enrollment among low-income children.

Previous work has also shown that higher EITCs, while encouraging single parents to increase their labor supply, may also crowd out teen employment (Neumark and Wascher

2007), which may serve as an unintended incentive for teens to go to college. If teens are unable to find work due to an increase in the supply of labor among single mothers, they may choose to remain in school longer instead.

3 Previous Work

The current analysis fits into a larger literature on the effects of financial aid on college enrollment. While there is also a large literature on the effects of the EITC on various labor force outcomes (see Hotz and Scholz (2003) for a review), there is limited research on the impacts of this tax credit on child education outcomes. Celik (2011) uses a similar strategy employed here to look at the effect of state EITCs on education investments of single mothers, but to my knowledge, this is the first paper to explore the educational attainment of children of EITC-recipients. The only work, to my knowledge, that analyzes the effect of the EITC on children of EITC-recipients looks at child test scores. Dahl and Lochner (2012) use a federal expansion of the EITC for two-child households to analyze the impact on child test scores using the children of the 1979 National Longitudinal Survey of Youth. Test scores were evaluated for children aged 5 up to 15. The authors found that a $1,000 increase in benefits increased math test scores by 2.1 percent of a standard deviation, and reading test scores by 3.6 percent of a standard deviation. The authors only looked at short-term outcomes, and there is little evidence investigating whether these effects persist, or if benefits impact older children as well.

There is also a literature on how financial aid in the form of tax credits has affected college enrollment and other outcomes, generally finding a small impact on enrollment. The Hope Tax Credit and the Lifetime Learning Credit are the two main education credits in the tax code, totalling around $2,000 in non-refundable credits. Long (2004) provides a thorough background on these two credits and details the main findings on college enrollment, school

choice, and other higher education outcomes. Because both credits are non-refundable, they only work to reduce tax liability, but if a household has no tax liability, then no credit is issued. Long (2004) shows that because these credits are non-refundable, they are more likely to help middle-income households and households where individuals would have attended college regardless of the credit. Further, since the tax credits are issued based on previous year's income and enrollment, they do little to alleviate short-term credit constraints. The EITC, while it still faces the issue that benefits are based on prior year's income and enrollment, is fully refundable at the federal level, and provides benefits of over $5,000 in 2011. The credit also only applies to households that earn less than $49,000 in 2011, specifically targeting low-income families.

Beyond tax credits, there is a long literature on how financial aid in general impacts college enrollment. Dynarski (2003) explores the effect of financial aid on college attendance using the Social Security Dependents credit that was in place between 1965-1982. Under the system, individuals aged 18-22 could receive Social Security benefits from their parents eligibility either if the parent had died or retired before the child reached age 22. Focusing on children whose fathers died, Dynarski explores how college attendance rates changed after the elimination of this benefit program. She finds significant reductions in college attendance rates among children whose fathers died following the elimination of the Social Security Dependent benefit system. She concludes that a $1,000 loss in aid results in a reduction in college enrollment by nearly 4 percentage points. She also finds that these individuals attain fewer years of total schooling, suggesting that the Social Security benefit did encourage children to attend college and complete more years of schooling.

The EITC has largely been overlooked in the literature as a source of financial aid for low-income families. Even though it is not directed towards financing higher education, the EITC could work in a similar way as the SSDI program, but for a broader group of children. The EITC has also increased exponentially over the last couple of decades, currently subsidizing

up to 40 percent of household earnings. The federal EITC provides low-income families with up to nearly $6,000 in refundable tax credits and children under the age of 24 who are enrolled as full-time students can be claimed as dependents on their parents' tax forms. If children are not enrolled in school, they must be under the age of 19 in order to be claimed as a qualifying child. This conditional inclusion of children up to age 23 may create incentives for children to remain in school beyond age 18. The EITC also underwent several expansions throughout the 1990s and 2000s at both the state and federal level, providing a natural experiment to test how a plausibly exogenous shock to family income impacted education outcomes of children.

4 Data

Data come from the Current Population Survey March Supplement (CPS) from 1992-2011. The CPS is a cross-sectional, nationally representative household survey administered every month, and is the prime resource for statistics on unemployment patterns. The March supplement is an annual survey that collects information on earnings from the prior calendar year. It also collects information on demographic characteristics such as race, educational attainment and enrollment, and marriage patterns. Conveniently, it also surveys households about their annual income from the previous tax year, allowing for the calculation of EITC eligibility and benefit level. Everyone currently living in the household is surveyed, as are individuals who usually live in the household but are currently living away for school. This allows me to enumerate individuals even if they are currently away at college. In order to determine EITC-eligibility, I need to observe the teenage child as well as at least one parent in the household so I restrict my analysis to individuals who identify as the child of the respondent.

As children are less likely to live at home as they age, and I am unable to observe parents

income if the child does not reside in the household, I restrict my analysis to 18-20 year old children. Figure 1 shows the percent of individuals in the CPS who identify as the child of the respondent by age, from 18-23. By restricting my analysis to 18-20 year olds, I can capture approximately 85 percent of the population. After age 20 the percent of individuals living with their parents drop below 70 percent. Individuals who are not enrolled in school are less likely to live with their parents than individuals who are enrolled, so in order to minimize bias associated with who lives with their parents, I only look at the sample below age 21. A comparison of 18-20 year olds who live with their parents to those who live on their own can be found in Appendix Table 1. Besides being less likely to be enrolled in school, individuals who live on their own are more likely to be married, have their own children, and have much lower household income. They are also much more likely to be women, likely single mothers.

The CPS serves as a good data source to look at how state EITCs affect various education outcomes because it has a large sample size and it is one of few national data sets that is representative of the population at the state level. Information about which states have EITCs, what year they were established, and benefit levels can be found in Table 1. Most states have established EITCs in the late 1990s and early 2000s, with a few states implementing EITCs in the late 1980s and early 1990s. Because the federal EITC also underwent many expansions in the 1990s and 2000s, I will focus on the period from 1992-2011. In 1992, the maximum federal benefit subsidized earnings up to $8,960 with a -17% marginal tax rate and was $1,650 (in 2000 dollars), while in 2009, marginal tax rates were -40% for incomes up to $9,950 and the maximum benefit was $5,028 for a household with two children. Figure 2 shows how the average EITC benefit changes before and after a state implements an EITC for an 18-20 year old individual living in an EITC-eligible household. The average benefit for these individuals rose by about $300 after a state implemented an EITC to an average benefit of $900 (2000$).

5 Empirical Method

As of 2011, 24 states and the District of Columbia provide their own state EITC, which serves as a supplement to the federal EITC. These credits are worth up to 40 percent of the federal benefit; over $2,000 for households gaining the maximum $5,666 credit in 2011. I use a difference-in-differences strategy to analyze how the implementation of these state EITCs affected children of EITC-eligible households. This type of analysis requires a few key assumptions. First, I assume that the implementation of a state EITC is not driven by other factors that might also affect the college enrollment rate, such as the economic conditions in a given state. Namely, if states implement EITCs because of a poor economy, and this also induces more individuals to enroll in college, my estimates will be biased. I can first test for this by looking at pre-treatment trends and performing falsification tests to see if I find any effect of the state EITC in years prior to the implementation.

Another concern is that families, in anticipation of a higher EITC, may reduce their earnings in order to become eligible for the EITC. Families may also do this if they anticipate sending a child to college and want to use the EITC to subsidize tuition. I will address this issue by using a proxy for EITC-eligibility. One potential proxy for EITC-eligibility is whether the child's parents have a college education. In my sample, approximately 40 percent of 18-20 year olds living in families where neither parent has any college experience are eligible for the EITC. In families where at least one parent has some college experience, only 14 percent are eligible for the EITC. Creating a proxy for EITC eligibility using parents' lack of college experience might help mitigate issues of endogeneity of EITC eligibility to schooling decisions. For the remainder of the paper, I will refer to EITC eligibility as whether the child has a parent with any college experience. A person is eligible if neither of their parents have any college experience (or the parent they are living with, in the case of single-parent households), and is ineligible if at least one parent has any college experience.

In using a difference-in-differences strategy, all of the identifying variation will come from states implementing EITCs and the fact that states do not all implement EITCs in the same year. Further, states are able to set their own benefit schedule, varying from a 5% supplement of the federal EITC, up to 40% of the federal benefit. The average state EITC in my sample, following implementation, was a 20% supplement to the federal benefit. In the vast majority of states, the state EITC is given to all individuals who claim the federal EITC, though Minnesota and Wisconsin have their own eligibility structure. Not all states provide refundable credits; in states with non-refundable credits, only individuals with some tax liability can benefit from the state EITC EITC [2]. Most states that have implemented their own EITC did so throughout the 1990s and 2000s. Given that the federal EITC also expanded a great deal during this time period, I will focus my analysis on the time period from 1992-2011, which captures the implementation of 17 state EITCs and the District of Columbia. Not all states have the same level of benefit, and several states change the benefit level after the initial implementation. The treatment intensity will be the size of the state EITC (as a percent of the federal benefit) in a given year. In my final set of models, a full set of state and year fixed effects are included, so the treatment effect is identified off of the transition in a given state from having no supplementary EITC to providing some state EITC, or from states changing the level of EITC benefit provided.

In addition to college enrollment patterns, I also look at other outcomes such as the likelihood of completing high school and the total number of years of schooling for 18-20 year olds. As some students who become eligible for a larger EITC may be too old to change their behavior and go to college before becoming ineligible for the EITC on their parents' tax returns, I may still see changes on different margins. The EITC may give some students the hope of going on to college after high school, which may encourage them to stay in

[2]Delaware, Maine, Rhode Island, and Virginia are currently at least partially non-refundable, but Illinois, Indiana, Iowa, and Oregon all had non-refundable credits at some point in time, but currently provide fully-refundable credits

school longer or finish their high school degrees. Inevitably, some of these students may not be able to enroll in college by age 20, but the EITC may have helped them complete high school. Looking at high school graduation rates and total years of schooling in addition to college enrollment rates will help explain how the EITC may be impacting the educational outcomes of children.

To do this, I will employ a series of simple difference-in-differences estimators that examine the changes in high school graduation rates, years of schooling, and college enrollment patterns following the implementation of a state EITC. I will begin by examining the intention to treat effect, pooling all states and looking at various outcomes for all 18-20 year old children before and after a state EITC is implemented, regardless of EITC eligibility. The general form of the model is:

$$Y_{i,s,t} = \gamma X_{i,s,t} + \theta Z_s + \alpha W_t + \phi EITC_{s,t} + \epsilon_i \tag{1}$$

where i indexes individuals, s indexes states, and t indexes years. $Y_{i,s,t}$ is the outcome variable of interest: college enrollment, high school completion, and years of schooling, $X_{i,s,t}$ is a vector of personal characteristics, Z_s and W_t are state and year fixed effects, respectively. $EITC_{s,t}$ is the size of the state EITC benefit, as a percent of the federal benefit. This variable is measured in 10-percent increments such that a one-unit increase in $EITC_{s,t}$ represents a state EITC benefit increase of 10 percentage points. Focusing on the entire population of 18-20 year olds serves as the ITT effect following the implementation of a state EITC. After establishing the relationship between state EITC benefit size and the outcomes of interest for all 18-20 year old children, I next turn to an analysis focusing on EITC-eligible households.

6 Results

Figures 3, 4, and 5 show differences in the outcome variables of interest non-eligible 18-20 year olds and EITC-eligible children. Figure 3 shows the difference in the share of 18-20 year olds enrolled in college between high income and low income children before and after the implementation of a state EITC. Before implementation, the average difference in college enrollment rates was, on average, about 29 percentage points. In the years after implementation, the gap in enrollment between high income and low income children drops to an average of 22 percentage points.

Figure 4 shows differences in the trends in average years of schooling before and after state EITCs were implemented. Before implementation, non-eligible children had about .64 more years of schooling than EITC-eligible children. After a state EITC benefit is established, the gap drops to around .44 years of schooling. Finally, Figure 5 shows differences in the share of 18-20 year olds with a high school degree, including those who are currently enrolled in school. Because the CPS is administered in March, there will likely be some 18 year olds who have not yet graduated from high school, but will likely graduate at the end of the school year. I do not expect the share of 18 year olds still in high school to differ much between EITC-eligible households and non-EITC eligible households because this is an artifact of the month of birth. Before implementation, high income children were about 16.5 percentage points more likely to have a high school degree, while after they were only 10.6 percentage points more likely to have a degree. Similar figures separated out by men and women can be found in the Appendix. For college enrollment, boys narrow the gap between high income and low income households by about 6 percentage points, while low income girls, on average, 7.5 percentage points compared to higher-income girls. Low income boys gain about .21 years of schooling over high income boys, while girls gain a similar .17 years of schooling. Finally, low income boys see an 6 percentage point increase in high school graduation rates over high

income boys and girls gain about 5 percentage points.

Table 2a shows descriptive results for the sample of 18-20 year olds who live in a state that ever implements an EITC. The first two columns show descriptive statistics for households where at least one parent has a college degree, compared to households where neither adult has a college degree, averaging characteristics over the years before a state implements an EITC–the "before" sample. The second two columns represent the "after" group and show descriptive statistics by the same groups averaging over the years after a state implements an EITC. The final column represents the difference-in-differences estimates: the change in the outcome variable of interest between the higher income population and the EITC-eligible population before and after the state EITC.

About 58 percent of 18-20 year olds in the non-eligible sample are enrolled in college before the state implements an EITC, while 56 percent are enrolled after the implementation. In contrast, only 28 percent of children in the EITC-eligible sample are enrolled in college in the years leading up to the state EITC implementation. Following the implementation, 34 percent of EITC-eligible children are enrolled, yielding a 7 percentage point increase over the individuals in the non-eligible sample over this time period. Moderate increases also exist for the other variables of interest. Higher income children have about 12.2 years of schooling before and after the state EITC. Low income children have 11.6 years of schooling before the state EITC, and 11.7 years after– a .17 of a year increase in schooling compared to the high income children after the implementation. Finally, about 74 percent of 18-20 year olds have a high school degree before the state EITC (including those who are still enrolled in school), and about 72 percent have a degree after the implementation. Only 57 percent of low income children have a high school degree in the years preceding a state EITC, while 61 percent have a high school degree following the implementation. Very few other demographic variables change as a function of EITC-eligibility over this time period– average EITC values go up by about $100 for low income households and family incomes fall by about $12,000

for EITC-eligible families compared to high income families.I find little evidence that low income families move states following the implementation of an EITC, suggesting that state EITC implementations do not have a large impact on migration patterns.

Tables 2b and 2c show descriptive statistics separately for men and women, highlighting some important differences in the outcome variables of interest. Overall, girls are far more likely to be enrolled in college, have more years of schooling, and are more likely to have a high school degree- consistent with trends in recent decades. Despite the gender gap in education, both low income boys and girls see similar gains in these outcomes following the implementation of a state EITC. Both low income boys and girls gained about 7 percentage points in likelihood of enrolling in college, but boys saw slightly larger gains in years of schooling and likelihood of completing high school, compared to girls. Low income boys gain .20 years of schooling after the implementation, while girls gain about .15 years. The probability of having a high school degree increases by 6.5 percentage points for boys, while it increases by only 4 percentage points for girls.

6.1 Multivariate Results

Table 3a shows results on the intention to treat sample from separate regressions for college enrollment, years of schooling, and high school graduation rates. The covariates shown are the prime variable of interest- the state EITC value in a given year. The values displayed represent the intention to treat value: the change in the outcome variable for all residents aged 18-20 of a state following the implementation of the EITC. Four models are shown, each row and each column represent a separate regression. Model 1 includes only the state EITC value. With no other controls, college enrollment rates increase in states that implement EITCs by 1.8 percentage points for a 10% EITC supplement. A 10% state EITC can be worth up to about $500, so this effect is quite similar to the effect in Dynarski (2003) that a $1,000 decline in benefits led to a 3.6 percentage point decline in likelihood of enrolling

in college. High school graduation rates increase by 1.1 percentage points, and years of schooling increase slightly by .038 of a year. Model 2 adds demographic controls, which renders all of the covariates insignificant. Model 3 adds year fixed effects, which change the results very little, and model 4 includes state fixed effects. With all controls and fixed effects in the model, states that implement EITCs show a marginally significant 1 percentage point increase in college enrollment rates, almost no change in years of schooling, and a 1 percentage point increase in likelihood of completing high school.

As the results in table 3a represent the total change in college enrollment, years of schooling and high school graudation for all 18-20 year olds, I next analyze the effect for individuals likely eligible for the EITC, who represent approximately 25% of the population in a given state. If the increase in college enrollment, years of schooling, and high school graduation rates are due to the implementation of the state EITC, we should see larger effects on low-income households.

Table 3b shows the same models as table 3a, but restricting the sample to only individuals whose parents lack a college degree. For all outcomes, effects are larger for this sample than for the entire sample of 18-20 year olds, suggesting that trends in educational attainment are being driven by lower income households. In the full model, college enrollment rates increase by about 1.5 percentage points, years of schooling by .05 of a year, and high school graduation rates increase by 2 percentage points.

Tables 4a, 4b, and 4c show regression results for low income men and women separately, each table representing a different outcome. Again, the primary variable of interest in these tables is the state EITC in a given year, scaled up by 10, such that a one-unit increase represents a 10% increment in the state EITC. Table 4a shows results for college enrollment, using a model with full demographic controls, year and state fixed effects. With a 10% increase in the state EITC, low income men are 1 percentage point more likely to enroll in college, and women are about 1.6 percentage points more likely to enroll, though neither

value is significant. Recall from Table 2b that approximately 28% of low-income boys and girls were enrolled in college before the implementation of a state EITC, so this increase represents a 5% increase in college enrollment among low income boys and girls.

Table 4b shows the results of a similar regression looking at the effects of the EITC on years of schooling. Effects are larger for girls and only significant for girls, though the gain is fairly small. A 10% state EITC increases the years of schooling of low income girls by just .07 of a year of schooling. Given that I restrict my analyses to 18-20 year olds, it is not surprising that this value is small. In future drafts, I would like to look at slightly older individuals to see if effects persist as children age. Table 4c shows results for high school graduation rates, which are also the most significant results. After a state implements a 10% EITC, low income boys are 1.6 percentage points more likely to finish high school, while girls are about 2.5 percentage points more likely to finish high school.

Demographic characteristics play a significant role in predicting all of the outcomes. Women show a significant advantage in all models, being significantly more likely to graduate from high school and enroll in college. Income matters as well- EITC recipients are less likely to graduate from high school, have fewer years of schooling, and are less likely to be enrolled in college. Higher family income increases the chances of graduating from high school and enrolling in college. Family structure matters as well- children who live with both parents are about 6 percentage points more likely to enroll in college and are about 2.5 percentage points more likely to complete high school. Children who come from larger families are less likely to finish high school, have fewer years of schooling, and are less likely to enroll in college. The number of male siblings seems to matter slightly more than the number of female siblings in the household, particularly for high school completion rates and college enrollment. Having a male sibling in the household reduces the likelihood of completing high school by about 3.5 percentage points, while a female sibling reduces the likelihood of completing high school by only 2 percentage points.

6.2 Robustness Checks

To further examine how the EITC impacts educational attainment, I run a number of robustness checks analyzing how effects vary over time, whether effects are concentrated among households that most benefit from being able to claim their children as dependents- those with fewer than 3 children (4 children for the years 2009-2012), whether low-income children are less likely to receive financial aid from other sources following a state EITC implementation, and whether families change their income level in response to state EITC generosity.

As the effect of a state EITC is likely to vary over time, I first include a set of pre and post-EITC implementation time indicators rather than the more-restricted, linear time trend as in Tables 3 and 4. Results indicate that effects of the state EITC do increase over time, but not in ways that vary with the value of the state EITC. Figures 6, 7, and 8 plot the effects of the time dummies before and after implementation. The pre and post-EITC time dummies indicate a strong linear time trend for all outcomes- in the years leading up the state EITC implementation, individuals are less likely to be enrolled in college, finish high school, and have fewer years of schooling. These effects diminish in the years right before the implementation of the EITC, and become strongly significant and positive following the implementation. Interacted with the value of the state EITC, however, shows no clear pattern (results not shown).

I next turn to results looking at the number of children living in the household. The EITC allows families to claim up to 2 children (3 for 2009-2012) on their tax returns, so household with more than 2 children do not gain any larger benefit than households with exactly 2 children. Because of this, we should expect to see no change in the likelihood of enrolling in college for households with 3 or more children since there is no added incentive for that child to remain in school past age 18. To test this, I interact an indicator for whether there are 3 or more children living in the household with the value of the state EITC, to see whether there are any changes in educational attainment among larger households. Table 5

shows results for college enrollment, years of schooling, and high school graduation rates. For college enrollment, the main effect of the state EITC remains around 1 percentage point for the pooled sample, and interacting the state EITC with an indicator for 3 or more children in the household increases the likelihood of enrolling in college by an insignificant .4 percentage points. Similar results are also found for years of schooling and high school graduation rates– households with three or more children are no more likely to see increases in years of schooling or high school graduation rates following the implementation of a state EITC. This supports my hypothesis that increases in educational attainment should be concentrated among households that have more to lose if their child does not remain in school past age 18.

One potential mechanism for how the EITC may increase college enrollment rates among low income children is that it serves as an alternative to taking out loans to finance higher education. If this is in fact happening, I should see lower take-up rates of educational assistance following a state EITC implementation. The CPS does ask questions about whether anyone in the household is receiving educational assistance from government or private loans, and how much assistance they received in the last year. I regressed likelihood of receiving educational assistance on state EITC values, conditional on enrollment in higher education, and results can be found in Table 6. The first three columns show results for the entire sample of 18-20 year old children, while the last three columns show results specifically for households where no parent has a college degree. For the full sample, I find no significant reduction in the likelihood of receiving educational assistance though the coefficients on state EITC value are slightly negative for women. For the EITC-eligible sample, I find an overall effect of a reduction in likelihood of receiving educational assistance by 2 percentage points. All of the effect seems to come from boys- low-income boys enrolled in college are 4 percentage points less likely to receive educational assistance following the implementation of a state EITC. While this could indicate that the EITC is allowing families to pay for college

themselves rather than take out loans, it could also suggest that households that receive EITC benefits are becoming ineligible for educational assistance. Given that family income for households where no parent has a college degree are less than $35,000, it is unlikely that the EITC is rendering them ineligible for financial aid entirely, but it is important to keep in mind, nonetheless. EITC benefits are included in household income on the FAFSA, and could reduce the amount of financial aid for EITC-eligible households.

One concern with the analysis up to this point is that one response to a state implementing an EITC, or providing a more generous EITC is for households to reduce their income in order to qualify for a larger benefit, or to qualify for the EITC at all. To see whether families do indeed change their income in association with the state EITC, I next regress the log of family income on state EITC values. Table 7 shows the results. For the entire sample of individuals aged 18-20, I find moderate increases in family income following the implementation of a state EITC. A 10% state EITC benefit increases pre-tax family income by about 5 percent. When I restrict the analysis to households where no parent has a college degree, I find small, insignificant impacts on family income. Following the implementation of a 10% state EITC benefit, low income households see a slight increase in family income by 3 percent. This suggests that this sample of households where no parent has a college degree do not seem to be altering their family income in order to become eligible for the EITC.

7 Conclusion

Preliminary results suggest that following the implementation of a state EITC, 18-20 year old individuals living with their parents are significantly more likely to be enrolled in college, are more likely to have completed high school, and have slightly more years of schooling. These effects seem to be slightly stronger among girls, while there are small, mostly insignificant

effects for boys. While descriptive statistics suggest that boys saw similar, if not larger, gains in college enrollment, years of schooling, and high school completion rates, I am unable to attain significance on any of the educational attainment outcomes of interest. I do find positive, significant effects of state EITCs on the education outcomes of girls. After the implementation of a state EITC, 18-20 year old EITC-eligible girls are 2.5 percentage points more likely to graduate from high school, 1.5 percentage points more likely to enroll in college, and gain about .07 years of schooling. Boys see a smaller increase in the probability of completing high school and enrolling in college, but results never attained significance at conventional levels. However, I do find that low-income boys enrolled in college are less likely to receive financial aid from other sources following the implementation of a state EITC. It is not clear from the current data whether the EITC is crowding out other sources of financial aid by making households ineligible, or whether households that receive the EITC elect to not apply for other forms of financial aid. Due to the low-income status of these households, however, it is unlikely that the EITC would render them ineligible for other sources of aid. If the EITC is inducing children to enroll in college who otherwise wouldn't, the lower likelihood of receiving outside aid could be due to a lack of awareness of other forms of educational assistance.

Since I am only able to look at 18-20 year olds reliably, I am unable to see if college enrollment patterns increase for older children. Children who are 17 or 18 when a state implements an EITC may not be able to adjust their behavior right away, but may eventually enroll in college. I am unable to accurately analyze this with the CPS data. Its large sample size and information about state of residence make the CPS a good data set to look at the general trends for this population. In future drafts, I would like to utilize longitudinal data sets to explore other possible mechanisms and to look at the educational outcomes of older children. Using the NLSY 1979 sample, I could look at the educational outcomes of children even after they move out of their parents' home. I could also look at different outcomes

such as grades in high school, to see if children increase their effort in school following the implementation of an EITC. With either the NLSY or the CPS, I would also like to look at the work patterns of teens. One of my hypotheses about the mechanisms driving the education results was that teens might be able to reduce their hours spent working and focus more time on schooling. Previous work has also shown that teens are less likely to be working when EITC values are high, due to the increased supply of labor among single mothers (Neumark and Wascher 2007).

References

Bailey, Martha and Sue Dynarski. forthcoming. *Whither Opportunity? Rising Inequality and the Uncertain Life Chances of Low-Income Children*, chap. Inequality in Postsecondary Education. Russell Sage New York.

Belley, Philippe and Lance Lochner. 2007. "The changing role of family income and ability in determining educational achievement." *Journal of Human Capital* 1 (1):37–89.

Carneiro, Pedro and James J. Heckman. 2002. "The evidence on credit constraints in post-secondary schooling." *The Economic Journal* 112 (October):705–734.

Celik, Sule. 2011. "The Impact of the Earned Income Tax Credit on the Educational Investments of Single Mothers: Evidence from State EITCs."

Dahl, Gordon B. and Lance Lochner. 2012. "The impact of family income on child achievement: Evidence from the Earned Income Tax Credit." *American Economic Review* 102 (5):1927–1956.

Dynarski, Susan M. 2000. "Hope for Whom? Financial Aid for the Middle Class and its Impact on College Attendance." NBER working paper 7756.

———. 2003. "Does aid matter? Measuring the effect of financial aid on college attendance." *American Economic Review* 93:279–290.

Hotz, Joseph V. and John Karl Scholz. 2003. chap. The Earned Income Tax Credit. University of Chicago Press.

LaLumia, Sara. 2012. "Tax Preferences for Higher Education and Adult College Enrollment." *National Tax Journal* 65 (1):59–90.

Long, Bridget. 2004. *College Choices: The Economics of Where to Go, When to Go, and How to Pay For It*, chap. The Impact of Federal Tax Credits for Higher Education Expenses. University of Chicago Press, 101–168.

Long, Bridget T. 2008. "The effectiveness of financial aid in improving college enrollment: Lessons for policy." Harvard working paper.

Lovenheim, Michael F. 2011. "The Effect of Liquid Housing Wealth on College Enrollment." *Journal of Labor Economics* 29 (4):741–771.

Neumark, David and William Wascher. 2007. "Minimum Wages, the Earned Income Tax Credit, and Employment: Evidence from the Post-Welfare Reform Era." IZA Discussion Paper No. 2610.

Tax Policy Center. 2012. "EITC Distribution by Number of Qualifying Children 1999-2009." URL `http://www.taxpolicycenter.org/taxfacts`.

Table 1. States with Earned Income Tax Credits, Year of Implementation,

	Year of Implementation	Benefit Level as of 2010
Rhode Island	1986	25
Maryland	1997	25
Vermont	1988	32
Iowa	1989	7
Wisconsin	1989	4% one kid 14% two, 43% three
Minnesota	1991	depends on # of children, avg: 33%
New York	1994	30
Massachusetts	1997	15
Oregon	1997	6
Kansas	1998	18
Colorado	1999	10
DC	2000	40
Illinois	2000	5
Maine	2000	5
New Jersey	2000	20
Oklahoma	2002	5
Indiana	2003	9
Virginia	2004	20
Delaware	2005	20
Michigan	2006	20
Nebraska	2003	10
Louisiana	2007	3.5
New Mexico	2007	10
North Carolina	2007	5
Missouri	2010	20
Connecticut	2011	0
Washington	2008 (announced)	beginning 2012 (10% expected)

source: TPC
http://www.taxpolicycenter.org/taxfacts/displayafact.cfm?Docid=293

Table 2a. Descriptive statistics by EITC status, 18-20 year olds before and after state EITC implementation

	Before State EITC		After State EITC		
	Non-EITC Eligible	EITC Eligible	Non-EITC Eligible	EITC Eligible	Difference in differences
Enrolled	57.5%	28.3%	55.9%	33.7%	0.070
	(.005)	(.006)	(.004)	(.006)	
Years of Schooling	12.20	11.58	12.18	11.73	0.172
	(.011)	(.018)	(.009)	(.016)	
Has a high school degree	73.6%	57.2%	71.8%	60.7%	0.052
	(.005)	(.006)	(.004)	(.006)	
Black	13.1%	24.1%	10.2%	19.5%	-0.018
	(.004)	(.006)	(.003)	(.005)	
Other	3.6%	3.5%	6.1%	6.7%	0.008
	(.002)	(.002)	(.002)	(.003)	
Female	47.3%	46.8%	48.3%	46.5%	-0.013
	(.005)	(.007)	(.004)	(.006)	
Age	18.910	18.901	18.887	18.906	0.028
	(.009)	(.011)	(.007)	(.01)	
% Eligible for the EITC	14.5%	36.9%	13.3%	33.6%	-0.020
	(.004)	(.006)	(.003)	(.006)	
EITC dollar value	222.76	602.39	286.11	788.60	122.9
	(7.122)	(13.38)	(7.611)	(16.937)	
Family Income	68,954	33,126	89,528	41,326	-12374.8
	(601.74)	(410.608)	(707.571)	(566.729)	
Number of Male Siblings in the Household	0.611	0.682	0.618	0.682	-0.006
	(.008)	(.012)	(.007)	(.011)	
Number of Female Siblings in the Household	0.584	0.620	0.572	0.655	0.047
	(.008)	(.011)	(.006)	(.011)	
Living with both parents	0.802	0.573	0.792	0.540	-0.023
	(.004)	(.006)	(.003)	(.006)	
Mother has at least some college	76.1%	0.0%	81.2%	0.0%	-0.051
	(.004)	(.)	(.003)	(.)	
Father has at least some college	72.4%	0.0%	69.9%	0.0%	0.025
	(.005)	(.)	(.004)	(.)	
State EITC amount (as percentage of federal benefit	0.00	0.00	20.47	20.74	0.276
	(.)	(.)	(.012)	(.017)	
Age at EITC implementation	24.763	25.356	14.503	15.210	0.114
	(.052)	(.065)	(.159)	(.237)	
Received Educational Assistance	0.383	0.391	0.360	0.381	0.012
	(.007)	(.012)	(.006)	(.011)	
Moved across states in last year	0.011	0.013	0.012	0.015	0.001
	(.001)	(.001)	(.001)	(.002)	
Number of Observations	9,002	5,875	13,560	6,556	

Source: Current Population Survey March Supplement 1992-2011. 18-20 year old children living with at least one parent. EITC eligibility is proxied by whether the children's parents have any college experience. EITC eligibility=1 if neither parent has college experience, =0 if at least one parent has some college experience

Table 2b. Descriptives by EITC status, before and after EITC implementation for 18-20 year old men

	Before State EITC Men		After State EITC Men		
	Non-EITC Eligible	EITC Eligible	Non-EITC Eligible	EITC Eligible	Difference-in-differences
Enrolled	51.3%	21.8%	50.5%	28.3%	0.074
	(.007)	(.007)	(.006)	(.008)	
Years of Schooling	12.09	11.41	12.10	11.61	0.196
	(.016)	(.025)	(.013)	(.022)	
Has a high school degree	70.0%	51.5%	69.5%	57.4%	0.064
	(.007)	(.009)	(.006)	(.008)	
Black	13.1%	22.9%	10.7%	18.0%	-0.025
	(.005)	(.008)	(.004)	(.007)	
Other	3.4%	3.3%	5.7%	7.0%	0.014
	(.003)	(.003)	(.003)	(.004)	
Age	18.908	18.920	18.915	18.928	0.002
	(.012)	(.015)	(.01)	(.014)	
% Eligible for the EITC	14.6%	36.3%	14.0%	33.1%	-0.026
	(.005)	(.009)	(.004)	(.008)	
EITC dollar value	220.86	574.04	305.04	769.19	111.0
	(.01)	(.018)	(.011)	(.023)	
Family Income	68,656	32,661	89,227	40,830	-12402.3
	(833.1)	(556.6)	(975.)	(731.1)	
Number of Male Siblings in the Household	0.601	0.671	0.613	0.673	-0.010
	(.011)	(.016)	(.01)	(.015)	
Number of Female Siblings in the Household	0.578	0.585	0.574	0.616	0.035
	(.011)	(.015)	(.009)	(.014)	
Living with both parents	0.801	0.589	0.793	0.570	-0.011
	(.006)	(.009)	(.005)	(.008)	
Mother has at least some college	76.7%	0.0%	80.6%	0.0%	-0.039
	(.006)	(.)	(.005)	(.)	
Father has at least some college	71.2%	0.0%	70.4%	0.0%	0.008
	(.007)	(.)	(.005)	(.)	
State EITC amount (as percentage of federal benefi	0.00	0.00	20.68	21.02	0.333
	(.)	(.)	(.017)	(.025)	
Age at EITC implementation	24.825	25.465	14.713	15.232	-0.121
	(.073)	(.09)	(.225)	(.328)	
Received Educational Assistance (if enrolled)	0.351	0.362	0.346	0.354	-0.003
	(.01)	(.018)	(.008)	(.016)	
Moved states since last year	0.012	0.013	0.011	0.017	0.005
	(.002)	(.002)	(.001)	(.002)	
Number of Observations	4,703	3,125	7,000	3,478	

Source: Current Population Survey March Supplement 1992-2011. 18-20 year old children living with at least one parent. EITC eligibility is proxied by whether the children's parents have any college experience. EITC eligibility=1 if neither parent has college experience, =0 if at least one parent has some college experience

Table 2c. Descriptives by EITC status, before and after EITC implementation for 18-20 year old women

	Before State EITC Women		After State EITC Women		
	Non-EITC Eligible	EITC Eligible	Non-EITC Eligible	EITC Eligible	Difference-in-differences
Enrolled	64.4%	35.7%	61.7%	39.8%	0.068
	(.007)	(.009)	(.006)	(.009)	
Years of Schooling	12.32	11.77	12.26	11.86	0.149
	(.016)	(.024)	(.013)	(.022)	
Has a high school degree	77.5%	63.8%	74.3%	64.4%	0.039
	(.006)	(.009)	(.005)	(.009)	
Black	13.1%	25.5%	9.8%	21.2%	-0.009
	(.005)	(.008)	(.004)	(.007)	
Other	3.9%	3.7%	6.5%	6.4%	0.001
	(.003)	(.004)	(.003)	(.004)	
Age	18.912	18.879	18.858	18.879	0.055
	(.012)	(.015)	(.01)	(.015)	
% Eligible for the EITC	14.5%	37.5%	12.6%	34.2%	-0.014
	(.005)	(.009)	(.004)	(.009)	
EITC dollar value	224.88	634.61	265.88	810.93	135.3
	(.01)	(.02)	(.01)	(.025)	
Family Income	69,284	33,655	89,850	41,897	-12323.3
	(870.1)	(607.7)	(1028.1)	(881.1)	
Number of Male Siblings in the Household	0.623	0.695	0.623	0.693	-0.001
	(.012)	(.017)	(.009)	(.015)	
Number of Female Siblings in the Household	0.590	0.660	0.570	0.701	0.061
	(.012)	(.017)	(.009)	(.017)	
Living with both parents	0.803	0.555	0.790	0.505	-0.037
	(.006)	(.009)	(.005)	(.009)	
Mother has at least some college	75.5%	0.0%	81.9%	0.0%	-0.064
	(.007)	(.)	(.005)	(.)	
Father has at least some college	73.8%	0.0%	69.4%	0.0%	0.044
	(.007)	(.)	(.006)	(.)	
State EITC amount (as percentage of federal b	0.00	0.00	20.24	20.43	0.192
	(.)	(.)	(.018)	(.025)	
Age at EITC implementation	24.694	25.232	14.279	15.185	0.368
	(.074)	(.094)	(.223)	(.344)	
Received Educational Assistance (if enrolled)	0.411	0.412	0.373	0.403	0.029
	(.009)	(.016)	(.008)	(.014)	
Moved states since last year	0.011	0.013	0.014	0.013	-0.002
	(.002)	(.002)	(.001)	(.002)	
Number of Observations	4,299	2,750	6,560	3,078	

Source: Current Population Survey March Supplement 1992-2011. 18-20 year old children living with at least one parent. EITC eligibility is proxied by whether the children's parents have any college experience. EITC eligibility=1 if neither parent has college experience, =0 if at least one parent has some college experience

Table 3a. Linear Probability Models, clustering standard errors at state level, 18-20 year olds pooling men and women. Separate regressions for each outcome variable. All states-- Intent to treat models. Coefficient is state EITC value in a given year

	Model 1	Model 2	Model 3	Model 4
Outcome variable				
College Enrollment	0.018 *	0.004	0.008	0.009 †
	(0.008)	(0.008)	(0.010)	(0.005)
Years of Schooling	0.038 **	0.014	0.021	0.022
	(0.012)	(0.013)	(0.015)	(0.015)
High school graduate	0.011 *	0.003	0.007	0.010 **
	(0.005)	(0.005)	(0.007)	(0.003)
Demographic Controls	N	Y	Y	Y
Year Fixed Effects	N	N	Y	Y
State Fixed Effects	N	N	N	Y
Number of Observations	99,596	99,596	99,596	99,596

Source: Current Population Survey March Supplement 1992-2011, 18-20 year old children. Demographic controls include indicator for female, black, Asian/Native American, EITC dollar value, log of family income, number of children living in the household, whether mom or dad has any college experience, state eitc value and age at eitc implementation. *** indicates significance at p<.001, ** p<.01 * p<.05, † p<.10. Interpretation: Effect on outcome variable of 10% state eitc implementation

Table 3b. Linear Probability Models, clustering standard errors at state level, 18-20 year olds pooling men and women. Separate regressions for each outcome variable. All states-- households with no college degrees. Coefficient is state EITC value in a given year

	Model 1	Model 2	Model 3	Model 4
Outcome variable				
College Enrollment	0.015 †	0.013	0.011	0.013 *
	(0.009)	(0.009)	(0.010)	(0.006)
Years of Schooling	0.059 ***	0.046 ***	0.041 ***	0.050 †
	(0.017)	(0.014)	(0.015)	(0.020)
High school graduate	0.014 ***	0.013 ***	0.013 ***	0.020 **
	(0.005)	(0.005)	(0.005)	(0.007)
Demographic Controls	N	Y	Y	Y
Year Fixed Effects	N	N	Y	Y
State Fixed Effects	N	N	N	Y
Number of Observations	38,824	38,824	38,824	38,824

Source: Current Population Survey March Supplement 1992-2011, 18-20 year old children. Demographic controls include indicator for female, black, Asian/Native American, EITC dollar value, log of family income, number of children living in the household, whether mom or dad has any college experience, state eitc value and age at eitc implementation. *** indicates significance at p<.001, ** p<.01 * p<.05, † p<.10.
Interpretation: Effect on outcome variable of 10% state eitc implementation

Table 4a. Linear Probability Model prediciting likelihood of enrolling in college, clustering standard errors at state level, 18-20 year old men and women separately, EITC-eligible households only

	Outcome: Enrolled in College		
	Men	Women	Pooled
State EITC amount (as percentage of federal ber	0.010	0.016	0.013 *
	(0.011)	(0.010)	(.006)
Linear time trend pre and post-EITC	-0.001	0.000	-0.001
	(0.001)	(0.002)	(.001)
Black	0.001	-0.002	0.000
	(0.010)	(0.009)	(.008)
Other	0.084 **	0.046 *	0.066 **
	(0.026)	(0.018)	(.019)
Female			0.130 ***
			(.006)
EITC dollar value (in thousands)	-0.024 ***	-0.022 ***	-0.024 ***
	(0.003)	(0.004)	(.003)
Log of Family Income	0.010 ***	0.013 ***	0.011 ***
	(0.001)	(0.001)	(.001)
Number of Male Siblings in the Household	-0.019 ***	-0.030 ***	-0.025 ***
	(0.003)	(0.004)	(.003)
Number of Female Siblings in the Household	-0.014 *	-0.020 ***	-0.017 ***
	(0.005)	(0.004)	(.004)
Living with both parents	0.038 ***	0.076 ***	0.056 ***
	(0.009)	(0.011)	(.009)
Year Fixed Effects	Y	Y	Y
State Fixed Effects	Y	Y	Y
R-squared	0.0396	0.0523	0.062
Number of Observations	20,592	18,232	38,824

Source: Current Population Survey March Supplement 1992-2011. 18-20 year old children living with at least one parent. EITC eligibility is proxied by whether the children's parents have any college experience. EITC eligibility=1 if neither parent has college experience, =0 if at least one parent has some college experience

Table 4b. Years of schooling, clustering standard errors at state level, 18-20 year old men and women separately, EITC-eligible households only

	Outcome: Years of Schooling		
	Men	Women	Pooled
State EITC amount (as percentage of federal be	0.036	0.066 *	0.050 †
	(0.046)	(0.031)	0.028
Linear time trend pre and post-EITC	-0.003	-0.006	-0.004
	(0.005)	(0.005)	0.004
Black	0.011	0.025	0.018
	(0.041)	(0.046)	0.039
Other	0.164 *	0.075	0.121 *
	(0.073)	(0.054)	0.056
Female			0.314 ***
			0.018
EITC dollar value (in thousands)	-0.095 ***	-0.092 ***	-0.094 ***
	(0.009)	(0.010)	0.007
Log of Family Income	0.051 ***	0.050 ***	0.051 ***
	(0.004)	(0.004)	0.003
Number of Male Siblings in the Household	-0.119 ***	-0.129 ***	-0.123 ***
	(0.020)	(0.013)	0.014
Number of Female Siblings in the Household	-0.096 ***	-0.107 ***	-0.101 ***
	(0.015)	(0.013)	0.011
Living with both parents	0.087 **	0.085 **	0.087 ***
	(0.025)	(0.025)	0.021
Year Fixed Effects	Y	Y	Y
State Fixed Effects	Y	Y	Y
R-squared	0.0601	0.1041	0.072
Number of Observations	20,592	18,348	38,824

Source: Current Population Survey March Supplement 1992-2011. 18-20 year old children living with at least one parent. EITC eligibility is proxied by whether the children's parents have any college experience. EITC eligibility=1 if neither parent has college experience, =0 if at least one parent has some college experience

Table 4c. Linear Probability Model prediciting likelihood of completing high school, clustering standard errors at state level, 18-20 year old men and women separately, EITC-eligible households only

	Outcome: High school Graduate		
	Men	Women	Pooled
State EITC amount (as percentage of federal benefit)	0.016	0.025 *	0.020 **
	(0.012)	(0.010)	(0.007)
Linear time trend pre and post-EITC	-0.003	-0.003 †	-0.003 †
	(0.002)	(0.002)	(0.001)
Black	-0.040 **	-0.012	-0.027 *
	(0.012)	(0.018)	(0.012)
Other	0.025	0.013	0.019
	(0.020)	(0.019)	(0.015)
Female			0.099 ***
			(0.006)
EITC dollar value (in thousands)	-0.031 ***	-0.027 ***	-0.029 ***
	(0.003)	(0.004)	(0.002)
Log of Family Income	0.015 ***	0.015 ***	0.015 ***
	(0.001)	(0.001)	(0.001)
Number of Male Siblings	-0.032 ***	-0.038 ***	-0.034 ***
	(0.005)	(0.004)	(0.004)
Number of Female Siblings	-0.022 ***	-0.022 ***	-0.022 ***
	(0.004)	(0.003)	(0.003)
Both parents live in the household	0.028 **	0.019	0.024 **
	(0.008)	(0.012)	(0.008)
Year Fixed Effects	Y	Y	Y
State Fixed Effects	Y	Y	Y
R-squared	0.0421	0.0386	0.047
Number of Observations	20,592	18,232	38,824

Source: Current Population Survey March Supplement 1992-2011. 18-20 year old children living with at least one parent. EITC eligibility is proxied by whether the children's parents have any college experience. EITC eligibility=1 if neither parent has college experience, =0 if at least one parent has some college experience

Table 5. Robustness Checks: Effects of the state EITC on outcomes of interest including an interaction for households with more than 2 children (3 for 2008-2011)

	Enrolled in College	Years of Schooling	Completed High School
State EITC amount (as percentage of federal benefit)	0.012 *	0.048 †	0.019 **
	(.006)	(.027)	(.007)
More than 2 kids in the household	-0.012	0.071 †	-0.006
	(.008)	(.037)	(.011)
State EITC amount*(More than 2 kids)	0.004	0.008	0.003
	(.004)	(.012)	(.004)
Linear time trend pre and post-EITC	0	-0.004	-0.003 †
	(.001)	(.004)	(.001)
Black	0	0.017	-0.027 *
	(.008)	(.039)	(.012)
Other	0.066 ***	0.121 *	0.019
	(.019)	(.056)	(.015)
Female	0.13 ***	0.314 ***	0.099 ***
	(.006)	(.018)	(.006)
EITC dollar value (in thousands)	-0.024 ***	-0.094 ***	-0.029 ***
	(.003)	(.007)	(.002)
Log of Family Income	0.011 ***	0.051 ***	0.015 ***
	(.001)	(.003)	(.001)
Number of Male Siblings in the Household	-0.022 ***	-0.143 ***	-0.033 ***
	(.003)	(.02)	(.005)
Number of Female Siblings in the House	-0.014 ***	-0.121 ***	-0.02 ***
	(.004)	(.018)	(.004)
Living with both parents	0.056 ***	0.087 ***	0.024 ***
	(.009)	(.021)	(.009)
Year Fixed Effects	Y	Y	Y
State Fixed Effects	Y	Y	Y
R-squared	0.062	0.072	0.047
Number of Observations	38824	38824	38824

Table 6. Linear Probability Models, clustering standard errors at state level, 18-20 year old men and women separately,only individuals enrolled in

	All enrolled population Outcome: Received Educational Assistance			Low-income population Outcome: Received Educational Assistance		
	Men	Women	Pooled	Men	Women	Pooled
State EITC amount (as percentage of federal benefit)	0.001	-0.017	-0.008	-0.038 **	-0.002	-0.017 *
	(0.006)	(0.012)	(.006)	(0.013)	(0.015)	(.008)
Linear time trend pre and post-EITC	-0.001	-0.003	-0.002 †	0.001	-0.006 *	-0.002
	(0.002)	(0.002)	(.001)	(0.003)	(0.002)	(.001)
Black	-0.009	-0.014	-0.012	-0.005	-0.025	-0.017
	(0.011)	(0.018)	(.013)	(0.025)	(0.026)	(.02)
Other	-0.013	-0.017	-0.016	-0.002	0.027	0.016
	(0.015)	(0.013)	(.012)	(0.042)	(0.024)	(.025)
Female			0.047 ***			0.052 ***
			(.006)			(.008)
EITC dollar value (in thousands)	0.024 ***	0.026 ***	0.025 ***	0.022 **	0.026 **	0.025 ***
	(0.004)	(0.005)	(.004)	(0.006)	(0.007)	(.005)
Log of Family Income	-0.012 ***	-0.009 ***	-0.010 ***	-0.011 **	-0.006 *	-0.008 ***
	(0.002)	(0.002)	(.001)	(0.003)	(0.002)	(.002)
Number of Male Siblings in the Household	0.010 †	0.008 †	0.010 *	0.002	-0.008	-0.003
	(0.006)	(0.004)	(.004)	(0.009)	(0.008)	(.006)
Number of Female Siblings in the Household	0.008 †	0.012 **	0.011 **	-0.006	0.008	0.002
	(0.004)	(0.004)	(.003)	(0.010)	(0.007)	(.005)
Mom has some college	0.031 **	0.022 *	0.026 **			
	(0.009)	(0.009)	(.008)			
Dad has some college	-0.012	-0.008	-0.010			
	(0.008)	(0.006)	(.006)			
Living with both parents	-0.010	-0.045 ***	-0.030 ***	-0.018	-0.053 ***	-0.040 **
	(0.010)	(0.009)	(.007)	(0.023)	(0.012)	(.011)
Year Fixed Effects	Y	Y	Y	Y	Y	Y
State Fixed Effects	Y	Y	Y	Y	Y	Y
R-squared	0.0371	0.0341	0.036	0.0452	0.0426	0.040
Number of Observations	19,268	23,159	42,427	4,580	6,383	10,963

Source: Current Population Survey March Supplement 1992-2011. 18-20 year old children living with at least one parent.

Table 7. Change in Log of Family Income, clustering standard errors at state level, 18-20 year old men and women separately, by EITC-eligible status

	Whole Population Outcome: Log Family Income			Low-Income Population Outcome: Log Family Income		
	Men	Women	Pooled	Men	Women	Pooled
State EITC amount (as percentage of federal benefit)	0.033	0.065 †	0.048 †	-0.015	0.087	0.028
	(0.034)	(0.036)	(.025)	(0.069)	(0.073)	(.046)
Linear time trend pre and post-EITC	-0.016 *	-0.014 †	-0.015 *	-0.024 †	-0.028 †	-0.025 *
	(0.007)	(0.008)	(.007)	(0.013)	(0.015)	(.012)
Black	-0.730 ***	-0.775 ***	-0.750 ***	-0.963 ***	-1.081 ***	-1.023 ***
	(0.078)	(0.089)	(.074)	(0.139)	(0.147)	(.128)
Other	-0.514 ***	-0.423 ***	-0.470 ***	-0.718 ***	-0.616 ***	-0.674 ***
	(0.076)	(0.065)	(.059)	(0.158)	(0.161)	(.139)
Female			0.117 ***			0.212 ***
			(.019)			(.038)
EITC dollar value (in thousands)	0.220 ***	0.166 ***	0.195 ***	0.496 ***	0.405 ***	0.452 ***
	(0.035)	(0.034)	(.034)	(0.053)	(0.052)	(.051)
Number of Male Siblings in the Household	-0.092 ***	-0.019	-0.057 **	-0.131 ***	-0.062 †	-0.098 ***
	(0.020)	(0.021)	(.016)	(0.034)	(0.035)	(.025)
Number of Female Siblings in the Household	-0.032	0.014	-0.008	-0.069 *	0.055 †	-0.005
	(0.019)	(0.015)	(.013)	(0.033)	(0.029)	(.025)
Mom has some college	0.703 ***	0.573 ***	0.639 ***			
	(0.045)	(0.049)	(.043)			
Dad has some college	0.729 ***	0.767 ***	0.747 ***			
	(0.038)	(0.060)	(.045)			
Living with both parents	1.787 ***	1.505 ***	1.649 ***	2.261 ***	1.881 ***	2.076 ***
	(0.091)	(0.114)	(.098)	(0.159)	(0.194)	(.171)
Year Fixed Effects	Y	Y	Y	Y	Y	Y
State Fixed Effects	Y	Y	Y	Y	Y	Y
R-squared	0.1898	0.1769	0.183	0.1554	0.1362	0.144
Number of Observations	52,649	46,947	99,596	20,592	18,232	38,824

Source: Current Population Survey March Supplement 1992-2011. 18-20 year old children living with at least one parent.

Figure 1: Percent of individuals living as 'child' in the household, by age

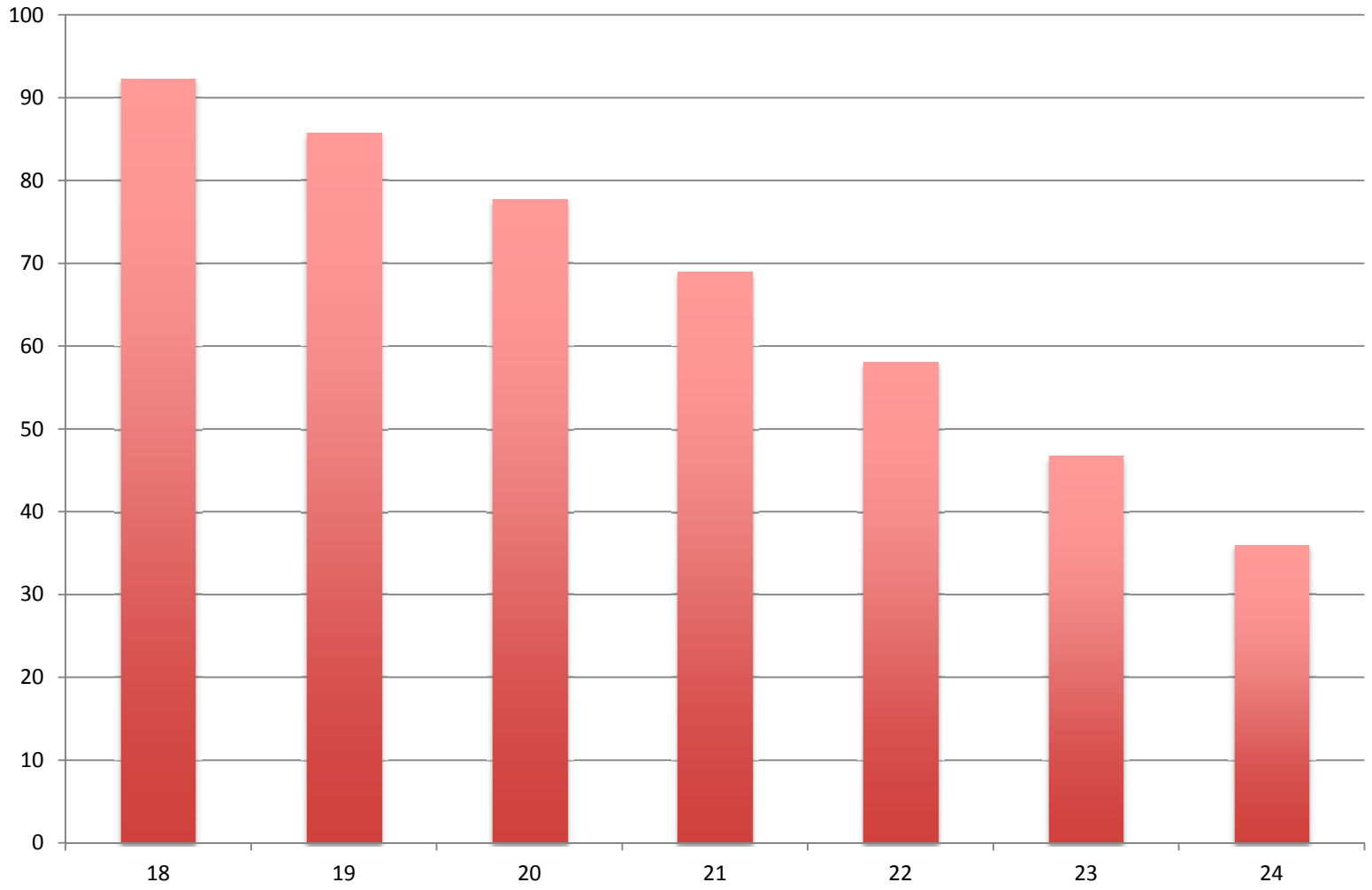


Figure 2: Average EITC benefit for 18-20 year olds living in proxy EITC-eligible households, by time to state EITC (2000$)

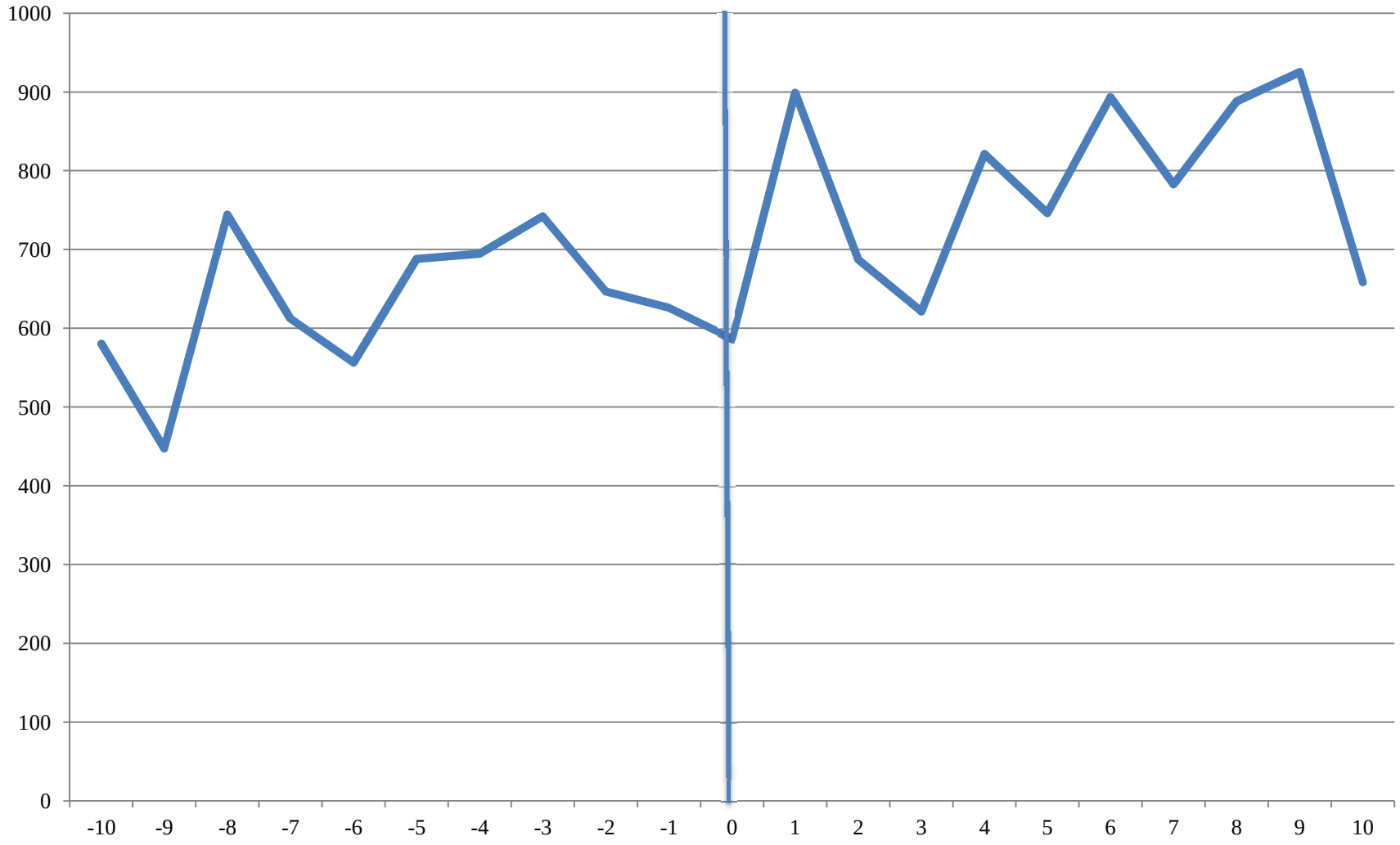


Figure 3: Gap in share of 18-20 year olds enrolled in college between high-income and low-income households

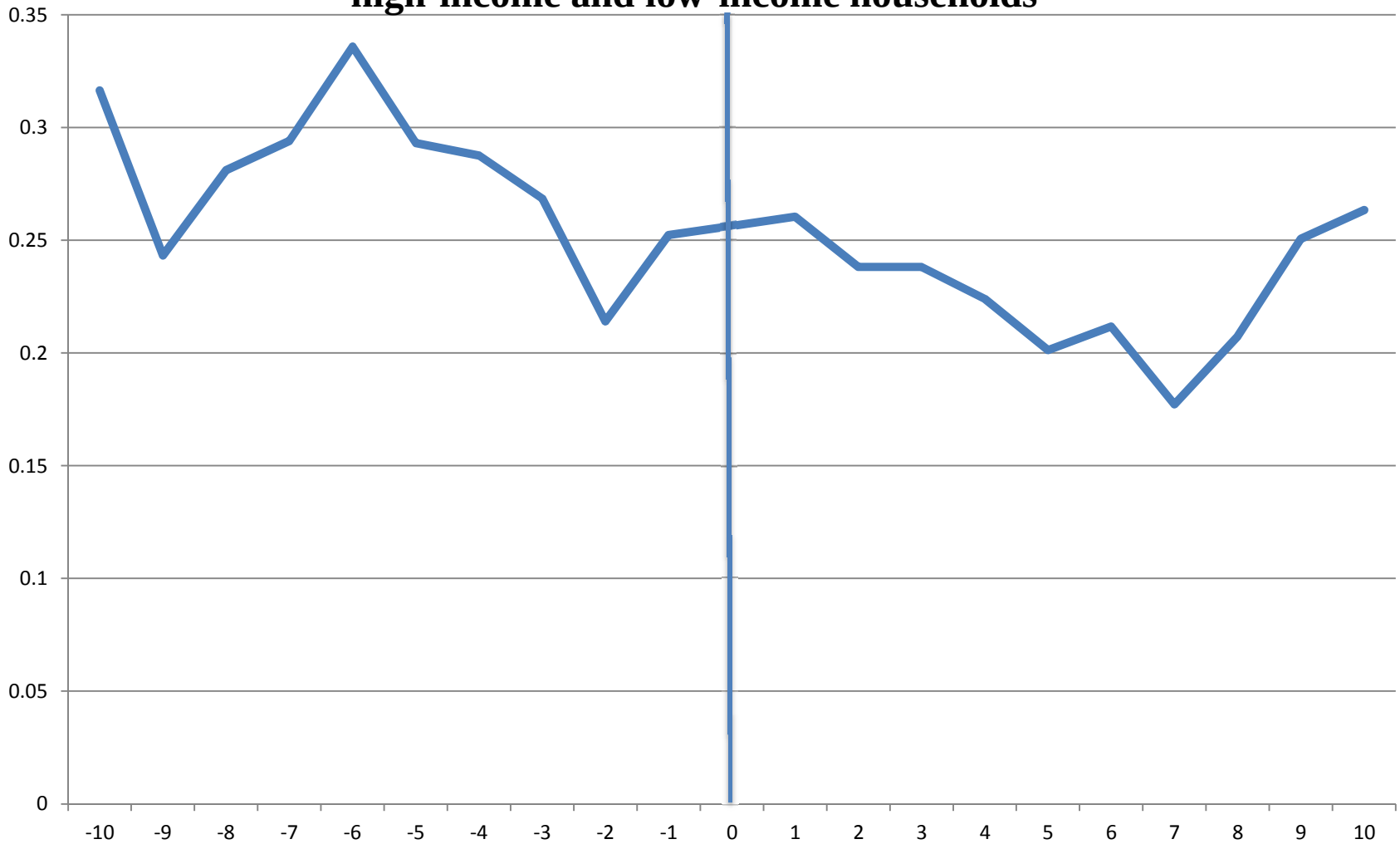


Figure 4: Gap in average years of schooling for 18-20 year olds between high-income and low-income households

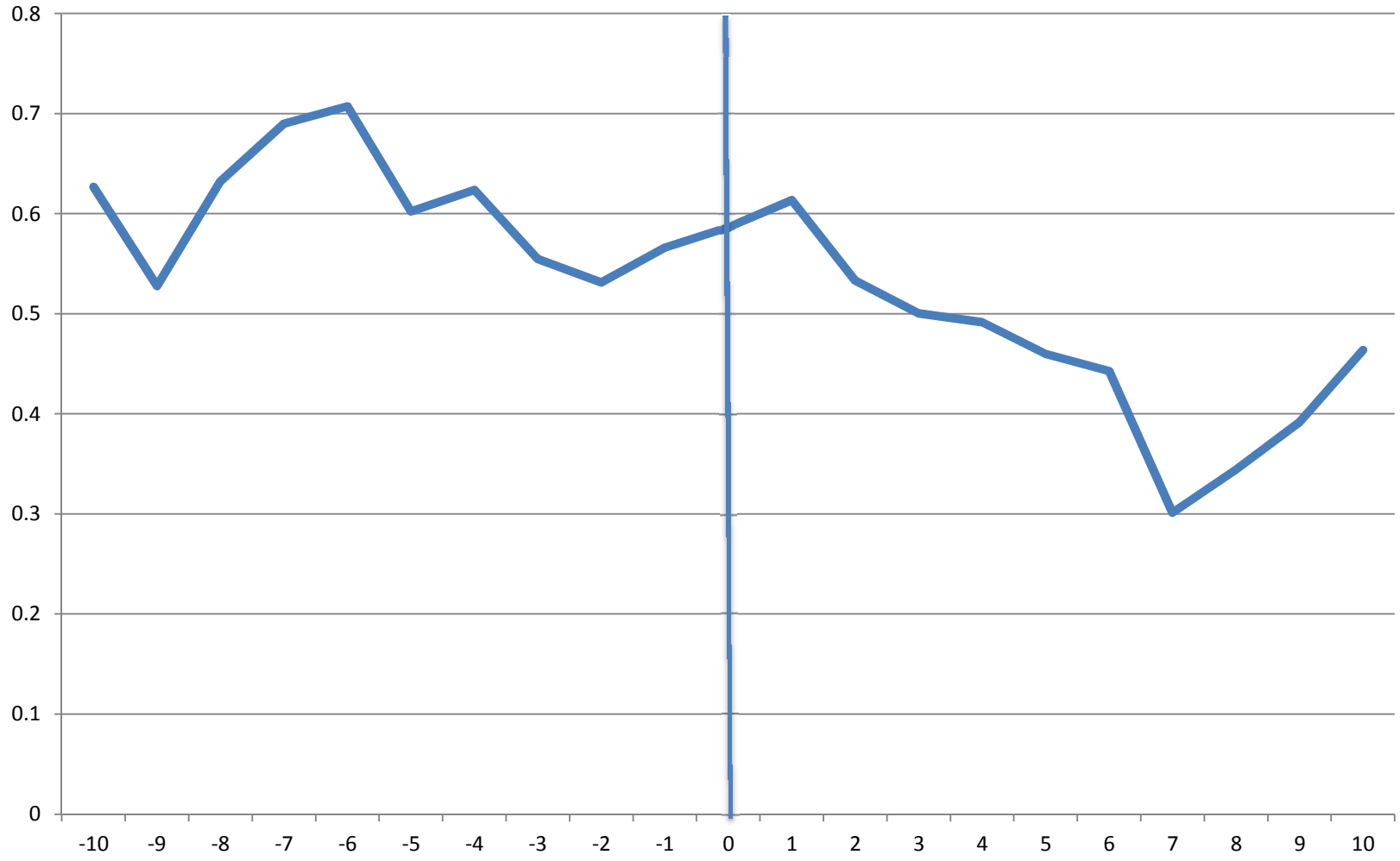
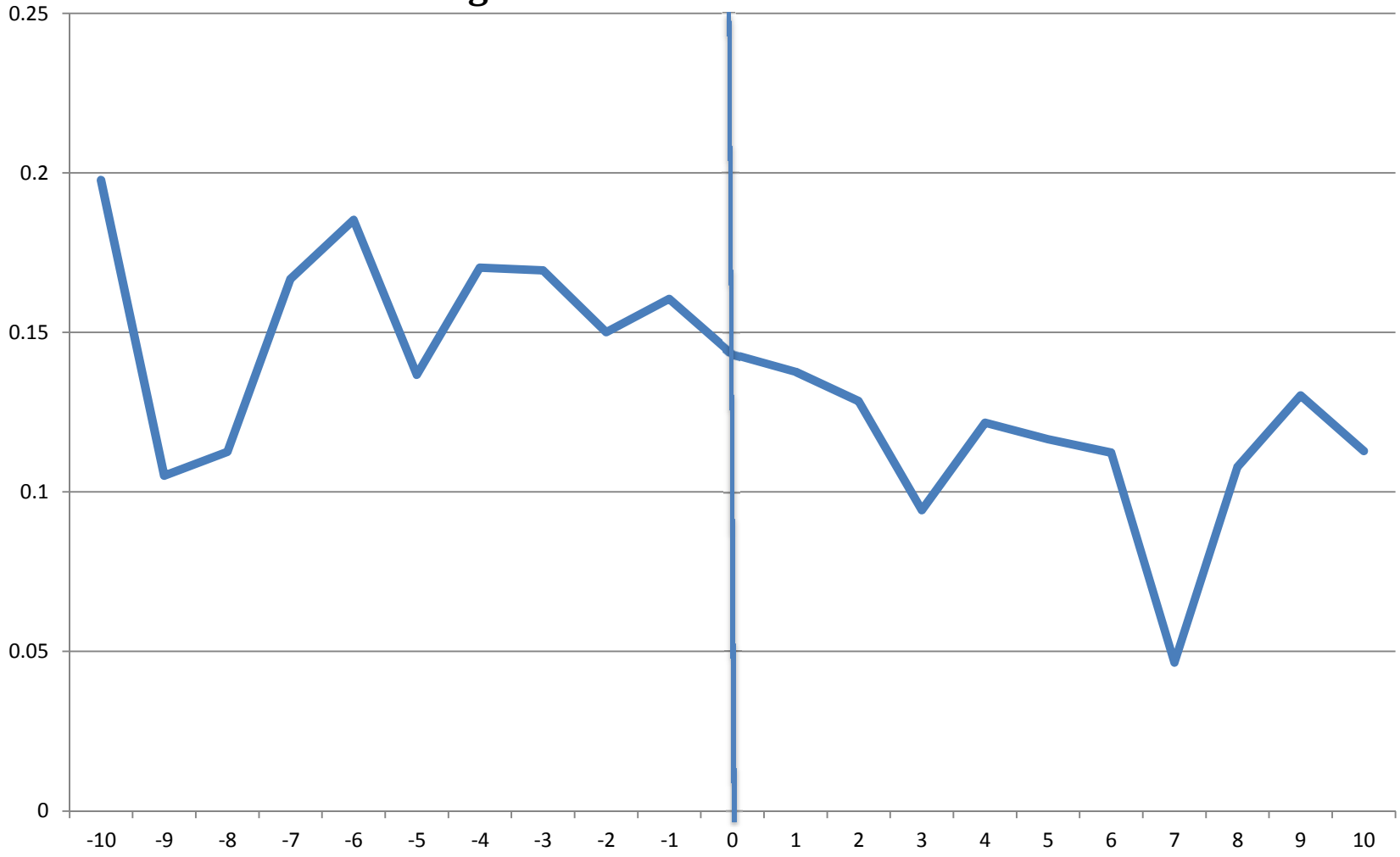
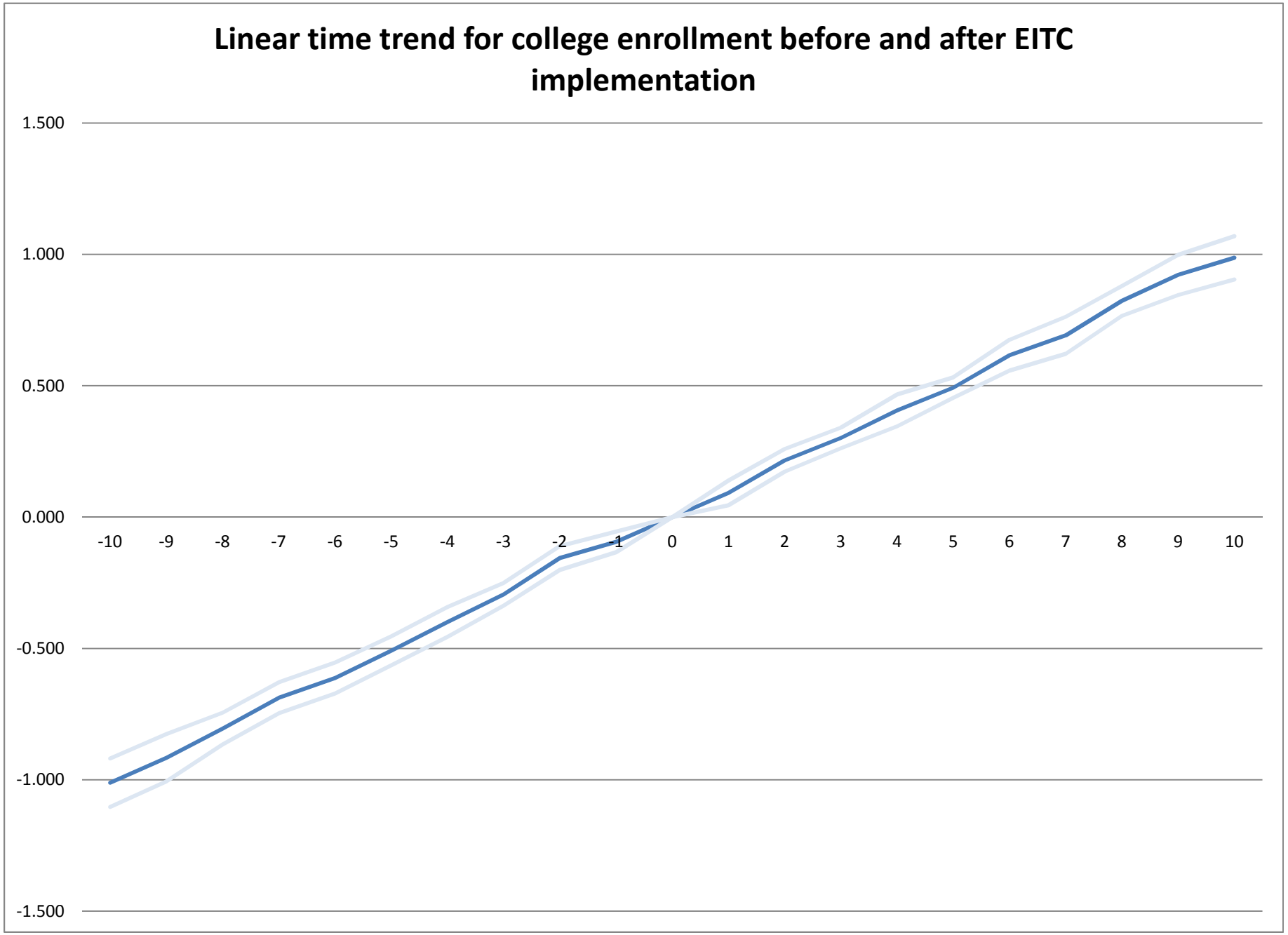
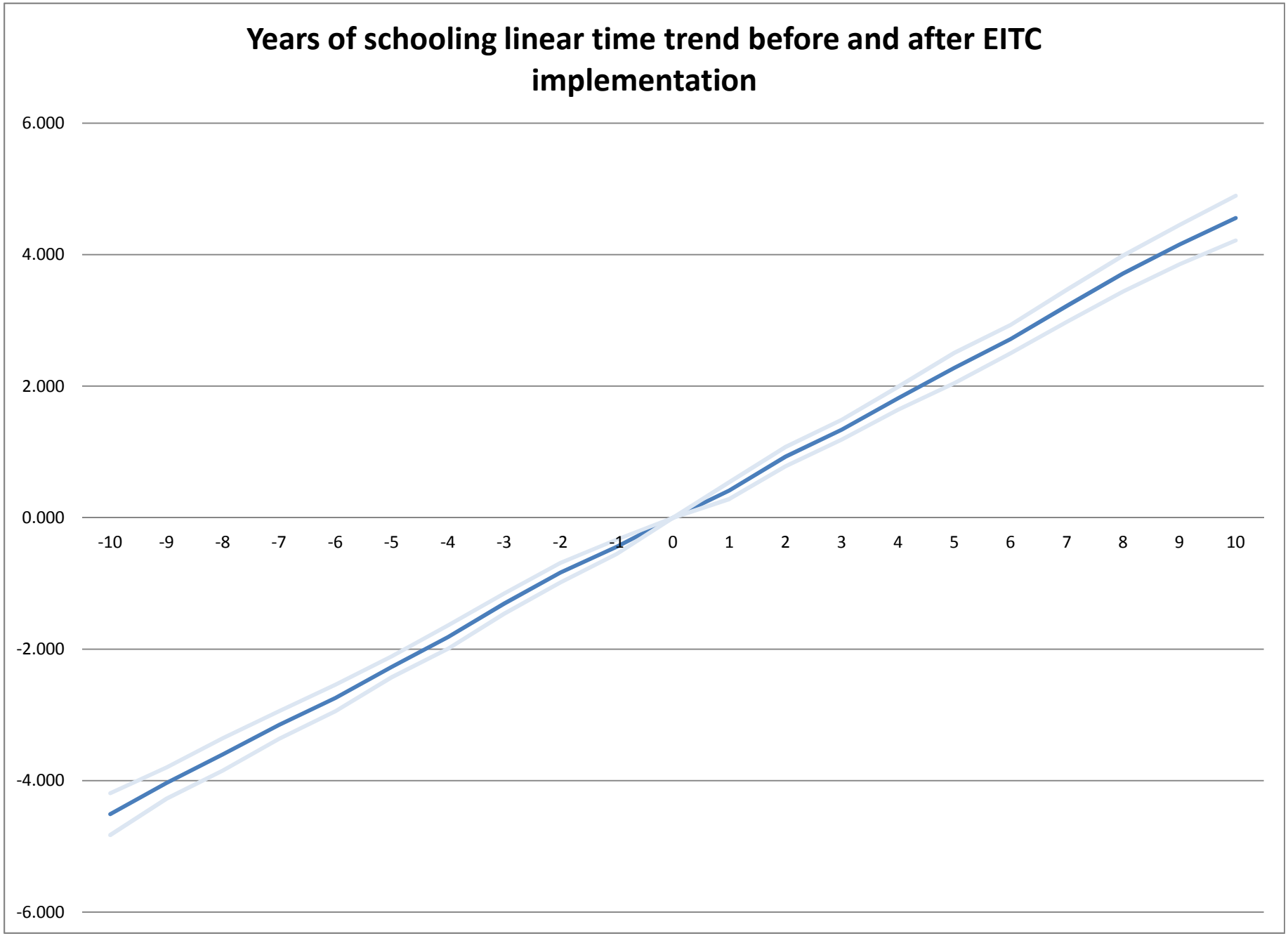


Figure 5:Gap in share of 18-20 year olds with a high school degree between high-income and low-income households




Linear time trend for college enrollment before and after EITC implementation
1.500
1.000
0.500
0.000
-0.500
-1.000
-1.500
-10
-9
-8
-7
-6
-5
-4
-3
-2
-1
0
1
2
3
4
5
6
7
8
9
10


Years of schooling linear time trend before and after EITC implementation
6.000
4.000
2.000
0.000
-2.000
-4.000
-6.000
-10
-9
-8
-7
-6
-5
-4
-3
-2
-1
0
1
2
3
4
5
6
7
8
9
10

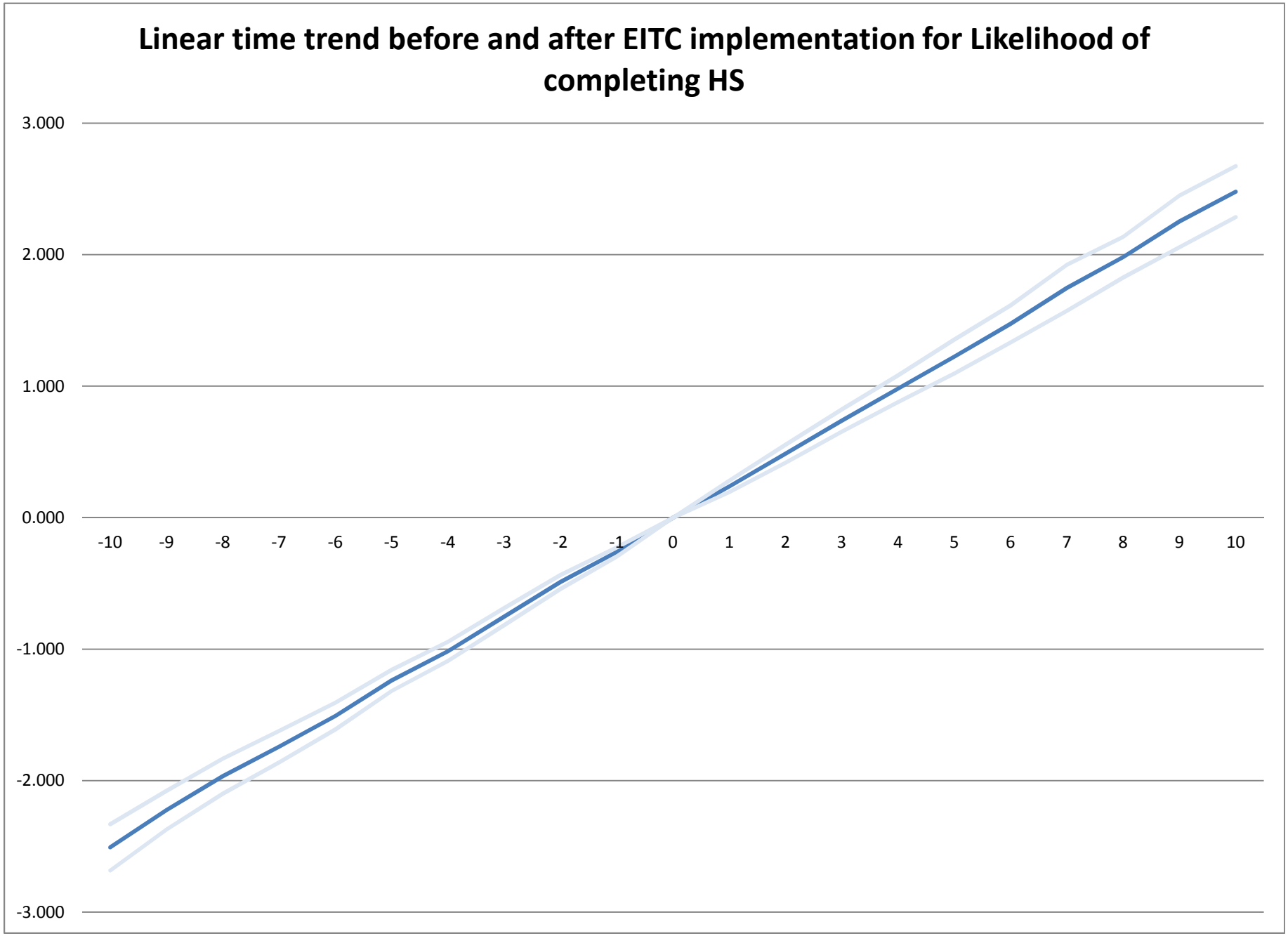

Linear time trend before and after EITC implementation for Likelihood of completing HS
3.000
2.000
1.000
0.000
-1.000
-2.000
-3.000
-10
-9
-8
-7
-6
-5
-4
-3
-2
-1
0
1
2
3
4
5
6
7
8
9
10

Figure A1: Difference in share of 18-20 year old men enrolled in college, by EITC status

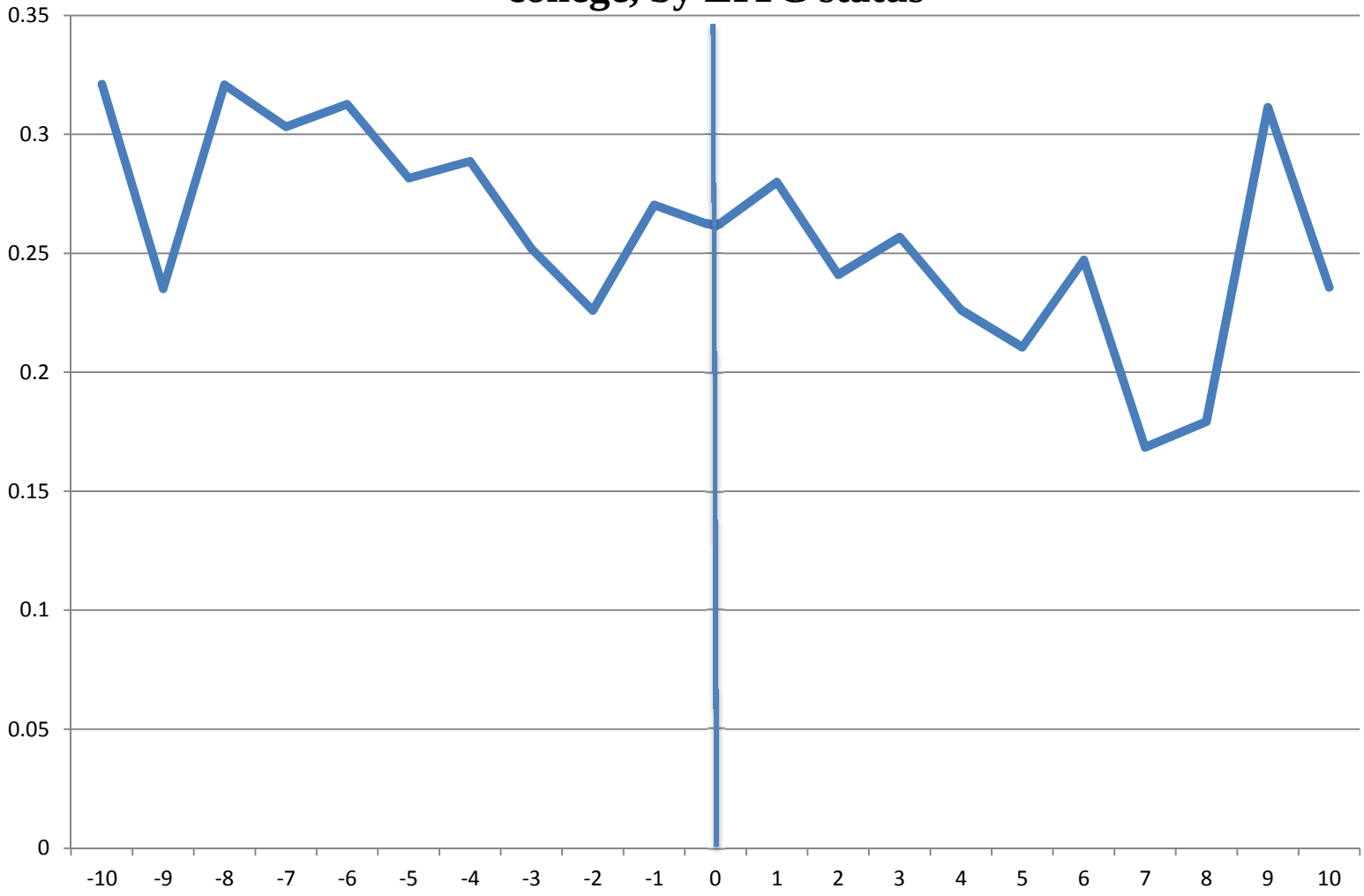


Figure A2: Difference in share of 18-20 year old women enrolled in college, by EITC status

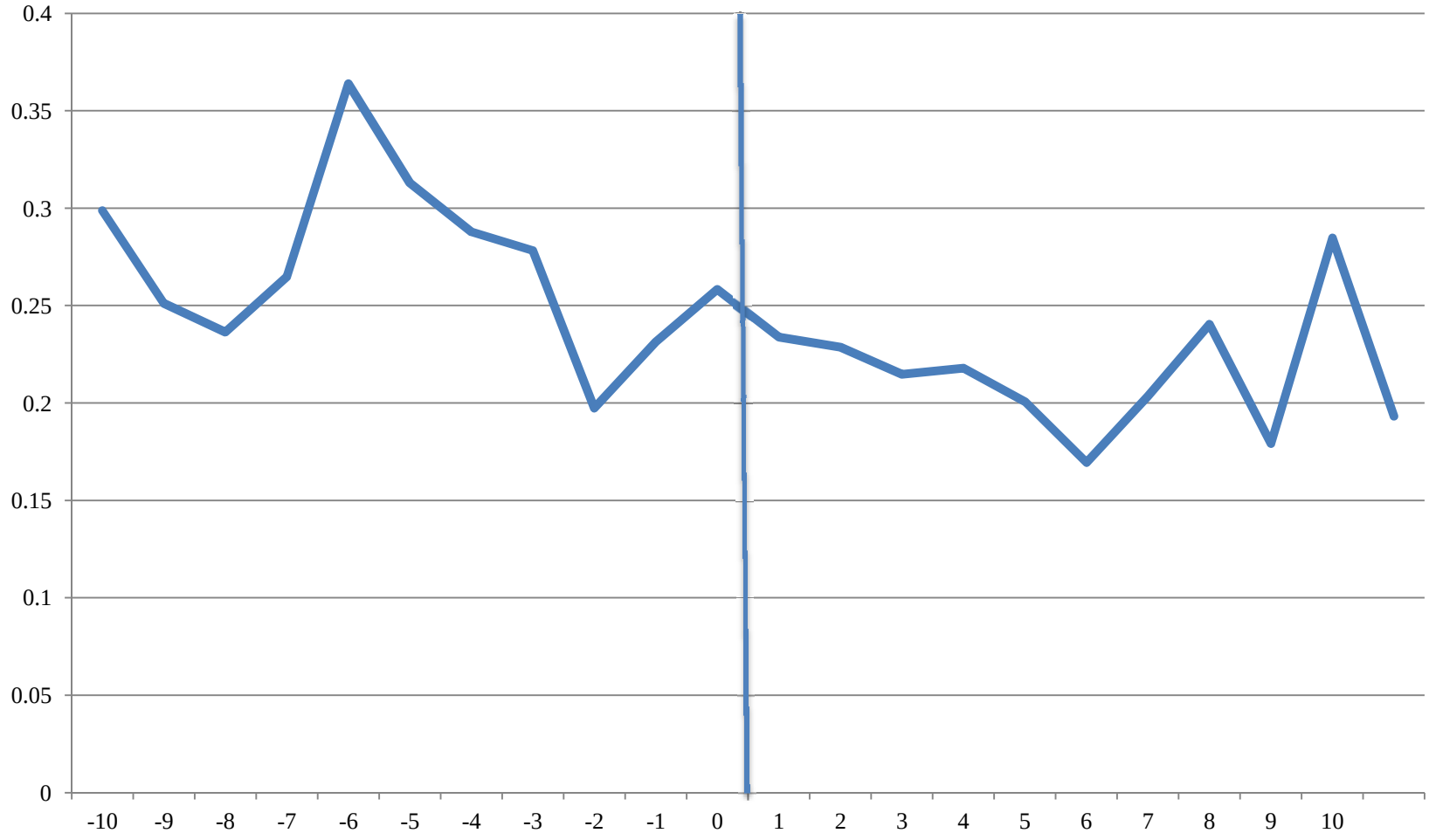


Figure A3: Difference in average years of schooling for 18-20 year old men, by EITC status

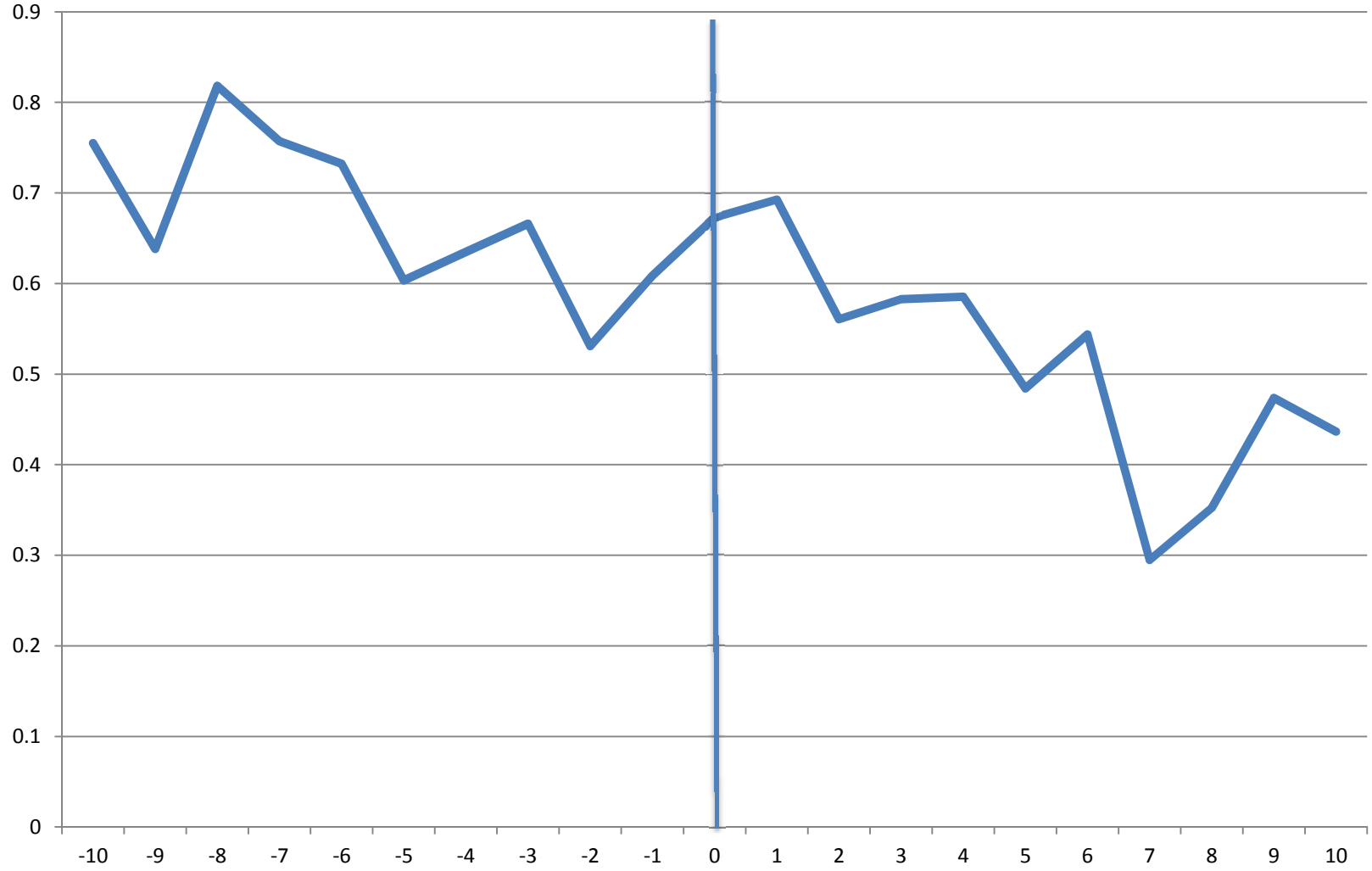


Figure A4: Difference in average years of schooling for 18-20 year old women, by EITC status

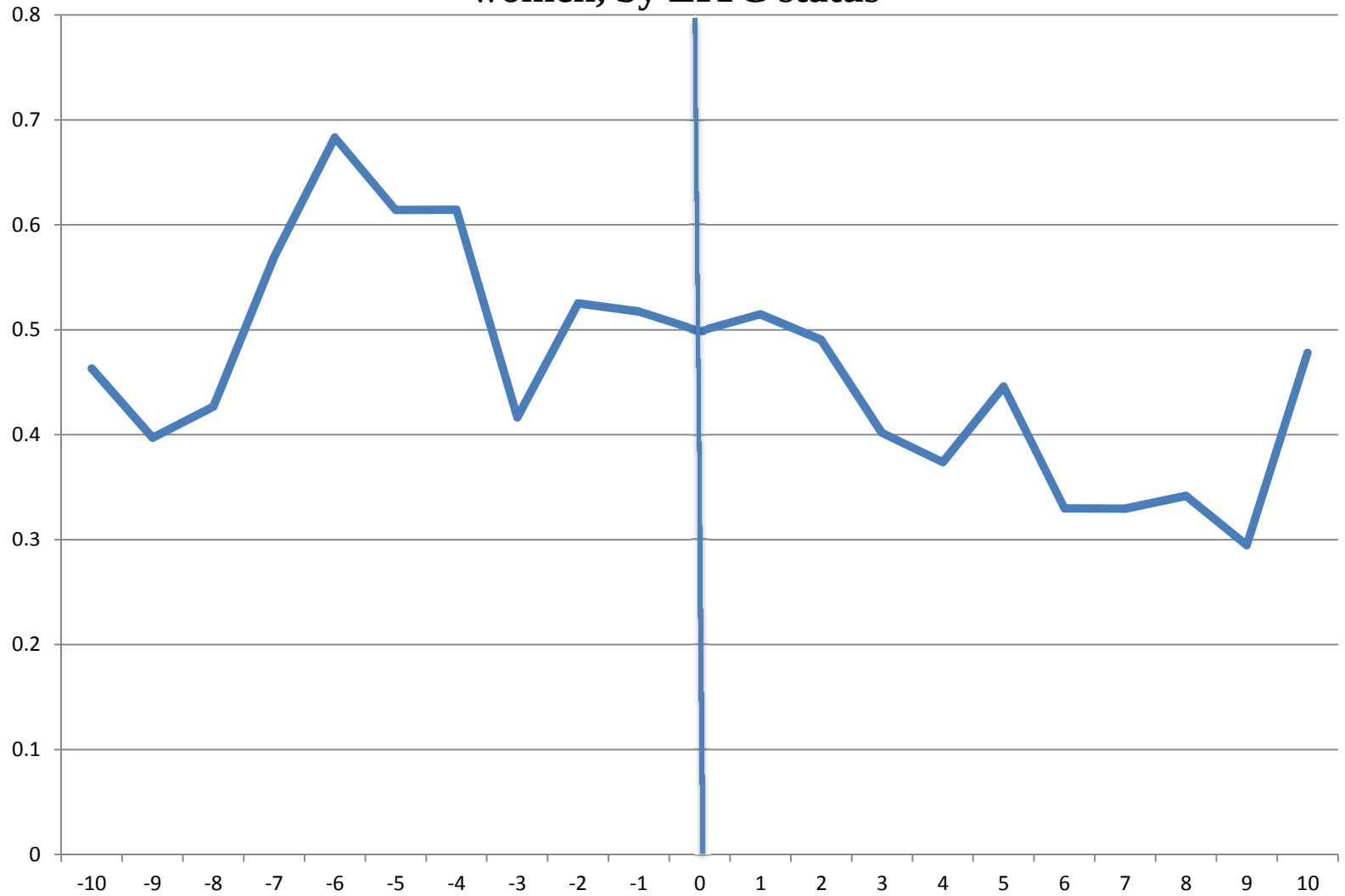


Figure A5: Difference in share of 18-20 year old men with high school degree, by EITC status

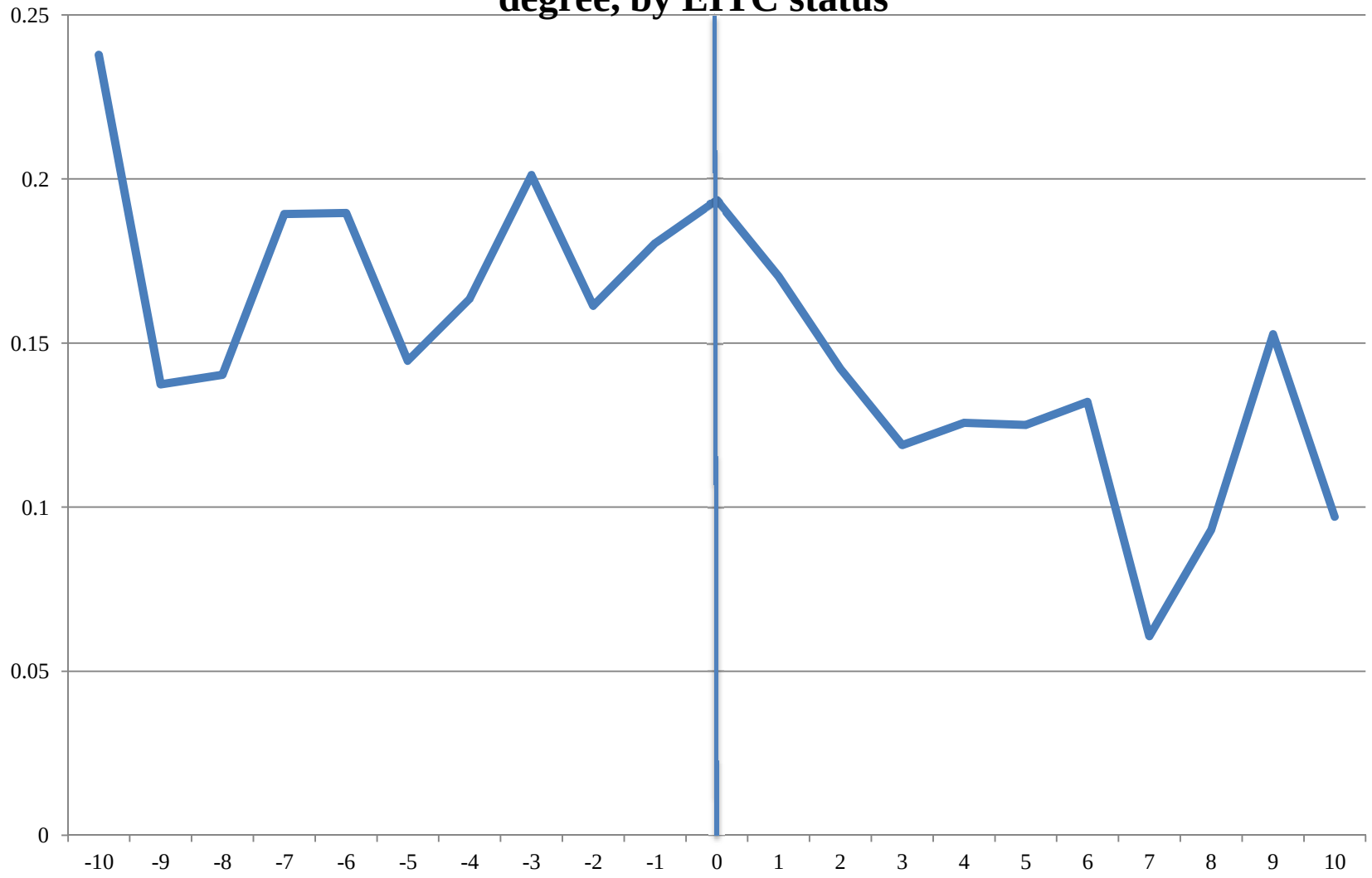


Figure A6: Difference in share of 18-20 year old women with high school degree, by EITC status