Stanford University Matt Kinskey

Public Policy Program

The Effect of Texas' "Robin Hood" School Finance Redistribution Program on Wealthy and Underprivileged Texas Public Schools

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Matt Kinskey

Public Policy Program
Stanford University
Stanford, CA 94305
mkinskey@stanford.edu

under the direction of
Michael Lovenheim

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Signature of Author……
Public Policy Program
May 20, 2009

Certified by……
Michael Lovenheim
Searle Freedom Trust Post-Doctoral Fellow, SIEPR
Thesis Advisor

Accepted by……...
Geoffrey Rothwell
Director, Public Policy Honors Program

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ABSTRACT

This paper evaluates the "Robin Hood" plan used in the Texas public school system, where caps are placed on tax revenues for school districts and excess revenues are redistributed, ala Robin Hood, to poorer school districts. The policy has been in effect for fifteen years, with no clear results as to how changes in school revenue affect academic performance. Thus, the main purpose of this paper is to evaluate how changes in revenue, either positive or negative, affect individual school performance from year to year. I ultimately find that Robin Hood has little to no effect upon the performance of underprivileged schools, in part because very little of the money actually finds its way into the classroom.

Keywords: Robin Hood tax plan, School finance, Property tax revenue

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1. Introduction

A question at the forefront of education and economics is whether money matters in American schools. While it is readily apparent to all that there exists a great disparity in living conditions between classes in modern America, what is unclear is whether this disparity is self-perpetuating. That is, whether the cycle of poverty is fed by educating poor children in below average conditions due to a disparity in resources between school districts. This is the question that has driven economic research of public schools for over three decades, whether increasing resources for schools of underprivileged students would improve their performance. This paper also seeks an answer to the question of whether money matters in America's schools using a school district refinancing program in Texas called Robin Hood.

For the state of Texas, this question is more prevalent than in nearly any other state. Texas possesses some of the greatest variance in median household income amongst school districts of any state in America, a product of its massive geographic area and distinct population variance. For example, in 1992, a suburb of Dallas, Glen Rose Independent School District, received $11,260 per student in total revenue, while the Houston Independent School District only took in on average $4,250[1] per student in total revenue. By no coincidence, the performance of schools also has a great degree of variance across the state. While high schools in affluent, predominantly white suburbs, like Glen Rose, are annually ranked amongst the best public schools nationally, school districts in poorer areas of Texas are woefully under-funded, under-staffed and under-performing. Accordingly, Texas state legislators saw the necessity to remedy some of the disparity in the quality of public schooling.

The issue of property tax revenue being used to fund public schools in Texas was first brought to the forefront in the 1973 Supreme Court case *San Antonio Independent School*

[1]Both figures are unadjusted for inflation.

District v. Rodriguez. The case concerned poor and wealthy districts in San Antonio, with parents of the Edgewood school district (a poor school district in San Antonio) arguing that wealthier districts, such as Alamo Heights, were able to contribute more towards the education of their children than parents in poor minority districts. The Texas Supreme Court ultimately reversed the decisions in favor of the Edgewood parents of the lower courts, ruling that Texas' school finance plan did not discriminate upon the basis of race, and that education was "neither 'explicitly nor implicitly' protected in the Constitution."

Nonetheless, legislators continued to work towards finding a way to close the revenue gap between rich and poor schools. In 1993, after nearly five years of failed attempts to pass similar bills, Texas legislators finally passed a "Robin Hood" bill for public school financing. The purpose of the bill was to take "excess" property taxes from richer districts and redistribute that money among the poorer school districts across the state in an effort to equalize funding in all Texas school districts. This redistribution was done by placing caps on the amount of property value eligible to be taxed by school districts. On tax revenue collected on property value exceeding this cap, the rest of the revenue would be collected by the state and redistributed among poorer districts in an inverse manner with relation to the districts relative amount of wealth.

Thus, Robin Hood provides an opportunity to examine the question that opened the paper: does money matter in American public schools? In terms of scale, Robin Hood is one of the most ambitious redistributive school finance program in American history; the program annually redistributes in the neighborhood of $3,000 per student to underprivileged schools. Moreover, it takes away several thousand more per student from wealthy schools. This program therefore is unique insofar as one can examine school district behavior on both ends of the

spectrum: how school districts behave not only when they receive additional money, but also when they have money taken away.

Robin Hood provides an opportunity to examine whether a relationship between state funding and academic performance exists. The Robin Hood program takes money from rich school districts by placing caps on the amount of money collected from property tax revenue. It then increases state aid to particularly poor districts in the aim to improve academic performance. As such, this paper will model relationships between changes in revenue received or lost to Robin Hood and various changes in district behavior, including total revenue intake, district expenditures, enrollment trends, and ultimately test performance. Specifically, I use a difference-in-difference model, comparing changes over time in rich or poor districts, separately, relative to changes over time in neutral districts that should be unaffected by the redistribution policy. By examining changes in district outcomes before and after the program implementation, I am able to identify the effect of Robin Hood on school district finances and student achievement separately for rich and poor districts. This is the first analysis in this large literature to be able to identify such effects for program losers (i.e., rich districts) as well as for program winners.

I find that while Robin Hood extracts a lot of money from rich districts, these districts respond by replacing lost revenue with additional tax revenue, causing no net decrease in revenues. Similarly, poor districts appear to offset the increased state aid by reducing the tax burden on their residents, causing Robin Hood to have only a small effect on total revenues. Money continues to be lost on the expenditure side, where I find that only a fraction of the money received from poor districts actually finds its way into the classroom. The significance of this is that while legislators may have intended for Robin Hood to dramatically alter the spending

behavior of districts, I find little change in per-student spending. Finally, I find little to no improvement in test scores of poor districts and no drop-off in rich district performance. This result is consistent with the lack of a revenue effect in these districts – simply put, Robin Hood did not achieve its goal of closing the expenditure gap between rich and poor districts, and so even if higher spending leads to higher test scores, this program as currently implemented will not be effective in raising test scores. Thus, my paper affirms the majority of pre-existing literature in failing to report any significant improvement in test scores of poor children due to increased classroom funding, but it is not clear whether this is because Robin Hood failed to redistribute funds or because redistribution itself does not affect student achievement.

I begin in section 2 by reviewing relevant literature regarding the relationship between school finance and student performance. This is to briefly ascertain whether past studies have found any relationship between increased funding and improved performance and just as importantly whether increased funding finds its way into the classroom. I then review the school finance plan of Robin Hood in section 3 and explain its difference from typical redistributive plans. In the case of Robin Hood, there are both winners and losers to the plan, different from most past studies that analyze programs only with winners. Data for the Robin Hood program comes from various governmental sources, as opposed to solely the Texas Education Agency. As such, while measures of the money lost to Robin Hood are readily available, data for the amount gained, as well as subsequent measures of revenue and expenditure behavior in section 4.1 must all be accessed from the Common Core of Data. A subsequent discussion in section 4.2 of the descriptive statistics from the data is important before transitioning into the methodology. While I model different steps of the process of money distribution from Robin Hood, a fixed effects model using differences in differences is used for all regressions. After modeling how to

track the money in section 5, I exhibit what percentages of the money received/recaptured from Robin Hood actually affect the revenue and expenditure streams of school districts. Finally, after showing how much actually makes it into the classroom, I evaluate whether money from Robin Hood makes any difference in academic performance, and offer some explanation as to why I see negligible influence of money upon test results in sections 6-7.

2. Literature Review

There is an extensive literature devoted to the relationship between increased funding and student performance. The near-consensus opinion of most academics is that there is little to no evidence that suggests a relationship between the two. Hanushek (1986) confirms this conclusion, summarizing over 100 such studies and showing that only a handful offer statistically significant evidence that increased funding enhances school performance. More importantly, Hanushek (1986) goes further to suggest explanatory causes for why more money does not produce better results. He argues that schools are operated in an economically inefficient manner, meaning that even though districts may receive additional funds, they do not effectively use them. As he concludes, "inefficiency on the part of public schools does not come as a great surprise to many for two reasons. First, educational decision makers apparently not guided by incentives to maximize profits or to conserve on costs. Second, they may not understand the production process and therefore cannot be expected to be on the production frontier" (Hanushek 1986). Thus, expecting more money to produce higher test scores is naïve, as districts do not operate in the same type of competitive markets as firms or other entities that deal with expenditure decisions. While there is a consensus in the economics literature that schools are operated in an inefficient manner, recommendations for how to react to this problem

vary. Hanushek (1986) recommends a full-scale halt to providing money to inefficient institutions. Others, like Hoxby (2001) suggest market-based methods for improving school efficiency, including performance-based salaries for teachers. She argues that school finance plans are often wasteful and self-defeating, as they serve to devalue property while making no discernible difference in the way schools spend their money or how their students perform. However, the criticism that schools have no market-based reason for improvement is an underlying problem for which there is no readily available and obvious solution.

A potential solution for the criticism of public schools as a non-competitive industry is to introduce a measure of competition. Hoxby (2000) argues that if citizens were granted the option of full school choice, schools would have no choice but continually to strive to improve or face its citizens moving to other districts. Moreover, introducing vouchers into the market provides similar competition that could induce more efficient school spending. Epple (1998) finds that tuition discounts for low-income students to private schools improves their performance, and again would serve as a competitive alternative that could encourage public schools to make more efficient use of their resources.

However, despite the many calls for improving economically inefficient schools, there remain pockets of researchers that oppose the generally accepted conclusion of Hanushek (1986). Biddle and Berliner (2002) argue that the majority of samples analyzed by Hanushek (1986) and similar economists are flawed. The reason for this flaw is that while said economists rightly track infusions of money into school districts, they fail to follow the money after the initial step. More specifically, while money may *appear* to be entering underprivileged schools, district-spending patterns suggest that a sudden influx of cash for poor schools does not guarantee a subsequent increase in spending in classrooms.

Moreover, there are cases in which the way additional state funding is spent is easily observable. Such is the case in Guryan (2003), who observed school finance reform in Massachusetts. Within the program, he was able to observe discernible increases in teacher expenditures amongst schools receiving additional funding. More significantly, within the schools that received the additional funding, Guryan (2003) observes a noticeable improvement in the performance of these schools. Card (1998) observes similar improvement amongst poorer schools that receive supplemental funding. While Card's observations are built around SAT test improvements, the conclusion is similar: money matters in the most impoverished of schools.

One of the underlying causes for the disagreement about whether additional funding produces improved results lies in *how* the money is being spent. While it is easy to determine how much money a school district receives from the state in a redistributive plan, it is much more difficult to determine how the money is spent. Miles and Rothstein (1995) sampled nine random districts across the country to track how they spent supplemental funds. What they found is that additional money was hardly devoted to classroom expenditures in a 1:1 ratio. In fact, additional money was instead used to fund alternative programs as opposed to enhancing basic classroom expenditures. While the motivation behind superintendents' decisions as to how to spend their districts' money often is inaccessible to researchers, the issue of how the money is spent is a critical component in understanding whether more money helps poor districts.[2] The remainder of this paper examines such changes due to Robin Hood in order to develop a more thorough understanding of the relationship between school financing and student achievement.

3. Robin Hood

[2]See Section VI on results for specific tracking of how Robin Hood dollars are spent.

Originally passed in 1993, "Robin Hood" was a nickname given to the school-finance plan developed by the Texas state legislature designed to provide equitable funding for all public school districts in the state. Though it originally began redistributing money for the 1993-94 school year, Senate Bill 7 was challenged and overturned by the Texas courts twice before finally being approved in January 1995 as Senate Bill 1, which entirely rewrote the Texas Education Code. In all three forms, the plan exhibited consistent themes: school districts are classified as property-poor, property-rich or neither. Districts will be referred to as either "poor," "neutral," or "rich" hereafter in the paper based upon this distinction.[3]

The method of classifying districts in this manner is based upon a district's property value per "weighted student." A weighted student is different from an actual student, involving such factors as students with disabilities, students with limited English-proficiency, and other circumstances that often result in students counting as more than one weighted student (Hoxby 2007). The abbreviation used by the state for this manner of referring to students is WADA (weighted student in average daily attendance). The significance of weighting particular students' attendance more heavily than others in relation to the Robin Hood plan is that disabled or non-English speaking students are often more heavily concentrated in poor districts. Moreover, districts are accountable for reporting their own figure. As one would imagine, both rich and poor districts have an incentive to inflate their WADA figure in an attempt to accentuate need (either to receive more money in the case of poor districts or keep more of it in the case of rich districts).

[3]Within the code, Chapter 41 refers to the method of determining whether a school district is considered rich. The subsequent section, Chapter 42, refers to a similar method of financing districts displaying greater degrees of need. References to districts either as "Chapter 41 districts" or "Chapter 42 districts" are based upon this categorization.

The original standard for classifying a district as rich was a cumulative property wealth across the district exceeding $280,000 per WADA in 1994 dollars.[4] Thus, every district classified as rich is allowed to keep all tax revenue collected on the below-threshold portion of property value, with all tax revenue on property value exceeding the ceiling recaptured by the state to fund poor districts. An important note is that school districts in Texas are permitted by law to set their own tax rates. Thus, rich districts are able to adjust their tax rates in response to the ceiling set by Robin Hood that changes annually. Such a response often is necessary due to the significant amount of money taken from districts. By 2004, after only a decade of the program's existence, over $6.2 billion had been recaptured from rich districts.

Hoxby (2007) measures the manner of response by rich districts, where the state anticipates under the program that rich districts will solely raise their tax rates to compensate for lost revenue to Robin Hood, with no other changes. However, in losing tax revenue to the program, a residual effect is that property loses value in Chapter 41 districts. The two subsequent effects are that residents are more inclined to move out of rich districts and into neutral districts (where they are able to realize the full benefit of their taxes), even further devaluing property in rich districts. All of this results in reduced revenue collected by the state, forcing the program to broaden its scope of Chapter 41 districts to replace lost revenue (Hoxby 2007). Therefore, even more districts respond by raising their tax rates to replace the lost revenue, gradually inching closer to the property tax cap agreed upon when Robin Hood was first put into effect (Hoxby 2007).

Poor districts receive recaptured money from the state proportional with the degree of need exhibited. The amount of need is in relation to the Chapter 42 WADA set by the state

[4]The threshold is annually updated not only due to inflation but also due to program needs, primarily revolving around the annual Chapter 42 WADA set by the Texas Education Agency.

annually. The Chapter 42 WADA asked of rich districts fluctuates by district, as the amount subject to recapture is based upon the rich districts relative amount of wealth and is subject to annual review and alteration. This minimum WADA is what drives the Chapter 41 threshold to which rich districts are subjected. The poorest districts receive the most amount of money from the state, with the total revenue per WADA of poor districts being roughly equal to that of neutral districts under the program after receiving the supplemental funds. In contrast, rich districts total revenue per WADA is roughly double this total, despite tax revenue lost to Robin Hood. Table 1 illustrates the difference in total revenue across the three types of districts.

Because the state sets a standard minimum amount of wealth per WADA for poor districts, there is likely to be a similar, yet opposite effect in poor districts to the one seen in rich districts. While Hoxby (2007) shows rich districts progressively approach the maximum property tax rate, poor districts have an incentive to reduce their tax rates, as revenue is guaranteed by the state. Moreover, there is no similar property tax floor to the property tax ceiling as part of the Texas Education code (Hoxby 2007). The state is only able to control the amount of money that poor districts are able to receive, as the program simply provides for revenue distribution and not for directed spending. As such, it reasonable to anticipate an alteration in poor districts' tax behavior. This is because there is traditionally a heavier tax burden (rate) in poor districts, as there is less from which to pool resources. Thus, with an influx in resources from Robin Hood, literature[5] suggests that poor districts are likely to reduce the burden on their residents.

4. Data

4.1. Sources

[5]For a complete formulation of the anticipated response of rich districts, see Hoxby (2007)

Accessing the requisite data to track changes in revenue, expenditure and student academic achievement at the district level proves to be remarkably difficult, involving several different governmental sources. My measure of student academic performance is the Texas Assessment of Academic Skills (TAAS) exam, which is given to student in 8^{th} and 10^{th} grade and tests math and reading skills. The TAAS exam underwent significant overhaul prior to 1994, resulting in no comparable test data available prior to 1994. I was able to obtain 1992 test data, but because this exam is scaled differently than exams post-1994, I construct yearly percentile rankings of math and reading TAAS scores in order to use the pre-Robin Hood data. Thus, performance is tracked by a district's relative academic standing in the state in each year.

As suggested by the relative ambiguity in the manner in which the amount of money poor schools receive is determined, the data concerning how much Chapter 42 districts receive is similarly imprecise. For rich districts, I use TEA data on how much money is recaptured by the state. For poor districts, there is no direct information on how much money they receive from the state due to this program – only information on total state aid is available. In order to approximate the amount received by poor districts, I use school finance data collected from F33 forms in the Common Core of Data. F33 data are available for the 1992 fiscal year (which corresponds to the 1991-92 academic year). However, it only becomes available again for the 1995 fiscal year. Consequentially, the final years available in my analysis are 1992 and 1995-2002. As Robin Hood was implemented in 1994, data availability limits my pre-treatment sample to one year of data, 1992.

The method for approximating the amount of money that can be attributed to aid from Robin Hood comes from the differential changes in total state revenue between poor and neutral districts after 1994. While the TEA does not provide the amount of money poor districts receive,

it does designate a district's classification as poor, neutral or rich. I assume that absent Robin Hood, changes in state revenue among poor districts would have been the same as in neutral districts. I then calculate what poor district state revenues would be had they experienced the same percentage change as the average percentage change among neutral districts between 1992 and each year post-1994. Under the assumption that neutral districts are a valid control group for what would have occurred in poor districts absent Robin Hood, this method allows me to approximate the amount received due to Robin Hood by poor districts as the difference between this estimated amount and the total amount of state revenues received by the district.

I also use F33 data to calculate changes in district revenues, district expenditures and all other financial data. All financial data are adjusted for inflation using the CPI-U index and are in 2009 dollars. All financial data also are scaled by district enrollment, so that monetary data is on a per-student basis.

4.2 Descriptive Statistics

The Robin Hood program redistributes just over $2,800 per student to poor districts on an annual basis. In contrast, Robin Hood recaptures $5,370 per student from rich districts on an annual basis. The disparity in figures within the sample is explained by the fact that fewer students are part of the recapture base as opposed to the students in aid-eligible districts.

As expected, I find that poor districts have higher enrollments of minority and free lunch eligible students than their neutral and rich counterparts do. However, the composition of Texas schools appears to vary slightly from traditional expectations. In looking at the table of means presented in Table 2, while poor districts have on average just under a 7% enrollment of African-American students, neutral schools actually have a higher enrollment (around 9%), and rich

districts have around a 6% enrollment for African-Americans. Thus, the concentration of African-Americans in the poorest districts typically associated with studies like this is not found in my analysis of Texas public schools. However, enrollment trends for Hispanic students do show a great disparity. Table 2 shows an average of 10% higher enrollment of Hispanics in impoverished districts than in neutral or rich districts. Finally, as could be expected, students eligible for a free-lunch program also average approximately 10 percentage points more in poor districts (around 35-40% of total enrollment) than in neutral and rich districts (both averaging around 25-30% over the nine-year sample).[6]

I also find that poor and neutral districts do not perform considerably differently over the nine-year sample. In taking the average performance of districts classified as poor over the entire duration of the nine-year sample, poor districts average in the 47th and 48th percentile for math and reading TAAS scores, respectively. Meanwhile, neutral districts reside in the 50th and 49th percentiles for math and reading. However, rich districts average in the 63rd and 61st percentiles in their math and reading TAAS performance, respectively over the duration of the sample. Moreover, when again referencing Table 2, neither of these scores represent a precipitous drop from where they began in the 1992 control, with the math score staying constant, while the reading score actually began in the 59th percentile. Poor districts display similarly consistent behavior; their percentile ranking shown in Table 2 in the 1992 control year was the 50th and 47th percentiles for math and reading. These trends suggest any effect of Robin Hood on poor district test score percentiles will be small, as the poor districts do not gain ground on the neutral districts after 1992 when the program is implemented.

[6]F33 data does not include information on how many students eligible for free-lunch programs in Texas are also minority students.

For school district finances, I find that the state devotes nearly four times the amount of resources to poor districts as opposed to rich, with on average $4,540 spent on poor districts by the state, while only $1,285 is spent on rich districts by Texas annually. However, rich districts still take in over $18,000 per year in total revenue, compared to just over $8,000 for poor districts, indicating that the reason for the severe disparity in state funding is that rich districts are more than capable of making up for the disparity in state revenue with their own substantial tax base. Part of the explanation for rich districts' ability to correct the disparity in state revenue lies in the difference in property tax revenue between rich and poor districts. Over the course of the sample, rich districts averaged an annual intake of $14,850 per student in tax revenue, compared to only $2,900 for poor districts. While these figures do not take into consideration in potential difference in tax rates, the disparity still is staggering.

I also find that poor and neutral districts average roughly the same amount of total and instructional expenditures. Poor districts annually spend a total of $9,250, along with $4,890 on instructional expenditures per student. Neutral districts exhibit similar spending behavior, with $9,250 and $4,900 spent per student in total and instructional expenditures, respectively. Consistent with their higher revenues, rich districts spend much more than either poor or neutral schools, annually spending a total of $16,750 per student, along with $6,050 in instructional expenditures. In sum, the descriptive statistics show that while poor and neutral districts behave relatively similarly, rich districts in Texas operate on an entirely different level, from student composition, to financial resources, and finally student performance. These differences make identification of the effect of expenditures on student achievement difficult because one cannot simply attribute the achievement differences across district types to differences in expenditures. In the next section, I describe my empirical model that will account for these fixed differences

across school district types in order to identify the effects of interest in this paper due to Robin Hood.

5. Methodology

As discussed in Section 3, Robin Hood is a unique policy within the scope of school finance redistributive plans, insofar as there are clear winners *and* losers to the plan. In contrast, most previous studies have been based on programs where poor schools receive more money but wealthier districts are unaffected. Evaluating the impact of this program thus requires an approach that accounts for both types of districts separately. The goal of this paper is to see whether changes in state aid due to Robin Hood (both positive and negative) affect a school district's finances and student achievement. To identify the causal effect of the program on these outcomes, I compare changes within districts from before and after the program implementation in 1994 for poor and rich schools to changes among districts that neither gained nor lost money from Robin Hood. Accordingly, two distinct but similar models must be developed: one for comparing poor districts' performance against neutral districts' performance over time and a second that compares rich districts' performance against neutral districts' performance over time.

The model used to estimate the effect of Robin Hood on poor districts is as follows:

$$Y_{it} = B_0 + B_1 AID_{it} + B_2 POOR_{it} + B_3 \%Black_{it} + B_4 \%Hispanic_{it} + B_5 \%FreeLunch_{it} + \alpha_i + \delta_t + e_{it,} \quad (1)$$

In Equation (1), AID is the amount received per student from Robin Hood in district i in year t, POOR is a dummy variable equal to one if the district is designated by TEA as poor, %Black is the percentage of students who are African-American, %Hispanic is the percentage of students

who are Hispanic, and %FreeLunch is the percentage of students who are eligible for the free-lunch program. The model also includes district and year fixed effects, and e_{it} is a random error term. Regressions using this model are estimated using a sample comprised solely of poor and neutral districts.

The model for comparing change over time in rich districts is nearly identical:

$$Y_{it} = B_0 + B_1 RECAPTURE_{it} + B_2 RICH_{it} + B_3 \%Black_{it} + B_4 \%Hispanic_{it} + B_5 \%FreeLunch_{it} + \alpha_i + \delta_t + e_{it} \quad (2)$$

In Equation (2), the noticeable difference is AID is replaced by RECAPTURE, where RECAPTURE is the amount taken per student from rich districts due to Robin Hood and POOR is replaced by RICH, where RICH is a dummy variable equal to one if the district is designated by TEA as a Chapter 41 district. All other variables in Equation (2) are as defined in Equation (1). Regressions using this model are comprised solely of samples or rich and neutral districts over the entire duration of data.

In both models, I include district fixed effects in order to control for any fixed differences across districts that are correlated both with the amount of redistribution aid taken or received and with financial and academic outcomes. These fixed effects are particularly important when my outcomes variable is test scores, as then both models can be interpreted as value added specifications that compare the rate of learning over time across different types of districts as a function of how much aid they received or lost. Rivkin, Hanushek and Kane (2005) discuss the necessity of observing the *rate* of learning over time, as opposed to simply measuring levels of learning between different classrooms. When evaluating the progress due to Robin Hood, one cannot simply see how different types of districts perform in a given year in the sample, as level

differences likely are correlated with unobservable characteristics of the district that also are correlated with educational expenditures, such as parental preferences for education.

A prevailing issue in evaluating redistributive plans like Robin Hood is how to evaluate academic performance. It is difficult to assess change over time given generally accepted methods of tracking student performance. What is certain, however, is the necessity to develop a model that is able to compare change over time between categories of students, in order to determine whether redistributive efforts are in fact producing the changes they intend. Hanushek (1986) explains the advantage of using standardized test scores to track results: "For the most part, value-added estimation has been possible only when outputs have been measured by standardized test scores. This results simply from data availability, because a one-shot data collection effort using school records can still yield intertemporal information through the history contained in normal records." The necessity to use standardized test scores as the measure of student performance is reaffirmed by the consistent lack of resources made available by school districts (Card 1998).

The outcome variables I use in this study are total per-student expenditure behavior, total per-student instructional expenditure, both total and state revenue intake per student, and math and reading TAAS test percentiles. In order to overcome the biases inherent in cross sectional studies of student achievement and student expenditures, I include a pre-treatment sample of data from 1992 while also comparing treatment groups (poor and rich districts) to a non-treatment group (neutral districts) using district fixed effects. In addition, by always including the control group of neutral districts in every regression, I prevent against simply observing districts generally improving at the same rate. Any positive or negative coefficient associated with change in revenue is made *in comparison to the standard rate of change* in districts unaffected

by Robin Hood due to factors that are neither observed nor measured by my study. The consequences of this are by comparing how different types of districts behave over time, I prevent against observing any prevailing spurious trends unrelated to changes induced by Robin Hood.

The final product is essentially a difference-in-difference model (time and district-classification) that also allows for differential effects related to the *degree* to which a district is poor or rich. In other words, when observing the change in behavior of poor and rich districts, it is important to account for the fact that districts gain or lose different amounts of money depending upon their relative degree of poverty or wealth. Thus, within the double-differences model that observes within-district changes over time, coefficients associated with money received or recaptured for poor or rich districts interact with the amount of money said district gains or loses. The inherent bias within such a model actually trends towards observing no change due to Robin Hood, as the people receiving the most amount of money (i.e., the poorest districts) are the districts that are most likely to be trending downward in academic performance.

The main coefficient of interest in each regression is B_1, which is the coefficient on the variables that indicate the amount of money either gained or lost to Robin Hood. I also control for a dummy variable indicating a district's status as either poor (in the poor/neutral comparison) or rich (in the rich/neutral comparison) is essential for the fixed effects described above. These dummies are zero for all districts prior to 1994, and they are identified because districts switch poor/neutral/rich status post-1994. These dummy variables control for any effect on outcomes of being labeled poor or rich by TEA that is unrelated to the amount of aid received or revenue recaptured. Integral to any discussion regarding how poor districts react to increased revenue is an examination of trends in minority enrollment. The significance lies in whether there are

distinguishable demographic trends that are correlated wither either academic performance or revenue trends. In accordance with this, the percentages of African-American and Hispanic enrollment are included in the model, as is the percentage of students eligible for free-lunch programs. Adding these three variables to the model controls for any correlation of demographic and revenue or performance trends.

6. Results

The first regression conducted models the relationship between change in revenue and Robin Hood. Within the regressions using revenue as the dependent variable, the coefficient associated with AID or RECAPTURE represents the per-dollar increase (or decrease) in revenue due to Robin Hood. In other words, a coefficient of 0.5 for AID would mean that school district revenue increases by $0.5 for every dollar a district received per student. Table 1 shows statistically significant evidence that poor districts are in fact receiving money due to Robin Hood and rich districts lose money to Robin Hood. However, column (ii) shows that total revenue only increases by $0.17 for every dollar that poor districts receive of Robin Hood aid. It is entirely unclear why the relationship is so far from one, which is the coefficient that is expected given the structure of the program. Figure 2 indicates an upward trend in total revenue collected by poor districts, yet there is no distinct uptick in total revenue of poor districts once Robin Hood takes its effect in the sample in 1995.

Unfortunately, the ambiguity in the Robin Hood discussed in Section 3 as to how the state precisely calculates the amount poor districts receive provides no easy explanation as to why they appear to be increasing their revenue by significantly less than the amount received. Moreover, column (v) indicates that rich districts do not appear to be losing any total revenue

due to Robin Hood. The coefficient of 1.01 suggests that for every dollar of money that is recaptured from them, they replace it with just over a dollar in revenue. This is particularly significant for the purposes of modeling any potential relationship between money and performance for those that *lose* money to a redistributive program, as even if I were to observe any drop-off in academic performance in rich districts, it would be difficult to attribute this to a loss of money to Robin Hood.

Part of the explanation for why poor districts do not see gains in revenue equal to funds received from Robin Hood (and why rich districts do not appear to lose any total revenue from Robin Hood) comes in evaluating the change in tax revenue among affected districts due to Robin Hood. Table 1 affirms the anticipated effects of Hoxby (2007) in the response of poor and rich districts to Robin Hood. As seen in column (iii), poor districts collect less money from taxes in response to their increased state aid, while column (vi) indicates rich districts are taking in additional revenue from taxes that replace almost everything lost to Robin Hood. Both results are statistically significant, are anticipated by the previous literature review and are a partial explanation for why total revenue changes less than one-to-one with Robin Hood funds. Figure 2 shows the downward trend in tax revenue of poor districts over the sample, as well as strong trend upward in tax revenue collected by rich districts during the course of Robin Hood.

As could be anticipated by the fact that that poor districts are only increasing their total revenue by $0.17 on the dollar due to Robin Hood, total expenditures also fail to rise significantly in poor districts, only $0.12/dollar received as shown in column (i) of table 3. Moreover, instructional expenditures are only increasing by $0.06 for every dollar received in poor districts. Instructional expenditures results are statistically significant at the 5 percent level, but the fact that the coefficient is so small suggests little of the aid from Robin Hood is finding

its way into more instructional expenditures per student. Figure 3 depicts an increase in total and instructional expenditures by poor districts, yet we see that they are increasing at an almost uniform rate with neutral districts. Again, this is unexpected, as Robin Hood is intended to give poor schools greater resources at their disposal. Moreover, despite the fact that Robin Hood is siphoning money away, rich schools are actually devoting $0.50 *more* to total expenditures for every dollar they have recaptured. This figure is also statistically significant and suggests rich districts are able to adequately compensate for lost revenue due to Robin Hood. Figure 3 shows the distinct jump in total expenditures of rich districts, as well as the incredible spending disparity between rich districts and the other two types of districts in the state.

The primary stated purpose of the Robin Hood program was to distribute revenue to bring poor districts towards the resource-levels of other districts. The underlying goal of this is for students in poor schools to see improved learning conditions through the mechanism of increased district expenditures, or even more specifically increased district instructional expenditures. The findings from table 1 are clear: there is statistically significant evidence at the 5% level that for every dollar of Robin Hood aid poor districts receive, their total revenue increases by only $0.17. While tax revenue drops by $0.10 for every dollar of Robin Hood aid poor districts receive (presumably to reduce significant tax burdens on district residents), there is still a significant portion of Robin Hood aid that does not appear to find its way into increased district revenue. The even more important consequence of this is that as seen in table 3, expenditures only increase by $0.12 for every dollar of Robin Hood aid poor districts receive. Most importantly, statistically significant evidence at the 5% level shows that instructional expenditures only increase by $0.06 for every dollar of Robin Hood aid. This indicates a significant failure of the program in its stated goal, affirming Hanushek (1986) in his conclusion that schools are an

economically inefficient institution. Further research into where exactly the other portion of Robin Hood aid is directed in poor districts would be helpful in explaining why total revenue increases by such a small ratio to the amount of Robin Hood aid received.

Because of the significant ambiguity as to where recaptured revenue from Robin Hood actually is going, it comes as little surprise to see a very weak relationship between academic performance and increased funding. Table 4 shows regressions of the dependent variables of math and reading scores. Within the context of these regressions, the coefficient with either AID or RECAPTURE now represents the per-dollar percentile increase in test scores. In other words, a coefficient of 0.5 would mean that a district improved its test score percentile ranking within Texas by one-half of one percentile. Column (i) shows that math scores only increase by 0.1 of a percentile, while column (ii) shows that reading scores increase by a similar margin in poor schools. Neither results are statistically significant at even the 10% level, but both estimates have p-values less than 0.15. While there appears to be some improvement that could be attributed to Robin Hood, it is relatively small in magnitude, despite the significant amount of money received per student due to Robin Hood. Rich districts show no reduction in performance compared to neutral districts. In fact, column (iii) indicates statistically significance evidence at the 10% level that rich districts are improving by 0.04 of a percentile for every dollar lost to Robin Hood compared to neutral districts in their math TAAS scores. This should be anticipated, as Tables 1 and 3 already showed that rich districts were replacing their losses. Column (iv) shows similar marginal improvement in reading TAAS scores, though the evidence is not statistically significant. Figure 4 shows the improvement over time of poor districts, indicating there is very little to distinguish the improvement of poor districts from that of neutral

districts, again confirming there is very little to suggest a relationship between the additional funding of Robin Hood and improved academic performance.

Although I find at most a weak positive relationship between increased revenues and student academic outcomes, it still is important to explore potential ways in which schools spent their increased revenue from the program. Rivkin, Hanushek and Kane (2005) find that poorer schools often have limited funds, which hinders how they can distribute their resources and how much can be devoted to teacher salaries. This in turn compromises the quality of teacher that poor schools can hire, justifying the notion that teacher quality and salary are correlated. Class size is another important determinant in explaining student's performance. Kreuger (1999) indicates a strong positive relationship between performance and attending smaller classes, particularly amongst minority and free lunch eligible students. These are the only two variables that contain explanatory power in my data as well for test scores.

For teacher salary, the scale for the coefficient associated with AID and RECAPTURE is the same for district revenue and expenditures. For student/teacher ratio, the coefficient associated with AID and RECAPTURE represents the change in ratio per dollar received or recaptured due to Robin Hood. When looking at Table 5, there is no clear effect of Robin Hood leading poor districts to reduce Student/Teacher Ratio. In fact, column (i) of the table suggests that student-teacher ratios are increasing in poor districts spending at a relative to neutral districts for every dollar of Robin Hood money received. While the coefficients are not statistically significant, at the very least these results suggest that despite the evidence that reducing student/teacher ratio is a good thing to spend money on; poor districts are not doing so. The same can be said for expenditures on teacher salary. Column (ii) shows that again, poor districts are not increasing salaries relative to neutral districts for every dollar of Robin Hood money

received. Thus, there is little evidence in the data that suggests poor districts are devoting significant additional resources towards hiring better-qualified teachers or more teachers.

Despite the program being fifteen years old, there is only one previous analysis of the Robin Hood program. Hoxby (2007) finds evidence that redistributive plans like Robin Hood devalue homes in rich areas, making the program ultimately self-defeating by increasing the tax burden on more districts. This in turn leads people to move towards more economically efficient districts, following a Tiebout (1956) migratory pattern. Under the assumption that people are able to move freely from community to community, a program like Robin Hood causes people to move out of the economically inefficient rich districts, and toward more economically efficient but poorer districts. While Hoxby (2007) suggests the logic behind such migration in the context of Robin Hood, there is to date no empirical analysis of such migration due to Robin Hood in Texas. Moreover, Guryan (2003) finds the opposite effect in his analysis of the Massachusetts school districts. As such, evaluating enrollment trends is important to evaluating whether redistributive school finance plans influence population trends. Within the context of Robin Hood, this has consequences for which districts give and receive money.

Table 6 tests the likelihood of Tiebout migration. Column (iii) of the table indicates that enrollment in rich districts is increasing at a faster rate than neutral districts for every dollar Robin Hood recaptures. Moreover, column (i) shows that poor districts' enrollment increases at a slower rate than neutral districts for every dollar Robin Hood gives. From the reviewed literature, we are likely to see a Tiebout migration when one area uses its tax dollars more efficiently than another does. Specifically, past literature anticipates a migration from rich districts to neutral (or even poor) districts, as both use their tax dollars more efficiently. The data

from column (iii) appears to support the notion held by Guryan (2003), though the results are not statistically significant.

7. Conclusion

This paper reaffirms results from Hanushek (1986) and many others suggesting little to no relationship between money and performance. While the fixed effects models do show a positive correlation between test-performance and increases in funding, the estimated effects are neither statistically significant nor particularly large in magnitude. In order to improve a single percentile in either math or reading TAAS scores, a district needs to receive approximately $800 per student according to my results. While the descriptive statistics in Table 2 show that districts are in fact receiving significant amounts of money, poor schools are shown only to improve by one-hundredth of one percentile for every dollar received from Robin Hood. The amount of grant money required to exhibit actual improvement suggests that Robin Hood is producing very little in actual academic improvement. Moreover, the results show that rich schools who are losing money to Robin Hood do not suffer at all in their performance, still improving more quickly than districts immune to Robin Hood. Finally, even if one were to interpret the results as suggesting a strong relationship between financial aid and academic improvement, it is difficult to attribute it to a particular source. Typical explanatory variables, such as class size, teacher wages and teacher employment, do not exhibit increases in poor districts relative to neutral districts from Robin Hood.

Shifting from the academic to the financial portion of Robin Hood, economic criticisms of the program appear to be reinforced. As shown in Table 3, the tax burden nearly doubles for rich districts, feeding into the cycle of consistently raising property taxes and devaluing property

suggested by Hoxby (2007). Consequently, it is fair to conclude that while Robin Hood certainly does redistribute significant amounts of money to poor districts it has negligible academic benefits. More research is necessary to disentangle whether this is the product of the specific design of Robin Hood or because of a general lack of influence that additional funding has upon test performance.

Table 1: Estimates of the change in district revenue in "poor" and "rich" districts in relation to districts unaffected by Robin Hood (1992-2002)

	Poor Districts			Rich Districts		
	State Revenue	Total Revenue	Tax Revenue	State Revenue	Total Revenue	Tax Revenue
Variable	**(i)**	**(ii)**	**(iii)**	**(iv)**	**(v)**	**(vi)**
State aid	.2700** (.0474)	.1698** (.0491)	-.1010** (.0384)			
Recaptured revenue				.0113** (.0043)	1.010** (.02)	.9630** (.0311)
Poor	-633.06** (103.75)	-438.09** (108.32)	195.92 (146.40)			
Rich				-381.22** (56.72)	-70.58 (139.81)	367.05** (155.39)
% Black	2337.30** (814.47)	709.73 (1215.39)	-4776.14** (2314.26)	2108.78** (801.17)	418.36 (1237.06)	-5208.78** (2515.66)
% Hispanic	1063.32 (747.02)	-383.22 (798.69)	816.80 (1588.25)	1146.82* (698.54)	56.65 (778.9)	1140.21 (1582.65)
% Free-lunch	-63.42 (167.96)	27.4471 (265.62)	115.80 (239.34)	-110.42 (145.07)	98.48 (228.41)	185.75 (246.49)
Constant	2366.07** (282.15)	7029.32** (328.66)	3460.24** (357.93)	2315.11** (266.44)	7001.53** (315.40)	3594.91** (382.40)

[1] Standard errors clustered by district are in parentheses: * indicates significance at the 10% level. ** indicates significance at the 5% level.
[2] All regressions are weighted by district enrollment. Variables are scaled by district enrollment
[3] The sample in columns (i)-(iii) is comprised of poor and neutral districts. The sample in columns (iv)-(vi) is comprised of rich and neutral districts.

Table 2: Sample means of selected variables for all districts

	Year								
	1992			1995			2002		
	Poor (139)	Neut. (727)	Rich (64)	Poor (141)	Neut. (736)	Rich (65)	Poor (124)	Neut. (741)	Rich (75)
Variable	**(i)**	**(ii)**	**(iii)**	**(iv)**	**(v)**	**(vi)**	**(vii)**	**(viii)**	**(ix)**
Math Percentile	50.28 (2.42)	49.44 (1.06)	63.39 (3.33)	45.2 (2.20)	49.72 (1.07)	63.85 (3.42)	51.17 (2.43)	48.74 (1.06)	63.04 (3)
Reading Percentile	47.01 (2.33)	50.04 (1.07)	59.94 (3.36)	45.14 (2.22)	50 (1.07)	62.12 (3.55)	51.74 (2.44)	48.6 (1.05)	63.91 (3)
State Aid	N/A	N/A	N/A	2605.8 (88.6)	N/A	N/A	3100.4 (126.8)	N/A	N/A
Recaptured Revenue	N/A	N/A	N/A	N/A	N/A	6932.5 (1473)	N/A	N/A	4122.6 (465.8)
State Revenue	3513.3 (136.2)	4105.5 (61.22)	534.38 (24.4)	3539.4 (103.2)	4606.2 (56.92)	1845.2 (72.87)	5343.3 (140.9)	4950.1 (64.64)	934.4 (26.03)
Total Revenue	7880.2 (106.9)	7945.3 (51.44)	11681 (568)	8318 (142.2)	8382.4 (58.87)	19606 (1701)	9743.7 (204.5)	9409.8 (68.5)	17051 (855.3)
Tax Revenue	3397.1 (142.1)	2905.4 (63.4)	9902.4 (509.7)	2935.2 (126.7)	2577.9 (57.2)	15814 (1631)	2734.1 (129.9)	3208.9 (71.38)	14497 (774.3)
Total Expenditures	7336.6 (92.04)	7371.4 (57.63)	10777 (453.7)	8625.1 (185.5)	8127.7 (61.9)	10592 (363.9)	9683 (199.9)	9738.5 (81.49)	17638 (892.5)
Instructional Expenditures	3817.3 (50.93)	3753.2 (25.73)	5052.6 (178.7)	4613.9 (93.89)	4397.2 (29.95)	5529.1 (167.7)	5189 (101.6)	5087.2 (36.09)	6408.3 (247.2)
S/T Ratio	14.18 (.191)	14.26 (.099)	12.55 (.364)	13.59 (.190)	13.72 (.089)	12.57 (.328)	12.24 (.195)	12.71 (.082)	11.61 (.326)
Teacher Salary	N/A	N/A	N/A	52706 (5916)	72337 (20105)	62860 (12684)	46171 (915.7)	78993 (21370)	49627 (1300)
Enrollment	5507 (1578)	3360 (327.1)	2488.2 (602.1)	5671 (1607)	3605 (346.7)	2654 (665.9)	1871 (379.7)	4685 (491.8)	4731 (1325)
Teachers	332.1 (89.7)	211.2 (19.7)	166.6 (35.4)	354.3 (94.1)	231.3 (21.1)	182.3 (41.2)	158 (33.9)	311.1 (30.5)	357.8 (90.9)
% Black	.0687 (.0088)	.0903 (.0047)	.0558 (.0129)	.0683 (.0090)	.0900 (.0047)	.0558 (.0134)	.0685 (.0092)	.0870 (.0046)	.0838 (.0157)
% Hispanic	.3470 (.0202)	.2250 (.0099)	.2657 (.0288)	.3798 (.0200)	.2357 (.0099)	.2668 (.0280)	.2905 (.0228)	.3005 (.0101)	.2452 (.0234)
% Free-lunch	.3814 (.0131)	.3530 (.0065)	.2898 (.0176)	.4016 (.0132)	.3779 (.0064)	.2988 (.0180)	.3813 (.0141)	.3798 (.0060)	.2965 (.0172)

[1] Standard deviations clustered by district are in parentheses.

[2] All variables apart from teacher salary and number of teachers are scaled by district enrollment. Teacher salary is scaled by number of teachers per district. All monetary figures are adjusted for inflation.

[3] Number in parentheses under row demarcating poor, rich and neutral districts indicates the number of district observations in the sample.

[4] For the 1992 sample, districts' status as poor, rich or neutral comes from their status in 1995 for showing the change over time due to Robin Hood.

Table 3: Estimates of the change in school district expenditures in "poor" and "rich" districts in relation to districts unaffected by Robin Hood (1992-2002)

	Poor Districts		Rich Districts	
	Total	Instruction	Total	Instruction
Variable	(i)	(ii)	(iii)	(iv)
State aid	.1206 (.0779)	.0638** (.0176)		
Recaptured revenue			.5213** (.0904)	-.0086** (.0044)
Poor	-342.30* (194.43)	-158.85** (48.76)		
Rich			95.14 (385.05)	-39.21 (33.60)
% Black	1049.99 (3102.92)	659.28 (461.0)	1579.87 (2790.66)	592.22 (492.67)
% Hispanic	-2211.75 (2299.66)	-525.71 (515.40)	-2717.12 (2101.68)	-525.06 (502.83)
% Free-lunch eligible	-633.63 (577.83)	126.92 (95.52)	-179.84 (494.43)	140.72 (102.96)
Constant	7779.74** (645.50)	3462.08** (195.22)	7783.47** (634.93)	3497.71** (181.13)

[1] Standard errors clustered by district are in parentheses: * indicates significance at the 10% level. ** indicates significance at the 5% level.
[2] All regressions are weighted by district enrollment. Variables are scaled by district enrollment
[3] The sample in columns (i) and (ii) is comprised of poor and neutral districts. The sample in columns (iii) and (iv) is comprised of rich and neutral districts.

Table 4: Estimates of the change in test score percentile-improvement in "poor" and "rich" districts in relation to districts unaffected by Robin Hood (1992-2002)

	Poor Districts		Rich Districts	
	Math	Reading	Math	Reading
Variable	**(i)**	**(ii)**	**(iii)**	**(iv)**
State aid	.0013 (.0009)	.0012 (.0008)		
Recaptured revenue			.0004* (.0002)	.0003 (.0002)
Poor	-5.146** (2.103)	-4.491** (1.937)		
Rich			-6.042 (4.437)	-5.775 (4.818)
% Black	-114.828** (26.963)	-65.867** (18.375)	-124.811** (26.935)	-58.528** (21.011)
% Hispanic	-90.416** (33.536)	-90.068** (21.937)	-86.312** (34.662)	-85.913** (21.782)
% Free-lunch eligible	-2.953 (9.966)	-2.229 (4.656)	-5.618 (10.337)	-3.130 (4.502)
Constant	91.325** (12.713)	83.237** (8.002)	93.087** (12.209)	81.720** (7.300)

[1] Standard errors clustered by district are in parentheses: * indicates significance at the 10% level. ** indicates significance at the 5% level.

[2] All regressions are weighted by district enrollment. Variables are scaled by district enrollment

[3] The sample in columns (i) and (ii) is comprised of poor and neutral districts. The sample in columns (iii) and (iv) is comprised of rich and neutral districts.

[4] All test-scores are for the end-of-year TAAS exams administered to 10^{th}-graders, with scores scaled to statewide percentile rankings.

Table 5: Estimates of the change in student-teacher ratio and teacher salaries in "poor" and "rich" districts in relation to districts unaffected by Robin Hood (1995-2002)

	Poor Districts		Rich Districts	
	S/T Ratio	Teacher Salary	S/T Ratio	Teacher Salary
Variable	**(i)**	**(ii)**	**(iii)**	**(iv)**
State aid	-.0001 (.0001)	-2.7281 (4.3177)		
Recaptured revenue			-4.16×10^{-6} (.00001)	.0003 (.0002)
Poor	.1637 (.3891)	20727.15 (30262.99)		
Rich			-.0062 (.1036)	-18491.89 (16374.18)
% Black	-5.9812* (3.3732)	-571156.3 (381651.9)	-5.0198* (2.9618)	-374476.5** (229805.3)
% Hispanic	-.3524 (1.7447)	-336482.7 (463602.5)	-.2641 (1.5895)	-332904.2 (508037.2)
% Free-lunch eligible	-.0209 (.5649)	97517.88 (64928.08)	-.1364 (.5436)	93441.01 (63906.02)
Constant	17.41** (.8345)	391692.1** (122073)	17.1883** (.7164)	266415.3** (135468.4)

[1] Standard errors clustered by district are in parentheses: * indicates significance at the 10% level. ** indicates significance at the 5% level.
[2] All regressions are weighted by district enrollment. Variables are scaled by district enrollment
[3] The sample in columns (i) and (ii) is comprised of poor and neutral districts. The sample in columns (iii) and (iv) is comprised of rich and neutral districts.

Table 6: Estimates of the change in enrollment and number of teachers in "poor" and "rich" districts in relation to districts unaffected by Robin Hood (1995-2002)

	Poor Districts		Rich Districts	
	Enrollment	Teachers	Enrollment	Teachers
Variable	**(i)**	**(ii)**	**(iii)**	**(iv)**
State aid	-.0484 (.2118)	.0086 (.0492)		
Recaptured revenue			.0363 (.0514)	.0043 (.0062)
Poor	241.05 (568.7)	-7.950 (153.4)		
Rich			-105.94 (772.29)	44.24 (60.71)
% Black	-30720.8 (21742.9)	-1350.8 (2161.7)	-28652 (21336)	-1543.5 (2079.5)
% Hispanic	43992.3** (16006.8)	4355.0** (1422.5)	43169** (15378)	4344.1** (1418.9)
% Free-lunch eligible	2347.5 (2335.8)	-74.15 (163.7)	1584.1 (2074.1)	-89.23 (160.25)
Constant	24722.5** (3929.5)	748.31** (318.8)	21597.6** (3583.7)	637.54** (289.58)

[1] Standard errors clustered by district are in parentheses: * indicates significance at the 10% level. ** indicates significance at the 5% level.
[2] All regressions are weighted by district enrollment. Variables are scaled by district enrollment
[3] The sample in columns (i) and (ii) is comprised of poor and neutral districts. The sample in columns (iii) and (iv) is comprised of rich and neutral districts.

Figure 1: Average amount of money per student taken from "rich" districts and received by "poor" districts due to Robin Hood (1995-2002)

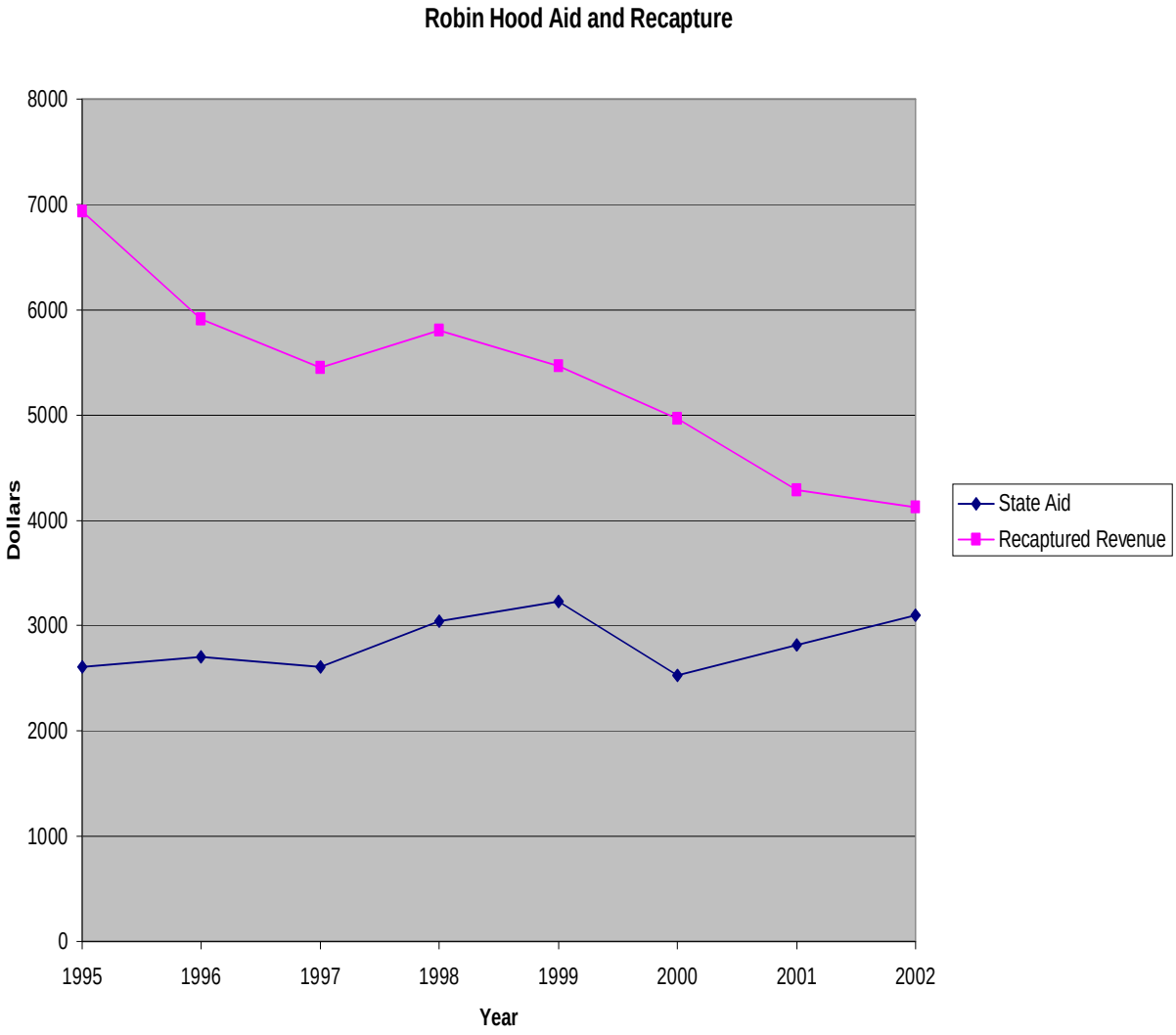
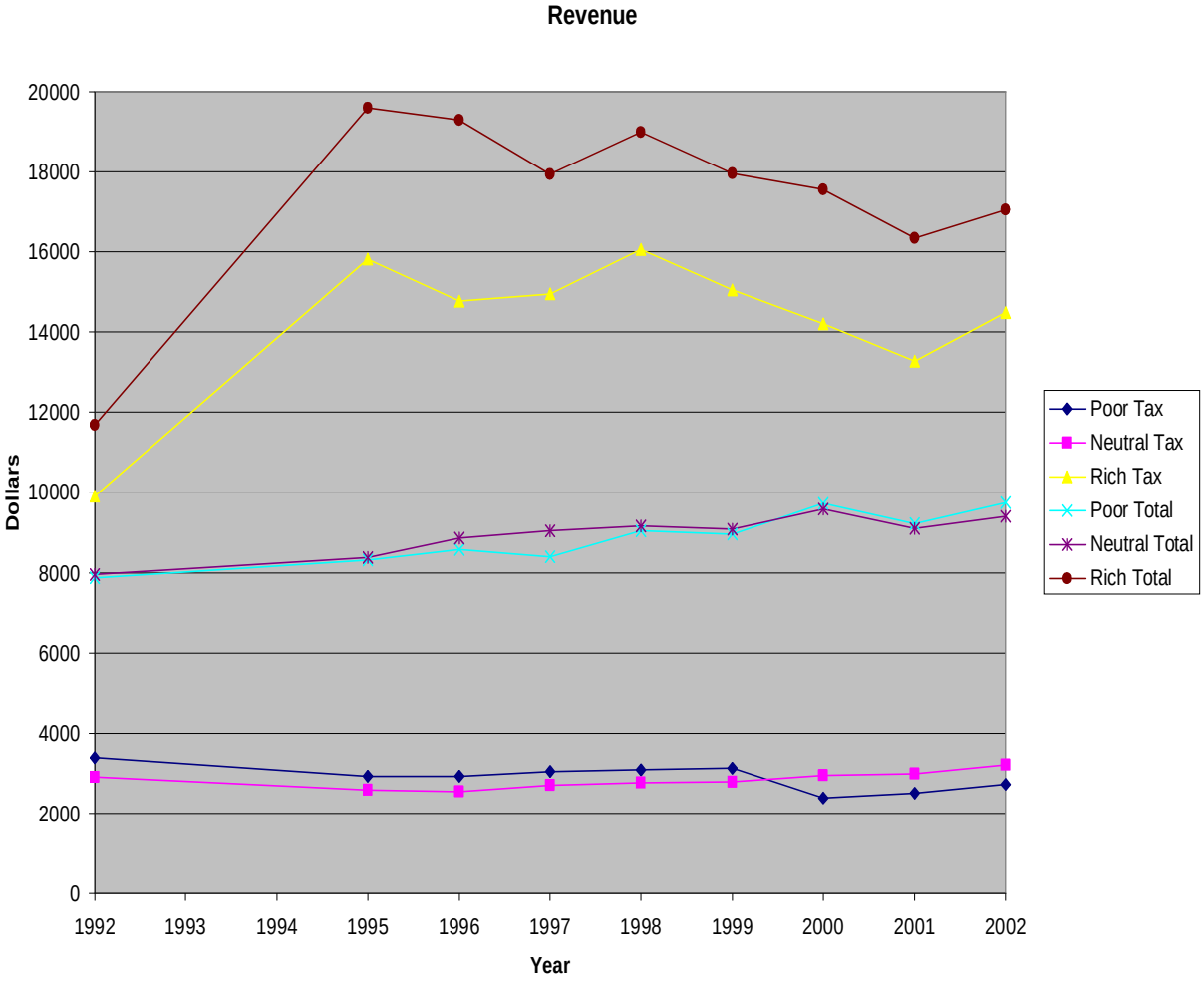
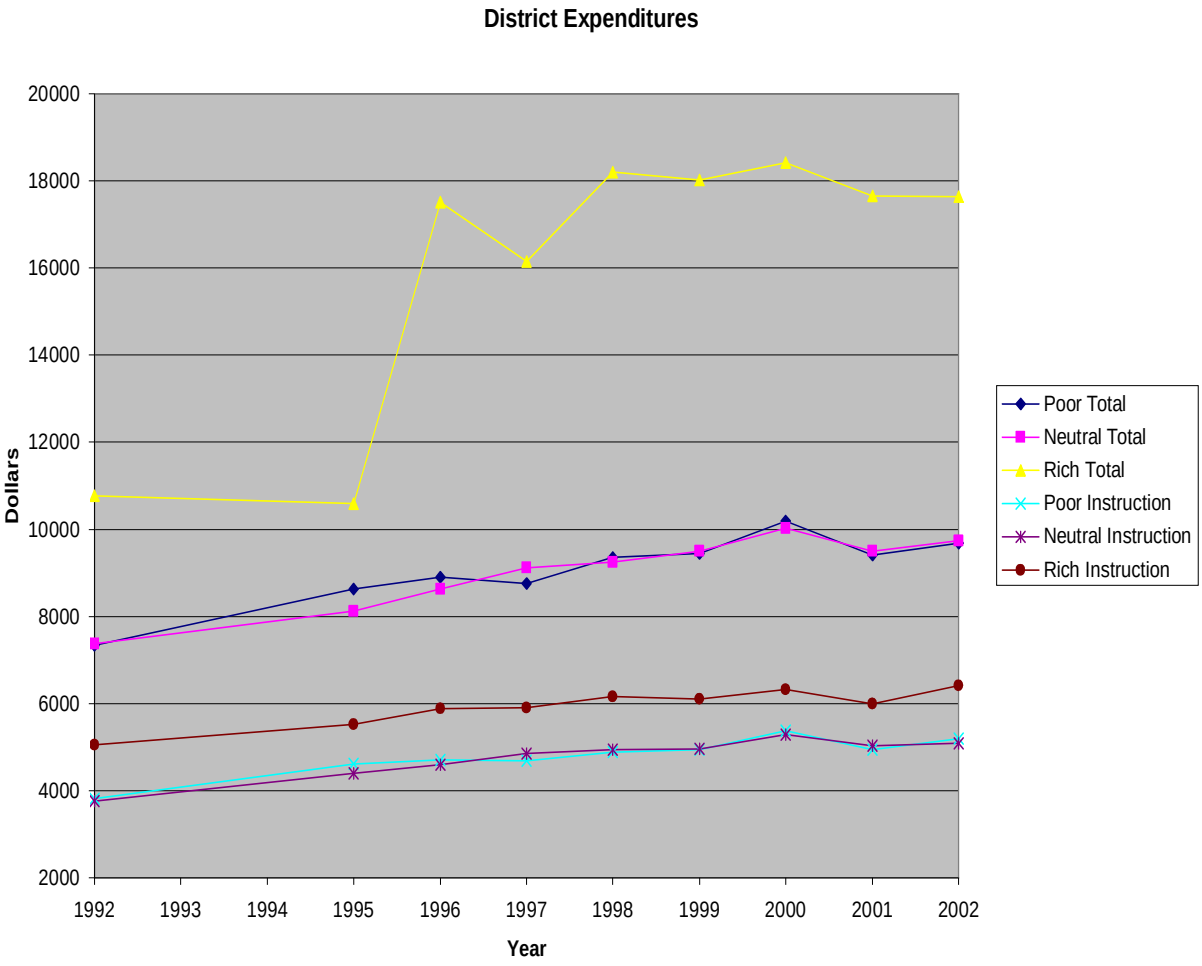


Figure 2: Average total revenue and tax revenue of "poor," "neutral" and "rich" districts (1992, 1995-2002)



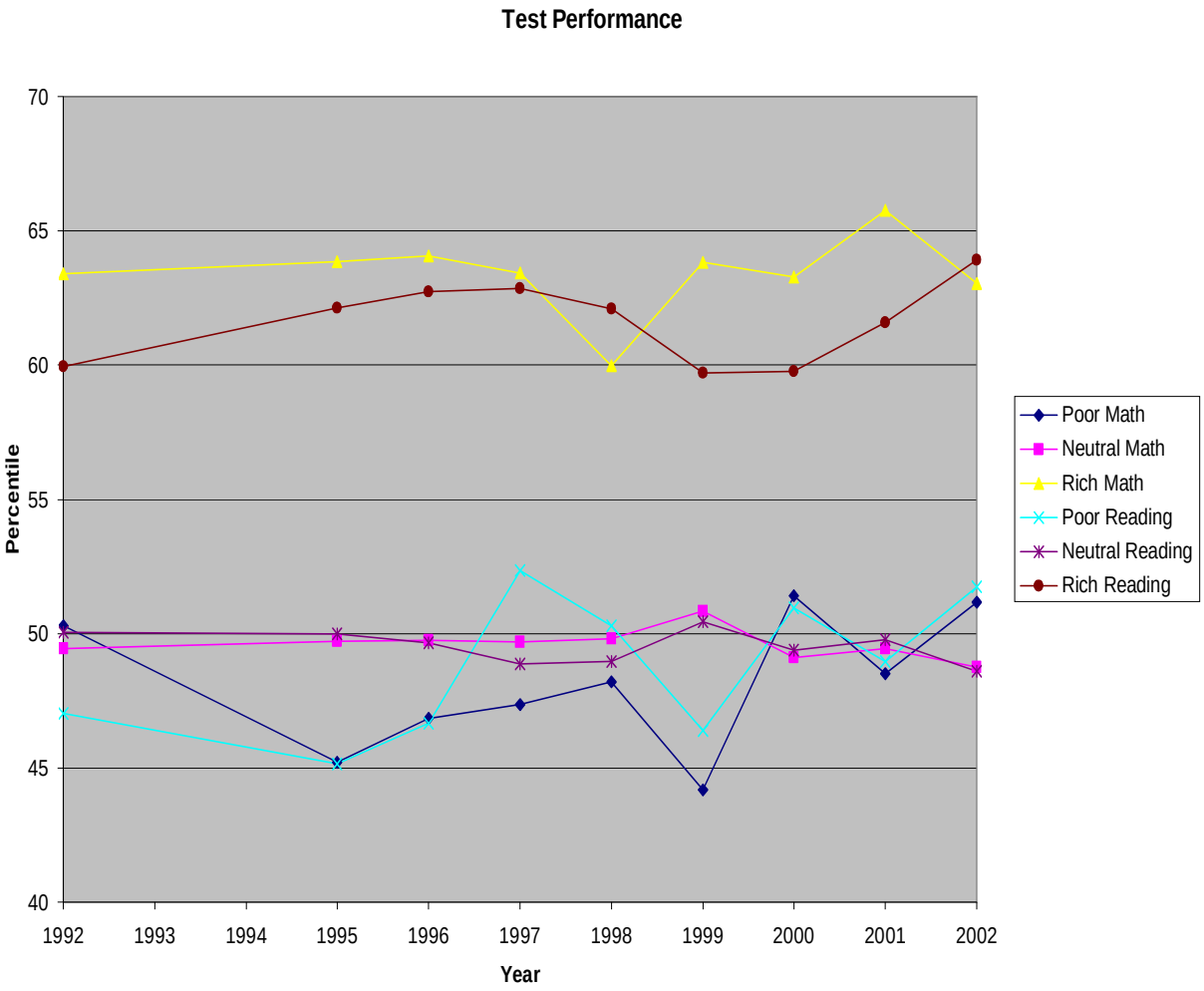
[1] For the 1992 sample, districts' status as poor, rich or neutral comes from their status in 1995 for showing the change over time due to Robin Hood.

Figure 3: Average total and instructional expenditures of "poor," "neutral" and "rich" districts (1992, 1995-2002)



[1] For the 1992 sample, districts' status as poor, rich or neutral comes from their status in 1995 for showing the change over time due to Robin Hood.

Figure 4: Average math and reading test scores of "poor," "neutral" and "rich" districts



[1] For the 1992 sample, districts' status as poor, rich or neutral comes from their status in 1995 for showing the change over time due to Robin Hood.

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