SCHOOL CHOICE

ISSUES

IN THE STATE

School Choice for Missouri: Many agree with the concept. Some disagree. And some simply want more information. As the public debate continues to grow louder about how best to provide a quality education to all Missouri children, it is critical to know the facts about school choice, and to have an understanding of how school choice programs have had an impact on communities, parents and students around the country. All of this analysis is done with one goal in mind: The best possible education for all of Missouri's children.

The High Cost of Failing to Reform Public Education in Missouri

Prepared By:

Brian J. Gottlob

Senior Fellow

Milton and Rose D. Friedman Foundation

March 2006

MILTON & ROSE D. FRIEDMAN FOUNDATION

The High Cost of Failing to Reform Public Education in Missouri

Prepared By:

Brian J. Gottlob

Senior Fellow

Milton and Rose D. Friedman Foundation

March 2006

MILTON & ROSE D. FRIEDMAN
FOUNDATION
Educational
Choice

About the Author

Brian J. Gottlob (bgottlob@poleconresearch.com) is the Principal of PolEcon Research. For 17 years Brian has analyzed economic, demographic, labor market industry and public policy trends for private sector, government and not-for-profit organizations. He has extensive experience in developing econometric models and has completed studies on range of economic, tax policy, energy, education, and health care issues in the States of New Hampshire, Virginia, Ohio, New Mexico, New York, Texas, Oregon, Michigan, Georgia, Mississippi, West Virginia and Illinois. Brian is a Senior Fellow at the Milton and Rose D. Friedman Foundation. He has been an instructor at the Whittemore School of Business and Economics at the University New Hampshire, a member of the Advisory Board of the New England Economic Partnership (NEEP) and a member of the National Association of Business Economics. Prior to founding PolEcon, Brian was a Vice President for Fiscal and Economic Policy at the Business and Industry Association of NH. He has an undergraduate degree in economics from the State University of New York and a graduate degree in public policy analysis from the University of New Hampshire.

About the Milton and Rose D. Friedman Foundation

The Milton and Rose D. Friedman Foundation, dubbed "the nation's leading voucher advocates" by the *Wall Street Journal*, is a non-profit organization established in 1996. The origins of the foundation lie in the Friedmans' long-standing concern about the serious deficiencies in America's elementary and secondary public schools. The best way to improve the quality of education, they believe, is to enable all parents with the freedom to choose the schools that their children attend. The Friedman Foundation builds upon this vision, clarifies its meaning to the public and amplifies the national call for true education reform through school choice.

Executive Summary

Executive Summary

As a large body of high-quality research has emerged in the past few years showing that school choice benefits the students who use it, much of the debate has shifted to the "public" or "social" effects of school choice. This study examines how school choice in Missouri would raise high school graduation rates, and measures the public benefits that would follow. It documents the public costs of high school dropouts in Missouri, in order to help citizens and policy makers better understand the stakes involved in school reform debates. We demonstrate how dropouts in Missouri affect overall earned income, state income tax payments, the number of Medicaid beneficiaries and their associated costs, and incarceration costs. We then calculate the current impact of competition from private schools on graduation rates in Missouri public schools, and examine how school choice proposals would increase this competition, raising public school graduation rates and reducing the public costs of dropouts. These calculations do not include the benefits of school choice for individual students who participate, or the benefits it confers directly on affected public schools (such as lower costs and higher revenues). Key findings include:

Dropouts are undercounted and costly to the state

- The annual costs associated with just one year's class of dropouts (an estimated 17,711 in 2005) is $71 million, or about $4,000 per dropout annually.
- Official state estimates dramatically understate the annual number of dropouts in Missouri. Independent estimates place the state's overall graduation at between 73 to 76 percent, rather than the 85.7 percent reported by the state in 2005.

Dropouts earn much less than graduates and the state loses significant tax revenues

- Dropouts in Missouri, on average, earn about $10,000 less per year than high school graduates; the 17,711 dropouts in 2005 represent more than $177 million in lost earnings each year.
- The total loss of earnings in 2004 of all dropouts, age 20-64, was $3.1 billion.
- The lower earnings of dropouts cost the state of Missouri lost income tax revenue of between $158 and $177 million annually.
- The unemployment rate for high school dropouts is 20.1 percent in Missouri compared to only 4.4 percent for high school graduates.

Dropouts cost the state millions in incarceration and Medicaid costs

- A Missouri dropout is twice as likely to be incarcerated as a high school graduate.
- The lifetime incarceration costs associated with just one year's worth of high school dropouts in Missouri is $28 million, or an average of $1,560 per white male dropout and $2,600 per African-American male dropout.
- 42 percent of high school dropouts or their dependents receive Medicaid benefits, compared to just 27 percent for high school graduates and 14 percent for individuals who attended college but received no degree.
- The additional Medicaid costs attributable to dropouts (compared to the cost if they had graduated high school) is $234 million per year, of which $90 million comes from Missouri general funds.
- From 1991-2001, Missouri's Medicaid expenditures grew at a faster rate any state except Oregon – an annual rate of 16.1 percent compared to the 50 state average of 11 percent.

School choice: improving public schools and saving taxpayers millions

- A school choice program in Kansas City and St. Louis that increases private school enrollments by 11,000 students would reduce annual dropout rates in public schools by 14 percent.

- A school choice program in Missouri would reduce dropout rates in public schools by increasing competition, producing total public benefits to the state of (in today's dollars) $95,000 per dropout prevented.

- A school choice program in Missouri that increased the percentage of children in private schools by 7.6 percent will reduce annual dropouts by 2,300 – 4,600 students. This will save between $8.5 and $17 million annually over the expected the expected life of the students.

Introduction and Overview

The individual consequences of not graduating from high school are large and well documented, but there are also substantial public or societal costs that accrue when individuals do not graduate from high school. Lower rates of labor force participation, employment among those who are in the labor force, and lower wages and salaries for those employed, are all consequences of the failure of individuals to obtain a high school diploma. Public costs result when individuals who do not graduate from high school contribute less to society and require more public services. When individuals attain higher levels of education there are associated public benefits in the form of lower utilization of public assistance programs, better health, lower rates of incarceration and overall lower social service expenditures, at the same time higher educational attainment increases productivity, economic growth, income, and tax revenues.

Most school districts and states dramatically understate the number of students who leave school before obtaining a high school diploma. At the same time, there have been few efforts to calculate the costs of dropouts beyond the individual or private consequences that result from failure to obtain a high school diploma. In combination, these factors contribute to an incomplete or understated assessment of the significance and costs to society of high school dropouts and the public consequences of a failure to make reforms to public education that address the problem.

Public costs and benefits are fundamental to debates about education reform but they are rarely documented. Expectations of large private and public gains from increasing educational achievement and attainment help explain a large portion of the willingness of citizens to support additional spending on public schools as well as the myriad of new and recycled reform initiatives that have swept through public education over the past two decades. This study addresses several critical education reform issues. First, in estimating some of the public costs associated with a failure to graduate high school, we help provide perspective on the urgency of reform for Missouri citizens and policymakers who may have little interest in education policy. Second, by documenting the costs associated with dropouts and calculating the likely impact that one reform (school choice) will have on high school graduation rates, we provide a basic model that can be used for calculating the return on investments for any education reform.

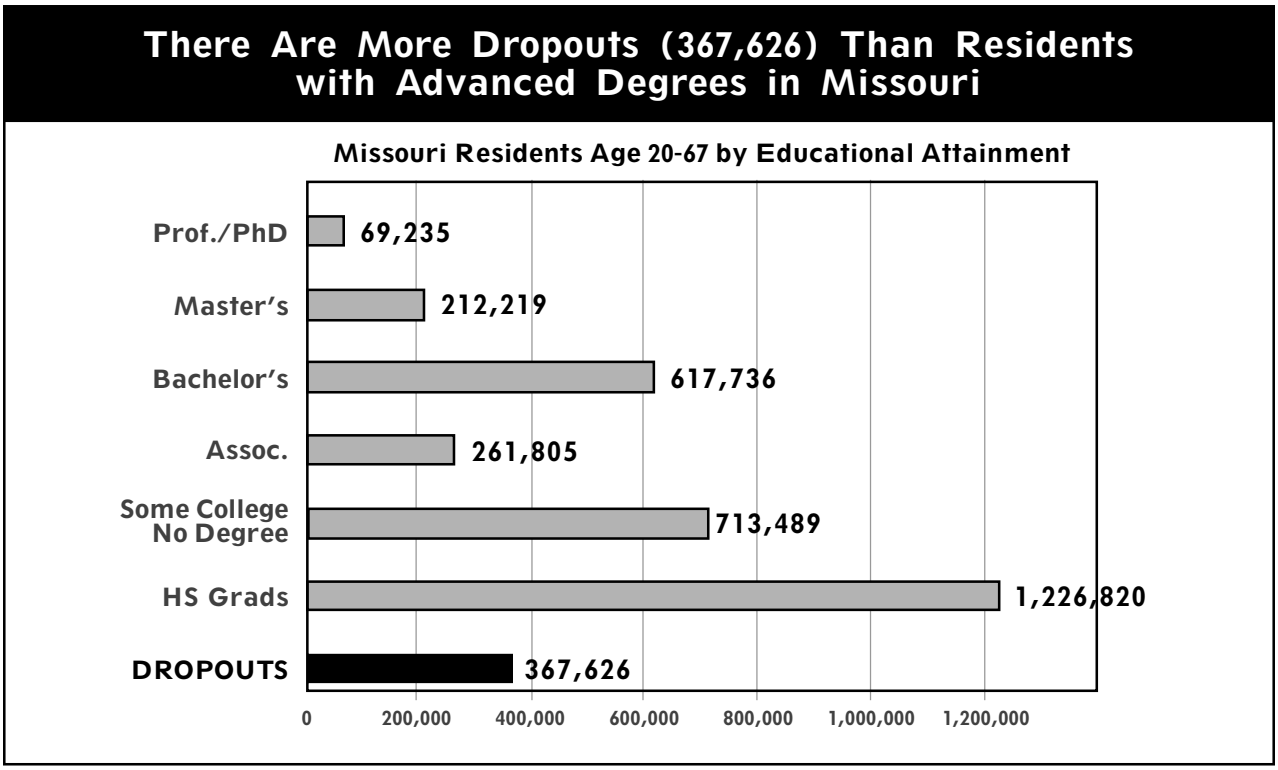
Finally, this research helps clarify how school choice benefits are allocated. As the evidence that school choice increases the achievement of choice students, opponents of choice have argued that the benefits to choice students are outweighed by the public costs of choice. A fundamental premise of school choice is that increased competition will improve the quality of public schools as well as benefit individual students and families. If school choice can be demonstrated to benefit students who remain in the public schools as well as those who participate in choice programs, then the private and public benefits of school choice become much larger. In this research we expand the public benefit calculation to include all citizens of Missouri, not just those with children in schools.

Research to date has largely focused on the private benefits of choice as measured by achievement test scores even though the effects of such test scores on subsequent labor market success are modest relative to the impacts of educational attainment.[1] Moreover, debates about the effect of school choice on achievement test scores, as currently framed, are largely irrelevant. To date, all school choice programs spend far less per pupil than do the public schools from which students are migrating. Thus, even if the test scores of choice students were not higher (although studies using generally accepted research standards suggest they are) the more relevant question is "compared to the amount of money spent per pupil in the public schools, do students who participate in school choice programs achieve as much or more per dollar spent". On that relevant question, the answer, even among research critical of school choice, is clearly that school choice produces greater achievement per dollar of expenditure.

The Size of the Dropout Problem in Missouri

High school graduation is an important predictor of an individual's future economic success. It also represents a key indicator of the performance of school districts and educational systems that sends a clear signal about the need for or results of education reform. Figure 1 shows the number of Missouri residents aged 20-67 by educational attainment.[2] The figure indicates that there are about 367,000 Missouri adults between the ages of 20 and 67 without a High school diploma. Just over one-half (53 percent) are dropouts in Missouri are male and 47 percent are female.

FIGURE 1



Source: PolEcon analysis of U.S. Census Bureau's "Current Population Survey" March 2005 data for Missouri

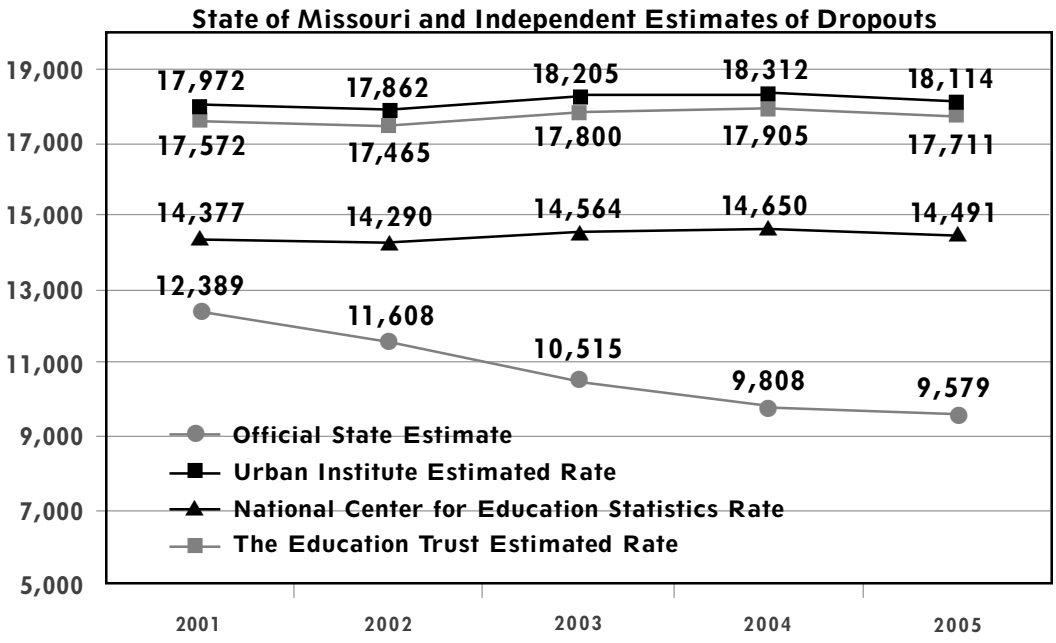
In Missouri and Throughout the Country, School Districts Underreport Dropouts

Most states and school districts significantly understate the problem of students failing to graduate from high school. Independent estimates by the Urban Institute,[3] the National Center for Education Statistics of the US Department of Education,[4] the Education Trust,[5] and our own review of annual enrollment and graduation data indicate that the number of dropouts is much higher in Missouri than is reported. These independent estimates of high school dropouts in Missouri place the state's overall graduation rate at from 73 to 76 percent rather than the 85.7 percent reported in 2005. Applying these independent estimates of dropout rates to Missouri's population of public high school students indicates that 7,000-8,000 more students dropout each year than are reported in official State estimates. Using information from the Urban Institute, we estimate that about 17,711 students in Missouri left high school before obtaining a high school diploma.

The problem of understating dropouts is especially apparent in Kansas City and St. Louis where the state-reported graduation rates were 75.9 percent and 58.6 percent respectively.[6] These rates are dubious at best. The

FIGURE 2

Independent Estimates Suggest That the Number of Annual Dropouts in Missouri is Much Higher than Reported



reported rate for Kansas City is higher than the average graduation rate throughout the country, and nearly 30 percentage points higher than the rate for urban school districts with large minority student populations. The Urban Institute places the graduation rate for all of Missouri at about 73 percent and the graduation rates in the districts of Kansas City and St. Louis at about 37.3 percent and 31.4 percent respectively. Our analysis of enrollment and graduation data in these cities suggests that the graduation rate is well under 50 percent but to minimize the potential for overstating the costs of high school dropouts and overstating the public benefits of increasing rates in those cities we use a graduation rate of 45 percent.

Dropouts Increase State Government Costs and Lower Economic Growth and Revenues

For the 367,626 Missouri residents between the ages of 20 and 67 who lack at least a high school diploma the consequences of dropping out are clear. Understanding that the same consequences face an additional 17,711 young people who dropped out of Missouri Schools in 2005 provides an indication of the public cost and benefits at stake for each year Missouri fails to reform public education. Here we document the individual or private consequences of dropping out and later in this report we calculate some of the public or social costs.

Table 1 shows how the few measures of social costs we have chosen are affected by educational attainment in Missouri. The table shows that Missouri residents without a high school diploma are less likely to be in the labor force and have a much higher probability of being unemployed than do high school graduates. Dropouts are much more likely to be on or to have a child who is receiving Medicaid benefits. Finally, dropouts are more likely to be incarcerated than are those with higher levels of educational attainment.

TABLE 1

Labor Market and Other Outcomes by Education Level in Missouri

	Dropouts	HS Grad	Some College, No Degree	Assoc. Degree	Bachelor's Degree	Master's Degree	Prof./PhD
% in Labor Force	62.3%	77.1%	77.4%	85.7%	85.6%	83.9%	99.1%
% in Labor Force Who Are Working	48.9%	71.5%	70.7%	81.0%	78.4%	78.6%	92.0%
Unemployment Rate	20.1%	4.4%	6.0%	4.3%	3.7%	3.2%	0.0%
Annual Earnings Incl. Wages and Other Income (age 20-64)[7]	$15,373	$24,995	$28,265	$31,420	$47,078	$52,251	$84,684
% Receiving Medicaid Benefits	42.1%	27.3%	14.7%	13.1%	6.2%	2.3%	5.1%
Incarceration Rates (male only)*				All College Degrees Reported Together			
White	0.93%	0.39%	0.27%	0.08%			
African American	4.11%	2.35%	2.15%	0.75%			

Source: U.S. Census Bureau, "Current Population Survey", March 2005 and PolEcon Calculations.
*Incarceration rates from U.S. Census Bureau as reported in E. Moretti, (2005)[8]

The Impact of Educational Attainment on Earnings is Well Known

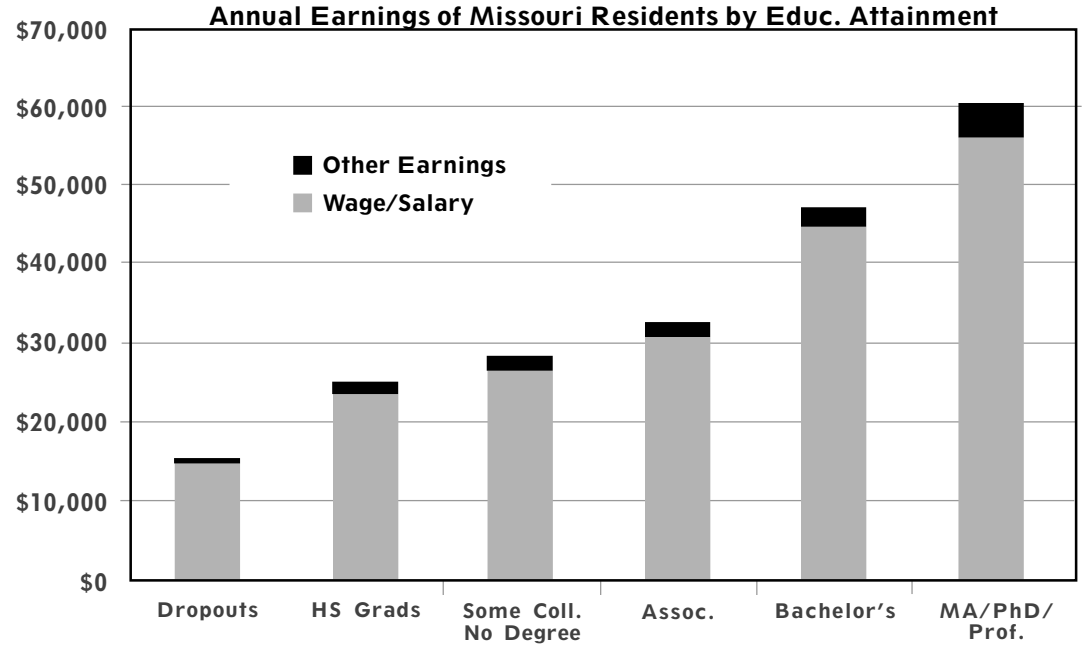
The average annual earnings of dropouts are far lower than are those who have received a high school diploma. Figure 3 shows the labor market consequences of dropping out in terms of annual earnings in 2004. The chart shows that dropouts earn on average, about $9,600 less than do high school graduates.

The wage and salary differential presented in Figure 3 is a result of both lower paying jobs as well as the lower labor force participation and employment rates of dropouts compared to graduates. As Figure 4 shows, dropouts have much higher unemployment rates than do individuals with at least a high school diploma. The unemployment rate for high school dropouts was 20.1 percent in Missouri based on March 2005 Current Population Survey Data which is the official source of US Bureau of Labor Statistics unemployment figures.

Table 2 depicts the simple relationship between education and earnings but earnings are also a function of other factors including age, experience and gender of individuals. For our estimates of the public costs of high school dropouts, we use using regression analysis that allow us to estimate the true relationship between education

FIGURE 3

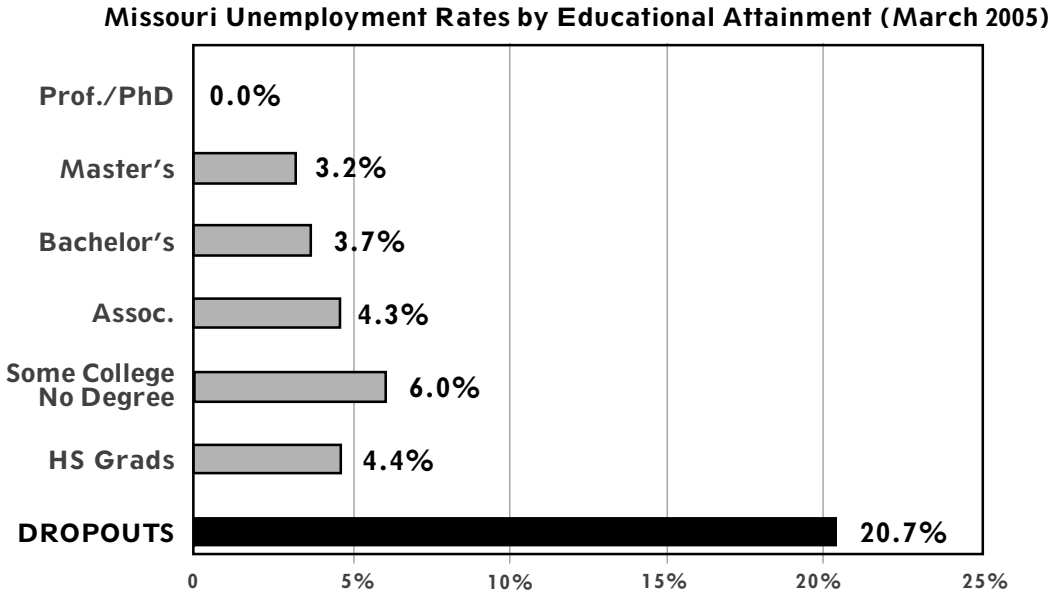
The Difference in Average Annual Earnings of Dropouts in Missouri and Those of High School Graduates is About $9,600



Source: PolEcon anaylsis of U.S. Census Bureau's "Current Population Survey" March 2005 data for Missouri

FIGURE 4

A Smaller Percentage of Dropouts are in the Labor Force and Those That are Face Much Higher Rates of Unemployment



Source: PolEcon analysis of U.S. Census Bureau's "Current Population Survey" March 2005 data for Missouri

and earnings separating out the influences of factors such as age, race and gender. We used a subset of Missouri respondents to the March 2005 Current Population Survey that included individuals age 20-64 who have completed at least the ninth grade but who had not attend a postsecondary institution, to determine the impact of a high school diploma, as well as the impact of each additional year of schooling completed has on earnings. Our results suggest that:

- Controlling for the age and sex of individuals, a high school diploma increases the total earnings of individuals in Missouri by an average of $12,249 a year compared to dropouts, but there are substantial differences in the earnings of dropouts depending on how many years of school they have completed, their gender and race.

- When the impact of age and gender are removed, each additional year of high school completed adds about $3,297 to the subsequent annual earnings of individuals in Missouri. This demonstrates that there are significant private and public benefits to having students complete as many years of high school as possible.

The higher earnings of high school graduates relative to dropouts is a substantial individual or private benefit to graduating from high school but it also produces public benefits as better educated individuals increase the productivity of the economy and their higher earnings produce higher revenues for the State of Missouri and as we highlight below, higher educational attainment results in lower use of many public assistance programs.

Dropouts in Missouri Resulted in $3.1 Billion in Lost Earnings in 2004

The difference we found in annual earnings between dropouts and high school graduates implies that if all of Missouri's working age had at least a obtained a high school diploma, then total earnings in Missouri would have been $3.1 billion higher in 2004.[9]

TABLE 2

Earnings Impact of Missouri Dropouts Age 20-64

Education Level	#20-64	Avg. Ann. Earnings	Total Earnings	No Dropouts (All Become HS Grads)
Dropouts	322,765	$15,373	$4,961,963,175	$0
HS Grads	1,184,242	$24,995	$29,599,773,517	$37,667,187,863
Some College No Degree	699,366	$28,265	$19,767,300,244	$19,767,300,244
Associate's Degree	261,805	$31,240	$8,226,017,822	$8,226,017,822
Bachelor's	606,966	$47,078	$28,574,502,562	$28,574,502,562
MA/Prof./PhD	275,006	$60,195	$16,554,068,672	$16,554,068,672
TOTALS	3,350,149	$32,143	$107,683,504,292	$110,789,077,162
			DIFFERENCE	$3,105,572,870

If even a small fraction of Missouri's 322,765 working age dropouts went beyond a high school to attend post secondary schools, then the increase in earnings would be substantially greater.

The $3.1 billion earnings impact from a more productive workforce would result in increased spending on goods and services that would produce large indirect and induced "multiplier" effects that are not estimated here but which will equal or exceed those of the direct benefits.

Dropouts Decrease State Income Tax Revenues by $158-$177 Million Annually

Along with increased earnings by Missouri residents, an increase in graduation rates will provide additional revenues for the State of Missouri.

We used the data presented above on the average earnings of Missouri dropouts and high school graduates (age 20-64) from March 2005 Current Population Survey to calculate hypothetical tax liabilities using the "TAXISM" models developed by the National Bureau of Economic Research. These models contain both federal and unique state-level models which estimate tax liabilities based on existing federal and state tax laws and marginal tax rates, including all available credits (e.g. earned income and child tax credits) and exemptions. We necessarily made simplifying assumptions in calculating tax liabilities. Most importantly we treat all taxpayers as if they are filing as single taxpayers, because we have no knowledge of spousal income (or if there is a spouse) of the population of dropout and high school dropout taxpayers.. We calculated state tax liabilities for taxpayers with from 0 dependent child exemptions to 2 dependent child exemptions. The complexities of individual tax filings cannot be captured when trying to model 322,765 tax returns[10] of working age dropouts but our results provide a reasonable estimate that is likely to be within a few percentage points of the true income tax cost associated with the earnings differential between graduates and dropouts.

The estimated Missouri State income tax liability for the six combinations of taxpayers is presented in Table 3. The table shows that the lower earnings of Missouri's working age dropouts result in state income tax revenues that are from $158 to $177 million lower than they would be if all residents had attained a least a high school diploma. These figures represent just one source of lost revenue. The increased spending that an additional $3.1 billion in earnings would generate would also produce more than $100 million in sales tax revenue as well as additional local and state revenues.

TABLE 3

Estimated Missouri State Income Tax Liability

	Adjusted Gross Income	2004 State Income Tax Liability		
		0 Child	1 Child	2 Child
HS Grads	$24,996.00	$725.80	$732.90	$713.70
Dropouts	$15,373.00	$243.50	$221.20	$166.00
Difference		$489.40	$511.70	$547.70
Difference x 322,765 Dropouts (Age 20-64)		$157,961,191	$165,158,851	$176,765,480

Dropouts are Much More Likely To Rely On "Safety Net" Programs

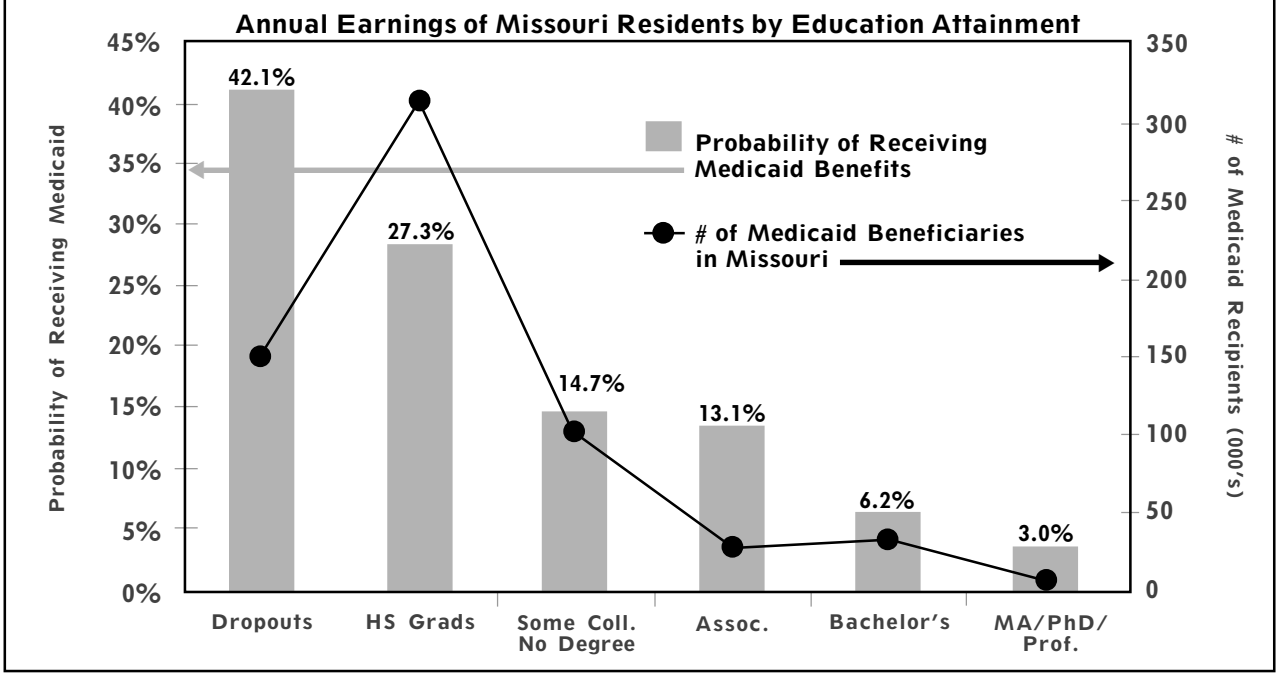
Individuals who fail to obtain at least a high school diploma are at a much greater risk of reliance on safety net programs such as Medicaid, Temporary Assistance to Needy Families (TANF), housing assistance, food stamps and other assistance programs. Although there are actually more individuals with a high school diploma and beyond who rely on these programs, the probability of being a beneficiary of one or more public assistance programs increases dramatically for individuals who do not have at least a high school diploma.

We highlight the impact of high school graduation on Medicaid to illustrate the impact on social safety net expenditures in Missouri. Medicaid is the largest and most costly safety net program in Missouri and in the country. Combined state and federal funds for Medicaid account for 32 percent of the total budget of the State of Missouri, a percentage only exceeded by Mississippi and Tennessee, and well above the 22 percent national average.[11]

Medicaid is a health insurance program for lower-income individuals that is a shared state-federal responsibility. In Missouri, there were 1,157,231 individuals eligible for Medicaid and 1,018,496 Medicaid beneficiaries in 2003.[12] The cost to service (payments for services only, not administrative and other program costs) these Missouri citizens was over $4.4 billion in 2003, of which the State of Missouri was responsible for about 38 percent, and the federal government about 62 percent.[13] Missouri spent about $1.1 billion of its general fund budget on Medicaid in 2004 year and another $957 million in other state funds (of which about $415 million were local funds).[14] Over the decade from 1991-2001, Missouri's Medicaid expenditures grew at a faster rate than any other state in the nation except Oregon, an annual rate of 16.1 percent, compared to the 50 state average of 11percent. Overall, about 19 percent of Missouri residents receive Medicaid benefits and 40 percent of all births in Missouri are financed by Medicaid.

FIGURE 5

Dropouts are About 11 Percent of Missouri's Population But They are 42.1 Percent More Likely to Receive Medicaid Benefits



Source: PolEcon anaylsis of U.S. Census Bureau's "Current Population Survey" March 2005 data for Missouri

The probability that an individual in Missouri will be a Medicaid beneficiary is strongly related to their educational attainment. As Figure 5 shows, individuals in Missouri who have at least a high school diploma are significant beneficiaries of the Medicaid program but high school dropouts are much more likely to use the program. Figure 5 shows that based on the March 2005 CPS, the probability that a high school dropout (or a dependent child) in Missouri receives Medicaid benefits is about 42 percent and the probability drops sharply to 27 percent for high school graduates, and continues to decline as educational attainment increases. In addition, like the earnings impacts of dropouts, there is a benefit to each additional year of schooling completed as regression analysis indicates that each year of high school completed reduce the probability that a dropout will be on Medicaid by about 4.8 percent.

The CPS is known to underestimate the number and percentage of public assistance recipients because of limitations on the individuals included in it samples, nevertheless it does highlight the relationship between educational attainment and public assistance costs. It will, however, produce a downwardly biased estimate in our calculations of the cost of dropouts and the impacts of educational reform on public costs and benefits.

The Additional Medicaid Costs of Dropouts Total at Least $234 Million Annually and $90 Million of State Funds

We compare the probability that a high school graduate in Missouri, or a dependent child, is on Medicaid (about 27 percent) compared to 42 percent for high school graduates and multiply the change in the number of expected Medicaid recipients by the average cost per Medicaid recipient (an estimated $4,339 in 2004) to arrive at an estimated cost of dropouts on the Medicaid program. We first multiply the estimated number of dropouts on Medicaid (from the CPS) by the average cost per Medicaid recipient. We then estimated the number of dropouts that would be on Medicaid if, instead of leaving school, they had all obtained a high school diploma. Table 4 presents estimated dropout related Medicaid costs. We estimate that if all Missouri dropouts had graduated from high school then there would be 54,034 fewer Medicaid recipients saving the Medicaid program about $234 million annually and the State of Missouri about $90 million in the State's share of those Medicaid costs. Again, because the CPS is known to underestimate the number of Medicaid recipients in the population,[15] these figures likely underestimate the actual cost of Medicaid related to dropouts in Missouri.

TABLE 4

Annual Medicaid Costs Attributable to Dropouts

	#20-67	% On or w/ Child on Medicaid	On or Child on Medicaid	Total Cost = Recipients x Avage Cost	State Share of Costs @.3853	# On Medicaid If All Graduated	Total Cost = Recipients x Avage Cost	State Share of Medicaid Costs
Dropouts	366,207	42.1%	154,173	$669,030,630	$257,777,502	0		$0
HS Grads	1,225,582	27.3%	335,136	$1,454,315,861	$560,347,901	435,276	$1,888,869,117	$727,781,271
Some Coll. No Degree	713,489	14.7%	104,752	$454,569,224	$175,145,522	104,752	$454,569,224	$175,145,522
Assoc. Degree	261,805	13.1%	34,219	$148,491,962	$57,213,953	34,219	$148,491,962	$57,213,953
Bachelors	615,115	6.2%	38,242	$165,951,912	$63,941,272	38,242	$165,951,912	$63,941,272
MA/Prof./PhD	277,495	3.0%	6,475	$28,099,633	$10,826,789	6,475	$28,099,633	$10,826,789
TOTAL	3,459,693	19.4%	672,998	$2,920,459,223	$1,125,252,939	618,965	$2,685,981,849	$1,034,908,806
		Difference (Annual Medicaid Cost of Dropouts)				54,034	$234,477,374	$90,344,132

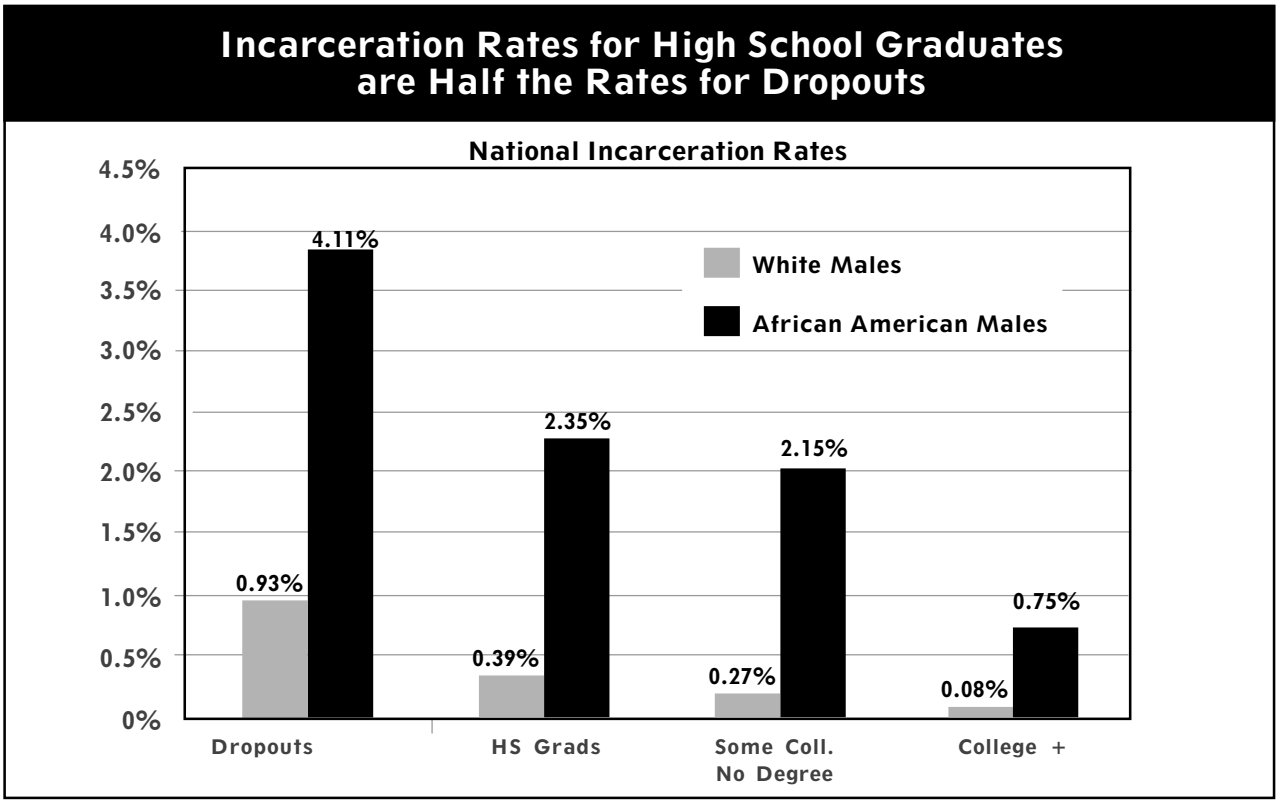
Incarceration Costs

Missouri spent over $500 million for its prison system in 2004.[16] The daily cost to house each prisoner (not including administrative cost of the prison system) averages about $40 or about $14,600 per year for each prisoner.[17]

Although the chances that any individual will be incarcerated in Missouri is small, the probability is twice as high for a high school graduate as it is for a high school dropout. Our estimates of the incarceration costs associated with school dropouts rely on differences in the probability that individuals with different levels of educational attainment will be incarcerated sometime during their lifetime. Because males account for the vast majority of incarceration costs, we calculate the impact of dropouts on incarceration costs using only male high school dropouts in Missouri. Figure 6 shows the probability of both white and African American male dropouts of being incarcerated at some point during their lifetime (although the highest incarceration rates are for young males in their 20's.)

In calculating the impact on earnings and Medicaid we were able to use individual responses by Missouri residents to monthly Census Bureau surveys in order to directly determine the earnings and use of public assistance of individuals with and without a high school diploma. For incarceration costs we have no direct individual measures of educational attainment, criminal activity, and incarceration in Missouri. Instead, we rely on the research of others for our estimates of the impact that graduating from high school has on incarceration rates. We use those estimates to determine the number of Missouri's dropouts each year that are likely to be incarcer-

FIGURE 6



Source: U.S. Census Bureau as reported in Moretti, E., "Does Education Reduce Incarceration Rates"

ated during the course of their lifetime. After we determine the number of each year's dropouts likely to be incarcerated, we use data on the type of crimes and the average length of sentences from the Missouri Department of Prisons to calculate a "weighted average sentence" which is applied to each projected incarceration. The weighted average sentence for each incarceration is converted to days and multiplied by the daily cost of incarceration to arrive at an average cost per incarceration and multiplied by the number of incarcerations to determine the incarceration costs for that year's dropouts. In addition, we multiply the costs by .45 to account for recidivism or the tendency of prisoners to be multiple offenders and to be imprisoned more than one time during their lives. We assume two incarcerations for 45 percent of the calculated number of prisoners (this recidivism rate is lower than most studies suggest). Adding the total cost of the first incarcerations to the cost of the recidivism, gives us a total cost of incarceration for one year's worth of dropouts. Although we allocate those cost to one year's worth of dropouts, the actual costs are incurred over a number of years or the length of sentences. Also note that it is possible that incarceration costs could occur in county or other jails, and possible even other states, but those factors do not alter the basic conclusions about the incarceration costs associated with dropouts.

Table 5 presents our estimates of the impact that dropouts have on annual incarceration costs. The table first calculates the expected number of incarcerations based on the annual number of dropouts in Kansas City and St. Louis, and the entire State of Missouri. We then calculate the expected number of incarcerations that would occur if all high school students graduated each year. The incarceration cost of dropouts is the difference between the number of incarcerations and associated costs if there were no dropouts in a year in Missouri, compared to the expected number of incarcerations associated with the actual number of dropouts. The table shows that the cost of ones year of dropouts (over the lifetime of the dropouts) is estimated at almost $30 million for the State of Missouri. Over the five year period examined, the cumulative cost is estimated to be about $140 million. The table also divides the cost of one year of dropouts by the total number of dropouts to arrive at an average incarceration cost per dropout.

For Kansas City and St. Louis, this cost per dropout (or potential benefits if reducing dropouts) is over $2,600 compared to $1,580 for Missouri as a whole. This difference reflects the fact that a majority of Kansas City and St. Louis dropouts are African American and have a higher probability of incarceration, thus costs of each dropout is much greater and the potential public benefits of reducing dropouts in those cities is greater than for the State as a whole. Our cost calculations do not include any costs for policing or prosecuting those who are incarcerated, or any administrative or capital costs of the prison system.

TABLE 5

Annual Incarceration Costs Attributable to Dropouts

	Kansas City and St. Louis					State of Missouri				
	2001	2002	2003	2004	2005	2001	2002	2003	2004	2005
Total Graduates	2,713	2,832	2,986	3,140	3,037	54,181	54,513	56,906	57,988	57,495
Dropouts	3,250	3,212	3,462	3,569	3,344	17,572	17,465	17,800	17,905	17,711
Graduation Rate	45.0%	45.0%	45.0%	45.0%	45.0%	73.6%	73.6%	73.6%	73.6%	73.6%
Cohort Black Dropouts	2,494	2,456	2,655	2,740	2,568	4,393	4,366	4,450	4,476	4,428
African-American Male Dropouts	1,421	1,400	1,513	1,562	1,464	2,504	2,489	2,536	2,551	2,524
Cohort White Dropouts	385	371	315	278	261	9,039	8,500	7,606	7,020	6,791
White Male Dropouts	219	211	180	158	149	5,152	4,845	4,335	4,001	3,871
Probable Incarcerations										
African-American	58	58	62	64	60	103	102	104	105	104
White	4	4	4	5	4	72	72	73	73	73
Probable Incarcerations w/out dropouts										
African-American	25	25	27	27	26	44	44	45	45	44
White	1	1	1	1	1	13	13	13	13	13
Reductions in Incarcerations										
African-American	33	33	36	37	34	59	58	60	60	59
White	3	3	4	4	3	59	59	60	60	60
Total Reductions	36	36	40	41	37	118	117	120	120	119
One Year Incarceration Costs ($millions)	$0.53	$0.53	$0.58	$0.60	$0.54	$1.73	$1.72	$1.75	$1.76	$1.74
Total Cost for Initial Incarceration ($millions)	$5.83	$5.83	$6.48	$6.64	$5.99	$19.14	$19.03	$19.39	$19.51	$19.30
Recidivism Cost @.45 Initial Incarceration	$2.62	$2.62	$2.92	$2.99	$2.70	$8.62	$8.56	$8.73	$8.78	$8.68
Total Cost of Dropouts ($millions)	$8.46	$8.46	$9.39	$9.63	$8.69	$27.76	$27.59	$28.12	$28.29	$27.98
Cumulative Incarceration Costs Attributable to Dropouts	$8.46	$16.91	$26.31	$35.94	$44.63	$27.76	$55.35	$83.47	$111.80	$139.70
Public Cost/Benefit Per Dropout	$2,602	$2,633	$2,714	$2,698	$2,599	$1,580	$1,580	$1,580	$1,580	$1,580

Missouri, Spends More Each Year on Dropouts After They Leave School, Than it Does (In State Aid) When They Are Enrolled In School

As we demonstrate, not every dropout results in state expenditures on Medicaid and incarcerations. Some dropouts cost the state tens of thousand of dollars annually while others may only cost the state some limited reductions in state income tax revenue. Still others may cost nothing. To account for these differences we spread the entire cost of one year of dropouts across the entire population of new dropouts in that year to arrive at an average cost per dropout.

The total cost of additional dropouts each year, averaged over the annual population of new dropouts suggests that, on average, the State of Missouri will continue to pay more for each dropout after they leave school than it does while they attended school. More importantly, the state will continue to incur the cost of each dropout for decades. The annual costs in Medicaid, incarcerations, and tax revenue associated with just one year's class of dropouts (an estimated 17,711 in 2005), is at least $71 million. The annual costs in terms of lost income tax revenue, higher Medicaid and incarceration costs averages about $4,000 per dropout. Average state aid is just under $3,000 per pupil (but higher in KC and St. Louis). Because reduced earnings patterns follow graduates their entire lives and incarceration costs and Medicaid usage are all multi year costs, it is likely that the State of Missouri continues to spend at least as much on dropouts after they have left school as it did in state aid and other expenditures when they were in school. The State of Missouri, or more accurately its citizens, continues to pay for its educational system's failures well into the future. Over their lifetime of an additional 50 years, the costs of one year's dropouts, even on a discounted basis, is likely to be many hundreds of millions of dollars.

TABLE 6

Annual Per Dropout Public or Social Costs* Associated with Three Public Activities

State Income Tax Revenue	$512	
Incarceration Costs	$1,580	White
	$2,649	African-American
Medicaid Costs	$1,672	
Average Annual Public Cost Per Dropout	$3,764	White
	$4,833	African-American

*Costs here are the difference between costs associated with dropouts, and the costs if dropouts had graduated from high school.

The Impact of Competition on Public School Graduation Rates

Advocates of competition in education generally believe that not only will children who participate in school choice programs benefit, but that overall productivity of public schools would increase as well. Nevertheless, most research on school choice initiatives focuses on the individual effects on students participating in school choice programs. A more complete characterization of the effects of school choice, however, would include both the general or system wide impacts as well as the individual effects of competition. As we have highlighted, the public or social costs associated with high school dropouts in Missouri are large. If competition from private schools is associated with higher public high school graduation rates, then increasing competition via school choice programs will not only produce benefits to public and private school children, it will be an effective way to increase the productivity of public schools and confer large social benefits by reducing high school dropouts

Sophisticated Methods Are Required to Determine the Impacts of Competition

Assessing the impact of competition from private schools on nearby public school graduation rates requires sophisticated statistical methods and few studies have employed methods rigorous enough to estimate the true relationship, free of any confounding influences. The main difficulty with assessing the relationship is that private schools typically do not appear randomly, but rather, the demand for private schools arises in response to public school conduct and quality. In mathematical terminology, the number of private school students and public school quality are simultaneously determined. Studies that look at the simple relationship between the percentage of private school students in an area and school quality could thus draw the inaccurate conclusion that a high percentage of private school students in a district results in lower public school productivity.

Some studies have employed appropriate methods and they indicate a growing body of evidence that competition from private schools improves achievement in neighboring public schools. Hoxby (2003)[18] provides a review of the evidence but perhaps the best designed study is one conducted by Dees (1998).[19] Dees study uses data from all US counties from the National Center for Education Statistics "Common Core of Data" (CCD)[20] in his study and finds that most studies of the relationship between competition and public school graduation rates use inappropriate statistical techniques and the effect is to "dramatically underestimate the effect of competition from private schools on the rate of high school completion in public schools."

Dees' results indicate that a one standard deviation increase in the percentage of students enrolled in private schools (equal to about 7.6 percent in our Missouri data) is associated with a 1.7 percent decline in the dropout rate overall, but a 3.4 percent decline in districts where at least 20 percent of students where non-white. We used ordinary least squares (OLS) regression models similar to Dees to estimate the relationship between the percentage of private school students in a district and high school graduation rates in public schools, controlling for income, racial, family variables, school spending per pupil, and school quality as measured by achievement test scores. Dees employed OLS models for comparison purposes but used two stage least squares (2SLS) models to control for the simultaneous determination between private school enrollments and public high school graduation rates. Data limitations do not allow us to use 2SLS models in this study but our OLS estimates (which as Dee's notes dramatically underestimate the relationship between private school enrollments and public school graduation rates) nevertheless suggest an even stronger relationship between competition and public school graduation rates.[21] Our results using OLS estimators suggest that the relationship between private school enrollments and public school graduations rates is approximately twice as large overall in Missouri as in Dees' data, and for larger school districts in communities with at least 15,000 residents, the relationship between private school enrollment and graduation rates is 2.5 to 3 times as large.

For the analysis of public benefits of competition from private schools we will use a range of effects of private school enrollment of from 3.4 to 6.8 percent for every one standard deviation increase in private school enrollments. Although an increase in graduation rates of between 3.4 and 6.8 percent may not seem large, as we have demonstrated, the costs of dropouts are so significant that the social benefits of even a modest increase in competition will be large.

The Public Benefits of Increasing Competition in Education

In this section we analyze the impact of an educational reform that would exogenously increase enrollments in private schools by the establishing a school choice program that provides tuition subsidies for Missouri children to attend the private school of their choice.

There are large differences in the percentage of students enrolled in private schools across Missouri's more than 500 school districts, with a range of 0 to 41 percent.[22] The Missouri Department of Elementary and Secondary Education estimates that there are about 95,000 students enrolled in approved private schools. Estimates from the National Center for Education Statistics and the US Census Bureau suggest the number is at least 25 percent higher, or at least 124,000. Overall, the percentage of children in private schools grades k-12 is between 10 and 13 percent. The mean percentage of students enrolled in private schools across Missouri's school districts is 7.9 percent and similar to Dees' data for all U.S. counties, the standard deviation is large at 7.6 percent.

Based on these figures and Dees' and our results we calculate that a one standard deviation (7.6 percent) increase in the percentage of Missouri children enrolled in private schools would mean:[23]

- About 67,000 additional students enrolled in private schools.
- About 5,500 additional private school students in Kansas City and St. Louis.
- A reduction in annual dropouts among students remaining in the public schools (not a reduction in the dropouts among school choice students in Missouri) of between 2,311 and 4,621 students.
- A reduction in annual dropouts (again among the students remaining in the public schools) in Kansas City and St. Louis of between 171 and 345 students. A larger program that increases private school enrollments by 11,000 students in Kansas City and St. Louis would reduce annual dropout rates by 14 percent.
- Annual public or social benefits from increased tax revenues and reduced Medicaid and incarceration costs of between $8.5 and $17.3 million for every 2,300-4,600 reduction in Missouri dropouts but because dropouts use other social services in higher rates than graduates the social benefits are likely to be 50 to 100 percent higher than those documented here.
- Earnings differentials between dropouts and graduates (and thus tax payments), public assistance use, and incarceration rates are lifelong patterns. Reducing one year's dropouts produces public benefits each year for, on average, at least another 50 years. The annual public or social benefits associated with a lifetime of another 50 years, discounted at 3.5 percent each year, results in a present value of benefits of between $218 and $443 million from increasing school competition by just 7.6 percent in Missouri. These figures imply that the discounted lifetime public benefit of reducing each dropout in Missouri's public schools is about $94,607.

- At an average cost of $3,800 per student enrolled in a school choice program, a program in Missouri that increases competition from private schools by 7.6 percent would cost about $257 million but would reduce state education aid payments by about $203 million dollars (more if a high percentage of choice students came from districts like Kansas City and St. Louis that receive more state aid per pupil). Subtracting annual benefits in just three areas analyzed in this report indicates that at a cost of between $36 and $45 or between $41 and $51 per pupil in Missouri's public schools, to substantially increase graduation rates. This amount equals between 1.6 percent and 1.9 percent of the amount of state per pupil aid in 2005. If the local school district costs of educating each child are reduced to reflect the movement of students to private schools, then a school choice program that increases the percentage students in Missouri attending private schools by 7.6 percent would save a combined $264 million at the same time it produced large public benefits by reducing the dropout rate.

The social gains outlined here in Table 7 presents our calculations of the social or non-private gains that will result from even a modest school choice program in Missouri. Changing the size of a program that introduces more competition into Missouri's education system will change the magnitude of these impacts but not the basic conclusion that the potential public benefit, in just four areas of public interest (state income, Medicaid, incarceration costs, and state tax revenue) of reducing each dropout in Missouri is approximately $4,000 annually and $95,000 over the life of each dropout prevented.

TABLE 7

The Public or Social Costs of a School Choice Program in Missouri

Cohort of Potential Graduates		67,562
Current Annual Dropouts		17,711
Size of Choice Program		67,592
Cost @ $3,800 Per Student		$256,850,922
(-) Saving in Public Educaiton Costs		
State @ $3,000 Per Student		$202,777,044
Local @ $4,700 Per Student		$317,684,036
Total Savings		$520,461,080
(=) Net Cost (Savings) of Choice Program		**($263,610,157)**
Impact on Dropout Rate=		
Increase in % of Missouri Students in Private Schools		7.6%
x		
Reduction in Dropouts: Low Elasticity		-2,311
High Elasticity		-4,621
Annual Public Benefit for Dropout Reduction		
(see Table 6 for Details)	Low	$9,319,772
@25% Black and 75% White	High	$18,639,544
Lifetime Public Benefit of Dropout Reduction	Low	$465,988,593
(Benefit for One Year of Reduced Dropouts)	High	$931,977,185
Lifetime Benefits Discounted at 3.5% for 50 years	Low	$218,601,007
	High	$437,202,014
Average Discounted Lifetime Public Benefit	Low	$94,607
of Reducing Each Dropout	High	$94,607

The lifetime public benefit of reducing each dropout suggests that if a school choice program provides choice for an additional 67,562 students in Missouri, that the lifetime public benefits associated with each individual benefit (choice scholarships) is between $3,234 and $6,468 dollars on a discounted basis, or between $6,894 and $13,788 on an undiscounted basis.

Combined, the savings in state and local educational expenditures that will result from educating each school choice student at the lower cost of private schools, along with the public benefits that will accrue as a result of competition's impact on public school graduation rates are a powerful and financially compelling rationale for introducing school choice reforms in Missouri.

Conclusions

Our report highlights some of the public costs of the failure of individuals to graduate from high school in Missouri. Our analysis of costs and benefits associated with dropouts is by no means complete. Rather, it highlights several areas where the impact of educational attainment on public costs is likely to be most significant. Most importantly, this report is an effort to introduce some objective methods to document the public implications of education policies that are often debated on the basis of their impact on individuals. These "private" costs and benefits are critical to understand, but the public costs and benefits will likely engage more of the public in the important debates over educational policy.

Our report demonstrates the large public costs associated with each student who fails to graduate from high school in Missouri. While our results have been intuitively understood for some time, the estimates in this report are important for assessing the cost effectiveness of policies that look to improve the performance of Missouri's public school. We conclude that the evidence suggests that introducing more competition in K-12 education in Missouri will significantly improve public high school graduation rates and that, even without considering any public benefits associated with high graduation rates, the impact of competition provides a compelling and cost effective method for improving the productivity of public schools.

Most importantly, we believe that our results indicate that school choice programs, rather than benefiting individuals at the expense of the public, provide large public benefits that likely equal or exceed the benefits to students in a choice program.

Endnotes

[1] Bishop, J., "Achievement , Test Scores, and Relative Wages", In *Workers and Their Wages* , AEI Press, Washington, DC, 1991.

[2] US Census Bureau, "Current Populations Survey" (CPS), March 2005 Supplement. The CPS is known to understate dropout numbers because it does not sample populations in institutions and because it does not distinguish between those who obtain a GED and those who graduate from high school with a diploma. Because research suggests that the labor market outcomes of a GED student are more similar to those of a dropout than a high school graduate, the distinction is important and the result here is to contribute to an underestimate of the public costs of Missouri's high school dropouts.

[3] Education Policy Center of The Urban Institute, "Who Graduates Who Doesn't: A Statistical Portrait of Public High School Graduation, Class of 2001", 2003.

[4] US Department of Education, National Center for Education Statistics, "The Averaged Freshman Graduation Rate for Public High Schools From the Common Core of Data, School Years 2001-2002 and 2002-2003. October, 2005

[5] The Education Trust, "Getting Honest About Grad Rates: How States Play the Numbers and Students Lose". June, 2005

[6] Missouri Department of Elementary and Secondary Education, available at: http://www.dese.mo.gov/schooldata/ftp/graduate_followup.xls

[7] For the earnings calculations here we limited the age range to 20-64 because labor force participation drops significantly after this age, as do wage and salary earnings, while Social Security Income increase among all categories of educational attainment.

[8] Moretti, E., "Does Education Reduce Participation in Criminal Activities?", University of California at Berkeley, Working Paper, 2005.

[9] This is appropriate for illustration and to approximate the earnings impacts but it is an oversimplification that does not consider the equilibrium effects that would occur in Missouri's labor market.

[10] Because there are a number of additional tax deductions, exemptions or credits that can apply to taxpayers age 65 and older, we limit our tax analysis to residents under the age of 65.

[11] National Association of State Budget Officers, "State Budgets, 2004" , Kaiser Family Foundation "State Health Facts On-Line"

[12] Centers for Medicare and Medicaid Services, US Department of Health and Humans Services, MSIS state summary data.

[13] Medicaid is a matching rate program and in 2003, Missouri's match rate was 38.53 percent for most but not all Medicaid services.

[14] National Association of State Budget Officers (NASBO), "State Budgets, 2004" Medicaid expenditures do not strictly follow general fund and other fund distinctions in Missouri and these figures represent NASBO estimates.

[15] Callahan, C. et. al. "A Longitudinal Model of Health Insurance, An Update: Employer Sponsored Insurance, Medicaid, and the Uninsured", *U.S. Department of Health and Human Services,* Working Paper, 2005.

[16] National Association of State Budget Officers, "*State Spending 2004*".

[17] Missouri Department of Corrections, "*Annual Report, 2003*"

[18] Hoxby, C., "School Choice and School Competition: Evidence from the United States", (2003), Swedish Economic Policy Review, 10.

[19] Dees, T., "Competition and Quality of Public Schools", (1998), Economics of Education Review, 17, 419-427

[20] The "CCD" is a "comprehensive, annual, national statistical database of all public elementary and secondary school districts which contains data that are comparable across states."

[21] We use official graduation rates published by the Missouri Department of Elementary and Secondary Education, even though they likely understate the dropout rate. To the extent that state date understates the dropouts across all school districts similarly, the statistical relationship between private school enrollments and graduation rates is not effected.

[22] US Census Bureau 2000 Census, Public Use Microdata Files

[23] We use a one-standard deviation increase in the percentage of children enrolled private schools for illustrative purpose only. A larger or smaller program that produces an exogenous change of a different magnitude would have impacts scaled accordingly.

THE MILTON AND ROSE D. FRIEDMAN FOUNDATION

WELCOMES YOUR SUPPORT

As a nonprofit 501(c)(3) organization, we rely solely on the generous support of our donors to continue promoting the Friedmans' vision for school choice throughout the country. Please send your tax-deductible gift today and help interject liberty and choice into our education system. Giving parents the freedom to choose the school that works best for their children is our goal, and with your help we can make it happen.

MILTON & ROSE D. FRIEDMAN
FOUNDATION

Educational
Choice

One American Square, Suite 2420 • Indianapolis, IN 46282
Phone: 317-681-0745 • Fax: 317-681-0945 www.FriedmanFoundation.org