College Scholarships As A Tool for Community Development?  
Evidence From The Kalamazoo Promise

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Abstract
On November 10 2005 the Kalamazoo Public School District announced that a group of anonymous donors had given the district an unusual gift: starting with the graduating class of 2006, graduates of the district will receive scholarships worth up to four years of college tuition and mandatory fees at any public community college, college or university in Michigan. These scholarships are called The Kalamazoo Promise. This paper addresses how the Promise transformed the school district and the surrounding community. Using data from the state of Michigan’s Center for Educational Performance and Information and the Michigan Educational Assessment Program, I use a difference-in-differences methodology to study the how the Promise affected the number of students enrolled in the Kalamazoo Public School District, the demographics of enrolled students (as measured by race and free lunch eligibility), the academic achievement of enrolled students (as measure by test scores and special education eligibility) and the levels of school violence. The Promise increased enrollment in the Kalamazoo Public School district by roughly 1,000 students. The timing and pattern of the increase in enrollment provide strong evidence that this increase was driven by the announcement of the Promise. The Promise did not significantly change the demographic mix or test scores of the students in the KPS. However, the rate of enrollment in special education programs has fallen. In the years since the Promise began, the Kalamazoo Public Schools have seen decreasing student violence. These findings are consistent with the possibility that existing students have increased their investments in education in light of the reduced cost of college attendance and the possibility that new entrants to the Kalamazoo Public Schools who were drawn by the Promise differed from students in the district at the time of the announcement of the Promise. An extensive literature documents the relationship between home prices and school quality. I explore the impact of the Promise on home prices in the Kalamazoo Public School District using nine years of data on all home sales in the county in which the school district is located. While the Kalamazoo Promise significantly changed several aspects of the Kalamazoo Public School District, I find no evidence that the Promise increased real estate values.

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1 Introduction

Recently many politicians have focused on school improvement as a vehicle for community improvement. Richard Daley, former mayor of Chicago, claimed “[t]he key to success in the city of Chicago is improving the schools” and according to New York City’s Mayor Michael Bloomberg, “[we must] make sure that our students have the first-class learning facilities they need to reach their full potential. We are building for our future - the future of our children and ultimately, the future of New York City.” It is possible that directing political will to school improvement is merely good politics - politicians should be seen kissing babies and giving pencils to their older siblings. But school improvement may be genuinely good policy. If strong school systems draw families interested in educational opportunities and businesses interested in a skilled workforce into a community, public schools can serve as a community development tool.

In this paper I study the impact of The Kalamazoo Promise, a scholarship program for graduates of the Kalamazoo Public School District. On November 10 2005 the Kalamazoo Public School District (KPS) announced that a group of anonymous donors had given the district an unusual gift: starting with the class of 2006, graduates of KPS will receive scholarships worth up to four years of college tuition and mandatory fees at any public community college, college or university in Michigan. These scholarships are called The Kalamazoo Promise[1].

It is generally very difficult to disentangle causal relationship between school and community characteristics. Expenditures on local public goods are jointly determined with community membership (Tiebout 1956). Because the Promise was announced unexpectedly, it is a useful case study to examine many questions of interest in the economics of education. Will students already enrolled in KPS when the Promise was announced attend college at higher rates because of the scholarship? Will they change their study habits in elementary and secondary schools in light of the reduced cost of college? Will new students enroll in the district? How will new students differ from the students enrolled before the announcement of the Promise? Can desirable schools increase home prices?

In this paper I analyze how the Promise changed the Kalamazoo Public School District. I

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estimate the value of the Promise to parents considering enrolling children in the district and show that the Promise is more valuable to wealthier parents whose children are more likely to attend four year college where the scholarship is most valuable. Using data from the state of Michigan’s Center for Educational Performance and Information and the Michigan Educational Assessment Program, I study the how the Promise affected the number of students enrolled in the Kalamazoo Public School District, the demographics of enrolled students (as measured by race and free lunch eligibility), the academic achievement of enrolled students (as measure by test scores and special education eligibility) and the levels of school violence. I find that the Promise increased enrollment in the Kalamazoo Public School district by roughly 1,000 students.\textsuperscript{2} The timing and pattern of the increase in enrollment provide strong evidence that this increase was driven by the announcement of the Promise. The Promise did not significantly change the demographic mix or test scores of the students in the KPS. However, the rate of enrollment in special education programs has fallen. While it is difficult to estimate the effect of the Promise on student behavior, in the years since the Promise began, the Kalamazoo Public Schools have seen decreasing student violence. These findings are consistent with the possibility that existing students have increased their investments in education in light of the reduced cost of college attendance and the possibility that new entrants to the Kalamazoo Public Schools who were drawn by the Promise differed from students in the district at the time of the announcement of the Promise. Finally, using data on all home sales in the county in which the school district is located, I study how the Promise affected home prices and find no evidence that the Promise increased real estate values in the KPS.

Financial aid and scholarship programs have significant effects on college choice and attendance. (Dynarski 2000) summarizes the literature and concludes that with some exceptions, studies generally find that “a $1,000 drop in schooling costs increases college attendance by 3 to 4 percentage points”. (Andrews, DesJardins and Ranchhod 2010) find that the Promise affected college choice for the cohort of students who were seniors at the time of the announcement, espe-

\textsuperscript{2}In a series of working papers from Western Michigan University’s Department of Education, Anne Cullen, Stephanie Evergreen, Katya Gallegos, Jeffrey N. Jones, Allison J. Kelaher Young, Gary Miron, Jessaca Spybrook and Elana Tornquist report results from focus groups and surveys of community organizations, high school students, parents and school staff. Most students and staff believe that the Promise has improved student attitudes towards school. Of particular relevance to this study is (Miron and Cullen 2008), released after my initial draft, which includes analysis similar to my own of the overall enrollment changes caused by the Promise and changes in district demographics. As far as I know, I am the first to analyze look at enrollment changes by grade, MEAP test results and school safety numbers.
cially for students from families with less than $50,000 in annual income. But less is known about how scholarship programs such as the Promise affect communities (and K-12 education systems in particular) because the Kalamazoo Promise is unusual in offering an almost universal scholarship to graduates in a particular geographic location. ([Miller-Adams 2009][1] argues that the only true forerunner to the Promise in this respect is a scholarship program that has been running since 1959 in Philomath, Oregon for graduates of a single high school.) For this reason, the Promise should be compared not just to other scholarship programs, but also to other initiatives designed to make public schools, particularly high poverty schools, more desirable to parents. One possible historical comparison is magnet programs. In 1972, the federal government began supporting magnet programs as a means of reducing segregation (Christenson, Eaton, Garet, Miller, Hikawa and DuBois 2003). Some magnet programs were successful at changing where parents enrolled their children, but even highly touted programs perpetuated high levels of segregation at the classroom level (Eaton and Crutcher 1996) and (West 1994). In this context, the Kalamazoo Promise is remarkable because it not only changed the educational decisions of a large number of families, but lead to enrollment increases even in the higher poverty and lower achieving schools in the District. The increase in student enrollment is especially dramatic because evidence suggests that a significant number of new students left private schools and significantly wealthier and higher performing public school districts to become eligible for the Promise.

2 Kalamazoo Schools and The Kalamazoo Promise

Kalamazoo County is located in southwestern Michigan, between Detroit and Chicago. The Kalamazoo Public School District (KPS) is one of many districts serving the County. Figure [1] shows the size and location of the county and its school districts[4]. In the Fall of 2005, KPS enrolled

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3([Miller-Adams 2009][1]) describes the history of Kalamazoo, the state of the community at the time of the announcement of the Promise, how organizations and community leaders have responded to the Promise and forecasts the effect of the Promise on employment and income growth in the region. Using different data and methods, reaches conclusions similar to my own about the effect of the Promise on enrollment in KPS and home prices in the region.

4Throughout what follows, “other public schools in Kalamazoo County” refers to the schools run by the other Local Education Agencies that serve the county (Climax-Scotts Community Schools, Comstock Public Schools, Galesburg-Augusta Community Schools, Gull Lake Community Schools, Parchment School District, Portage Public Schools, Schoolcraft Community Schools, and Vicksburg Community Schools), the Kalamazoo Regional Educational Service Agency, an Intermediate School District which runs alternative schools and provides support services (more details available online at http://kresa.schoolwires.com), and the county’s Public School Academies (currently Kalamazoo Advantage Academy, Oakland Academy, and Paramount Charter Academy). School district boundaries are not coincident with county lines. The following Local Education
about 10,000 students. These students were significantly poorer than students attending other public schools in Kalamazoo County. 61.1% of KPS students qualified for free or reduced price meals, compared with 25.8% of students at other school districts in the county. KPS students were also more likely to be non-white (59.7% vs. 12.9%) and enrolled in special education (14.3% vs. 11.8%) than the students at other school districts in the county but less likely to have met state standards in either math or reading. Before the announcement of the Promise, KPS students differed demographically from students attending other districts in Kalamazoo County.

The Kalamazoo Promise is available only to students living in and enrolled in the Kalamazoo Public School District. The generosity of the scholarship is determined by the length of time the student attends school in the district before graduating and is not dependent on the student’s high school academic record or family income. The first two columns of Table (1) show the scholarship generosity as a function of the grade at which the student enters the district. For example, graduates who attend KPS starting in kindergarten receive 100% of college tuition and fees while those who only attend ninth through twelfth grade receive sixty-five percent. Students must be enrolled continuously - a student who attends elementary and high school in KPS but a private middle school will only receive a 65% scholarship, reflecting her continuous enrollment since the start of high school.

Since the Promise’s terms are given as a fraction of tuition and fees, the value of the Promise depends on the college the recipient chooses to attend and the cost of tuition and fees at that college at the time the recipient is a student. Michigan has many public post-secondary institutions and students do not need to travel far from home to use the Promise since Western Michigan University and Kalamazoo Valley Community College are both located in Kalamazoo County.

I compute a rough estimate of the present discounted value of the Promise to a family considering whether or not to enroll at child in the Kalamazoo Public School District in the fall following the announcement of the Promise. During the 2005-2006 school year, published in-state tuition and

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5 According to the American Community Survey 3-Year estimates for 2005-2007, the county was 84.0% white, relative to 79.6% of Michigan as a whole. As the difference across school districts in the fraction of non-white students suggests, the county is quite segregated, with most non-whites living in the center of the county. Figure (2) shows the fraction of residents in each Census block in Kalamazoo County listed as white in the 2000 Census.
fees at public colleges in Michigan ranged from $1,456 (at the least expensive two year college) to $9,213 (at the most expensive four year college). Baum and Ma (2007) find that over the past ten years, after adjusting for inflation, tuition and fees at public two year colleges rose an average of 1.5% per year while tuition and fees at public four year colleges rose an average of 4.4% per year. Using the base rates from 2005-2006 and Baum and Ma’s average increases, I estimate the present discounted value of the scholarship in 2006-2007 for new students, assuming that students advance one grade each year and attend college immediately following high school.

The remaining columns of Table (1) show the results. For families considering whether or not to enroll a child in KPS starting in the 2006-2007 school year, columns (3) and (5) are estimates of the present discounted value of the Promise if it is used for four years of tuition and fees at an expensive Michigan public school while columns (2) and (4) are estimates of the present discounted value of the Promise if it is used for two years of tuition and fees at an inexpensive Michigan public school. Estimates in columns (3) and (4) are based on a 0% real discount rate and estimates in columns (5) and (6) are based on a 5% real discount rate.

While the scholarships can only be used to attend a public post-secondary institution in the state of Michigan, they are otherwise remarkably unrestricted. The Promise can be used for both academic and vocation programs. The Promise is available to students for 10 years after graduation from KPS (and possibly longer for students who serve in the military). Promise recipients are required to be full time students in good standing and must maintain a 2.0 grade point average at their post-secondary institution of choice. However, if a student’s GPA drops below 2.0, the Promise may be reinstated if she is able to bring her GPA back to a 2.0. Unlike Pell Grants, the Promise is available to students from any economic background. Unlike Georgia’s HOPE scholarship, there are no academic requirements (other than high school graduation) for scholarship take-up.

Table (1) shows that the expected value of the Promise varies greatly depending on expectations about the child’s college plans and on the family’s discount rate. Consider a family deciding whether to enroll a child in kindergarten in KPS: If she is expected to attend a two year public

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6 Data from the National Center for Education Statistics’ Integrated Post-Secondary Education Data System, available online at http://nces.ed.gov/ipeds/.
college and the real discount rate of the family is 5%, the present value of the Promise is about $2,000. But if she is expected to attend an expensive four year public college and real discount rate of the family is 0%, the present value of the Promise is about $70,000. The Promise has no direct value to families who are quite sure that the child will not attend college or that the child will attend a private college. (The Promise may have other less direct costs or benefits to these families, for example those generated by changes in property values, as discussed in Section 4.)

College enrollment rates differ by family income and wealth (see, for example, (Conley 2001) and Ellwood and Kane (2000)). There is no consensus about why enrollment rates differ. Differences in quality of primary and secondary education, returns to higher education, discount rates and credit constraints are among the possible explanations that have been explored recently. See, for example, Cameron and Taber (2004), Card (1995), Carneiro and Heckman (2002). However, it is unlikely that differences in college attendance rates by family background are driven solely by the costs of tuition and fees, so the Promise is more valuable in dollar terms for wealthier families with children who are more likely to attend college.

According to the Education Longitudinal Study of 2002, about 33% of young adults from families earning less than $35,000 per year attended a two year college and 18% attended a four year public college, while 20% of young adults from families earning more than $100,000 attended a two year college and 45% attended a four year public college. To obtain a very rough estimate of the difference in the value of the Promise to low and high income families, note that the expected present value of the Promise can be written as

$$E[PV] = \text{Value (2 year)} \cdot P[2 \text{ year}] + \text{Value (4 year public)} \cdot P[4 \text{ year public}]$$  \hspace{1cm} (1)

These probabilities are not the true probabilities relevant calculating the value of the Promise if Michigan attendance patterns are atypical or, more importantly, if the Promise changes college choices, but they provide a starting point for estimation. Using these probabilities and the value

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7College choice here is the first post-secondary institution attended by the student. Income is 2001 income from all sources; the cut-offs correspond to roughly the 33rd percentile and 87th percentile of the income distribution in the ELS:2002. While the attendance figures for two-year colleges include private two-year college not covered by the Promise, less than 2% of students attend private two year colleges. The income gap in college attendance is even larger when private four colleges are included; an additional 8% of students from families earning less that $35,000 attend private four year colleges, while an additional 27% of students from families earning more that $100,000 attend private four year colleges. The author thanks Matthew Chingos for these calculations.

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of the Promise estimated in Table \( \text{[I]} \), for two families with a 5% real discount rate considering whether or not to enroll a kindergarten student in KPS, the expected present value of the Promise to a family in the lowest income quartile is about $6,871 while the expected present value of the Promise to a family in the highest income quartile is more than twice as large, at $16,326. Moreover, students from low-income families have access to additional funding sources, including federal Pell Grants, Perkins Loans and Federal Work-Study jobs, which also suggests that the Promise is more valuable on average for students from high-income families.

One factor that could dampen response to the Promise for any family is uncertainty about the future of the program. The Promise may not be in place forever, but it currently has no expiration date. The scholarship is administered by a 501(c)(3) non-profit corporation called The Kalamazoo Promise. According to its website, “The Kalamazoo Promise is set up to go on indefinitely. If the decision is ever made to discontinue the program the donors have Promised to fund all students in the Kalamazoo School District at that time, K-12.”

3 The Effect of the Promise on the Kalamazoo Public School District

I first investigate the effect of the Promise on the Kalamazoo Public School District. Following the announcement of the Promise, enrollment in KPS increased. This increase followed years of steady or declining enrollment. Increases in enrollment by grade match the generosity of the scholarship by grade, further suggesting that families were responding to the Promise. In addition, the fraction of students enrolled in special education and the rate of student violence decreased.

The data for this analysis come from two sources. Information on enrollment, race, free and reduced price lunch eligibility and school violence come from the Center for Educational Performance and Information, CEPI, part of Michigan’s Office of the State Budget. Enrollment numbers are for kindergarten through 12th graders, excluding students in pre-K programs, alternative ungraded programs and adult education students. Enrollment numbers (including information on racial diversity) are from CEPI’s Pupil Headcount Data files. CEPI data on free and reduced price meal eligibility come from two sources. Until the 2005-2006 school year, data are from the School
Meals Program Claim Form. Starting in the 2006-2007 school year, CEPI reports reflect calculations for individual students using a state-wide student tracking system. School safety information is reported to the state throughout the school year by districts (both local education agencies and public school academies). Information on academic achievement comes from the Michigan Educational Assessment Program, MEAP, part of Michigan’s Department of Education. While some form of the MEAP has existed for more than ten years, the Department of Education warns that scores are only comparable from Fall 2005 onwards, when the timing and content of the exams were significantly revised. My primary measure of academic achievement is the fraction of students meeting (or exceeding) grade-level standards in reading and math. This measure is available annually since Fall 2005 for 3rd-8th graders. The MEAP data have two important disadvantages: First there is a very short pre-period since only Fall 2005 provides information on student achievement before the Promise. Second, these data do not cover older students. Both CEPI and MEAP data are available online.

3.1 Changes in Total Enrollment

The Kalamazoo Promise was announced in November of 2005. Enrollment in the Kalamazoo Public Schools between Fall 2005 and Fall 2006 increased by 1,021 students. Figure (4) shows that the enrollment increase in the Kalamazoo Public Schools following the announcement of the Promise followed three years of falling or stable enrollment. As shown in Table (2), this increase is especially remarkable because total enrollment in Michigan public schools dropped during this period. No other school district in the state gained as many students that year as the Kalamazoo Public School District. While KPS is a fairly large school district, as shown if Figure (3), it experienced one of the largest percentage gains in the state as well.

To test whether the Promise caused significant enrollment changes more formally, let $E_y$ stand for the number of students enrolled in KPS in the Fall of year $y$ and let $\text{After}_y$ be a dummy variable

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8 The state currently administers the Michigan Merit Examination, which includes both the ACT and a Michigan specific component, to 11th graders, but these data are only available since the Spring 2007 (after the announcement of the Promise).

9 Center for Educational Performance and Information data are available for download at http://www.michigan.gov/cepi and Michigan Educational Assessment Program data are available for download at http://www.michigan.gov/meap.
for the post period after the announcement of the Promise. The results of estimating

\[ E_y = \beta_0 + \beta_1 \cdot \text{After}_y + \epsilon_y \]  

are shown in column (1) of Table (3). Average enrollment has been approximately 1,099 students higher following the announcement of the Promise. Letting \( t \) stand for the number of years since 2002, it is possible to include a linear time trend and estimate:

\[ E_y = \beta_0 + \beta_1 \cdot \text{After}_y + \beta_2 \cdot t + \epsilon_y \]  

The results are shown in column (2) of Table (3). This specification presumes that the Promise affected the level of enrollment in the Kalamazoo Public School, but not the trend in enrollment. The estimated effect of the Promise does not change significantly in this specification because the pattern of enrollment over time is essentially U shaped, with no significant linear time trend.

The previous two regressions use only enrollment totals from KPS. However, it is also useful to compare the enrollment increase in KPS to enrollment changes in other districts, for a difference-in-difference estimate of the effect of the Promise. Letting \( E_{dy} \) stand for the enrollment in district \( d \) in year \( y \), I estimate the change in enrollment by comparing the enrollment change in KPS after the announcement of the Promise to enrollment changes in other districts, controlling for year and district fixed effects.

\[ E_{dy} = \beta_0 + \beta_1 \cdot \text{KPS}_{dy} \cdot \text{After}_{dy} + \sum_{y \in \text{Years}} \tau_y \cdot Y_{dy} + \sum_{d \in \text{Districts}} \delta_d \cdot D_{dy} + \epsilon_{dy} \]  

I use three separate comparison groups. In column (3), enrollment changes in the Kalamazoo Public School District are compared to enrollment changes at other Kalamazoo County public schools districts. The estimated effect of the Promise on enrollment increases to approximately 1,195 students in this specification. While using local school districts as a comparison group is generally useful to control for regional shocks, there is strong evidence (discussed below) that the Promise negatively affected enrollment in local public school districts, so this may overstate the effect of the Promise on enrollment in the Kalamazoo Public School District.
In column (4), enrollment changes in the Kalamazoo Public School District are compared to enrollment changes in a set of comparably sized school districts. The comparison districts are drawn using Fall 2002 enrollment data. At that point, enrollment in KPS was 11,084 students. Comparison districts are all Michigan school districts that enrolled more than 10,000 and less that 12,000 students.\footnote{Those districts are the Southfield Public School District (10,266 students), Huron Valley Schools (10,754 students), the Taylor School District (10,782 students), Traverse City Area Public Schools (10,886 students), the Pontiac City School District (11,164 students), the Waterford School District (11,588 students), LAnse Creuse Public Schools (11,650 students) and the Port Huron Area School District (11,963 students).} Figure (4) shows the evolution of enrollment in the comparison school districts. On average, enrollment in the comparison school districts has been declining very slowly over time. While KPS enrollment closely matched average enrollment in Fall 2002, enrollment in KPS dropped below enrollment in the comparison schools in Fall 2003 and remained below comparison schools until after the announcement of the Promise. In Fall 2006, KPS enrolled more students than the comparison schools did on average, and the gap between KPS enrollment and enrollment in the comparison schools has continued to grow in every subsequent year. The difference-in-difference estimate of the effect of the Promise on enrollment using the comparison schools is approximately 2,020 students. This estimate of the effect of Promise reflects the fact that similarly sized districts have lost students over the past ten years, as did the Kalamazoo Public School District until it gained significant numbers after the Promise.

Finally, when the change in enrollment at KPS following the announcement of the Promise is compared to all other Michigan Public School districts, the estimated effect of the Promise is about 1,210 students, as shown in column (5). Whether using data only from the Kalamazoo Public School District or data from the entire state, each regression specification suggests an effect of the Promise of more than 1,000 students, in line with the simple difference in enrollment between Fall 2005 and Fall 2006 of 1,021 students.

Because school district sizes vary substantially within Kalamazoo County and Michigan as a whole, it is also useful to consider percentage changes in enrollment. Using the same specifications described above to examine changes in log enrollment, the estimated effect of the Promise ranges between 6.5% (when enrollment changes in the KPS are compared with enrollment changes in local public school districts) and 19.7% (when enrollment changes in the KPS are compared with
enrollment changes in districts of a similar size in Fall 2002). The full results are shown in columns (1), (2), (3), (4) and (5) of Table (4). The change in enrollment following the announcement of the Promise was atypical because the increase was substantial compared both to recent trends in enrollment in KPS and to enrollment changes in the same period for other Michigan public school districts.

3.2 Distribution of Enrollment Changes within the District

While new students might have been drawn only to the highest performing or wealthiest schools in the district, in fact there were enrollment increases across the board at schools in the Kalamazoo Public School District.\textsuperscript{[11]} I divide KPS elementary schools into two groups based on the fraction of students meeting or exceeding state standards in reading in Fall 2005.\textsuperscript{[12]} High schools are excluded as a matter of necessity since reading scores are not available after 8th grade. While test score measures are available for middle schools, enrollment gains following the Promise were systematically lower in middle schools than in elementary schools, seemingly due to the incentives of the Promise (see further discussion below) and in KPS in 2005, middle school pass rates on the state exams were systematically lower than elementary school pass rates. To avoid conflating low enrollment gains at middle schools due to low test scores with low enrollment gains due to older students, this analysis is restricted to elementary schools.

The reading pass rate in Fall 2005 ranged differed significantly across KPS elementary schools, from a high of 93% at Indian Prairie Elementary School to a low of 47% at Northglade Montessori School. Schools are classified as high achieving (above median KPS pass rates) if at least 70% of students met state reading standards.\textsuperscript{[13]} Figure (5) shows the enrollment gains for each group. The enrollment increase immediately following the announcement was slightly larger in the schools

\textsuperscript{[11]} Students living in the KPS are assigned to a school based on where they live. However, KPS has a significant number of magnet schools (including specialized programs in environmental sciences, international studies and writing). Students living anywhere in the district may attend any magnet school.

\textsuperscript{[12]} The correlation between the overall pass rate in reading and the overall pass rate was math at the school level for Fall 2005 is 96%.

\textsuperscript{[13]} The eight schools in which at least 70% of students met state readings standards in Fall 2005 are Arcadia Elementary School, Chime Elementary School, Greenwood Elementary School, Indian Prairie Elementary School, King-Westwood Elementary School, Parkwood-Upjohn Elementary School, Washington Writer’s Academy and Winchell Elementary School. The eight schools in which less that than 70% of students met state reading standards in Fall 2005 are Edison Environmental Science Academy, Lincoln International Studies School, Milwood Elementary School, Northeastern Elementary School, Northglade Montessori School, Spring Valley Center for Exploration, Woods Lake Elementary and the Woodward School for Technology and Research.
bottom half of the distribution of academic achievement. The highest performing schools made larger enrollment gains in the following two school years.\footnote{14}

The same pattern appears if KPS elementary schools are divided into two groups based on poverty levels in the 2005-2006 school year.\footnote{15} As shown in Figure (6), the increase in enrollment immediately after the announcement of the Promise was almost identical in the two groups, but the lower poverty schools continued to see large gains in the years following the Promise. While it is not really possible to separate out heterogeneity in enrollment gains by school wide differences in academic achievement from heterogeneity in enrollment gains by school wide differences in poverty levels, (these two figures look similar because in 2005, 75% of KPS elementary schools were either both below the median in academic achievement and above the median in poverty or above the median in academic achievement and below the median in poverty), it is possible to conclude that the large enrollment gains in KPS after the Promise were spread throughout the district. The Promise not only increased enrollment in a district with higher overall poverty rates and lower overall test scores than the surrounding districts, but increased enrollment in schools with higher poverty rates and lower test scores than those in the surrounding districts.

The sharp increase in enrollment could have been caused by factors other than the Promise. For example, a baby boom in 2001 might make for an enrollment increase in Fall 2006 driven entirely by an increase in the number of kindergarten students. However, the actual pattern of enrollment changes by grade in the Kalamazoo Public School District matches the incentives of the Promise, further suggesting that the Promise is the primary cause of the enrollment increase.

The number of students enrolled in each grade in the KPS in Fall 2005, before the announcement of the Promise, is shown in Figure \ref{fig:enrollment}. With one exception, enrollment levels are highest in the elementary grades, roughly constant in the middle grades, and decline precipitously in high school.

\footnote{14}{One possible explanation for this pattern is that parents were not aware of the pass rates at the time they were making decisions about where to live. According Janet Lower of MEAP, Fall test scores are generally made available to the public by the end of the academic year and it is likely that parents making schooling decisions over the Summer 2006 could have obtained this information. However, the accessibility of such information greatly influences the extent to which parents choose schools with higher test scores (Hastings and Weinstein 2008).}

\footnote{15}{Elementary schools are grouped based on the fraction of students enrolled in the free or reduced price lunch program in the 2005-2006 school year. The eight elementary schools where at least 70% of the students were eligible for free or reduced price meals in Fall 2005 are Edison Environmental Science Academy, Greenwood Elementary School, Lincoln International Studies School, Milwood Elementary School, Northeastern Elementary School, Spring Valley Center for Exploration, Washington Writers’ Academy and Woods Lake Elementary. The eight elementary schools where fewer than 70% of students were eligible for free or reduced price meals in Fall 2005 are Arcadia Elementary School, Chime Elementary School, Indian Prairie Elementary School, King-Westwood Elementary School, Northglade Montessori School, Parkwood-Upjohn Elementary School, Winchell Elementary School and the Woodward School for Technology and Research.}
The exception is ninth grade: in Fall 2005, there were approximately three hundred more ninth graders than either eighth or tenth graders. This phenomenon, known as the “ninth grade bulge” is common because the ninth grade is composed of two groups of students: the previous year’s eighth graders and the previous year’s ninth graders who did not earn enough credits in the first year of high school to qualify as tenth graders (Haney, Madaus, Abrams, Wheelock, Miao and Gruia 2004). Both the large size of the ninth grade bulge and the declining enrollment throughout the high school years suggest the four year high school graduation rate in KPS before the Promise was low.

As noted above and shown in Table (I), the generosity of the Promise depends on how long a student is continuously enrolled in the Kalamazoo Public School District prior to graduation. The Promise is structured to ensure that families who wish to take advantage of the scholarship are tied to the district for at least four years. The value of the Promise ranges from a 100% scholarship for kindergarten entrants to a 65% scholarship for 9th grade entrants. Students entering the Kalamazoo Public School District in 10th, 11th and 12th grade are not eligible for the Promise.

Between Fall 2005 and Fall 2006, enrollment increased in every grade except 10th and 11th. Figure (8) shows both how the generosity of the scholarship varies by grade level and how much enrollment increased in each grade. Enrollment in the Kalamazoo Public School District increased the most for the grades in which the Promise provides the most generous benefits. The enrollment increases are much noisier than the smooth progression of scholarship benefits, but the overall pattern is similar: the enrollment increases were largest in the early years when the scholarship benefit is largest, and dropped sharply after ninth grade.

The pattern of enrollment increases by grade in KPS does not exactly match the scholarship incentives. However, the deviations are sensible given the structure of the school system. Enrollment increases were larger among 9th graders than among 8th graders, even though new 8th graders receive a 70% scholarship while new 9th graders receive only a 65% scholarship. This likely reflects a higher willingness on the part of students to enter a district at the start of high school (when most students change school buildings anyway) than in the last year of middle school. Additional, there was a large increase in enrollment among 12th graders even though the Promise does not provide
any benefits for students who transfer into KPS only for a single year. While it is not possible to
tell a conclusive story using only aggregate data, it seems likely that the increase in 12th graders
was not driven by new entrants to the Kalamazoo Public School District, but by a decrease in exits
for existing students. In both of the two years before the announcement of the Promise, KPS en-
rolled more than a hundred more 11th graders than 12th graders, so the increase (of 80 additional
12th graders between Fall 2005 and Fall 2006) can be accounted for by a decrease in drop-out
rates or an increase in 12th graders staying in high school for an additional year to prepare for and
apply to college. With these reasonable exceptions, the grade by grade enrollment increases in the
Kalamazoo Public School District closely mirror the incentives of the Promise.

3.3 Changes in Enrollment at Nearby Schools

Since school-aged children do not materialize from thin air in the course of a single academic
year, the increase in enrollment at KPS must have come at the cost of a decrease in enrollment
at local private schools, nearby public school districts, home schools or from schools outside of
the region. A year after the announcement of the Promise, Robert Jorth, administrator of The
Kalamazoo Promise, noted in an interview with National Public Radio that he had “found thirty
different states represented in the new students in KPS.”\footnote{Quote from 11-29-2006 National Public Radio interview.}

While new students enrolled in KPS
from across the country, local private schools and nearby public school districts were likely the
primary source of students.

As illustrated in Figure (9), enrollment in other public school districts in Kalamazoo County,
which had been fairly steady at about 24,300 students since Fall 2002 fell by 813 students follow-
ing the announcement of the Kalamazoo Promise. If 813 students left other local public schools
and enrolled at schools in the Kalamazoo Public School district, those students alone would ac-
count for 80% of the increase in KPS enrollment. Interpreting the private school enrollment data
is more complicated because enrollment at private schools in the Kalamazoo Intermediate School
District was falling even before the announcement of the Promise. However, enrollment in local
private schools fell by 392 students between Fall 2005 and Fall 2006, after several years of av-
verage enrollment losses of approximately 100 students per year. If 392 students left local private schools to enroll in KPS schools, those students alone would account for 38% of the increase in KPS enrollment. Since public schools are more closely monitored by the state, the CEPI data on enrollment at private schools may be more error prone than public school enrollment data. But there is no reason to believe that such errors would bias private school enrollments downward after the announcement of the Promise. Decreases in enrollment at local public and private schools more than cover the enrollment increases in the KPS.

The Promise requires that students not only attend a KPS school, but also reside in the district. Private schools generally do not have residency requirements for students, and before the Promise about 11% of 5-17 year olds living in Kalamazoo County were enrolled in private schools (Southeast Michigan Census Council 2007), so the large enrollment change in private schools is unsurprising. However, the drop in enrollment at local public schools is more puzzling.

As discussed in Section (4) below, there was no substantial increase in the volume of home sales in Kalamazoo County at the time of the Promise. There could have been a significant amount of mobility without an increase in sales because 35% of housing units in Kalamazoo County were not owner occupied in 2005 (Southeast Michigan Census Council 2007). But using data from the 2005 and 2006 American Community Surveys, I find no increase in mobility for families with children in Kalamazoo County. Table (5) shows that the mobility rate fell in 2006 1% more for households with children than for household without children in the Kalamazoo City PUMA and 4% more in the Kalamazoo County PUMA. Comparing these areas with the rest of Michigan, there was a statistically significant drop in mobility of 3% for households with children in 2006 relative to the rest of the state in the Kalamazoo County PUMA but no statistically significant drop in mobility in the Kalamazoo City PUMA. If the Promise significantly increased mobility as families moved into KPS, this was either too small to measure or was offset by a reduction in mobility among families with children already living inside KPS.

Some students enrolled in other public schools districts could have become eligible for the

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17 School districts and Public Use Microdata Areas do not coincide, and Kalamazoo County is covered by two different PUMAs, Michigan PUMA 02601 (mostly Kalamazoo City, Oshkomo Township and Portage City) and Michigan PUMA 02602 (all of Kalamazoo and Van Buren Counties not included in the Kalamazoo City PUMA).
Promise without changing addresses. At the time of the Promise, a student in Kalamazoo County was allowed to enroll in a district other than her home district if she received permission from both of the districts in question. So some students may have been living in KPS but enrolled in the surrounding public schools. For these students, changing schools was enough to become eligible for the Promise.

The pattern of enrollment changes by grade further suggests that many of the new Kalamazoo Public School District enrollees came from local schools. Figure shows the change in enrollment at each grade level between Fall 2005 and Fall 2006 for the Kalamazoo Public School District and for all the public and private schools in the Kalamazoo County Intermediate School District except those in KPS. If the Promise simply induced enrollment changes from local private schools and other local public schools into KPS, the two series would be mirror images of each other - each third grader lost in a local private school would correspond to a third grader gained in the KPS. The two series do not completely mirror each other. Notably, KPS experienced a large gain in 5th graders, while other local schools maintained the same 5th grade enrollment. However, the overall shapes are quite similar, with roughly the same sized gains and losses in the early grades and corresponding enrollment spikes for students entering high school. While there may have been net migration into or out of the region, a significant portion of the enrollment increases in the KPS can be explained by drops in enrollment at nearby public school districts and private schools.

The Promise appears to have had a large effect on enrollment in the KPS. After years with a stable or declining student population, enrollment increased by 10% following the announcement of the Promise. The pattern of enrollment increases by grade matches the generosity of the Promise by grade, which is further evidence that many of the new students enrolled in KPS because of the Promise. The large effect on enrollment is especially notable because of the large economic disparities between the students in KPS and those in other districts before the announcement of the Promise. For many parents, the lure of free college tuition outweighed whatever concerns they had

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18 These rules have recently changed to make it even easier for students to enroll in out of district schools. Under Michigan’s Schools of Choice Program, local school districts may now enroll a student residing in a contiguous intermediate school districts without the permission of the student’s home district. In Kalamazoo County, Galesburg-Augusta Community Schools, Gull Lake Community Schools and the Parchment School District have decided to participate in the program. These districts are inviting applications from students who reside in other public school districts in Kalamazoo as well as from students who reside in the Allegan, Barry, Branch, Calhoun, Cass, St. Joseph, and Van Buren Intermediate School Districts.
about sending their children to a higher poverty school district.

3.4 School Demographics and School Culture

The Kalamazoo Public Schools gained over 1,000 students between Fall 2005 and Fall 2006. Given the magnitude of the change, the Promise might have significantly altered the demographics of the student body. It did not. In the year after the announcement of the Promise, KPS students remained roughly 40% white and 48% black (with most other students classified as Hispanic). The proportional increases are shown in Figure (11). In the years since the Promise began, enrollment has held steady or increased for each group. The Promise did not significantly alter the fraction of poor students enrolled in the Kalamazoo Public School system either, but the pattern over time is revealing. New entrants to the Kalamazoo Public School system in the 2006-2007 school year, immediately following the announcement, were less likely than continuing students to be eligible for free or reduced price lunches. In all, KPS students were about 2% less likely to be eligible for free or reduced price lunch in the 2006-2007 school year than in the 2005-2006 school year. Free and reduced price lunch eligibility is a limited measure of socioeconomic economic status (Harwell and LeBeau 2010), but this does suggest that most of the families lured by the Promise in the 2006-2007 school year were significantly above the poverty line. However, as shown in Figure (12), over the succeeding school years, as enrollment has continued to rise in KPS, the number of students too wealthy to receive free or reduced price meals has actually fallen. While wealthier families drove the enrollment gain immediately after the announcement of the Promise, poorer families are driving the more recent enrollment gains.

While the racial and economic balance of the district has not been changed by the Promise, the fraction of students enrolled in special education has fallen significantly. The enrollment rate decreased by a statistically significant 0.60 percentage points (a 4.4% drop) after the Promise.

Interpretation of these data is complicated by three factors. First, the reporting system for free and reduced price meal eligibility changed between the 2005-2006 school year and the 2006-2007 school year. However, as shown in Figure (13), eligibility increased in the rest of Michigan during the time period, so this change in unlikely to have contributed to the decrease in eligibility in Kalamazoo. Second, these numbers probably underestimate the number of incoming students in the 2006-2007 school year who were too wealthy to receive free or reduced price lunches: There is a discrepancy between the total enrollment in the Fall of 2005 in KPS and total enrollment as measured in the 2005-2006 free and reduced price lunch data. Enrollment is higher in the 2005-2006 free and reduced price lunch data, suggesting that the data may have been collected after enrollment already started to rise due to the Promise. Finally, while students living below 1.85 times the federal poverty line are entitled to free or reduced price meals, only students who are living in foster homes or households that participate in federal assistance programs are automatically enrolled, raising the question of whether new entrants might be less likely to be enrolled in the program simply because they had not yet certified their eligibility.
Difference-in-difference estimates of the effect of the Promise comparing KPS to other public schools in Kalamazoo County suggest that Promise caused a 0.98 percentage point (and 7.6%) drop in the fraction of students enrolled in special education, though, as noted above, the other Kalamazoo County public schools may be a poor control in this case given the flow of students across districts within the county. The timing of the drop in special education enrollment exactly coincides with the announcement of the Promise, and this change is consistent with the incentives of the Promise: Special education students are considerably less likely to enroll in post-secondary education, and those that do enroll in post-secondary education are more likely to choose vocational programs than four year colleges for which the Promise is most valuable ((Fairweather and Shaver 1990) and (Wagner and Blackorby 1996)). As shown in Figure (14), the special education rate dropped most dramatically immediately following the announcement of the Promise and has remained below pre-Promise levels in every subsequent year.

It is of interest to learn whether students and families alter their educational investments in primary and secondary school in light of a reduction in the cost of college. In the case of the Kalamazoo Promise, the increase in enrollment following the announcement of the Promise complicates this analysis. If data are collected at the school or district level (as is the case for the data used in this paper) these data reflect both changes in behavior of students enrolled in KPS at the announcement of the Promise and changes in the composition of the student body. Even if data are collected at the individual level, the influx of new students may change the classroom environment students experience, through, for example, such mechanisms as peer effects or overcrowding.\footnote{Overcrowding may be less of a concern in this particular case because of the steep decline in KPS enrollment in the years leading up to the Promise. In the 3 years before the announcement of the Promise, KPS lost over 800 students.}

Unfortunately, there is no publicly available data on study habits. However, Michigan does track student test scores and school safety. Test scores have increased in the years since the announcement of the Promise. Figure (15) shows the evolution math and reading scores of 3rd - 8th graders in the Michigan Educational Assessment Program. Because there is significant year to year variation in the overall fraction of students passing MEAP, scores for KPS and for the other public schools in Kalamazoo are shown relative to the pass rate in the rest of Michigan.\footnote{Students are counting here as passing if they are rated as meeting or exceeding standards. The rate for the rest of Michigan is calculated by the fraction of public school MEAP takers in a given grade, subject and year outside of Kalamazoo County who passed the exam. (Some private schools also administer MEAP, but the program is voluntary.)}
and reading, and for every grade between 3rd and 8th, the pass rate improved in KPS between the pre-Promise Fall 2005 scores and the most recent Fall 2009 scores. Because the pass rates have increased in the rest of the state over this period, the gains would be even larger absent the normalization.

However, it is unlikely that these gains results from the Promise. First, for most grades and subjects, there was no especially large increase in Fall 2006 over Fall 2005, so the increase is not attributable to large differences in achievement between newcomers in Fall 2006 and existing KPS students. Second, KPS students lagged behind students in the rest of the state and students in other public school districts in Kalamazoo on the MEAP in Fall 2005. As the overall pass rate of MEAP exams has risen over the four years following the Fall 2005 administration, there was more room for improvement in KPS than elsewhere in the county or state. Figure (16) shows the change in the MEAP pass rates for 3rd grade math and 3rd grade reading among districts with MEAP performances just above and below the performance of KPS in Fall 2005. Pass rates rose significantly for each district, and KPS is not an outlier among districts with similar initial performance. KPS performance on MEAP has improved over the last five years, but the evidence suggests that this increase is not due to the Promise.

Another measure of school culture is school safety. Violations of school safety are a relevant measure a school district’s performance since (in addition to injuries or suspensions for the students involved) such incidents may distract other students and staff from focusing on learning. The primary measure of school safety reported here is a composite of incidents of various types (larcenies, robberies, arson incidents, bomb threats, dangerous weapons found at school, criminal sexual conduct, vandalism, possession of controlled substances, gang related activities and assaults). As shown in Panel (a) of Figure (17), the rate of school safety violations has decreased since the

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22Michigan has collected information on different types of school safety violations over the years. There are sixteen categories of incidents that have been consistently tracked and made public by the state every year from the 2001-2002 school year through the 2008-2009 school year: arson, bomb threats (and explosions), criminal sexual conduct, drive by shootings, gang activity necessitating the involvement of law enforcement, homicides, hostage takings, “illegal possession” (use, possession or sale of controlled substances), larceny, physical assaults, robberies, suicide attempts, trespassers, unauthorized removal of students from school grounds, vandalism and the presence of dangerous weapons. During this entire period, both before and after the announcement of the Promise, the Kalamazoo Public School District reported no explosions, drive by shootings, homicides, hostage takings, suicide attempts or unauthorized removals. I focus here on the remaining ten categories with consistent data across the years and with at least one incident during this period. One risk of using a composite measure is that one incident may be counted twice - for example, a single incident may be listed both as criminal sexual conduct and as a physical assault. There is no reason to believe that this is more likely to occur before the Promise than after, but if the Promise caused a fall in the crime rate, the drop will look too big in the composite measure for this reason. Results for criminal sexual conduct, larceny and physical assaults, each shown separately, do not suffer from this problem.
announcement of the Promise. On average there have been 311 fewer incidents per year after the announcement of the Promise, a drop of 9.1%, but the drop is not statistically significantly different from zero.\textsuperscript{23}

The decrease in dangerous incidents is largely driven by decreases in incidents of criminal sexual conduct, larcenies and physical assaults, shown in the remaining Panels. Arson, bomb threats, gang related activity, robberies and vandalism are very rare both before and after the Promise. Possession, use and sale of controlled substances is less rare (with about forty two incidents per year) but the number of incidents has only declined slightly since the announcement of the Promise, and incidents of possession of a dangerous weapon follow a similar pattern. While the incidents of criminal sexual conduct and physical assaults are significantly lower, on average, after the announcement of the Promise, the timing of the drop does not coincide with the announcement of the Promise. Both spiked in the 2003-2004 school year and had already fallen significantly by the 2004-2005 school year, before the announcement of the Promise. On the other hand, the timing of the drop in larcenies coincides exactly with the announcement of the Promise.

One concern in examining these trends is the possibility of evolving reporting standards. There is significant year to year variation in the rate of incidents in the state of Michigan as a whole. While in the majority of cases, a student’s enrollment status is clear, a given altercation may be classified differently from school to school or from year to year. For example, In both the 2007-2008 school year and the 2008-2009 school year, the state defined its reporting standards the same way (incidents of physical assault “between a student and another person(s) that were reported to law enforcement or that resulted in suspension or expulsion”). But given the dramatic decrease in the assault rate in the state of Michigan outside of Kalamazoo County during the 2008-2009 school year on the heels of five years during which the rate moved very slowly, it seems likely that reporting standards did change.

However, assaults also fell in the Kalamazoo Public Schools during 2006-2007 and 2007-2008, when assaults were essentially unchanged in the other public schools in Kalamazoo County and rose in the remainder of the state of Michigan. As discussed above, enrollment in KPS has con-

\textsuperscript{23}These results do not change significantly if the 2005-2006 school year is excluded since the first few months are in the pre-period or if difference-in-difference estimates are used comparing KPS to other Kalamazoo County public schools.
tinually increased since the announcement of the Promise, so the rate of incidents per student has
decreased even more dramatically. It is possible that the Promise has contributed to the decline in
school violence in KPS. In all, the clearest impact of the Promise on KPS was a dramatic increase
in enrollment, but there is also evidence that special education enrollment and school violence
decreased in the wake of the announcement.

4 Real Estate Results

The Promise provides a direct benefit to families in KPS who planned to pay to send their children
to Michigan’s public post-secondary institution and are now able to use the Promise instead. But
the economic incidence of the Promise may be broader. There is strong evidence that home prices
move in response to changes in local amenities. Tax changes are quickly capitalized in housing
prices (Rosen 1982). Housing prices also move with school quality, changes in information about
school quality, and educational spending ((Barrow and Rouse 2004), (Black 1999), (Bogart and
Cromwell 1997), and (Figlio and Lucas 2004), though some existing hedonic estimates may be too
high due to sorting (Bayer, Ferreira and McMillan 2007)). Since the Promise can be thought of as
an increase in benefits for people living in the Kalamazoo Public School District, it may have been
capitalized in housing prices.

The Promise spent about $3.2 million as of January 2008\textsuperscript{24} To obtain a lower bound for the
annual value of the Promise, suppose that the number of students using the Promise does not
change, that college choice stays about the same, and that the $3.2 million has covered two years
of post-secondary education for the class of 2006 and one year for the class of 2007. This suggests
that that once the Promise has been granting scholarships for four years, spending will be at least
$4 million per year. In the 2005 American Community Survey, there were 32,900 housing units in
the municipality of Kalamazoo (which is not coincident with KPS but includes most of the district)
so a reasonable upper bound on the number of housing units in KPS is 40,000. This means that
the Promise is worth, on average, at least $100 per year per housing unit. If the program lasts
indefinitely and the real discount rate is 5%, the Promise has a present value of at least $2,100 per

\textsuperscript{24}Data available online at http://www.upjohninst.org/promise/cuselect.pdf
housing unit.

Since the number of students in the Kalamazoo Public Schools increased following the announcement of the Promise, one factor that might dampen the capitalization of the Promise into home prices is an increase in tax burden. In particular, an influx of students requires an influx of teachers. However, in 1994 Michigan passed Proposal A, a school finance reform measure which shifted primary responsibility for school funding from local governments to the state. (Prior to Proposal A, local governments provided 67% of general funding for K-12 education and after Proposal A, the state provided 78% of the general funds (Lockwood 2002).) Proposal A also created new barriers to prevent future local property tax increases. This suggests that large tax increases are unlikely to offset the benefit of the Promise.

I use a database of all property sales in Kalamazoo County between the second quarter of 2001 and the first quarter of 2010 to determine whether the Promise affected housing prices.\textsuperscript{25} Information on property sales in Kalamazoo County is collected at the municipal level and passed on to the county Equalization Department on an annual basis. Kalamazoo County’s municipalities include four cities - Galesburg, Kalamazoo, Parchment and Portage and fifteen townships - Alamo, Brady, Charleston, Climax, Comstock, Cooper, Kalamazoo, Oshtemo, Pavilion, Prairie Ronde, Richland, Ross, Schoolcraft, Texas and Wakeshma.\textsuperscript{26}

\subsection*{4.1 Kalamazoo Before and After the Promise}

To study the effect of the Promise on housing prices, I first study changes in housing prices in the Kalamazoo Public School District after the announcement of the Promise. Students are only eligible for the Promise if they meet the attendance requirements and live inside the District. The results are shown in Table \cite{6}. These results use sale price as the dependent variable. To down weight the importance of very expensive sales, I also estimate all models with the log of sale price as the dependent variable. These results are shown in Table \cite{7}.

Housing prices increased on average by $10,758 (or about 7.0\%) following the announcement of the Promise, as shown in Table \cite{6}. This database is from Mathew Hansen at the County Equalization Department of Kalamazoo County. The database includes all residential sales in the county from 3/31/01 through 4/1/2010. For most of this period there is detailed information about the property and sale, including the school district of the property in question. However, from 4/1/2006 through 3/31/2008 this information is not available for all sales and is in some cases imputed using the parcel number and a 2010 list of all parcels in KPS.

\textsuperscript{25}Information available online at http://www.kalcounty.com/equalization/assess/assessors.htm.
of the Promise. However, housing prices were increasing in KPS long before the announcement of the Promise, so it is not reasonable to associate this increase with the Promise. To take account of the fact that housing prices were increasing before the Promise was announced, I estimate the change in housing values allowing for quadratic time trends. Let $p_{it}$ stand for the price of a house $i$ sold at time $t$. Time, $t$, is measured in years since the start of my sample, April 1st 2001. After$_{it}$ is a dummy variable which is one if the house was sold after the announcement of the Promise. I estimate the following equation:

$$p_{it} = \beta_0 + \beta_1 \cdot \text{After}_{it} + \beta_2 \cdot t + \beta_3 \cdot t^2 + \epsilon_{it}$$

(5)

The estimated effect of the Promise drops dramatically. These results, shown in column (2) of Tables (6) and (7), are still positive at $4,686 or 3.0%, but the estimated coefficients on the Promise are not statistically different from zero at 5% significance in either of these specifications.

It is important to note that housing sales are strongly seasonal. In terms of both sale price (shown in Figure [18] and sale volume (shown in Figure [19]), summer is the boom time for real estate. I account for this type of seasonality by including dummy variables for the calendar month in which the sale occurs. I estimate

$$p_{it} = \beta_0 + \beta_1 \cdot \text{After}_{it} + \beta_2 \cdot t + \beta_3 \cdot t^2 + \sum_{\text{Feb}., \text{...}, \text{Dec}} \delta_m \cdot D_{itm} + \epsilon_{itm}$$

(6)

where $m$ indexes months and the $D_{itm}$ are a set of dummies variables for month of sale. The results are shown in column (3) of Tables (6) and (7). In this specification, the most reliable estimate of the effect of the Promise using data only from the Kalamazoo Public School District, the estimated effect of the Promise is positive but insignificantly different from zero at the 5% level, with an estimated effect of $4,896 in levels and 4.2% in logs.

Because the Promise is more valuable, on average, for large families (with multiple children to take advantage of the scholarship) and for wealthier families (with children who are more likely to attend four-year public colleges), the effect of the Promise may be larger for more expensive homes. Figure [21] reports the estimated effects of the Promise from quantile regressions running
from 10% to 90%. Each regression includes a quadratic time trend and month dummies. In line with the prediction, the estimated effect does increase with the value of the home; estimated effects from the 75th to 90th quantiles are a significantly positive at the 5% level and range from $9,795 to $17,663. Using only data from the Kalamazoo Public School District, there is some evidence that the Promise increased home prices for the top end of the housing market. However, the estimated size of the effect of the Promise is small relative to the variation in home sales and it is not possible to make conclusions regarding the effect of the Promise on the market as a whole.

4.2 Difference-in-Difference Estimate of the Effect of the Promise

To more accurately measure the effect of the Promise on housing prices, it would be helpful to have a real estate sales database from a group of school districts (as similar as possible to KPS before the announcement of the Promise) and to compare how housing values evolved in those districts in comparison to KPS before and after the announcement of the Promise. I am not able to make that comparison because I do not have access to real estate sales databases from such school districts. Instead I compare the change in housing values in KPS before and after the announcement of the Promise to the change in housing values for the rest of Kalamazoo County over the same period. While this strategy has the advantage of adding a comparison group, it does have two important disadvantages. First, the rest of the county was quite dissimilar from KPS before the announcement of the Promise. Figure (20) shows the distribution of residential sales prices inside and outside of the school district before the Promise. Homes inside KPS generally sold for substantially less. Second, using the rest of the county as a comparison group assumes that the Promise did not have any spillover effects on home prices outside of the district. It is possible that the Promise made the entire region more desirable, raising prices in the rest of the county, or that families flocking into KPS depressed prices in the rest of the county. That said, the advantage of using the remainder of the county as a comparison group is that it provides a control for regional economic shocks that can drive changes in home prices.

Difference-in-Difference estimates of the effect of the Promise are shown in Tables (6) and (7).
The basic specification I estimate is

\[ p_{ilt} = \beta_0 + \beta_1 \cdot \text{After}_{ilt} + \beta_2 \cdot \text{KPS}_{ilt} + \beta_3 \cdot \text{KPS}_{ilt} \cdot \text{After}_{ilt} + \epsilon_{ilt} \]  

As before, \( p \) is the home price, either in levels or in logs and \( \text{After} \) is a dummy variable which takes the value one if the home was sold after the announcement of the Promise. The new component in this specification is that price is also indexed by \( l \), the location of the home. \( \text{KPS} \) is a dummy variable which takes the value one if the home is inside the Kalamazoo Public School District. The parameter of interest is \( \beta_3 \), the difference-in-difference estimate of the effect of the Promise. In the basic specification, the estimated effect of the Promise is -$12,839 or -7.8%. Both are statistically different from zero at the 5% level.

As in the previous section, it is helpful to account for seasonality and time trends. Adding a quadratic time trend (shown in column (5)) does not significantly change the estimated effect; there may be similar time trends throughout the county. I take advantage of the comparison group and control flexibly for both time trends and seasonality with a set of 107 month (\( m \)) by year (\( y \)) dummies. I estimate

\[ p_{ilmy} = \beta_0 + \beta_1 \cdot \text{After}_{ilmy} + \beta_2 \cdot \text{KPS}_{ilmy} + \beta_3 \cdot \text{KPS}_{ilmy} \cdot \text{After}_{ilmy} + \sum \delta_{my} \cdot D_{ilmy} + \epsilon_{ilmy} \]

The difference-in-difference estimates of the effect of the Promise in this specification, -$13,505 in levels and -7.9% in logs are also similar to the results in the basic specification, and suggest that the Promise substantially reduced home prices in the Kalamazoo Public School District. Results from quantile difference-in-difference regressions are shown in 22. The point estimates are negative for every quantile from 10% to 90%, including the most expensive homes.

Importantly, the time period for this analysis includes the recent financial crisis, which may have played out differently in the two regions of the county in the absence of the Promise since there is evidence that sub-prime mortgages have disproportionately affected low income neighborhoods with high concentrations of minorities ((Bromley, Campen, Nafici, Rust, Smith, Stein and van Kerkhove 2008) and (Wyly, Moos, Hammel and Kabahizi 2009)). I use nationwide foreclo-
sure data from RealtyTrac Inc. which include estimates of the total number of foreclosures in each county from April 2005 through November 2009. Figure (23) shows the average number of foreclosures per month in Kalamazoo County and in counties adjacent to Kalamazoo. The number of foreclosures per month began to rise about a year earlier in Kalamazoo than in the adjacent communities and rose continually between January 2006 and January 2009. Unfortunately, foreclosure totals are not available separately by school district so while KPS is less like the surrounding counties than most of the other school districts in Kalamazoo County (in terms of demographics and urbanicity) these data do not distinguish between KPS and the remainder of the county. Still, the sharp increase in foreclosures suggests that the sub-prime mortgage crisis is a possible contributing factor to the significant and negative estimates of the effect of the Promise computed with difference-in-difference techniques.

In specifications including only data from the Kalamazoo Public School District, the estimated effect of the Promise is positive but small and generally not statistically different from zero. When the Kalamazoo Public School District is compared to the rest of the county, the estimated effect of the Promise is statistically significant and negative. Although KPS is a reasonably large school district, the value of the Promise per household I estimate ($2,100) is small relative to the variability in home prices and there is no evidence that the Promise has increased home prices in the Kalamazoo Public School District.

5 Discussion

The Kalamazoo Promise is available for students in a single public school district. This makes it difficult to know to what extent the effects of the Promise are universalizable. It is not possible to separate out the effects of the Promise from the effects of other programs that have been operating in the district over the same time frame. For example, Kalamazoo Communities in Schools, which provides many services to the Kalamazoo Public School District, started only a few years before the Promise and has been growing. The Promise is well advertised and several universities have

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27 The data include notices of default, lis pendens, trustees’ sales, foreclosure sales and real estate owned properties. The measures reported here is the total number of properties in all categories of foreclosure.
made complementary scholarships available to Promise recipients. Following the announcement the Promise received media attention from both local and national press. The Kalamazoo Gazette has printed many pieces on the Promise. National Public Radio’s Morning Edition ran a piece on the Promise immediately after the announcement and a follow-up piece a year later. Katie Couric visited Kalamazoo and presented a piece on the Promise on CBS Evening News in February 2007. While the scholarship only covers tuition and fees, Promise recipients from the Class of 2006 who enrolled at Western Michigan University also received a guarantee of four years of free room and board. Wayne State University, Eastern Michigan University and Lake Superior University also announced special financial packages to help Promise recipients with other college expenses. The intensity of the media glare and the additional benefits for scholarship recipients make it especially difficult to know whether the changes following the Promise are attributable solely to the scholarship itself.

While the Promise does not appear to have significantly increased home prices in the Kalamazoo Public School, the Kalamazoo Public School District experienced an upsurge in enrollment because of the Promise. This is especially notable because the Kalamazoo Public School District was significantly poorer and lower achieving than neighboring school districts at the time the Promise was announced. The Kalamazoo Promise has had an effect on the educational choices of families living in and around Kalamazoo County. It will be informative to see going forward how the Promise affects the quality of the education offered by KPS and the economic well being of the surrounding community.
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<td>(3)</td>
</tr>
<tr>
<td></td>
<td>4 Year</td>
<td>2 Year</td>
<td>4 Year</td>
</tr>
<tr>
<td>Kindergarten</td>
<td>100</td>
<td>$71,915</td>
<td>$3,614</td>
</tr>
<tr>
<td>1st Grade</td>
<td>95</td>
<td>$65,440</td>
<td>$3,382</td>
</tr>
<tr>
<td>2nd Grade</td>
<td>95</td>
<td>$62,682</td>
<td>$3,332</td>
</tr>
<tr>
<td>3rd Grade</td>
<td>95</td>
<td>$60,040</td>
<td>$3,283</td>
</tr>
<tr>
<td>4th Grade</td>
<td>90</td>
<td>$54,483</td>
<td>$3,064</td>
</tr>
<tr>
<td>5th Grade</td>
<td>85</td>
<td>$49,288</td>
<td>$2,851</td>
</tr>
<tr>
<td>6th Grade</td>
<td>80</td>
<td>$44,433</td>
<td>$2,644</td>
</tr>
<tr>
<td>7th Grade</td>
<td>75</td>
<td>$39,901</td>
<td>$2,442</td>
</tr>
<tr>
<td>8th Grade</td>
<td>70</td>
<td>$35,671</td>
<td>$2,246</td>
</tr>
<tr>
<td>9th Grade</td>
<td>65</td>
<td>$31,727</td>
<td>$2,054</td>
</tr>
<tr>
<td>10th Grade</td>
<td>0</td>
<td>$0</td>
<td>$0</td>
</tr>
<tr>
<td>11th Grade</td>
<td>0</td>
<td>$0</td>
<td>$0</td>
</tr>
<tr>
<td>12th Grade</td>
<td>0</td>
<td>$0</td>
<td>$0</td>
</tr>
</tbody>
</table>

Numbers shown are for new students entering in 2006-2007 school year. Four year college estimates are based on a base tuition and fees of $9,213 in 2005-2006 and an inflation-adjusted annual increase of 4.4% per year. Two year college estimates are based on a base tuition and fees of $1,456 and an inflation-adjusted annual increase of 1.5% per year. I assume the child advances one grade each year and attends either four or two years of college immediately following high school.
Table 2: Enrollment Changes in Michigan Public School Districts

<table>
<thead>
<tr>
<th>Change in Enrollment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Average Change Across Districts*</td>
</tr>
<tr>
<td>(Standard Deviation)</td>
</tr>
<tr>
<td><strong>Districts with Largest Losses</strong></td>
</tr>
<tr>
<td>Detroit City School District</td>
</tr>
<tr>
<td>Flint City School District</td>
</tr>
<tr>
<td>Saginaw City School District</td>
</tr>
<tr>
<td>Pontiac City School District</td>
</tr>
<tr>
<td>Grand Rapids Public Schools</td>
</tr>
<tr>
<td><strong>Districts with Largest Gains</strong></td>
</tr>
<tr>
<td>Kalamazoo Public School District</td>
</tr>
<tr>
<td>Oak Park City School District</td>
</tr>
<tr>
<td>School District of the City of Inkster</td>
</tr>
<tr>
<td>Dearborn City School District</td>
</tr>
<tr>
<td>Old Redford Academy</td>
</tr>
</tbody>
</table>

Changes shown are between Fall 2005 and Fall 2006, before and after the announcement of the Promise. * Average change across districts includes the 725 Public School Districts with positive enrollment in 2002 through 2006.
Table 3: Enrollment Changes in the Kalamazoo Public School District

<table>
<thead>
<tr>
<th></th>
<th>(1)</th>
<th>(2)</th>
<th>(3)</th>
<th>(4)</th>
<th>(5)</th>
</tr>
</thead>
<tbody>
<tr>
<td>After the Promise</td>
<td>1,098.8</td>
<td>1,030.6</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(308.4)*</td>
<td>(691.5)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Linear Time Trend</td>
<td>17.1</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(150.9)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>KPS and After the Promise</td>
<td></td>
<td>1,194.8</td>
<td>2,019.9</td>
<td>1,209.8</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>(118.1)**</td>
<td>(481.4)**</td>
<td>(694.9)</td>
<td></td>
</tr>
<tr>
<td>District Fixed Effects</td>
<td>NO</td>
<td>NO</td>
<td>YES</td>
<td>YES</td>
<td>YES</td>
</tr>
<tr>
<td>Year Fixed Effects</td>
<td>NO</td>
<td>NO</td>
<td>YES</td>
<td>YES</td>
<td>YES</td>
</tr>
<tr>
<td>R^2</td>
<td>0.6790</td>
<td>0.6799</td>
<td>0.9981</td>
<td>0.7767</td>
<td>0.9693</td>
</tr>
<tr>
<td>Observations</td>
<td>8</td>
<td>8</td>
<td>105</td>
<td>72</td>
<td>6,439</td>
</tr>
<tr>
<td>Universe</td>
<td>KPS</td>
<td>KPS</td>
<td>Local</td>
<td>Similar</td>
<td>All</td>
</tr>
</tbody>
</table>

Notes: Data from Michigan’s Center for Educational Performance and Information. Data are K-12 enrollment number by public school district between 2002 and 2009. Columns (1) and (2) are restricted to the Kalamazoo Public Schools. Column (3) includes all districts in Kalamazoo County (in addition to KPS, the county’s other Local Education Agencies (Climax-Scotts Community Schools, Comstock Public Schools, Galesburg-Augusta Community Schools, Gull Lake Community Schools, Parchment School District, Portage Public Schools, Schoolcraft Community Schools and Vicksburg Community Schools), the county’s Public School Academies (Kalamazoo Advantage Academy, Navigator Academy, Oakland Academy, Paramount Charter Academy and Youth Advancement Academy; Kalamazoo Advantage Academy and Navigator Academy are currently closed) and the Intermediate School District for Kalamazoo County (the Kalamazoo Regional Educational Service Agency)). Column (4) includes the Kalamazoo Public Schools and similar school districts, selected to match KPS enrollment during the 2002-2003 school year (the start of the sample). In that year, Fall enrollment at KPS was 11,084 students. The comparison school districts are all the other districts that enrolled more than 10,000 and less that 12,000 students. Those districts are Southfield Public School District (10,266 students), Huron Valley Schools (10,754 students), Taylor School District (10,782 students), Traverse City Area Public Schools (10,886 students), Pontiac City School District (11,164 students), Waterford School District (11,588 students), L’Anse Creuse Public Schools (11,650 students) and Port Huron Area School District (11,963 students). Column (5) includes all public school districts in the state. Standard errors are shown in parentheses. * indicates significance at 5%; ** significance at 1%.
Table 4: Enrollment Changes in the Kalamazoo Public School District (Logs)

<table>
<thead>
<tr>
<th>Dependent Variable is Log of Student Enrollment</th>
<th>(1)</th>
<th>(2)</th>
<th>(3)</th>
<th>(4)</th>
<th>(5)</th>
</tr>
</thead>
<tbody>
<tr>
<td>After the Promise</td>
<td>0.0989</td>
<td>0.0986</td>
<td>(0.0275)*</td>
<td>(0.0617)</td>
<td></td>
</tr>
<tr>
<td>Linear Time Trend</td>
<td>0.0001</td>
<td>(0.0135)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>KPS and After the Promise</td>
<td>0.0654</td>
<td>0.1973</td>
<td>0.0891</td>
<td>(0.1234)</td>
<td>(0.0562)**</td>
</tr>
<tr>
<td>District Fixed Effects</td>
<td>NO</td>
<td>NO</td>
<td>YES</td>
<td>YES</td>
<td>YES</td>
</tr>
<tr>
<td>Year Fixed Effects</td>
<td>NO</td>
<td>NO</td>
<td>YES</td>
<td>YES</td>
<td>YES</td>
</tr>
<tr>
<td>$R^2$</td>
<td>0.6832</td>
<td>0.6832</td>
<td>0.9880</td>
<td>0.7315</td>
<td>0.9839</td>
</tr>
<tr>
<td>Observations</td>
<td>8</td>
<td>8</td>
<td>105</td>
<td>72</td>
<td>6,439</td>
</tr>
<tr>
<td>Universe</td>
<td>KPS</td>
<td>KPS</td>
<td>Local</td>
<td>Similar</td>
<td>All</td>
</tr>
</tbody>
</table>

Notes: Data from Michigan’s Center for Educational Performance and Information. Data logs of K-12 Fall enrollment totals by public school district between 2002 and 2009. Columns (1) and (2) are restricted to the Kalamazoo Public Schools. Column (3) includes all districts in Kalamazoo County (in addition to KPS, the county’s other Local Education Agencies (Climax-Scotts Community Schools, Comstock Public Schools, Galesburg-Augusta Community Schools, Gull Lake Community Schools, Parchment School District, Portage Public Schools, Schoolcraft Community Schools and Vicksburg Community Schools), the county’s Public School Academies (Kalamazoo Advantage Academy, Navigator Academy, Oakland Academy, Paramount Charter Academy and Youth Advancement Academy; Kalamazoo Advantage Academy and Navigator Academy are currently closed) and the Intermediate School District for Kalamazoo County (the Kalamazoo Regional Educational Service Agency)). Column (4) includes the Kalamazoo Public Schools and similar school districts, selected to match KPS enrollment during the 2002-2003 school year (the start of the sample). In that year, Fall enrollment at KPS was 11,084 students. The comparison school districts are all the other districts that enrolled more than 10,000 and less that 12,000 students. Those districts are Southfield Public School District (10,266 students), Huron Valley Schools (10,754 students), Taylor School District (10,782 students), Traverse City Area Public Schools (10,886 students), Pontiac City School District (11,164 students), Waterford School District (11,588 students), L’Anse Creuse Public Schools (11,650 students) and Port Huron Area School District (11,963 students). Column (5) includes all public school districts in the state. Standard errors are shown in parentheses. * indicates significance at 5%; ** significance at 1%. 
## Table 5: Mobility Changes in Kalamazoo and Van Buren Counties

**Linear Probability Model**

Dependent Variable is 1 if the Household Moved in the Last Year

<table>
<thead>
<tr>
<th>Kal City PUMA</th>
<th>Kal County PUMA</th>
</tr>
</thead>
<tbody>
<tr>
<td>(1)</td>
<td>(2)</td>
</tr>
<tr>
<td><strong>Year is 2006</strong></td>
<td></td>
</tr>
<tr>
<td>0.0127</td>
<td>0.0030</td>
</tr>
<tr>
<td>(0.0020)**</td>
<td>(0.0002)**</td>
</tr>
<tr>
<td><strong>Household has Children</strong></td>
<td></td>
</tr>
<tr>
<td>-0.0944</td>
<td>-0.0346</td>
</tr>
<tr>
<td>(0.0031)**</td>
<td>(0.0002)**</td>
</tr>
<tr>
<td><strong>Year is 2006, Household has Children</strong></td>
<td></td>
</tr>
<tr>
<td>-0.0143</td>
<td>-0.0090</td>
</tr>
<tr>
<td>(0.0044)**</td>
<td>(0.0004)**</td>
</tr>
<tr>
<td><strong>Household is in Kalamazoo PUMA</strong></td>
<td></td>
</tr>
<tr>
<td>0.1209</td>
<td></td>
</tr>
<tr>
<td>(0.0012)**</td>
<td></td>
</tr>
<tr>
<td><strong>2006, Household is in Kal</strong></td>
<td></td>
</tr>
<tr>
<td>0.0097</td>
<td></td>
</tr>
<tr>
<td>(0.0016)**</td>
<td></td>
</tr>
<tr>
<td><strong>Household has Children, HH is in Kal</strong></td>
<td></td>
</tr>
<tr>
<td>-0.0598</td>
<td></td>
</tr>
<tr>
<td>(0.0025)**</td>
<td></td>
</tr>
<tr>
<td><strong>Year is 2006, HH has Children &amp; is in Kal</strong></td>
<td></td>
</tr>
<tr>
<td>-0.0053</td>
<td></td>
</tr>
<tr>
<td>(0.0035)</td>
<td></td>
</tr>
<tr>
<td><strong>Constant</strong></td>
<td></td>
</tr>
<tr>
<td>0.2716</td>
<td>0.1507</td>
</tr>
<tr>
<td>(0.0015)**</td>
<td>(0.0001)**</td>
</tr>
</tbody>
</table>

$R^2$ | 0.0094 | 0.0040 | 0.0093 | 0.0028
Number of Observations (weighted) | 234,652 | 19,496,178 | 388,586 | 19,496,178
Number of Observations (unweighted) | 1,796 | 201,139 | 4,270 | 201,139
Universe | PUMA | Michigan | PUMA | Michigan

Data from 2005-2006 ACS obtained online at http://usa.ipums.org. All regressions are weighted. KPS is in two different Public Use Microdata Areas. Kalamazoo City PUMA is Michigan PUMA 02601 (mostly Kalamazoo City, Oshtemo Township and Portage City). Kalamazoo County PUMA is Michigan PUMA 02602 (all of Kalamazoo and Van Buren Counties not included in the Kalamazoo City PUMA). Columns (1) and (3) are difference-in-difference estimates run with data only from within the relevant PUMA. Columns (2) and (4) are difference-in-difference-in-difference estimates comparing columns (1) and (3) to the rest of Michigan. Standard errors are shown in parentheses. * indicates significance at 5%; ** significance at 1%.
Table 6: Housing Values in the Kalamazoo Public School District ($)

<table>
<thead>
<tr>
<th>Dependent Variable is Sale Price ($)</th>
<th>(1)</th>
<th>(2)</th>
<th>(3)</th>
<th>(4)</th>
<th>(5)</th>
<th>(6)</th>
</tr>
</thead>
<tbody>
<tr>
<td>After the Promise</td>
<td>10,758</td>
<td>4,686</td>
<td>4,896</td>
<td>23,596</td>
<td>18,997</td>
<td>-13,317</td>
</tr>
<tr>
<td>Linear Time Trend</td>
<td>8,717</td>
<td>8,935</td>
<td>(1,982)**</td>
<td>(1086)**</td>
<td>10,883</td>
<td>(1,087)**</td>
</tr>
<tr>
<td>Quadratic Time Trend</td>
<td>-830</td>
<td>-847</td>
<td>(125)**</td>
<td>(125)**</td>
<td>-1,109</td>
<td>(123)**</td>
</tr>
<tr>
<td>Kalamazoo Public School District</td>
<td>-43,628</td>
<td>-43,659</td>
<td>-43,659</td>
<td>(1,841)**</td>
<td>(1,838)**</td>
<td>(1,841)**</td>
</tr>
<tr>
<td>KPS and After the Promise</td>
<td>-12,839</td>
<td>-13,198</td>
<td>-13,505</td>
<td>(3,147)**</td>
<td>(3,145)**</td>
<td>(3,199)**</td>
</tr>
<tr>
<td>Constant</td>
<td>108,905</td>
<td>94,884</td>
<td>94,326</td>
<td>152,533</td>
<td>135,567</td>
<td>165,567</td>
</tr>
<tr>
<td>Month of Sale Dummies</td>
<td>NO</td>
<td>NO</td>
<td>YES</td>
<td>NO</td>
<td>NO</td>
<td>NO</td>
</tr>
<tr>
<td>Month x Year Dummies</td>
<td>NO</td>
<td>NO</td>
<td>NO</td>
<td>NO</td>
<td>NO</td>
<td>YES</td>
</tr>
<tr>
<td>$R^2$</td>
<td>0.0044</td>
<td>0.0104</td>
<td>0.0121</td>
<td>0.0426</td>
<td>0.0461</td>
<td>0.0520</td>
</tr>
<tr>
<td>Observations</td>
<td>10,649</td>
<td>10,649</td>
<td>10,649</td>
<td>27,585</td>
<td>27,858</td>
<td>27,858</td>
</tr>
<tr>
<td>Universe</td>
<td>KPS</td>
<td>KPS</td>
<td>KPS</td>
<td>Kalamazoo County</td>
<td>Kalamazoo County</td>
<td>Kalamazoo County</td>
</tr>
</tbody>
</table>

Notes: Data are all residential property sales with positive sale price between 4/1/2001 and 3/31/2010 in Kalamazoo County, Michigan, provided by the Kalamazoo County Equalization Department. In the first three columns, the data are further restricted to sales in the Kalamazoo Public School District. Standard errors are in parentheses. Units of time trends are years since 4/1/2001. * significant at 5%; ** significant at 1%
Table 7: Housing Values in the Kalamazoo Public School District (logs)

<table>
<thead>
<tr>
<th></th>
<th>(1)</th>
<th>(2)</th>
<th>(3)</th>
<th>(4)</th>
<th>(5)</th>
<th>(6)</th>
</tr>
</thead>
<tbody>
<tr>
<td>After the Promise</td>
<td>0.0698</td>
<td>0.0303</td>
<td>0.0417</td>
<td>0.1476</td>
<td>0.1005</td>
<td>-0.0686</td>
</tr>
<tr>
<td></td>
<td>(0.0130)**</td>
<td>(0.0231)</td>
<td>(0.0233)</td>
<td>(0.0111)**</td>
<td>(0.0179)**</td>
<td>(0.0952)</td>
</tr>
<tr>
<td>Linear Time Trend</td>
<td>0.0858</td>
<td>0.0893</td>
<td>0.0838</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(0.0089)**</td>
<td>(0.0089)**</td>
<td>(0.0063)**</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Quadratic Time Trend</td>
<td>-0.0087</td>
<td>-0.0092</td>
<td>-0.0082</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(0.0010)**</td>
<td>(0.0010)**</td>
<td>(0.0007)**</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Kalamazoo Public School District</td>
<td>-0.2500</td>
<td>-0.2503</td>
<td>-0.2481</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(0.0106)**</td>
<td>(0.0106)**</td>
<td>(0.0106)**</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>KPS and After the Promise</td>
<td>-0.0778</td>
<td>-0.0798</td>
<td>-0.0792</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(0.0182)**</td>
<td>(0.0182)**</td>
<td>(0.0185)**</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(0.0074)**</td>
<td>(0.0163)**</td>
<td>(0.0163)**</td>
<td>(0.0067)**</td>
<td>(0.0122)**</td>
<td>(0.0340)**</td>
</tr>
<tr>
<td>Month of Sale Dummies</td>
<td>NO</td>
<td>NO</td>
<td>YES</td>
<td>NO</td>
<td>NO</td>
<td>NO</td>
</tr>
<tr>
<td>Month x Year Dummies</td>
<td>NO</td>
<td>NO</td>
<td>NO</td>
<td>NO</td>
<td>NO</td>
<td>YES</td>
</tr>
<tr>
<td>$R^2$</td>
<td>0.0027</td>
<td>0.0113</td>
<td>0.0157</td>
<td>0.0435</td>
<td>0.0495</td>
<td>0.0570</td>
</tr>
<tr>
<td>Observations</td>
<td>10,649</td>
<td>10,649</td>
<td>10,649</td>
<td>27,585</td>
<td>27,858</td>
<td>27,858</td>
</tr>
<tr>
<td>Universe</td>
<td>KPS</td>
<td>KPS</td>
<td>KPS</td>
<td>Kalamazoo County</td>
<td>Kalamazoo County</td>
<td>Kalamazoo County</td>
</tr>
</tbody>
</table>
Figure 1: Map of Kalamazoo County - School Districts

School Districts in Kalamazoo County

<table>
<thead>
<tr>
<th>ID</th>
<th>NAME</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>ATHENS AREA SCHOOLS</td>
</tr>
<tr>
<td>2</td>
<td>CLIMAX-SCOTTS COMMUNITY SCHOOL DISTRICT</td>
</tr>
<tr>
<td>3</td>
<td>COLON COMMUNITY SCHOOL DISTRICT</td>
</tr>
<tr>
<td>4</td>
<td>COMSTOCK PUBLIC SCHOOLS</td>
</tr>
<tr>
<td>5</td>
<td>GALESBURG-AUGUSTA COMMUNITY SCHOOL DISTRICT</td>
</tr>
<tr>
<td>6</td>
<td>GULL LAKE COMMUNITY SCHOOLS</td>
</tr>
<tr>
<td>7</td>
<td>KALAMAZOO PUBLIC SCHOOL DISTRICT</td>
</tr>
<tr>
<td>8</td>
<td>LAWTON COMMUNITY SCHOOL DISTRICT</td>
</tr>
<tr>
<td>9</td>
<td>MATTAWAN CONSOLIDATED-SCHOOL</td>
</tr>
<tr>
<td>10</td>
<td>MENDON COMMUNITY SCHOOL DISTRICT</td>
</tr>
<tr>
<td>11</td>
<td>OTSEGO PUBLIC SCHOOLS</td>
</tr>
<tr>
<td>12</td>
<td>PARCHMENT SCHOOL DISTRICT</td>
</tr>
<tr>
<td>13</td>
<td>PLAINWELL COMMUNITY SCHOOLS</td>
</tr>
<tr>
<td>14</td>
<td>PORTAGE PUBLIC SCHOOLS</td>
</tr>
<tr>
<td>15</td>
<td>SCHOOLCRAFT COMMUNITY SCHOOLS</td>
</tr>
<tr>
<td>16</td>
<td>VICKSBURG COMMUNITY SCHOOLS</td>
</tr>
</tbody>
</table>

Notes: Data from Census 2000 TIGER/Line. This map shows the sixteen school Local Education Agencies with catchment areas within Kalamazoo County. Several districts also serve students from other counties. Only Climax-Scotts Community Schools, Comstock Public Schools, Galesburg-Augusta Community Schools, Gull Lake Community Schools, Kalamazoo Public School District, Parchment School District, Portage Public Schools, Schoolcraft Community Schools and Vicksburg Community Schools are classified by the Michigan Department of Education as located in Kalamazoo County and participate in the Kalamazoo Regional Educational Service Agency, an Intermediate School District which runs alternative schools and provides support services (more details available online at http://kresa.schoolwires.com).
Figure 2: Map of Kalamazoo County - Fraction White by Census Block

Kalamazoo County
Fraction White by Block Group
Census 2000

Notes: Data from Census 2000 TIGER/Line. The bold line indicates the boundaries of the Kalamazoo Public School District.
Figure 3: Statewide Enrollment Changes

Notes: Data from Michigan’s Center for Educational Performance and Information. Percentage change is calculated by finding the difference between Fall 2006 and Fall 2005 enrollment and dividing by Fall 2005 enrollment. The graph is restricted to public school districts with at least 1,000 students in Fall 2005. While the Kalamazoo Public School District would still be near the top of the distribution of percentages changes without this restriction, the tails of the distribution would be much wider, particularly because of the openings and closings of Public School Academies (charter schools).
Figure 4: Enrollment Totals by Year

Notes: Data from Michigan's Center for Educational Performance and Information. Graph represents total K-12 enrollment as of the Fall of the year listed. The vertical line represents the announcement of the Promise in November of the 2005-2006 school year. A student is counted as enrolled in another school in Kalamazoo County if she is enrolled in one of the county’s other Local Education Agencies (Climax-Scotts Community Schools, Comstock Public Schools, Galesburg-Augusta Community Schools, Gull Lake Community Schools, Parchment School District, Portage Public Schools, Schoolcraft Community Schools or Vicksburg Community Schools), one of the county’s Public School Academies (Kalamazoo Advantage Academy, Navigator Academy, Oakland Academy, Paramount Charter Academy or Youth Advancement Academy; Kalamazoo Advantage Academy and Navigator Academy are currently closed) or served directly by the Intermediate School District for Kalamazoo County (the Kalamazoo Regional Educational Service Agency). Comparison school districts are selected to match KPS enrollment during the 2002-2003 school year. In that year, Fall enrollment at KPS was 11,084 students. The comparison school districts are all the other districts that enrolled more than 10,000 and less that 12,000 students. Those districts are Southfield Public School District (10,266 students), Huron Valley Schools (10,754 students), Taylor School District (10,782 students), Traverse City Area Public Schools (10,886 students), Pontiac City School District (11,164 students), Waterford School District (11,588 students), L’Anse Creuse Public Schools (11,650 students) and Port Huron Area School District (11,963 students).
Figure 5: Enrollment Changes at KPS Elementary Schools by Academic Achievement in Fall 2005

Notes: Enrollment data from Michigan’s Center for Educational Performance and Information, academic achievement data from the Michigan Educational Assessment Program. KPS elementary schools are sorted into academic achievement groups based on the fraction of students meeting or exceed state standards in reading in Fall 2005. The eight schools in which at least 70% of students met state readings standards in Fall 2005 are Arcadia Elementary School, Chime Elementary School, Greenwood Elementary School, Indian Prairie Elementary School, King-Westwood Elementary School, Parkwood-Upjohn Elementary School, Washington Writer’s Academy and Winchell Elementary School. The eight schools in which less than 70% of students met state reading standards in Fall 2005 are Edison Environmental Science Academy, Lincoln International Studies School, Milwood Elementary School, Northeastern Elementary School, Northglade Montessori School, Spring Valley Center for Exploration, Woods Lake Elementary and the Woodward School for Technology and Research. Numbers reported are enrollment totals for each group. The vertical line represents the announcement of the Promise in November of the 2005-2006 school year.
Figure 6: Enrollment Changes at KPS Elementary Schools by Poverty Level in Fall 2005

Notes: Enrollment and free and reduced price lunch eligibility data from Michigan’s Center for Educational Performance and Information. Schools are sorted into poverty groups based on the fraction of students enrolled in free or reduced price meal programs in Fall 2005. The eight elementary schools where at least 70% of the students were eligible for free or reduced price meals in Fall 2005 are Edison Environmental Science Academy, Greenwood Elementary School, Lincoln International Studies School, Milwood Elementary School, Northeastern Elementary School, Spring Valley Center for Exploration, Washington Writers’ Academy and Woods Lake Elementary. The eight elementary schools where fewer than 70% of students were eligible for free or reduced price meals in Fall 2005 are Arcadia Elementary School, Chime Elementary School, Indian Prairie Elementary School, King-Westwood Elementary School, Northglade Montessori School, Parkwood-Upjohn Elementary School, Winchell Elementary School and the Woodward School for Technology and Research. Numbers reported are enrollment totals for each group. The vertical line represents the announcement of the Promise in November of the 2005-2006 school year.
Figure 7: Enrollment by Grade in the Kalamazoo Public School District in Fall 2005

Notes: Enrollment data from Michigan’s Center for Educational Performance and Information. This figure shows the total number of students enrolled in each grade in the Kalamazoo Public School District in the Fall of 2005, immediately before the announcement of the Promise. “0” represents kindergarten, the remaining numbers represent grade levels.

Figure 8: KPS Enrollment Changes (Fall 2005 - Fall 2006) and Scholarship Generosity By Grade

Notes: Enrollment data from Michigan’s Center for Educational Performance and Information, scholarship generosity from the Kalamazoo Promise website. Note that the same scale is used to represent both enrollment changes and the generosity of the Promise. For the enrollment change series, the numbers represent how many more students KPS enrolled in Fall 2006 than in Fall 2005 in the given grade. For the scholarship generosity series, the numbers represent the percentage of tuition and fees the Promise will cover for students continuously enrolled in KPS starting at the given grade. For example, the two series nearly coincide at kindergarten. The Kalamazoo Public School District gained 102 kindergarten students between Fall 2005 and Fall 2006. The Kalamazoo Promise covers 100% of tuition and fees for students who attend KPS continuously starting in kindergarten.
Figure 9: Enrollment Changes in Local Public and Private Schools

Notes: Data from Michigan’s Center for Educational Performance and Information. Data are Fall enrollment totals relative to enrollment in Fall 2005. Data are for all private schools in the Kalamazoo Intermediate School District. Similarly, other public schools include all public schools in the Kalamazoo Intermediate School District excluding schools in the Kalamazoo Public School District. The vertical line represents the announcement of the Promise in November of the 2005-2006 school year.

Figure 10: Kalamazoo County Enrollment Changes (Fall 2005 - Fall 2006) By Grade

Notes: Data from Michigan’s Center for Educational Performance and Information. Data are number of students enrolled in each grade in Fall 2006 relative to Fall 2005. Private schools are all private schools in the Kalamazoo Intermediate School District. Similarly, other public schools include all public schools in the Kalamazoo Intermediate School District excluding schools in the Kalamazoo Public School District.
Figure 11: Enrollment Changes in the Kalamazoo Public School District by Race

Notes: Data from Michigan’s Center for Educational Performance and Information. Graph represents total K-12 enrollment as of the Fall of the year listed. The “Other” category includes students categorized as American Indian, Asian, Hispanic, Multiracial and Native Hawaiian. In the Kalamazoo Public School District, most students in this category are classified as Hispanic. The vertical line represents the announcement of the Promise in November of the 2005-2006 school year.

Figure 12: Enrollment Change in the Kalamazoo Public School District by Eligibility for Free and Reduced Price Meals

Notes: Data from Michigan’s Center for Educational Performance and Information. 2003 represents the 2003-2004 school year, etc. The vertical line represents the announcement of the Promise in November of the 2005-2006 school year.
Figure 13: Percentage of Students Eligible for Free and Reduced Price Meals in Michigan

Notes: Data from Michigan’s Center for Educational Performance and Information. 2001 represents the 2001-2002 school year, etc. The vertical line represents the announcement of the Promise in the 2005-2006 school year.

Figure 14: Percentage of Students Enrolled in Special Education in Michigan

Notes: Data from Michigan’s Center for Educational Performance and Information. 2003 represents the 2003-2004 school year, etc. The vertical line represents the announcement of the Promise in the 2005-2006 school year.
Figure 15: Normalized Scores from the Michigan Educational Assessment Program

(a) 3rd Grade Math

(b) 4th Grade Math

(c) 5th Grade Math

(d) 6th Grade Math

(e) 7th Grade Math

(f) 8th Grade Math
Figure 15: Normalized Scores from the Michigan Educational Assessment Program

Notes: Data from the Michigan Department of Education’s Michigan Educational Assessment Program. Each Figure shows the fraction of students in a particular grade meeting or exceeding standards for math or reading. The fractions shown (for the Kalamazoo Public School District, and for students at other public schools in Kalamazoo County) are then normalized by the fraction of public school students in the rest of the state of Michigan who met or exceeded subject grade standards in that year. For example, among 8th graders in Michigan public schools in 2005, 54.5% of KPS students and 72.6% of students at other public schools in Kalamazoo County met reading standards. However, 74.6% of students in Michigan public schools outside of Kalamazoo County met state standards in 2005, so the normalized percentages meetings standards are -20.1% for KPS and -2.0% for other public school students in Kalamazoo County.
Figure 16: Scores from the Michigan Educational Assessment Program

(a) 3rd Grade Math Pass Rates

Notes: Data from the Michigan Department of Education’s Michigan Educational Assessment Program. 2005 represents MEAP pass rates for the Fall 2005 administration. For both 3rd grade math and 3rd grade reading, the time series of pass rates are shown for KPS and for the two districts just above and just below the KPS pass rate Fall 2005. The vertical line represents the announcement of the Promise in the 2005-2006 school year.

(b) 3rd Grade Reading Pass Rates
Figure 17: School Safety

(a) All Incidents

(b) Physical Assaults

(c) Larcenies

(d) Criminal Sexual Conduct

Notes: Data from Michigan’s Center for Educational Performance and Information. “All incidents” is the total number of larcenies, robberies, arson incidents, bomb threats, dangerous weapons found at school, criminal sexual conduct, vandalism, possession of controlled substances, gang related activities and physical assaults in each year. The vertical line represents the announcement of the Promise in the 2005-2006 school year.
Figure 18: Monthly Median Sales Prices in Kalamazoo County

Notes: Data are all residential property sales with positive sale price between 4/1/2001 and 3/31/2010 in Kalamazoo County, Michigan, provided by the Kalamazoo County Equalization Department. The vertical line indicates the announcement of the Kalamazoo Promise in November 2005.

Figure 19: Monthly Sales Volume in Kalamazoo County

Notes: Data are all residential property sales with positive sale price between 4/1/2001 and 3/31/2010 in Kalamazoo County, Michigan, provided by the Kalamazoo County Equalization Department. The vertical line indicates the announcement of the Kalamazoo Promise in November 2005.
Figure 20: Distribution of Home Prices Before the Promise

![Distribution of Home Prices Before the Promise](image)

Notes: Data are all residential property sales with positive sale price between 4/1/2001 and 11/09/2005 in the Kalamazoo Public School District (left panel) and the rest of Kalamazoo County (right panel), provided by the Kalamazoo County Equalization Department.

Figure 21: Quantile Difference Estimates

![Quantile Difference Estimates](image)

Notes: Data are all residential property sales with positive sale price between 4/1/2001 and 3/31/2010 in the Kalamazoo Public School District, provided by the Kalamazoo County Equalization Department. This figure reports difference estimates of home prices in the Kalamazoo Public School District after the Promise relative to before the promise. Each dot is a coefficient from a quantile regression including a linear time trend, a quadratic time trend, and month dummies. The quantiles represented run from 10% to 90% in units of 5%. The bars are 95% confidence intervals.
Notes: Data are all residential property sales with positive sale price between 4/1/2001 and 3/31/2010 in Kalamazoo County, Michigan, provided by the Kalamazoo County Equalization Department. This figure reports difference-in-difference estimates of home prices in the Kalamazoo Public School District relative to the rest of the county after the Promise relative to before the promise. Each dot is a coefficient from a quantile regression including month x year dummies. The quantiles represented run from 10% to 90% in units of 5%. The bars are 95% confidence intervals.

Notes: Data are from RealtyTrac and include all types of foreclosures (Notices of Default, Lis Pendens, Notices of Trustees’ Sale, Notices of Foreclosure Sale and Real Estate Owned properties) from April 2005 through November 2009. The data are converted into monthly averages from reporting periods that range from two to nine months in length (accounting for the varying plateau lengths in the graph). The average for adjacent counties includes all the counties that share a border with Kalamazoo, namely Allegan, Barry, Branch, Calhoun, Cass, Saint Joseph and Van Buren counties.