Rural and Urban High School Dropout Rates: Are They Different?

Jeffrey L. Jordan and Genti Kostandini
University of Georgia-Griffin
Elton Mykerezi
University of Minnesota

Citation: Jordan, J. L., Kostandini, G., & Mykerezi, E. (2012). Rural and urban high school dropout rates: Are they different? *Journal of Research in Rural Education*, *27*(12), 1-21. Retrieved from http://jrre.psu.edu/articles/27-12.pdf

This study estimates the high school dropout rate in rural and urban areas, the determinants of dropping out, and whether the differences in graduation rates have changed over time. We use geocoded data from two nationally representative panel household surveys (NLSY 97 and NLSY 79) and a novel methodology that corrects for biases in graduation rates (Heckman and La Fontaine, 2010). Our findings suggest that high school graduation rates are very similar across the rural-urban continuum in the early 2000s, and they are lower by 3 percentage points compared to the 1980s, with the decline experienced uniformly across the rural-urban continuum. We find that gender, family assets, the presence of biological parents, and maternal attributes appear to be the main determinants of graduation and influence graduation in a similar way across both urban and rural areas. For years, the research literature has looked at various issues from a perspective of determining how rural and urban areas are different with regard to high school dropout rates. We suggest that once family attributes are accounted for differences in rural and urban areas are small and narrowing.

It is well known that remaining in school at least through high school graduation is vital to staying out of low-wage America. In addition to lower wages, students who do not finish high school are more likely to be unemployed, to end up in prison, to need public assistance, and to die at a younger age (Olson, 2006). Yet, many continue to leave school before graduation. Dropping out of high school thus has social costs reflected in lost tax revenue and increased expenditures for health care, corrections, food and cash assistance, subsidized housing, and public assistance, making drop-out prevention a priority for policy.

Several studies have found rural-urban differences on both high school dropout rates and the likely causes of dropping out (e.g., Paasch & Swaim, 1995; Pallas, 1987; McCaul, 1988; Strange, 2011). They have found that the major determinants of dropping out are related to individual and family characteristics, industry structure (e.g., McGranahan, 2004), likelihood of getting a job and school discipline (McCaul, 1988), as well as community and school risk factors (Paasch & Swaim, 1995). Given that the isolation by distance, technology, transportation, or communication between rural and urban areas may have been substantially reduced in recent years, it is important to examine rural-urban dropout rates and their determinants. Rural America is experiencing rapid changes that are blurring rural-urban spatial and social boundaries (Lichter & Brown, 2011). In addition, some research has suggested that spatial distinctions are less important than aspatial distinctions (e.g., race or class) within spatial categories (Beggs, Haines, & Hurlbert, 1996; Hamilton, 2006). As urban areas expand and take in previously distant rural areas, and as transportation and communications systems make the space between urban and rural areas less pervasive, it is useful to examine empirically the extent to which the process of human capital formation is structurally different in rural and urban areas. This may particularly be the case in terms of secondary education; should we focus on place, or on family and race? For example, Lichter and Brown (2011) argued that the "the blurring of rural-urban spatial boundaries has been accompanied by the hardening of aspatial boundaries (e.g. race and class)" (p. 584). This study asks if the determinants of success in high school are

Correspondence concerning this article should be addressed to Jeffrey L. Jordan, Department of Agricultural and Applied Economics, 1109 Experiment St., University of Georgia-Griffin, Griffin, GA 30223-1797. E-mail: jjordan@uga.edu

substantially different across urban and a variety of rural places with recent, nationally representative data.

High school graduation rate is "a barometer of the health of American society and the skill level of its future workforce" (Heckam & LaFontaine, 2010, p. 244). Studies on high school graduation rates using nationally representative data have produced conflicting results even on such a basic and necessary statistic as the graduation rate itself. Recently, Heckman and LaFontaine (2010) developed a methodology that corrects for biases and produces sound estimates that reconcile the very different prior estimates of high school dropout rates. However, they reported national level estimates of high school dropout rates with no distinction between rural and urban areas.

The purpose of this article is threefold. First, we adopt the methodology of Heckman and LaFontaine (2010) to explore rural-urban differences in high school graduation rates and investigate the likely causes of dropping out. Second, we use recent, geocoded nationally representative data from the National Longitudinal Survey of Youth (U.S. Department of Labor, 2011) and the most recent rural-urban continuum codes from the Economic Research Service (U.S. Department of Agriculture, 2011) to explore whether structural differences exist even within rural areas. Lastly, we examine if differences in graduation rates and basic determinants of these have changed substantially since the 1980s (using earlier data from the NLSY 1979).

The rest of the article is organized as follows. Section two provides a review of the literature on high school dropout rates and different measurements used. Section three presents the methodology used, and a description of the data is provided in section four. Results are discussed in section five, and section six concludes.

High School Dropout Rates

Before we examine rural-urban dropout rates and their determinants we need to establish what a "graduate" is. A fundamental problem in addressing issues surrounding high school dropouts is that scholars have been in stark disagreement on such a basic statistic as the high school graduation rate. For instance, in studies that used a variety of data sources and definitions, the graduation rate has been estimated to be anywhere from 66% to 88% in recent years. The range of estimated minority dropout rates is particularly high, from 50% to 85% (Heckman & LaFontaine, 2010). Because of these difficulties, debates persist regarding dropout rates, their distribution across racial and ethnic lines, and time trends (Chaddock, 2006; Heckman & LaFontaine, 2010; Mathews, 2006; Michel & Roy, 2006). There has been virtually no discussion of measurement issues surrounding rural graduation rates and differences with urban graduation rates.

Heckman and LaFontaine (2010) systematically considered the sources of bias across a number of nationally representative datasets and documented multiple sources of bias in data and methods for estimating the high school dropout rate. They argued that there are several sources of potential bias in many studies and datasets and recommended several corrective steps. First, they argued strongly against the inclusion of individuals as high school graduates who have a General Educational Development (GED) certificate. Inclusion of these individuals appears to bias the estimates, especially when it comes to minorities, as they obtain disproportionate shares of GEDs. In addition, they noted that GED recipients have labor and wage outcomes that are more similar to those of high school dropouts rather than high school graduates. Second, they argued that the prison and military populations, which are excluded when using Current Population Survey data, should be included in these calculations. Third, they opposed the inclusion of immigrants who came to the United States after completing high school because it causes downward bias on the estimates. Fourth, bias in the coverage of the dataset that is used should be determined in addition to proxy response bias in census data. Finally, they recommended the use of the eighth-grade enrollment (rather than ninth-grade, which includes retention bias) as the base for dropout estimation.

In this study we follow Heckman and LaFontaine (2010) in defining who is a high school graduate and how to isolate graduates with 1979 and 1997 cohorts of the NLSY. More specifically, we count GED recipients as high school dropouts, we include military and prison populations and exclude immigrants who entered the United States with a high school diploma, and use the eighth-grade enrollment as the base for dropout estimation.[1]

Research on high school dropout rates (with no rural-urban distinction) has found a number of factors that influence one's decision to drop out of high school. Test scores and poor grades, while important, are not the only determinants of dropouts (McCaul, 1988; Rumberger, 1983). Early studies suggest that students' low self-esteem (e.g., Rumberger, 1983), school quality (McNeal, 1997) and the availability of work (McCaul, 1988; Rumberger & Lamb, 2003) influences the decision to drop out. In his recent book Dropping Out (2011), Rumberger classified the predictors of dropping out as student educational performance, behavior, attitudes, and background. Ekstein and Wolpin (1999), using the 1979 NLSY, found that youths who drop out of high school have lower ability and/or motivation, have lower expectations after graduation, and put higher value on leisure compared to those who graduate. Montmarquette, Viennot-Briot, and Dagenais (2007), using a dataset from Canada, indicated that parent education and attending a

[1] We note that counting GED recipients as dropouts does not cause differences between rural and urban dropout rates.

private school reinforce the decision to favor schooling over labor. Their study also pointed out that the legal age to access the labor market, high minimum wages, and low unemployment rates influence the decision to drop out. In a recent survey (Bridgeland, Dilulio, & Morison, 2006) of 16 to 25 year olds who dropped out, nearly half said a major reason was that classes were not interesting.

Studies have also looked at rural-urban differences on both high school dropout rates and the likely causes of dropping out. For example, Pallas (1987) found that urban students drop out more frequently. Pallas also noted that rural educators claim that a rural education is different, better than in more crowded and congested urban areas with fewer problems leading students to drop out. A seminal study from 1964 (Barker & Gump, 1964) also noted less alienation in rural schools.[2] McCaul (1988) suggested that rural dropouts were more likely to report getting a job or not getting along with the teacher as causes for dropping out and gave lower ratings to school effectiveness and discipline. Using the 2004 American Community Survey, Strange (2011) said that the rural dropout rate (11%) is higher than the suburban rate (9%) but lower than in cities (13%). Strange (2011) also noted that the average freshman graduation rate in rural areas is calculated at 75%, which is higher than in cities (65%) but lower than in suburbs or towns (79% and 76%, respectively). Studies have also suggested that dropouts are different in rural areas due to the local industry structure. McGranahan (2004) found the presence of mining and manufacturing employers requiring low skill workers makes rural dropouts different. However, by the end of the 1970-2000 study time frame, there was no evidence that agriculture, mining, or manufacturing employment opportunities led to higher dropout rates. In addition, rural dropouts were more likely to be American Indian or White, while urban dropouts were more likely to be Black or Hispanic.

The question of whether rural schools are inferior to urban and suburban schools (in terms of graduation and achievement) has produced conflicting results, sometimes even among studies that used the same dataset. For instance, using the National Education Longitudinal Survey (NELS), Fan and Chen (1999) concluded that "rural schools do as well as non-metro schools; sometimes better" (p. 42). Roscigno and Crowley (2001) also employed NELS data and found that students living in rural areas exhibit lower levels of educational achievement and a higher likelihood of dropping out of high school than do their non-rural counterparts. While rural Americans' educational attainment levels continue to improve, Gibbs (2003) noted that many believe that rural education still lags behind urban levels with large regional and racial differences. Reeves and Bylund (2005) suggested that the conflicting findings are mostly due to the use of different methods and definitions for what is rural. In our specifications we include several regional, racial, and peer context characteristics when we investigate differences in dropout rates between rural and urban areas.

Thus it is unclear whether youths living in rural areas face different socioeconomic characteristics or educational environments compared to their urban counterparts. For example, the 2004 American Community Survey (Strange, 2011) showed that rural children are less likely to be poorer than those in cities and towns, but more likely to be poorer than those in suburbs. Yet Strange (2011) noted that in the 10% of rural and small town districts with high poverty rates, 37% of students live in poverty, comparable to the Bronx. It is therefore important to investigate the determinants of high school dropouts on rural and urban areas separately. Most of the recent work on rural-urban differences are, however, largely descriptive in nature. Potential fundamental differences in the mechanisms that lead to dropping out across rural versus urban areas have not been investigated in a multivariate framework with recent data.

In sum, there is substantial disagreement on if and how the decision to drop out of high school differs for rural youth. One fundamental measurement issue remains largely unresolved and might be responsible for conflicting findings across studies: who is considered a "graduate." Lack of attention regarding how dropout rates are measured may, in part, be responsible for conflicting findings on the question of whether rural high school students are significantly different than their urban counterparts (e.g. Fan & Chen, 1999; McCaul, 1988; Roscigno & Crowley, 2001).

We use recent and past nationally representative data sets to provide an in depth analysis of high school dropout rates in the United States, correcting for any potential bias in measurement and paying particular attention to urban-rural differences with widely accepted definitions of "rurality" that explicitly acknowledge that not all "non-metro" areas are the same. Specifically we:

- Use recent, geocoded, nationally representative data from the National Longitudinal Survey of Youth in 1997 (NLSY97) and adopt the recommendations of Heckman and LaFontaine (2010) to reduce data bias on how graduation rates are measured.
- Base our discussion on four broad categories of locations based on Beale Codes, a classification system that is widely used by the US-Economic Research Service (ERS) to categorize counties in terms of "rurality."

[2] However, the study by Barker and Gump (1964) is more than 25 years old and may not reflect conditions present in the NLSY data used in this study.

- Use rich, household level data that allows us to address questions of whether the causes of rural dropouts are different from urban dropouts.

- Use geocoded household level data from a similar cohort of youth as the NLSY97 but who attended high school in the late 1970s and early 1980s to examine whether the rural-urban differences in graduation and its correlates have changed over the last 30 years.

Methodology

We designate dropouts consistently with Heckman and LaFontaine (2010) and first provide corrected estimates of the dropout rate for urban and various rural areas in the 2000s and the 1980s. We then estimate probit models to address two questions: Are rural youth at more or less risk of dropping out relative to their urban counterparts? Are the determinants of dropping out different for rural than for urban students?

To address the first question we estimate probit regressions with the whole population and include indicators of rurality. To address the second question, we estimate separate models by rural/urban zones. We include three sets of control variables: (1) individual and family characteristics (race, gender, income as of 1997 and whether the family ever went through "hard times," net worth of the household, household size and composition, relation of the youth to adults at home, education of parents and poverty ratio, attending a public school); (2) peer context characteristics (percent of peers that are part of a gang, do drugs, skip class, and want to attend college), and (3) geographic context variables (total population, crimes rate, median family income, racial composition, unemployment, and employment by sector). Models estimated separately by "zone" indicate if any of the predictors have a different impact in areas of varying rurality.

Lastly, we estimate models for two cohorts (1997 and 1979) to examine possible changes in rural dropout rates and the determinants of dropping out over the last 20 years. We control for a subset of variables that reflect conditions at or prior to eighth grade and that are consistently defined in both datasets.

Data

This study employs nationally representative data from the NLSY79 and the NLSY97 survey from the Bureau of Labor Statistics. The NLSY79 consists of 12,686 young men and women who were 14 to 22 years old when they were first surveyed in 1979. They were interviewed annually through 1994 and currently are being interviewed biannually. The NLSY97 consists of approximately 9,000 youths who were 12 to 16 years old as of December 31, 1996. The first round of the survey started in 1997, with both the parents and the youths interviewed and youths continue to be interviewed on an annual basis.

Each individual in the surveys was assigned a location code using the USDA's Beale Code system, developed in 1974 and last updated in 2003. Beale Codes were used here because they were designed specifically to examine the continuum between urban and rural areas. They were developed for the analysis of trends in non-metro areas that are related to population density and metropolitan influence. Beale Codes allow a more detailed analysis of the survey data than the more common urban-suburban-rural classification systems. For ease of presentation, based on the Beale Codes (Table 1), we grouped individuals in four categories: those living in large metro areas if the Beale code is equal to 0 or 1; those living in smaller metro areas if code is 2 or 3; those living in non-metro urban areas with urban population of 20,000 or more and 2,500 to 19,999 and adjacent to a metro area if code is 4, 5, or 6; and rural areas if code is 7, 8, or 9. We combined Beale Codes 0 and 1 since they both include areas with populations over 1 million. Codes 2 and 3 were combined because they include populations between 250,000 and 1 million. We grouped codes 4, 5, and 6 since they all represent urban populations over 20,000 or smaller urban populations that are adjacent to larger metro areas. The final grouping includes all rural populations. We included code 7 here, which includes a small amount of urban population that is not adjacent to metro areas.

Results

We focus our discussion on three sets of results. First we look at dropout rates using NLSY79 and NLSY97 for the entire sample and then for each location category separately (Table 2). These provide accurately measured dropout statistics (per Heckman & LaFontaine, 2010) for each area defined on the bases of ERS definitions. These computations also allow us to examine if the change in dropout rates across the rural-urban continuum over the last 20 years is consistent with national trends or differentiated by zone. Dropout estimates in Table 2 suggest that rural areas have very similar graduation rates compared to the whole sample. Results for the nationally representative samples are very similar to the findings of Heckman and LaFontaine (2010) suggesting a decline in the rate of graduation. Specifically, estimates show a 3 percentage point decline in the overall graduation rate between the two cohorts.

Descriptive statistics also indicate that the dropout rates are very similar across areas in both years (23.1%, 22.7%,

Table 1
Description of the Rural-Urban Continuum Codes (1983-2003)

Beale Code Aggregations Used in This Article	Beale Code	Description
Category 1: Larger Metro	0	Central counties of metro areas of 1 million population or more
	1	Fringe counties of metro areas of 1 million population or more
Category 2: Smaller Metro	2	Counties in metro areas of 250,000 to 1 million population
	3	Counties in metro areas of fewer than 250,000 population
Category 3: Urban, Non-Metro	4	Urban population of 20,000 or more, adjacent to a metro area
	5	Urban population of 20,000 or more, not adjacent to a metro area
	6	Urban population of 2,500 to 19,999, adjacent to a metro area
	7	Urban population of 2,500 to 19,999, not adjacent to a metro area
Category 4: Rural	8	Completely rural or less than 2,500 urban population, adjacent to a metro area
	9	Completely rural or less than 2,500 urban population, not adjacent to a metro area

Source: U.S. Department of Agriculture, Economic Research Service. (2011).

22.9% and 22.9% in large metro, small metro, non-metro urban, and rural areas, respectively, in the 1997 cohort). The increase in dropout rates over time in large metro areas is exactly equal to the national average (3.2 points), while the increase in smaller metro areas is 3.8 points, in non- metro urban it is 3.0 points and in rural areas it is only 1.4 points. Overall, just as for the nation as a whole, areas experienced an increase in dropouts. For smaller and non-metro urban areas this increase was comparable to the national average, and in rural areas, it was lower.

We next look at the determinants of dropping out of school using NLSY97 (Table 3). The dependent variable is whether the student graduated from high school. The first specification (1) controls for race and gender. The second specification (2) includes family characteristics. The third specification (3) adds peer context variables and the fourth specification (4) includes geographic context variables.

Specifications (1) through (3) show no statistically significant differences across all non-metropolitan zones in graduation rates. The last specification (4), which includes geographic context variables, shows that youths residing in smaller metro areas are 3 percentage points more likely to graduate compared to those living in large metro areas. In addition, some race and gender variables become non-significant or switch signs as we add additional controls. More specifically, Hispanic males are less likely to graduate compared to hite males, but as we add family characteristics, peer context, and geographic context variables they become as likely to graduate as white males. Black males are also less likely to graduate when controlling for individual and family characteristics. However, after adding peer context and geographic context variables, the difference becomes insignificant suggesting that they attend more problematic schools and reside in more disadvantaged areas. Black

Table 2
High School Graduation Rates

	All	Large Metro	Small Metro	Non-Metro Urban	Rural
			NSLY97		
High school dropout rate	0.229	0.231	0.227	0.229	0.229
High school graduation rate	0.771	0.769	0.773	0.771	0.771
Number of observations	8984	4238	3025	981	740
			NLSY79		
High school dropout rate	0.197	0.199	0.189	0.199	0.215
High school graduation rate	0.803	0.801	0.811	0.801	0.786
Number of observations	10755	4684	3497	1489	1085

Table 3
Determinants of Dropping out (Marginal Effects, NLSY 1997)

Variables	(1)	(2)	(3)	(4)
Small Metro	-0.0021	-0.0009	-0.0019	0.0299**
	(0.0109)	(0.0106)	(0.0106)	(0.0131)
Non-Metro Urban	-0.0206	-0.0128	-0.0195	0.0153
	(0.0170)	(0.0166)	(0.0164)	(0.0195)
Rural	0.0011	0.0253	0.0150	0.0344
	(0.0193)	(0.0171)	(0.0177)	(0.0230)
White female	0.0326**	0.0443***	0.0458***	0.0466***
	(0.0131)	(0.0128)	(0.0129)	(0.0128)
Hispanic male	-0.1320***	-0.0161	0.0027	-0.0269
	(0.0212)	(0.0200)	(0.0187)	(0.0216)
Hispanic female	-0.0575***	0.0537***	0.0702***	0.0443**
	(0.0189)	(0.0173)	(0.0164)	(0.0191)
Black male	-0.1755***	-0.0468***	-0.0246	-0.0134
	(0.0185)	(0.0170)	(0.0166)	(0.0178)
Black female	-0.0342**	0.0807***	0.0983***	0.1068***
	(0.0169)	(0.0136)	(0.0133)	(0.0138)
Household size		0.0048	0.0050	0.0044
		(0.0055)	(0.0055)	(0.0056)
# Children younger than 18		-0.0226***	-0.0231***	-0.0227***
		(0.0067)	(0.0067)	(0.0067)
# Children younger than 6		-0.0062	-0.0031	-0.0046
		(0.0094)	(0.0094)	(0.0094)
Other family arrangement at age 12		-0.1700***	-0.1529***	-0.1538***
		(0.0260)	(0.0261)	(0.0261)
Two adults - One biological parent		-0.1275***	-0.1114***	-0.1091***
		(0.0278)	(0.0274)	(0.0272)
Raised by one biological parent		-0.1425***	-0.1263***	-0.1260***
		(0.0119)	(0.0120)	(0.0120)
Mother's years of education		0.0091***	0.0090***	0.0091***
		(0.0031)	(0.0028)	(0.0029)
Father's years of education		0.0044**	0.0038**	0.0039*
		(0.0022)	(0.0019)	(0.0020)
Poverty ratio		0.0111***	0.0098***	0.0097***
		(0.0032)	(0.0032)	(0.0032)
Net worth		0.0037***	0.0034***	0.0032***
		(0.0006)	(0.0006)	(0.0006)
Hard times		-0.0741***	-0.0687***	-0.0655***
		(0.0228)	(0.0223)	(0.0223)
Attended public school		-0.0088	0.0045	0.0065
		(0.0166)	(0.0175)	(0.0176)
25% students part of a gang			-0.0252**	-0.0281**
			(0.0126)	(0.0126)
50% students part of a gang			-0.0461**	-0.0460**
			(0.0190)	(0.0190)
75% students part of a gang			-0.1007***	-0.1038***
			(0.0271)	(0.0274)
Almost all students part of a gang			-0.0995***	-0.1066***
			(0.0332)	(0.0337)
25% students do drugs			0.0172	0.0167
			(0.0133)	(0.0133)
50% students do drugs			0.0162	0.0169
			(0.0157)	(0.0157)

Table 3 (continued)
Determinants of Dropping out (Marginal Effects, NLSY 1997)

Variables	(1)	(2)	(3)	(4)
75% students do drugs			-0.0082	-0.0079
			(0.0180)	(0.0181)
Almost all students do drugs			-0.0801***	-0.0810***
			(0.0232)	(0.0235)
25% students skip class			-0.0202	-0.0206
			(0.0134)	(0.0134)
50% students skip class			-0.0240	-0.0243
			(0.0161)	(0.0161)
75% students skip class			-0.0431**	-0.0427**
			(0.0192)	(0.0192)
Almost all students skip class			-0.0488**	-0.0479**
			(0.0228)	(0.0228)
25% students want college			0.0580***	0.0604***
			(0.0198)	(0.0197)
50% students want college			0.0907***	0.0921***
			(0.0182)	(0.0182)
75% students want college			0.1224***	0.1222***
			(0.0181)	(0.0182)
Almost all students want college			0.1170***	0.1159***
			(0.0178)	(0.0179)
Total population in 1988 (1K)				0.0001***
				(0.0000)
Serious crimes per 100 population in 1997				-0.0019
				(0.0023)
Median family income in 1989 (1K)				0.0038***
				(0.0014)
Percent Black population in 1990				-0.0001
				(0.0001)
Percent Hispanic population in 1990				0.0000
				(0.0001)
Civil unemployment rate in 1997				0.0005
				(0.0003)
Percent children below poverty in 1989				0.0001
				(0.0001)
Percent employed in agriculture				0.0194**
				(0.0094)
Percent employed in finance				0.0051
				(0.0147)
Percent employed in health services				-0.0232
				(0.0164)
Percent employed in public administration				-0.0061
				(0.0085)
Percent employed in manufacturing				-0.0065**
				(0.0033)
Observations	8,965	8,965	8,965	8,965

Note. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% level, respectively.

females, on the other hand, are less likely to graduate in specification (1) and they are more likely to graduate in specifications (2) through (4) after controlling for family characteristics, peer context variables, and geographic context variables.

With respect to the other sets of control variables, we find the relationships we expected. For example, family structure appears to be important; children raised in households that do not include both biological parents are less likely to graduate. We find that the number of children in the family and going through hard times have a negative impact on graduation while higher family incomes increase the likelihood that one graduates. As expected, children with more peers who use drugs, skip classes, and are part of gangs are less likely to graduate, although odds of graduating increase if they have more peers who want to attend college. With respect to the geographic control variables, results suggest that students in areas with higher incomes are more likely to graduate, while areas with higher employment in public administration and manufacturing are negatively associated with the likelihood of graduation.

Next we investigate how these rates of graduation are produced for each geographic area using the same sets of control variables (Tables 4, 5, 6, and 7). Gender, race, and ethnicity show similar associations with graduating from high school across all areas (although some of the coefficients are not estimated very precisely). The exceptions are Hispanic and Black males in rural areas; they are more likely to graduate than White males, while in all other areas the two graduation rates are either not different or lower than those of White males (after controlling for family characteristics, peer context variables, and location attributes).

Also, relative to living with two biological parents, all other family arrangements (one biological parent and another adult, single parent, other non-parent household) show negative associations with graduation. Income and assets also matter. Household net worth always shows a positive association. Income increases the odds of graduation in all geographic areas, except surprisingly not in smaller metro areas. The same pattern is visible in mother's education; it is only not significantly correlated with graduation in smaller metro areas. Surprisingly, father's years of education show a positive association with graduation only in non-metro urban areas. Similar associations between peer context variables and graduation are also found across all four geographic zones. As expected, the association between having more peers in gangs and the likelihood of dropping out is stronger in large metro areas.

Turning to the geographic context variables, we find a few notable differences across places. First, a higher income is associated with a higher likelihood of graduation among those that reside in large metro areas and a lower likelihood of graduation in rural areas. Second, a higher share of Hispanic population increases the likelihood of graduation in smaller metro areas but decreases the likelihood of graduation in rural areas. However, the magnitude of the marginal fixed effects on the coefficients is very small, less than 1%, in both cases. Third, a higher percentage of population employed in agriculture is associated with a higher likelihood of graduation only in smaller metro and non-metro urban areas. Fourth, the likelihood of graduation is negatively associated with employment in health services (non-metro urban), public administration (large metro and rural), and manufacturing (large metro and smaller metro). Finally, we find that median family income where the youth resides is associated with a lower dropout rate in large metro areas and a higher dropout rate in rural areas, but has no effects in smaller metro and non-metro areas. More specifically an increase of $1,000 in median family income decreases the likelihood of dropping out by 0.8 percentage points in large metro and increases the likelihood of dropping out by 3 percentage points in rural settings.

Overall, the main determinants of graduation are gender, race, assets, presence of biological parents at home, maternal attributes, characteristics of the high school peers, as well as industry structure and the level of income in the area. Most have similar influences regardless of location, with some exceptions. As noted, Blacks and Hispanics are actually at an advantage in the most remote areas. Also, household income and mother's education appears to have an impact on large metro, smaller metro, and rural areas, while father's education appears to have an impact only on non-metro urban areas. This indicates that these areas may have the social structure and community assets to help youth overcome disadvantages associated with low parental education or income. One notable similarity across outcomes is that attending public schools produces similar graduation rates to private schools.

Finally, Table 8 illustrates how the main determinants of dropping out have changed in the last 20 years using NLSY79 and NLSY97 data. Here we examine if predictors of dropping out have changed, and if these changes are different in rural areas. The outcome variable is whether youths graduate. In these models we use fewer control variables (only those that are similar in both NLSY cohorts), but they are the main predictors of dropping out.

As noted already, both estimates that control for race, ethnicity, and family characteristics show no statistically significant differences in dropout by location for youth who were in their teens in 1997. However, once we add geographic control variables, smaller metro areas appear to have slightly higher graduation rates in 1997. In 1979, estimates that control for race (specification 1) show statistically similar rates of dropouts across regions, but once we add family characteristics, smaller metro and rural areas appear to have slightly higher graduation rate ($p<0.1$) compared to large

metro for youth who were in their teens in 1979. Moreover, once we add location related variables, all categories show graduation rates that are higher than large metro in 1979, suggesting that youth living in the large cities in 1979 were at a disadvantage compared to their peers in suburban and remote areas. When it comes to race, graduation rates are very similar for White females and Black females, compared to White males in both 1997 and 1979. However, Hispanic males appear to be at disadvantage to White males across all specifications in 1997 and only in the first two specifications in 1979. Black males show a similar pattern, they have lower graduation rates in 1997 for all three specifications, but once we control for family characteristics (specification 2) and geographic context variables (specification 3), the

Table 4
Determinants of Dropping out for Large Metro Areas (Marginal Effects, NLSY 1997)

Variables	(1)	(2)	(3)	(4)
White female	0.0054	0.0076	0.0123	0.0134
	(0.0229)	(0.0224)	(0.0222)	(0.0221)
Hispanic male	-0.1586***	-0.0403	-0.0201	-0.0493
	(0.0301)	(0.0288)	(0.0272)	(0.0309)
Hispanic female	-0.0772***	0.0400*	0.0628***	0.0380
	(0.0267)	(0.0239)	(0.0221)	(0.0256)
Black male	-0.1952***	-0.0732***	-0.0447*	-0.0341
	(0.0275)	(0.0260)	(0.0255)	(0.0274)
Black female	-0.0507**	0.0627***	0.0851***	0.0913***
	(0.0248)	(0.0212)	(0.0208)	(0.0215)
Household size		0.0056	0.0031	0.0004
		(0.0077)	(0.0077)	(0.0077)
# Children younger than 18		-0.0263***	-0.0250***	-0.0242**
		(0.0095)	(0.0094)	(0.0094)
# Children younger than 6		0.0118	0.0147	0.0181
		(0.0143)	(0.0145)	(0.0147)
Other family arrangement at age 12		-0.1795***	-0.1662***	-0.1676***
		(0.0396)	(0.0397)	(0.0395)
Two Adults - One biological parent		-0.0867**	-0.0713*	-0.0784*
		(0.0418)	(0.0411)	(0.0413)
Raised by one biological parent		-0.1165***	-0.0967***	-0.0962***
		(0.0186)	(0.0187)	(0.0186)
Mother's years of education		0.0087**	0.0087**	0.0086**
		(0.0041)	(0.0034)	(0.0037)
Father's years of education		0.0050	0.0039	0.0040
		(0.0032)	(0.0027)	(0.0028)
Poverty ratio		0.0144***	0.0123***	0.0109***
		(0.0039)	(0.0038)	(0.0039)
Net worth		0.0032***	0.0027***	0.0023***
		(0.0008)	(0.0008)	(0.0008)
Hard times		-0.0673*	-0.0608*	-0.0578*
		(0.0357)	(0.0350)	(0.0347)
Attended public school		-0.0300	-0.0163	-0.0108
		(0.0210)	(0.0222)	(0.0229)
25% students part of a gang			-0.0335*	-0.0372**
			(0.0187)	(0.0189)
50% students part of a gang			-0.0724***	-0.0759***
			(0.0278)	(0.0281)
75% students part of a gang			-0.0779**	-0.0859**
			(0.0367)	(0.0378)
Almost all students part of a gang			-0.1623***	-0.1810***
			(0.0485)	(0.0500)

Table 4 (continued)
Determinants of Dropping out for Large Metro Areas (Marginal Effects, NLSY 1997)

Variables	(1)	(2)	(3)	(4)
25% students do drugs			0.0222	0.0217
			(0.0198)	(0.0199)
50% students do drugs			0.0221	0.0266
			(0.0224)	(0.0223)
75% students do drugs			-0.0001	-0.0008
			(0.0251)	(0.0253)
Almost all students do drugs			-0.0807**	-0.0829**
			(0.0337)	(0.0341)
25% students skip class			-0.0212	-0.0213
			(0.0206)	(0.0207)
50% students skip class			-0.0120	-0.0098
			(0.0230)	(0.0229)
75% students skip class			-0.0320	-0.0265
			(0.0269)	(0.0269)
Almost all students skip class			-0.0488	-0.0403
			(0.0323)	(0.0320)
25% students want college			0.0533*	0.0573**
			(0.0293)	(0.0288)
50% students want college			0.0824***	0.0852***
			(0.0270)	(0.0267)
75% students want college			0.1216***	0.1195***
			(0.0274)	(0.0274)
Almost all students want college			0.1224***	0.1198***
			(0.0265)	(0.0264)
Total population in 1988 (1K)				0.0000***
				(0.0000)
Serious crimes per 100 population in 1997				0.0030
				(0.0031)
Median family income in 1989 (1K)				0.0081***
				(0.0021)
Percent Black population in 1990				-0.0001
				(0.0001)
Percent Hispanic population in 1990				-0.0000
				(0.0001)
Civil unemployment rate in 1997				-0.0005
				(0.0006)
Percent children below poverty in 1989				0.0001
				(0.0002)
Percent employed in agriculture				0.0141
				(0.0367)
Percent employed in finance				-0.0251
				(0.0238)
Percent employed in health services				0.0336
				(0.0288)
Percent employed in public administration				-0.0222**
				(0.0110)
Percent employed in manufacturing				-0.0180**
				(0.0081)
Observations	4,225	4,225	4,225	4,225

Note. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% level, respectively.

Table 5
Determinants of Dropping out for Smaller Metro Areas (Marginal Effects, NLSY 1997)

Variables	(1)	(2)	(3)	(4)
White female	0.0557***	0.0692***	0.0655***	0.0612***
	(0.0208)	(0.0200)	(0.0203)	(0.0203)
Hispanic male	-0.1351***	-0.0268	-0.0085	-0.0401
	(0.0333)	(0.0330)	(0.0318)	(0.0373)
Hispanic female	-0.0434	0.0483	0.0589*	0.0298
	(0.0331)	(0.0310)	(0.0305)	(0.0349)
Black male	-0.1499***	-0.0304	-0.0158	-0.0073
	(0.0325)	(0.0292)	(0.0288)	(0.0306)
Black female	-0.0489	0.0665***	0.0791***	0.0873***
	(0.0301)	(0.0247)	(0.0241)	(0.0257)
Household size		0.0045	0.0050	0.0026
		(0.0100)	(0.0102)	(0.0102)
# Children younger than 18		-0.0178	-0.0175	-0.0166
		(0.0120)	(0.0122)	(0.0122)
# Children younger than 6		-0.0115	-0.0101	-0.0089
		(0.0155)	(0.0157)	(0.0156)
Other family arrangement at age of 12		-0.1594***	-0.1367***	-0.1395***
		(0.0405)	(0.0405)	(0.0408)
Two Adults - One bio. parent		-0.1419***	-0.1314***	-0.121***
		(0.0449)	(0.0449)	(0.0452)
Raised by one biological parent		-0.1762***	-0.1647***	-0.1621***
		(0.0217)	(0.0218)	(0.0218)
Mother's years of education		0.0094*	0.0100**	0.0104**
		(0.0048)	(0.0048)	(0.0051)
Father's years of education		0.0016	0.0012	0.0016
		(0.0027)	(0.0024)	(0.0024)
Poverty ratio		0.0070	0.0064	0.0077
		(0.0050)	(0.0050)	(0.0051)
Net worth		0.0039***	0.0038***	0.0038***
		(0.0011)	(0.0011)	(0.0011)
Hard times		-0.0797**	-0.0708*	-0.0608
		(0.0390)	(0.0382)	(0.0383)
Attended public school		0.0234	0.0307	0.0160
		(0.0322)	(0.0346)	(0.0336)
25% students part of a gang			-0.0066	-0.0079
			(0.0207)	(0.0207)
50% students part of a gang			-0.0100	-0.0092
			(0.0301)	(0.0304)
75% students part of a gang			-0.1106**	-0.1158***
			(0.0443)	(0.0447)
Almost all students part of a gang			-0.0613	-0.0849
			(0.0570)	(0.0589)
25% students do drugs			-0.0065	-0.0108
			(0.0234)	(0.0238)
50% students do drugs			-0.0254	-0.0277
			(0.0273)	(0.0274)
75% students do drugs			-0.0575*	-0.0614*
			(0.0334)	(0.0337)
Almost all students do drugs			-0.1281***	-0.1305***
			(0.0406)	(0.0413)

Table 5 (continued)
Determinants of Dropping out for Smaller Metro Areas (Marginal Effects, NLSY 1997)

Variables	(1)	(2)	(3)	(4)
25% students skip class			0.0118	0.0128
			(0.0223)	(0.0224)
50% students skip class			0.0317	0.0401
			(0.0257)	(0.0253)
75% students skip class			-0.0015	0.0080
			(0.0322)	(0.0315)
Almost all students skip class			-0.0071	0.0081
			(0.0372)	(0.0358)
25% students want college			0.0617*	0.0606*
			(0.0339)	(0.0341)
50% students want college			0.1074***	0.1106***
			(0.0306)	(0.0307)
75% students want college			0.1275***	0.1317***
			(0.0302)	(0.0303)
Almost all students want college			0.1074***	0.1092***
			(0.0305)	(0.0307)
Total population in 1988 (1K)				-0.0000
				(0.0001)
Serious crimes per 100 population in 1997				-0.0031
				(0.0050)
Median family income in 1989 (1K)				-0.0036
				(0.0027)
Percent Black population in 1990				0.0002
				(0.0001)
Percent Hispanic population in 1990				0.0002*
				(0.0001)
Civil unemployment rate in 1997				0.0009**
				(0.0005)
Percent children below poverty in 1989				-0.0006*
				(0.0003)
Percent employed in agriculture				0.0635**
				(0.0278)
Percent employed in finance				-0.0137
				(0.0224)
Percent employed in health services				-0.0068
				(0.0273)
Percent employed in public administration				-0.0032
				(0.0216)
Percent employed in manufacturing				-0.0092*
				(0.0051)
Observations	3,022	3,022	3,022	3,022

Note. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% level, respectively.

differences in graduation rates among Black males are not statistically different in 1979.

A few other differences are worth noting. The gaps in graduation rates for Black males seem to be worse than 20 years ago. Black males were on average 17 percentage points (specification 1) less likely to graduate in 1997, while in 1979 they were only 11 percentage points less likely to graduate. In addition, when we add more of the same control variables in both 1979 and 1997, they attenuate all the differences in dropout rates among Black men in 1979, but not in 1997. White females are still at an advantage when it comes to graduating, but they were at a higher advantage 20 years ago. Family composition is defined consistently in both surveys and appears to be important in predicting high school completion across areas in both cohorts. So being raised by two biological parents has produced both an

Table 6
Determinants of Dropping out for Non-Metro Urban Areas (Marginal Effects, NLSY 1997)

Variables	(1)	(2)	(3)	(4)
White female	0.0231	0.0664*	0.0678*	0.0637*
	(0.0373)	(0.0354)	(0.0357)	(0.0358)
Hispanic male	-0.0422	0.0206	0.0788	0.0760
	(0.0858)	(0.0690)	(0.0592)	(0.0609)
Hispanic female	-0.0955	0.0313	0.0502	0.0345
	(0.1039)	(0.0823)	(0.0767)	(0.0980)
Black male	-0.2868***	-0.1082**	-0.0795	-0.0854
	(0.0495)	(0.0517)	(0.0506)	(0.0754)
Black female	-0.0688	0.0781*	0.0947**	0.0826
	(0.0498)	(0.0410)	(0.0388)	(0.0526)
Household size		0.0071	0.0137	0.0161
		(0.0179)	(0.0179)	(0.0181)
# Children younger than 18		-0.0266	-0.0383*	-0.0403*
		(0.0218)	(0.0222)	(0.0222)
# Children younger than 6		-0.0407	-0.0385	-0.0362
		(0.0298)	(0.0303)	(0.0297)
Other family arrangement at age 12		-0.1602**	-0.1389*	-0.1556**
		(0.0787)	(0.0793)	(0.0790)
Two Adults - One biological parent		-0.3548***	-0.3083***	-0.3189***
		(0.0833)	(0.0881)	(0.0883)
Raised by one biological parent		-0.1547***	-0.1375***	-0.1417***
		(0.0408)	(0.0408)	(0.0402)
Mother's years of education		0.0082	0.0037	0.0060
		(0.0067)	(0.0069)	(0.0069)
Father's years of education		0.0154**	0.0168***	0.0160**
		(0.0060)	(0.0062)	(0.0062)
Poverty ratio		-0.0007	-0.0023	-0.0019
		(0.0101)	(0.0100)	(0.0102)
Net worth		0.0023	0.0026	0.0025
		(0.0018)	(0.0018)	(0.0019)
Hard times		-0.1152*	-0.1205*	-0.1233*
		(0.0659)	(0.0660)	(0.0688)
Attended public school		0.0420	0.0462	0.0438
		(0.0534)	(0.0556)	(0.0551)
25% students part of a gang			-0.0392	-0.0320
			(0.0414)	(0.0415)
50% students part of a gang			-0.0639	-0.0571
			(0.0620)	(0.0627)
75% students part of a gang			-0.1638	-0.1348
			(0.1103)	(0.1072)
Almost all students part of a gang			-0.0458	-0.0303
			(0.0941)	(0.0948)
25% students do drugs			0.0752**	0.0770**
			(0.0346)	(0.0341)
50% students do drugs			0.0237	0.0267
			(0.0457)	(0.0457)
75% students do drugs			0.0001	-0.0006
			(0.0552)	(0.0557)
Almost all students do drugs			-0.0620	-0.0617
			(0.0691)	(0.0700)
25% students skip class			-0.0415	-0.0433
			(0.0405)	(0.0411)

Table 6 (continued)
Determinants of Dropping out for Non-Metro Urban Areas (Marginal Effects, NLSY 1997)

Variables	(1)	(2)	(3)	(4)
50% students skip class			-0.0976*	-0.1027**
			(0.0508)	(0.0511)
75% students skip class			-0.1188*	-0.1324*
			(0.0669)	(0.0703)
Almost all students skip class			0.0064	0.0007
			(0.0656)	(0.0676)
25% students want college			0.0210	0.0270
			(0.0703)	(0.0698)
50% students want college			0.0300	0.0437
			(0.0656)	(0.0650)
75% students want college			0.1077*	0.1187*
			(0.0609)	(0.0604)
Almost all students want college			0.1050*	0.1149**
			(0.0586)	(0.0573)
Total population in 1988 (1K)				0.0001
				(0.0011)
Serious crimes per 100 population in 1997				0.0027
				(0.0093)
Median family income in 1989 (1K)				0.0010
				(0.0086)
Percent Black population in 1990				-0.0001
				(0.0003)
Percent Hispanic population in 1990				0.0000
				(0.0002)
Civil unemployment rate in 1997				-0.0007
				(0.0009)
Percent children below poverty in 1989				0.0002
				(0.0007)
Percent employed in agriculture				0.1141**
				(0.0479)
Percent employed in finance				0.0031
				(0.0926)
Percent employed in health services				-0.1012**
				(0.0497)
Percent employed in public administration				-0.0319
				(0.0385)
Percent employed in manufacturing				0.0030
				(0.0124)
Observations	979	979	979	979

Note. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% level, respectively.

advantage 20 years ago and now, regardless of location. A significant difference in the likelihood of graduation is found in 1979 regarding whether youth attended a public school. More specifically, students that attended a public school in 1979 were 11 percentage points less likely to graduate. There is no difference in 1997. There are also several differences in the geographic context variables that are worth noting. Total population and per capita income seems to have a positive impact on the likelihood of graduation in 1997, but not in 1979. Surprisingly, unemployment rate has a positive impact on the likelihood of graduation in 1997 and a negative impact in 1979.

Thus, we find suggestive evidence that schools in remote areas had an advantage in the 1980s, but that is no longer the case. Similar to the findings of McCaul (1988), our results suggest that Blacks had a lower probability of graduation in both the 1980s, but by the 2000s it has either been reduced in size or completely reversed in the most remote rural areas. In fact they are at an advantage in remote areas. In addition, all familial arrangements have a strong

Table 7
Determinants of Dropping out for Rural Areas (Marginal Effects, NLSY 1997)

Variables	(1)	(2)	(3)	(4)
White female	0.0538	0.0620**	0.0685**	0.0667***
	(0.0357)	(0.0298)	(0.0270)	(0.0246)
Hispanic male	0.1256**	0.1403***	0.1292***	0.1169***
	(0.0556)	(0.0295)	(0.0267)	(0.0303)
Hispanic female	-0.0220	0.0478	0.0330	0.0612
	(0.0800)	(0.0539)	(0.0533)	(0.0482)
Black male	-0.0115	0.0730**	0.0739**	0.0688*
	(0.0560)	(0.0364)	(0.0339)	(0.0397)
Black female	0.1748***	0.1697***	0.1629***	0.1497***
	(0.0360)	(0.0222)	(0.0202)	(0.0223)
Household size		-0.0033	0.0050	0.0099
		(0.0199)	(0.0203)	(0.0196)
# Children younger than 18		-0.0085	-0.0189	-0.0209
		(0.0223)	(0.0223)	(0.0218)
# Children younger than 6		-0.0392	-0.0203	-0.0125
		(0.0288)	(0.0280)	(0.0276)
Other family arrangement at age 12		-0.2239**	-0.2295**	-0.1679*
		(0.0892)	(0.0925)	(0.0918)
Two Adults - One biological parent		-0.0492	-0.0085	0.0307
		(0.0941)	(0.0776)	(0.0622)
Raised by one biological parent		-0.1199***	-0.0894**	-0.0585
		(0.0378)	(0.0366)	(0.0364)
Mother's years of education		0.0139*	0.0134**	0.0134**
		(0.0073)	(0.0068)	(0.0065)
Father's years of education		0.0043	0.0035	0.0034
		(0.0065)	(0.0063)	(0.0060)
Poverty ratio		0.0278*	0.0233*	0.0230*
		(0.0142)	(0.0132)	(0.0131)
Net worth		0.0088**	0.0100***	0.0107***
		(0.0036)	(0.0033)	(0.0031)
Hard times		-0.0067	-0.0156	-0.0113
		(0.0579)	(0.0579)	(0.0546)
Attended public school		-0.0416	-0.0317	-0.0403
		(0.0676)	(0.0647)	(0.0574)
25% students part of a gang			-0.0435	-0.0538
			(0.0480)	(0.0478)
50% students part of a gang			-0.0114	-0.0042
			(0.0691)	(0.0686)
75% students part of a gang			-0.4093**	-0.4511***
			(0.1601)	(0.1586)
Almost all students part of a gang			0.1292***	0.1151***
			(0.0400)	(0.0444)
25% students do drugs			0.0070	0.0021
			(0.0344)	(0.0331)
50% students do drugs			0.1008***	0.0870***
			(0.0330)	(0.0321)
75% students do drugs			0.0549	0.0342
			(0.0412)	(0.0434)
Almost all students do drugs			0.0677	0.0536
			(0.0530)	(0.0542)
25% students skip class			-0.0638	-0.0528
			(0.0420)	(0.0406)

Table 7 (continued)
Determinants of Dropping out for Rural Areas (Marginal Effects, NLSY 1997)

Variables	(1)	(2)	(3)	(4)
50% students skip class			-0.1786***	-0.1398**
			(0.0596)	(0.0571)
75% students skip class			-0.1576**	-0.1190*
			(0.0715)	(0.0666)
Almost all students skip class			-0.2030*	-0.1509
			(0.1173)	(0.1122)
25% students want college			0.0833*	0.0766*
			(0.0488)	(0.0450)
50% students want college			0.1195**	0.1167**
			(0.0546)	(0.0509)
75% students want college			0.1050*	0.1052**
			(0.0541)	(0.0499)
Almost all students want college			0.1023**	0.0959**
			(0.0444)	(0.0416)
Total population in 1988 (1K)				0.0008
				(0.0022)
Serious crimes per 100 population in 1997				0.0241
				(0.0171)
Median family income in 1989 (1K)				-0.0391**
				(0.0165)
Percent Black population in 1990				0.0003
				(0.0003)
Percent Hispanic population in 1990				-0.0007**
				(0.0003)
Civil unemployment rate in 1997				0.0099***
				(0.0034)
Percent children below poverty in 1989				-0.0021**
				(0.0010)
Percent employed in agriculture				0.0282
				(0.0273)
Percent employed in finance				0.1972*
				(0.1069)
Percent employed in health services				0.0806
				(0.0845)
Percent employed in public administration				-0.2539**
				(0.1201)
Percent employed in manufacturing				-0.0031
				(0.0139)
Observations	739	739	739	739

Note. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% level, respectively.

Table 8
Determinants of Dropping out (Marginal Effects, NLSY 1979 and 1997)

	NLSY1997			NLSY1979		
Variables	(1)	(2)	(3)	(1)	(2)	(3)
Small Metro	-0.0021	0.0035	0.0255**	0.0029	0.0179*	0.0274**
	(0.0109)	(0.0107)	(0.0128)	(0.0106)	(0.0100)	(0.0132)
Non-Metro Urban	-0.0206	-0.0109	0.0096	-0.0148	0.0152	0.0418*
	(0.0170)	(0.0165)	(0.0196)	(0.0143)	(0.0128)	(0.0241)
Rural	0.0011	0.0199	0.0354	-0.0268	0.0285**	0.0525*
	(0.0193)	(0.0177)	(0.0222)	(0.0169)	(0.0142)	(0.0302)
White female	0.0326**	0.0405***	0.0415***	0.0529***	0.0674***	0.0565***
	(0.0131)	(0.0126)	(0.0125)	(0.0108)	(0.0103)	(0.0137)
Hispanic male	-0.1320***	-0.0454**	-0.0634***	-0.1776***	-0.0328*	-0.0386
	(0.0212)	(0.0217)	(0.0241)	(0.0204)	(0.0178)	(0.0240)
Hispanic female	-0.0575***	0.0312*	0.0150	-0.0893***	0.0523***	0.0579***
	(0.0189)	(0.0188)	(0.0209)	(0.0191)	(0.0132)	(0.0172)
Black male	-0.1755***	-0.0883***	-0.0705***	-0.1123***	0.0003	0.0074
	(0.0185)	(0.0179)	(0.0193)	(0.0157)	(0.0137)	(0.0179)
Black female	-0.0342**	0.0480***	0.0621***	-0.0262*	0.0941***	0.1014***
	(0.0169)	(0.0152)	(0.0159)	(0.0140)	(0.0097)	(0.0126)
Household size		0.0070	0.0070		-0.0019	-0.0004
		(0.0053)	(0.0053)		(0.0021)	(0.0027)
Number of children		-0.0248***	-0.0251***		-0.1165***	-0.1052***
		(0.0049)	(0.0049)		(0.0111)	(0.0143)
Other family arrangement at age 12		-0.1356***	-0.1339***		-0.1443***	-0.1864***
		(0.0246)	(0.0246)		(0.0300)	(0.0387)
Two adults - One biological parent		-0.1124***	-0.1083***		-0.1222***	-0.1558***
		(0.0265)	(0.0262)		(0.0188)	(0.0249)
Raised by one biological parent		-0.1265***	-0.1243***		-0.0989***	-0.0889***
		(0.0106)	(0.0106)		(0.0151)	(0.0186)
Mother's years of education		0.0120***	0.0120***		0.0112***	0.0107***
		(0.0035)	(0.0037)		(0.0012)	(0.0015)
Father's years of education		0.0058**	0.0058**		0.0112***	0.0101***
		(0.0026)	(0.0027)		(0.0010)	(0.0013)
Attended public school		-0.0237	-0.0214		-0.1151***	-0.1143***
		(0.0163)	(0.0164)		(0.0137)	(0.0165)
Total population (1K)			0.0000**			0.0000
			(0.0000)			(0.0000)
Serious crimes per 100 population			-0.0042*			-0.0000***
			(0.0023)			(0.0000)
Per capita income			0.0000***			-0.0000
			(0.0000)			(0.0000)
Percent Black population			-0.0001			-0.0001
			(0.0000)			(0.0001)
Percent Hispanic population			0.0000			-0.0001
			(0.0000)			(0.0001)
Civil unemployment rate			0.0006**			-0.0007*
			(0.0003)			(0.0004)
Percent employed in manufacturing			-0.0052*			-0.0000
			(0.0030)			(0.0001)
Observations	8,965	8,965	8,965	10,755	10,742	6,438

Note. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% level, respectively.

negative impact on graduation relative to living with both biological parents. Males are also at a disadvantage relative to females.[3]

Conclusion

This study estimates the high school dropout rate in rural and urban areas, as well as the determinants of dropping out using data from two nationally representative panel household surveys (NLSY 97 and NLSY 79). We find that high school dropout rates are similar throughout the urban-rural continuum. Overall, dropout rates are 3 percentage points higher in the 2000s than in the 1980s across all locations. We find that the determinants of dropping out are also similar across the urban-rural continuum. Family level characteristics are far more predictive of dropping out than geographic attributes and appear to operate in similar ways across locations. These determinants are gender, race (in some cases), family assets, the presence of both biological parents, maternal attributes, and peer characteristics. The biggest exception, after adding all control variables, is that Black and Hispanic males are at an advantage in the most rural areas in terms of graduating, although their numbers are small. Females are more likely to graduate than males, holding all other variables constant.

We find that differences in graduation rates among races mostly disappear when peer and some location attributes are included. Graduation rates for Black students have declined in the 2000s compared to the 1980s. Additionally, the difference in graduation rates between public and private schools in the 1980s have disappeared in the 2000s.

We make three main points. First, much of the confusion regarding rural-urban graduation gaps comes from considerations regarding how "graduates" are defined. We define graduates as in Heckman and LaFontaine (2010), a study that was specifically designed to address how graduation rates are measured across the main nationally representative datasets and define rural areas consistently with the definitions that underlie the ERS Rural-Urban continuum codes, an index designed to classify counties by "degree or rurality." Our findings suggest that high school dropout rates are very similar across the rural-urban continuum in the early 2000s. Overall, rates are higher by 3 percentage points in the 2000s compared to the 1980s, and this decline was experienced uniformly across the rural-urban continuum. The only exception is found in the most remote rural areas, where there were higher raw graduation rates in the 1980s but no difference in the late 1990s. Also, the increase in dropout rates over the last 20 years was lower in remote rural areas.

A recent study (Swanson, 2009) looked at various reports on graduation rates for 2005. These reports showed that the difference between urban graduation rates (60.9%) and rural (74%) were large (with suburban graduation rates at 75.3%). In contrast, we do not find such large differences. Part of this gap could be accounted for by how states calculate their high school graduation rates. The results of our analysis on graduation differentials across the rural-urban continuum (using NLSY 97) do not change across zones when we control for several important attributes such as income, gender, race, assets, and other family and peer characteristics as well as location characteristics.

Second, with respect to the determinants of dropping out and how they differ across a location's degree of "rurality," we find that gender, family assets, presence of biological parents, and maternal attributes appear to be among the main determinants of graduation and influence graduation in a similar way across all zones with few exceptions that are small in magnitude. We also find that peer related characteristics influence youths' likelihood to drop out. Some peer characteristics have a higher influence on more urban areas (e.g., being part of a gang, or doing drugs) and some (e.g., skipping class) in more remote areas. This reinforces Rumberger's (2011) finding that having friends who engage in criminal behavior or are part of gangs increases the odds of dropping out. We also find that, in general, from the location attributes, median family income and industry structure influence dropout rates, and they have different magnitudes and directions in rural and urban areas. Overall, differences in family-level conditions have far more predictive power in determining graduation than geographic attributes. Further, these conditions appear to operate in similar ways across locations and over time. For example, even after controlling for individual and familial attributes, Black males are 7 percentage points less likely to graduate than White males, and youths raised in households with one biological parent are 12 points less likely to graduate. However, we need to emphasize that once we control for peer attributes and geographic attributes, we find that in some cases race and gender differences in dropout rates are explained away for Hispanic males and Black males in more urban areas. The only exception of

[3] To test the robustness of the results to definitions or rurality as well as high school graduation definitions we looked at variations in how the nine Beale Codes were combined and how graduation was defined. When we define rural counties as only zones 8 and 9 (not including zone 7 and moving it to the adjacent non-metro category), we see no significant change in the determinants of dropping out. Also, when GEDs are included in the definition of graduation conclusions remain the same. We also conducted a multinomial probit regression with outcomes for no high school, GED, and regular high school graduation separately. The determinants of getting a GED are nearly identical with the determinants of no high school degree, reinforcing Heckman and LaFontaine's (2010) argument that GEDs are similar in outcomes to no high school graduates. This robustness appendix is available from the authors upon request.

notable magnitude here concerns the most remote areas. Even after adding all control variables, we find that Black and Hispanic males are actually at an advantage in the most remote areas. However, when looking at the number of Blacks and Hispanics in the rural areas we find that there are only about two percent 2% Hispanic students and 8% Black students in these remote areas. Thus, there are only about 20 Hispanic students represented in zone 4—perhaps too small to draw inferences. While an 8% Black student population is also small, some of the effect we see in the remote areas may be due to fewer peer group influences.

With regard to gender, we find that females are more likely to graduate, even after we hold constant a myriad of familial and other attributes. Similar trends have been investigated by several studies (e.g., Bridgeland et al., 2006; Swanson, 2009). In a study on dropout factories, Balfanz and Legters (2004) showed that high schools with the highest dropout rates may not be an urban-rural issue but one of race. Only 1% of schools with 90% or more White students were classified as having a weak promotion power (similar to graduation rates). However, 29% of schools where ethnic minorities comprised most of the student body have senior classes with 50% fewer seniors than freshmen. Only 3% of White schools had 60% fewer seniors than freshmen, but 66% of minority schools exhibited this type of weak promotion. Balfanz and Legters noted that 46% of African-American children and 33% of Latino students attend high schools in which graduation is not the norm (11% for White children). While Balfanz and Legters showed the worst promoting power schools are in cities, our results indicate that this is not about urban-rural differences and more about race. In addition, Balfanz and Legters showed that about 15% of the nation's high schools account for more than half the nation's drop outs and close to 75% of its minority dropouts. They suggested that in terms of place, about half the dropouts are in cities in the North, Midwest, and West, and about half are in Southern and Southwestern areas, including rural areas. As they note, "outside of the rural South, it is rare to find white students in appreciable numbers attending high schools with the high dropout and low graduation rates signaled by weak promoting power" (p. 23).

Overall, when investigating determinants of dropping out over the last 30 years (with NLSY 97 and NLSY 79) using the same controls, the results of our study suggest that family and peer characteristics trump place. With regard to race, some differences are explained away when we control for peer and some location attributes. Thus, the important policy concerns do not reside in urban and rural differences but in parental issues. Our results show that the impact of a two-parent home (particularly biological parents) is significant. The effect on graduation rates of two-parent households was also found in a study by Vartanian and Gleason (1999) and was particularly strong among black youth. McGranahan (2004) also found a significant relationship between dropping out and not being raised in a two-parent home. While little can be done about family structure at the school or district level, much can be done in terms of parent engagement strategies that can help parents or guardians become more involved in the educational progress of their children. Two other important conclusions can be drawn when looking at race and ethnicity in the 2000s and the 1980s. Using a common set of control variables, we find that Blacks are less likely to graduate in the 2000s compared to 1980s, but they appear to be more likely to graduate in remote areas. Public schools, however, seem to have caught up with the disadvantage that they had with private schools in the 1980s, and they do not differ in graduation rates in the 2000s.

Our last point is that not all rural areas are the same. In fact, we find counties with low rural-urban Beale Codes to be rather similar to urban areas, and the most notable differences across zones are all concentrated in the most remote rural areas.

This study represents the first attempt to explore the narrowing differences in graduation rates between urban and rural America. For years the literature has looked at various issues from a perspective of determining how rural and urban areas are different. We suggest that once family attributes are accounted for, differences in rural and urban areas are small and narrowing. Although we find that the main determinants of dropping out are very similar across rural and urban areas, we do find that some location and peer attributes play different roles in urban and rural areas. Our findings with respect to the closing of non-metro metro gap in high school graduation are similar to the findings of Paasch and Swaim (1995). However, they are slightly different with respect to the effects of individual, family, and community characteristics, which were similar in their study among the rural, urban, and suburban students.[4] Overall, as Paasch and Swaim, we find that family characteristics are the main determinants of high school completion, even in the 2000s.

We suggest two broad areas of future research based on our results. First, more work is required to examine exactly how family characteristics affect high school completion. Particularly of interest is the different effect of two biological parents as opposed to all other family arrangements. We also suggest that research on the effectiveness of dropout prevention policies that factor the high penalties imposed by different familial arrangements, poverty, race, and peer surroundings is needed.

[4] We do not use the same variables as Paasch and Swaim (1995), thus any differences need to be interpreted with caution.

References

Barker, R., & Gump, P. (1964). *Big school, small school*. Stanford, CA: Stanford University Press.

Balfanz, R., & Legters, N. (2004). *Locating the dropout crisis. Which high schools produce the nation's dropouts? Where are they located? Who attends them?* (Report No. 70). Retrieved from Center for Research on the Education of Students Placed at Risk, John Hopkins University, Web site: http://www.csos.jhu.edu/crespar/techReports/Report70.pdf

Beggs, J. J., Haines V. A., & Hurlbert, J. S. (1996). Revisiting the rural-urban contrast: Personal networks in nonmetropolitan and metropolitan settings. *Rural Sociology*, *61*, 306-325.

Bridgeland, J. M., Dilulio, J.J., & Morison, K. B. (2006). *The silent epidemic: Perspectives of high school dropouts*. Washington, DC: Civic Enterprises. Retrieved from http://www.ignitelearning.com/pdf/TheSilentEpidemic3-06FINAL.pdf

Brown, D. L., Cromartie J., & Kulcsar L. J. (2004). Micropolitan areas and the measurement of American urbanization. *Population Research and Policy Review*, *23*, 399-418.

Chaddock, G. R. (2006). US high school dropout rate: High, but how high? *The Christian Science Monitor,* June 21. Retrieved from http://www.csmonitor.com/2006/0621/p03s02-ussc.html

Denaux, Z. S. (2009). Determinants of technical efficiency: Urban and rural public schools in the state of Georgia. *Southwestern Economic Review*, *36*(1), 105-115.

Eckstein, Z., & Wolpin, K. I. (1999). Why youths drop out of high school: The impact of preferences, opportunities and abilities. *Econometrica*, *67*(6), 1295-1340.

Fan, X., & Chen, M. J. (1999). Academic achievement of rural school students; A multi-year comparison with their peers in suburban and urban schools. *Journal of Research in Rural Education*, *15*(1). Retrieved from http://www.jrre.psu.edu/articles/v15,n1,p31-46,Fan.pdf

Gibbs, R. (Ed.). (2003). *Rural education at a glance*. Rural Development Research Report 98, USDA-Economic Research Service. Retrieved from http://www.ers.usda.gov/Publications/RDRR98/

Hamilton, L. (2006). *Rural voting in the 2004 election* (Carsey Fact Sheet No. 2). Retrieved from http://www.carseyinstitute.unh.edu/publications/FS_ruralvote_06.pdf

Heckman, J. J., & LaFontaine, P. A. (2010). The American high school graduation rate: Trends and levels. *The Review of Economics and Statistics*, *93*(2), 244-262.

Lichter, D. T., & Brown, D. L. (2011). Rural America in an urban society: Changing spatial and social boundaries. *Annual Review of Sociology, 37*, 565-592.

Mathews, J. (2006). Dropout data raise questions in two fronts. *Washington Post*, May 23. Retrieved from http://www.washingtonpost.com/wp-dyn/content/article/2006/05/22/AR2006052201187.html

McCaul, E. (1988). *Rural public high school dropouts: Data from High School and Beyond*. Paper presented at the Annual Conference of the New England Education Research Organization, Rockland, ME.

McGranahan, D. A. (2004). The persistence of county high school dropout rates in the rural South, 1970-2000. *Review of Regional Studies*, *34*(3), 288-302.

McNeal, R. B. (1997). High school dropouts: A closer examination of school effects. *Social Science Quarterly*, *78*(1), 209-222.

Michel, L., & Roy, J. (2006). Tracking students over time using surveys. *Washington Post*, May 23. Retrieved from http://www.washingtonpost.com/wp-dyn/content/article/2006/05/22/AR2006052201197.html

Montmarquette, C., Viennot-Briot, N., & Dagenais, M. (2007). Dropout, school performance and working while in school. *The Review of Economics and Statistics*, *89*(4), 752-760.

Olson, L. (2006). The down staircase. In *Diplomas Count: An Essential Guide to Graduation Policy and Rates*. Special issue of *Education Week*, *25*(41S), June 22.

Paasch, K. M. & Swaim, P. L. (1995). More rural students are graduating from high school, but a serious dropout problem remains. *Rural Development Perspectives*, *10*(3), 24-34.

Pallas, A. M. (1987). School dropouts in the United States. In W. T. Denton (Ed.), *Dropouts, pushouts and other casualties* (pp. 23-39). Bloomington, IN: Phi Delta Kappa.

Reeves, E. B., & Bylund, R. A. (2005). Are rural schools inferior to urban schools? A multilevel analysis of school accountability trends in Kentucky. *Rural Sociology*, *70*, 360-386.

Roscigno, V. J. & Crowley, M. (2001). Rurality, institutional disadvantage, and achievement/attainment. *Rural Sociology*, *66*, 268-292.

Rumberger, R. W. (1983). Dropping out of high school: The influence of race, sex, and family background. *American Educational Research Journal*, *20*, 199-220.

Rumberger, R. W. (2011). *Dropping out: Why students drop out of high school and what can be done about it*. Cambridge, MA: Harvard University Press.

Rumberger, R. W., & Lamb, S. P. (2003). The early employment and further education experiences of high

school dropouts: A comparative study of the United States and Australia. *Economics of Education Review*, *22*(4), 353-366.

Strange, M. (2011). Finding fairness for rural students. *Kappan Magazine*, *92*(6), 8-15.

Swanson, C. B. (2009). *Closing the graduation gap: Educational and economic conditions in America's largest cities*. Bethesda, MD: Editorial Projects in Education, Inc.

U.S. Department of Agriculture, Economic Research Service. (2011). *1993 rural urban continuum codes*. Retrieved from http://www.ers.usda.gov/data-products/rural-urban-continuum-codes.aspx

U.S. Department of Labor, Bureau of Labor Statistics. (2011). *National Longitudinal Survey of Youth 1997 Cohort, 1997-2009 (Rounds 1-12)* [Data file]. Produced by the National Opinion Research Center, the University of Chicago and distributed by the Center for Human Resource Research, The Ohio State University, Columbus, OH.

Vartanian, T. P., & Gleason, P. M. (1999). Do neighborhood conditions affect high school dropout and college graduation rates? *Journal of Socio-Economics*, *28*(1), 21-41.