

Data Watch

Research Data in the Economics of Education

Thomas S. Dee, William N. Evans and
Sheila E. Murray

This section will offer a description of data sources that may be of interest to economists. The purpose is to describe what data are available from those sources, what questions can be addressed because of the unique features of the data, and how an interested reader can gain access to the data. Suggestions for data sources that might be discussed here (or comments on past columns) can be sent to William N. Evans, c/o Data Watch, University of Maryland, Department of Economics, College Park, Maryland 20742 or they can be e-mailed to <evans@econ.umd.edu>.

Introduction

Economists have developed a wide variety of policy-relevant, empirical research projects that address the role of education in promoting individual and social welfare. Recent examples include studies on the impact of school spending on educational outputs, the differences between public and private schools, the effects of competition among schools, the determinants of teacher quality, the impact of unions on schools and the consequences of education finance reform. One reason for the proliferation of such empirical studies has been the emergence of high-quality, micro-level data on education. In this paper, we discuss three broad

■ *Thomas S. Dee is Assistant Professor of Economics, Swarthmore College, Swarthmore, Pennsylvania. William N. Evans is Professor of Economics, University of Maryland, College Park, Maryland. Sheila E. Murray is Assistant Professor of Public Policy, University of Kentucky, Lexington, Kentucky, and Visiting Scholar, Northwestern University/University of Chicago Joint Center for Poverty Research, Evanston, Illinois. Their e-mail addresses are <tdee1@swarthmore.edu>, <evans@econ.umd.edu>, and <semurray@nwu.edu>, respectively.*

types of data sets: data on educational institutions, data on educational outcomes at the individual level, and data sets from school reforms and experiments. In each section, we summarize some of the leading surveys, discuss the general availability of the data, and identify some, but certainly not all, of the research that has utilized these data.

This review is by no means exhaustive. We have restricted our attention to analyses of data sets describing primary and secondary education. Moreover, we emphasize data sets that are excellent sources of information but are less well-known and utilized by economists. In particular, two obvious omissions from this review are the National Longitudinal Survey of Youth (NLSY) and the Panel Study of Income Dynamics (PSID). Both are broad-based studies that track people over periods of time, gathering information both on educational attainment and on many other issues as well. An introduction to the NLSY is currently on the web at <http://stats.bls.gov/nlsview.htm>. For an introduction to the PSID, see Duncan, Brown and Stafford (1996) in this journal or <http://www.isr.umich.edu/src/psid/index.html>.

Institutional Data on Schools and Districts

The U.S. Department of Education's National Center for Education Statistics (NCES) and the Governments Division of the U.S. Census Bureau have constructed several useful data sets with detailed institutional information on public and private K-12 schools and school districts, which are summarized in Table 1.¹ For example, the NCES's Common Core of Data (CCD) contains data at the state, district and school levels for the roughly 87,000 public elementary and secondary schools and 17,000 public school districts in the United States. The CCD data are based on annual surveys and are available on CD-ROM and from the NCES website for the 1988-89 through the 1995-96 school year. The school-level data in the CCD reflect basic school characteristics, such as school identity, type and operating status; urban status; student enrollment by grade and race/ethnicity; number of classroom teachers; and number of students who qualify for a free or reduced-price lunch. At the district level, the CCD provides information on the number of instructional and non-instructional employees, students enrolled and the number of high school graduates. Although these institutional data are fairly rich in information on basic

¹ Some NCES data can be downloaded from their website (<http://nces.ed.gov>); information or questions about other data can also be addressed there. Typically, single copies of NCES data sets can be obtained free of charge, while supplies last. Many NCES data sets on CD-ROM can also be purchased for a nominal fee from the Government Printing Office. The NCES is located at 555 New Jersey Avenue NW, Washington, DC 20208. Data from the Governments Division of the U.S. Census Bureau can be downloaded from the Census website <http://www.census.gov>. The Governments Division staff may be contacted by e-mail links on the website or by phone at 1-800-437-4196. The Governments Division is located in Suitland, Maryland; however, mail should be sent to the Governments Division, Bureau of the Census, Washington, D.C., 20233-6800.

Table 1
Summary Information for Institutional Data Sets

<i>Data Set</i>	<i>Unit of Observation</i>	<i>Census or Sample?</i>	<i>Data Frequency</i>	<i>Years Available (Distributor)</i>
<i>from National Center for Education Statistics (http://nces.ed.gov)</i>				
Common Core of Data	School	Census	yearly	1988–97 (Online from NCES) Previous years (NCES staff)
School District Data Book	District	Census	10 years	1990 (Order online from NCES)
Private School Survey	School	Census	2 years	1990, 1992, 1994, 1996 (Online from NCES) 1976–80 (ICPSR)
Schools and Staffing Survey	District/school/ principal/teacher/ student	Sample	3 years	1987, 1988, 1993 (online from NCES)
<i>from Bureau of the Census (http://www.census.gov/govs/www/school.html)</i>				
School District Financial (F-33)	District	Census Sample	5 years yearly	1962–87 (ICPSR) 1992–95 (Online)
School District Employment	District	Census Sample	5 years yearly	1962–87 (ICPSR) 1992 (Online)
School District Mapping Files	District	Census	10 years	1970 (NCES staff) 1980 (ICPSR)

characteristics and educational resources, they lack data on student outcomes, such as average school test scores. However, in a growing number of states (29 in the 1995-96 CCD), school districts are providing consistently defined dropout data by grade (7-12), gender, race and ethnicity (Dee, 1998).

The CCD also contains merged district-level data on revenues by source, expenditures by function and fall enrollments from the School District Financial (F-33) Files, which are collected jointly by NCES and by the Governments Division of the U.S. Bureau of the Census. The F-33 surveys are sent annually to a sample of school districts and to all districts in years ending in a zero, two or seven. The Governments Division also collects data on school district employment, salaries and union participation. These data are not included in the CCD, but can be found in the Census of Governments' Employment File.

The F-33 files for 1992 through 1995 are downloadable from the Census Bureau's web page at (<http://www.census.gov/govs/www/school.html>) and on the CCD CD-ROM available from the NCES. Earlier F-33 files are only available from various NCES researchers. The NCES website has a list of all staff members and their research areas that may prove useful in trying to locate these historical files. The Census of Governments Financial and Employment data from 1962-1987 are available from the Inter-university Consortium for Political and Social Research

(ICPSR) at <http://www.icpsr.umich.edu> and from the staff at Census Bureau's Governments Division for 1992. Almost all of the F-33 data are included in these files. However, district enrollment data are not given for the 1500 districts that depend on a city or a county for taxing authority.

A few notes of caution are appropriate when using the F-33 data. Not all the districts are independent operating entities that actually instruct students. For example, a county with a large number of districts may collect money centrally in an administrative district and distribute those funds to operating districts. In 1992, almost 7 percent of the more than 16,000 districts surveyed reported no students. More importantly, surveys and accounting procedures differ over time and across states, making it difficult to distinguish spending between functional components such as instructional and administrative expenditures. Murray, Evans and Schwab (1998), Murray (1995), and Card and Payne (1998) discuss these issues in more detail.

The Census Bureau and NCES have also produced special district-level tabulations of the socioeconomic information available from the 1970, 1980 and 1990 Censuses. These "Census mapping files" include data on median household income, median housing value, the poverty and "at risk" status of children, the educational attainment of householders, the languages spoken at home and the types of school (public or private) children attend. The 1980 district-level Census data are available from the Inter-university Consortium for Political and Social Research while the 1970 Census data are available only from NCES staff. District-level data from the 1990 Census are available on CD-ROMs in the NCES's School District Data Book. The School District Data Book also includes merged data from certain CCD and F-33 surveys. Extracting data from these CD-ROMs for a national cross-section of districts is fairly tedious. However, some of the School District Data Book's most frequently used variables are available in the "Top 100" data file which is found on each CD.

The Private School Survey (PSS) from the NCES is the primary source of institutional data on all private elementary and secondary schools. The PSS data for the 1976-80 period are available from the ICPSR and the data from four more recent biennial surveys (1989-90 through 1995-96 school years) may be ordered by contacting NCES staff. The PSS reports data on student enrollments, the number of teachers and high school completions as well as information on basic school characteristics like identity, religious affiliation, program emphasis, coeducational status and the length of the school day and year. Unfortunately, this survey does not include questions about tuition and fees.

The NCES collects more detailed information on both private and public K-12 institutions through the Schools and Staffing Survey (SASS), which was administered during the 1987-88, 1990-91 and 1993-94 school years. Although SASS was originally intended to be a triennial survey, it is not scheduled to be fielded again until the 1999-2000 school year. SASS is actually a set of surveys with four core components: the Teacher Demand and Shortage Survey, the School Principal Survey, the School Survey, and the School Teacher Survey. During the 1993-94

school year, SASS integrated the survey responses from 13,274 schools and administrators, 68,284 teachers and 5,459 school districts. These responses provide nationally representative data on the training, compensation and availability of teachers, on school policies and administrators, as well as data on available school programs and services like the National School Lunch Program and specific programs for remedial, gifted and bilingual students, health care, drug abuse prevention and counseling. Each SASS cycle also included a Teacher Follow-up Survey, administered one year after the original survey, which collected information on employment, teaching status, future plans and opinions. The 1993-94 SASS also included special questionnaires on library resources and a student-records questionnaire that linked to teachers and schools the information available in student records such as courses taken, grade point average, attendance, programs and services used. In contrast to the private school survey discussed above, tuition information is included as part of the SASS for private schools. "Restricted-use" versions of SASS allow linkages to the additional institutional data available in the CCD and Private School Survey. Restricted-use NCES data files contain information about geographic location or school and district identity. These variables are excluded from public-use files to preserve the confidentiality of schools, staff and students. The restricted-use files can be used by a researcher at their own institution, but require the researcher to establish a computer security procedure to insure the confidentiality of the data. Complete instruction on obtaining a restricted-use license can be found on the NCES website at (<http://nces.ed.gov/licenses.html>).

These institutional data on schools and districts have been employed in a variety of contexts. Data from the CCD have been used by Boozer, Krueger and Wolkon (1992) to measure the differences in educational resources for black and white students, by Cullen (1997) to investigate the incidence of spending on special education in Texas, and by Cullen and Figlio (1998) to measure the financial gain from reclassifying a student as disabled. Wyckoff (1992) used data from various F-33 files to compare within-state measures of spending inequality. Evans, Murray and Schwab (1997) and Murray, Evans and Schwab (1998) used the F-33 to examine whether court-mandated school finance reform altered the distribution of within-state public school resources. Hoxby (1998) also used the F-33 to consider the incentives for local school districts to tax local property, given state funding formulas. The data from SASS have been used by Ballou and Podgursky (1993) and Verdugo and Schneider (1994) in studies of teacher compensation and attitudes and by Figlio (1997) in research that examines whether tax revolts influenced student-teacher ratios and teacher salaries.

In some cases, these institutional data sets can be combined with student outcome data such as test scores, high school completion and wages. Using a panel data of school district resources from the Census of Governments and the educational attainment of 16-19 year-old residents from the Census Mapping Projects, Hoxby (1996) examined the impact of teachers' unions on student outcomes. Dee (1998), using data from the CCD, Private School Survey and 1990 Census, presents

evidence on how competition from private schools influences high school completion in neighboring school districts. Card and Payne (1998) related within-state variation in school spending from the 1977 and 1992 F-33 to within-state differences in SAT data from the College Board.

Student-Level Data Bases

The institutional data discussed in the previous section provide important detail on the structure of education in the United States but relatively few measures of student outcomes. Fortunately, such outcome measures are available in a number of longitudinal and cross-sectional data sets. The availability of student-level data is summarized in Table 2.

The NCES has conducted three major longitudinal surveys of elementary and secondary school students: the National Longitudinal Survey of 1972 (NLS-72), High School and Beyond (HS&B) and the National Education Longitudinal Survey of 1988 (NELS:88). NLS-72 began with a sample of about 19,000 high school seniors enrolled during the spring of 1972. The 1973 follow-up interviews added about 4,500 new respondents. Additional follow-ups of this sample were conducted in 1974, 1976, 1979 and 1986. HS&B began with surveys of the students who were high school seniors and sophomores in 1980. The 1980 senior cohort to HS&B was selected to be directly compared to the original NLS-72 sample. Samples of both cohorts were re-surveyed in 1982, 1984 and 1986 and the sophomore cohort was re-surveyed again in 1992. There are no plans for any additional follow-ups to either the NLS-72 or HS&B surveys. NELS:88 began with a nationally representative sample of 8th graders in 1988. This base-year sample included data from almost 25,000 students in 1,052 public and private schools. There have been three biennial follow-ups to the NELS:88 survey and a fourth follow-up is planned for the year 2000. Interviews of school administrators and teachers were also conducted in the base year and the first two follow-ups. Additionally, a parent was surveyed in both the base year and second follow-up. Unlike HS&B, additional students were added to the NELS:88 panel in the first two follow-ups to provide nationally representative cross-sections of high school sophomores and seniors. Given the timing of these surveys, pooled data from NLS-72, the HS&B senior cohort and NELS:88 provide nationally representative data on the high school classes of 1972, 1982 and 1992.

These three surveys are similar in many respects. Each uses a two-stage sample design where schools are selected first and then students are sampled from the school. All three surveys include detailed baseline data about the students, their families and their schools. Each also contains at least some transcript data as well as detailed characteristics of the schools that students attend. However, these surveys also have particular strengths and weaknesses. NLS-72 follows students into their early 30s, but the sample only includes those who made it to their senior year of high school. In contrast, NELS:88 and the senior cohort of HS&B only follow students through their early 20s, while the 1992 follow-up of the HS&B sophomore

Table 2
Availability of Student Level Data

Survey	Survey Years	Type of data (Distributor)
<i>from National Center for Education Statistics at <http://nces.ed.gov></i>		
National Longitudinal Survey of 1972	1972 Base Year/ Follow-ups in 1973, 1975, 1978, 1986	Public use (Order online from NCES)
High School and Beyond	1980 Base Year/ Follow-ups in 1982, 1984, 1986, 1992 (sophomore cohort only)	Public use (ICPSR) Restricted-use (Contact NCES)
National Education Longitudinal Survey	1988 Base Year/ Follow-ups in 1990, 1992, 1994, 2000 (expected)	Public use (Order online from NCES) Restricted-use (Contact NCES)
National Assessment of Educational Progress	Annually 1969–1979 Biennially 1980 to present	Public use 1969–1979 (ETS) Restricted use, 1980–on (Contact NCES)
<i>from Bureau of the Census at <http://www.census.gov/govs/www/school.html></i>		
October Current Population Surveys	Annually beginning 1968	Individual years 1968–95 (ICPSR) Uniform file, 1968–1997 (Unicon Corp, < www.unicon.com >)
Public Use Micro-Data Samples	Decennially 1940–1990	1940–1990 (ICPSR) 1970–1990 (CIESIN, < www.ciesin.org >) 1980, 1990 (Bureau of the Census)

cohort follows students through their late 20s. NELS:88 and the sophomore cohort of HS&B provide data on students who dropped out earlier in high school. Most of the family background information in NLS-72 and HS&B is reported by the students themselves, generating high non-response rates for such questions as family income or parent's education. In contrast, NELS:88 contained a much larger survey of parents than HS&B, probably generating better data for these family background variables. Unlike NLS-72, which has only baseline standardized exam scores, the sophomore cohort of HS&B and original NELS:88 respondents have re-test results for exams. However, the sophomore cohort of HS&B was given the same exam in both the sophomore and senior years, while in the NELS:88 sample, students who performed better on the base-year exam were given more difficult exams in subsequent years.

Public-use versions of NLS-72 and NELS:88 that contain individual-level data can be obtained at no cost on CD-ROM from the NCES. The data sets can also be purchased for a nominal fee from the Government Printing Office. Given the detailed information available about students in the later follow-ups to the HS&B survey, NCES no longer provides public use versions of any HS&B files with access

to individual-level records. The only public use data from HS&B that NCES provides are cross-tabulations of results that can be generated with the NCES Data Analysis System. Some HS&B data sets with individual-level data are still available from ICPSR. Additionally, restricted-use versions of HS&B that contain individual-level records are available for those who obtain an NCES restricted-use data license. A restricted-use version of NELS:88 is also available. The restricted-use versions of HS&B and NELS:88 contain more detailed information about the student and/or school such as the state in which the school is located. The restricted-use version of NELS:88 can also be linked to the institutional and census data discussed in the previous section.

Economists have used these longitudinal data sets to address a wide array of interesting and policy-relevant questions. Altonji (1995) used the NLS-72 to examine the impact of course selection on labor market outcomes. Murnane, Willett and Levy (1995) used both the NLS-72 and HS&B in their analysis of the importance of cognitive skill in wage determination. Much of the early work with HS&B analyzed the differences between public and private schools (Coleman, Hoffer and Kilgore, 1982; Coleman and Hoffer, 1987; Goldberger and Cain, 1982; Sander and Krautmann, 1995; Evans and Schwab, 1995). HS&B has also been used to analyze such topics as racial differences in job market outcomes (Grogger, 1996), the impact of teacher characteristics (Ehrenberg and Brewer, 1994; Ehrenberg, Goldhaber, and Brewer, 1995), and school tracking (Argys, Brewer and Rees, 1996). McLanahan and Sandefur (1994) used NELS:88, HS&B and other data sets to analyze the impact of family structure on child outcomes.

The most widely cited data on trends in test score performance are from a cross-sectional data set, the National Assessments of Educational Progress (NAEP). The Department of Education refers to the NAEP as the "Nation's Report Card" and according to one specialist in the field, the NAEP provides "the only dependable national index for monitoring the performance of our schools" (Bock, 1986). NAEP exams were given annually from 1969-1979, and every two years since. The most frequently administered exams have been in reading, mathematics and science. National NAEP exams are administered to two separate samples: one designed to continue measuring trends in performance over time, the other designed to compare performance at a point in time. The trend samples are administered to students aged 9, 13 and 17, while the cross-sectional samples are administered to students in 4th, 10th, and 12th grade. Both samples include information from private and public schools. Starting in 1990, a separate NAEP sample was started to provide state-level estimates of the academic performance of 4th and 8th grades. Until 1994, only public schools were sampled in these state samples; private schools were added in 1994. By 1996, 47 states participated in the state sample. In the trend samples, there is basic demographic data about the students (race, ethnicity, sex, and so on) but limited information about the students' home life, with the only consistent family variable over the years being parents' education. As other samples and surveys have been added over time, the size of the trend sample has been

reduced greatly. For example, over 72,000 students were surveyed for the 1971 reading exam but only 15,000 were included in the 1996 test.

Cross-tabulations from various NAEP exams are downloadable from the NCES web page. The primary outcome results from these NAEP are “scaled scores” where values are calculated by “item response theory” (IRT). IRT is a method that is used to weight questions by the degree of difficulty and the individual’s performance on other questions. These adjustments are made because NAEP is a multiple-choice exam, and not all students receive the same set of questions. Individual-level data are available on public release data files for all NAEP exams prior to 1990 from the Educational Testing Service (ETS) at (<http://www.ets.org>). The public use files are available on 9-track tape and cost a few thousand dollars per exam. Starting with 1990, there are no public use versions of NAEP data sets that contain individual-level scores. However, restricted-use data files on CD-ROM are available from NCES. Data from the NAEP have been used by only a handful of economists, including Fuchs and Reklis (1994), Grissmer et al. (1994) and Cook and Evans (forthcoming).

Data on one of the most familiar measures of student achievement, the SAT, are also available from the College Board. For example, Card and Payne (1998) use random samples of scores at the individual level for the 1978-1992 period. These scores are matched to individual data from the Student Descriptive Questionnaire. In this survey, students voluntarily give family background information, such as basic demographic data (age, race, sex and grade), information about their high school (public/private, size, state) and curriculum. These data may be purchased from the College Board at (<http://www.collegeboard.edu>).

Several surveys periodically conducted by the federal government are also a useful source of cross-sectional data on educational outcomes. In particular, data from the Current Population Surveys (CPS) and the Public-Use Micro-Data Samples (PUMS) associated with the decennial censuses are frequently employed in educational research. Information on years of completed schooling are available in the 1940-1980 PUMS and the CPS through 1991. Starting with the 1990 Census and the January 1992 CPS, questions on educational attainment were changed to a degree-based format (Kominski and Siegel, 1992). Questions about school enrollment, current grade and type of school are also available from the Census samples listed above. In the 1970 and 1980 PUMS, researchers can combine information on current grade of enrollment, quarter of birth and age to identify whether a student of a particular age is progressing in school with others from their cohort (Angrist and Krueger, 1992; Bronars and Grogger, 1994). The ability to use this grade-for-age outcome is limited in the 1990 PUMS, because quarter of birth is not reported and because only broad grade ranges are listed for students enrolled in grades 1-4 and 5-8.

The School Enrollment Supplements to the October CPS provide, for all respondents aged three and up, information about whether they are currently enrolled in school, at what grade level, their enrollment in the previous year, and the type of school. In months other than October, school enrollment is also

recorded for those aged 16-24 but this information is only available beginning in 1985. In some years, other questions have been added to the October enrollment supplement. For example, supplemental questions have been asked about computer usage (in 1984, 1989 and 1993), grade repetition (1992), disability status (1992, 1995), private school financing (1991), whether parents read to their infant children (1990), enrollment in English as a second language courses (1995), and summer school enrollment (1996). Since 1988, the October supplement has also identified whether high school graduates received their degree as a result of a GED exam. These data may prove useful in analyzing whether earning a GED improves labor market outcomes. Cameron and Heckman (1993) and Tyler, Murnane and Willet (1997) present conflicting evidence on this point.

Yearly school enrollment supplements from 1968 through 1996, as well as a uniform file for 1968-1990, are available from the ICPSR. Uniform files for the 1968-1997 time period can also be purchased from the Unicon Corporation on a CD-ROM that includes a data extraction program. This data set costs \$750 and is easy to use. PUMS data for most years are available from ICPSR and CD-ROMs with 1980 and 1990 PUMS data can be purchased from the Bureau of the Census. The 1980 5-percent sample costs \$700 for the five-CD set, while the 1990 data costs \$450 for a seven-CD set. Researchers can also obtain data extractions from various PUMS from 1940-1990 from the Center for International Earth Science Information Network (CIESIN) at (<http://www.ciesin.org>).

The Future and Present

States and school districts have embarked on variety of ambitious education reforms and experiments. The need for sound empirical evaluations of these activities has generated new data sources that can inform many of the questions central to the economics of education. Some of the more recent examples of school, district or state-specific data sets can be found in Krueger's (1997) analysis of the Project STAR in Tennessee and Rouse's (1998) analysis of the Milwaukee school choice experiments. Public use versions of these data sets are available on the web at (<http://www.nashville.net/~heros/star.htm>) and (http://dpls.dacc.wisc.edu/choice/choice_index_html), respectively. An ambitious data collection effort called the Harvard/University of Texas-Dallas Texas Schools Project is described in Hanushek, Kain and Rivkin (1998). These data are not yet publicly available but efforts are underway to provide a public-use version. As experiments and reforms proliferate, so too will the number of high-quality detailed data sets for particular schools or areas. Such data sources provide a provocative and policy-relevant area for continued growth in research on the economics of education.

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