Economic assumptions

Various economic variables are used in the forecasting models for numbers of elementary and secondary teachers, public elementary and secondary school expenditures, and postsecondary enrollment.

The source of these variables is the trend scenario of the "U.S. Monthly Model January 2012: Short-Term Projections" developed by the economic consulting firm IHS Global Insight. The trend scenario depicts a mean of possible paths that the economy could take over the forecast period, barring major shocks. The economy, in this scenario, evolves smoothly, without major fluctuations.

More information about specific assumptions

For details about the primary assumptions used in this edition of *Projections of Education Statistics*, see table A-1 on page 84.

Accuracy of the projections

Projections of time series usually differ from the final reported data due to errors from many sources. This is because of the inherent nature of the statistical universe from which the basic data are obtained and the properties of projection methodologies, which depend on the validity of many assumptions.

The mean absolute percentage error (MAPE) is one way to express the forecast accuracy of past projections. This measure expresses the average absolute value of errors over past projections in percentage terms. For example, an analysis of projection errors over the past 28 editions of *Projections of Education Statistics* indicates that the MAPEs for public school enrollment in grades PK–12 for lead times of 1, 2, 5, and 10 years were 0.3, 0.6, 1.3, and 2.6 percent, respectively. For the 1-year-out projection, this means that one would expect the projection to be within 0.3 percent of the actual value, on average.

For a list of MAPEs for selected national statistics in this publication, see table A-2 on page 85. Sections A.1 through A.5 each contains at least one text table (tables A through F) that presents the MAPEs for the key national statistics of that section. Each text table appears directly after the discussion of accuracy of that section's national projections. For a list of MAPEs by state and region for public elementary and secondary enrollment, see tables A-7 through A-9 on pages 94–99 and for a list of MAPEs by state and region for the number of high school graduates in public schools, see table A-10 on pages 104–105.

Tables A-3 and A-4 present an example of how the MAPEs were constructed using actual values for national public elementary and secondary enrollment projections for schools years 2007 through 2010 and enrollment projections from the last four editions of *Projections of Education Statistics*. The top two panels of table A-3 shows the actual values for school years 2007 through 2010 and enrollment projections for each year from *Projections of Education Statistics to 2017* with the number of projections generally decreasing by one for each subsequent edition. The bottom panel of table A-3 shows the percentage differences between the actual values and the projected values. For example, the projected value for 2007 presented in *Projections of Education Statistics to 2017* was 0.7 lower than the actual value for that year.

The top panel of table A-4 shows the absolute value of the percent differences from table A-3 arranged by lead time rather than year. For example, in the *Projections of Education Statistics to 2018*, the last year of actual data reported was 2006–07 and thus the lead time for the projection of 2007–08 data was 1 year. Thus, the 0.4 appearing in the 2007–08 column of Table A-3 for *Projections of Education Statistics to 2018* appears in the column for lead times of 1 year in Table A-4, indicating that projection of the one-year-out forecast from *Projections of Education Statistics to 2018* differed by 0.4 percent in absolute terms from its actual value. The MAPEs for each lead time shown in the bottom panel of table A-4 were calculated by computing the average of the absolute values of the percentage differences for that lead time. For example, the absolute values of the percentage differences for lead time 2 for the four editions of the *Projections of Education Statistics* appearing on the top panel table A-4 are 0.7, 0.7, 0.1, and 0.4. The MAPE for a lead time of 2 years was then calculated by taking the average of these numbers, or 0.5. This matches the MAPE that appears in the bottom panel for a lead time of 2 years. (Calculations for table A-3 are based on unrounded numbers.) These MAPEs are different from the MAPEs for public elementary and secondary enrollment projections elsewhere in this report because the MAPEs in the example were calculated using only the last 4 editions of *Projections of Education Statistics*.

The number of years used in the analysis of the projection error differs by statistics both because projections of additional education statistics have been added to the report over time and because, for some statistics, there have been such a substantial change in the methodology used to produce the projections that the projections produced using the earlier methodology were not included in the analysis of the projection error. MAPEs are presented for a statistic only after it has been produced using substantially the same methodology in five previous editions of *Projections of Education Statistics.*

Table A-1. Summary of forecast assumptions to 2021

Variable	Assumption
Demographic assumptions	
Population	Projections are consistent with the Census Bureau estimates
18- to 24-year-old population	Census Bureau projection: average annual growth rate of 0.1%
25- to 29-year-old population	Census Bureau projection: average annual growth rate of 0.6%
30- to 34-year-old population	Census Bureau projection: average annual growth rate of 1.3%
35- to 44-year-old population	Census Bureau projection: average annual growth rate of 0.6%
Economic assumptions	
Disposable income per capita in constant dollars	Annual percent changes range between -1.9% and 2.2% with an annual growth rate of 1.4%
Education revenue receipts from state sources per capita in constant dollars	Annual percent changes range between -2.4% and 2.3% with an annual growth rate of 1.3%
Inflation rate	Inflation rate ranges between 1.0% and 2.0%
Unemployment rate (men)	
Ages 18 and 19	Remains between 17.7% and 26.8%
Ages 20 to 24	Remains between 10.8% and 15.6%
Age 25 and over	Remains between 5.3% and 7.9%
Unemployment rate (women)	
Ages 18 and 19	Remains between 14.3% and 19.6%
Ages 20 to 24	Remains between 9.3% and 13.1%
Age 25 and over	Remains between 5.0% and 7.3%

[1] As the Census Bureau projections were not updated to reflect the 2011 Census Bureau population estimates, the Census Bureau age-specific population projections for each year were adjusted by multiplying the ratio of the total Census Bureau estimate for 2011 to the total Census Bureau projection for 2011.
SOURCE: U.S. Department of Commerce, Census Bureau, Population Estimates, retrieved October 16, 2011, from http://www.census.gov/popest/data/index.html; and 2008 National Population Projections, retrieved November 2, 2008, from http://www.census.gov/population/www/projections/2008projections.html; and IHS Global Insight, "U.S. Monthly Model January 2012 Short-Term Projections." (This table was prepared March 2012.)

Table A-2. Mean absolute percentage errors (MAPEs), by lead time for selected statistics in all elementary and secondary schools and postsecondary degree-granting institutions: 2012

Statistic	Lead time (years)									
	1	2	3	4	5	6	7	8	9	10
Public elementary and secondary schools										
Prekindergarten–12 enrollment	0.3	0.6	0.8	1.1	1.3	1.4	1.6	1.9	2.3	2.6
Prekindergarten–8 enrollment	0.3	0.6	1.0	1.3	1.4	1.6	1.9	2.4	2.8	3.3
9–12 enrollment	0.4	0.7	0.9	1.1	1.2	1.5	1.8	2.2	2.4	2.5
High school graduates	1.0	1.0	1.5	1.6	1.5	2.0	2.7	3.7	4.3	4.3
Elementary and secondary teachers	0.8	1.4	1.7	2.2	2.8	3.4	3.9	4.3	5.0	5.9
Total current expenditures	1.3	2.1	2.0	2.1	2.6	3.3	3.9	4.1	4.0	4.0
Current expenditures per pupil in fall enrollment	1.3	2.1	2.0	2.0	2.9	3.6	4.3	4.6	5.2	5.2
Private elementary and secondary schools										
Prekindergarten–12 enrollment	3.4	4.6	3.7	7.2	7.7	10.6	9.3	9.4	8.1	6.3
Prekindergarten–8 enrollment	3.5	4.9	4.1	8.0	9.2	12.1	10.6	10.4	10.2	7.9
9–12 enrollment	3.0	3.8	2.3	4.3	2.8	5.8	5.7	6.1	1.3	1.3
High school graduates	0.9	0.9	1.6	2.8	5.0	6.2	4.9	4.8	1.6	1.6
Postsecondary degree-granting institutions										
Total enrollment	1.7	2.6	3.6	4.7	5.3	6.2	7.6	9.4	11.7	13.1
Men	1.7	3.0	4.2	5.5	6.3	7.0	8.1	9.8	11.7	13.3
Women	1.8	2.6	3.7	4.3	4.6	5.6	7.2	9.0	11.7	12.9
4-year institutions	1.8	3.0	4.0	5.4	6.0	7.0	8.5	10.6	13.1	14.8
2-year institutions	2.2	3.2	4.2	4.8	5.0	5.0	5.9	7.1	9.4	10.1
White	1.1	2.4	3.9	5.5	6.7	7.4	—	—	—	—
Black or African American	4.2	8.8	12.5	15.8	19.0	20.5	—	—	—	—
Hispanic or Latino	4.2	8.6	12.1	15.5	18.9	22.1	—	—	—	—
Asian/Pacific Islander	2.6	5.0	5.7	7.0	6.0	4.7	—	—	—	—
American Indian/Alaska Native	5.2	4.1	5.6	3.3	2.4	5.0	—	—	—	—
Nonresident alien	2.7	4.8	7.8	9.5	7.3	2.1	—	—	—	—

— Not available.
[1] MAPEs for public prekindergarten–12 enrollments were calculated using the last 28 editions of *Projections of Education Statistics.*
[2] MAPEs for public high school graduates were calculated from the past 21 editions of *Projections of Education Statistics.*
[3] Data for teachers expressed in full-time equivalents. MAPEs for teachers were calculated from the past 20 editions containing teacher projections.
[4] In constant dollars based on the Consumer Price Index for all urban consumers, Bureau of Labor Statistics, U.S. Department of Labor. MAPEs for current expenditures were calculated using projections from the last 20 editions containing current expenditure projections.
[5] MAPEs for private prekindergarten–12 enrollments and high school graduates were calculated from the past 10 editions.
[6] MAPEs for postsecondary degree-granting institution enrollments were calculated using the last 14 editions of *Projections of Education Statistics.*
NOTE: Mean absolute percentage error is the average value over past projections of the absolute values of errors expressed in percentage terms. No MAPEs are presented for degrees conferred as the current models used for producing these projections have only been used for two other editions of *Projections of Education Statistics.* Calculations were made using unrounded numbers. Some data have been revised from previously published figures.
SOURCE: U.S. Department of Education, National Center for Education Statistics, *Projections of Education Statistics*, various issues. (This table was prepared February 2012.)

Table A-3. Example of constructing mean absolute percentage errors, part 1

Source	Year of data			
	2007–08	2008–09	2009–10	2010–11
	Enrollment, in thousands			
Actual	49,293	49,266	49,373	49,484
	Projected enrollment, in thousands			
Projections of Education Statistics to 2017	49,644	49,825	50,067	50,353
Projections of Education Statistics to 2018	49,470	49,623	49,788	50,034
Projections of Education Statistics to 2019	†	49,265	49,312	49,386
Projections of Education Statistics to 2020	†	†	49,282	49,306
	Percentage difference between actual and projected values			
Projections of Education Statistics to 2017	0.7	1.1	1.4	1.8
Projections of Education Statistics to 2018	0.4	0.7	0.8	1.1
Projections of Education Statistics to 2019	†	#	-0.1	-0.2
Projections of Education Statistics to 2020	†	†	-0.2	-0.4

† Not applicable.
# Rounds to zero.
NOTE: Some data have been revised from previously published figures. Calculations are based on unrounded numbers.
SOURCE: U.S. Department of Education, National Center for Education Statistics, Common Core of Data (CCD), "State Nonfiscal Survey of Public Elementary/Secondary Education," 2005–06 through 2010–11; and *Projections of Education Statistics*, various editions. (This table was prepared March 2012.)

Table A-4. Example of constructing mean absolute percentage errors, part 2

Source	Lead time (years)			
	1	2	3	4
	Absolute value of percentage difference between actual and projected values			
Projections of Education Statistics to 2017	†	0.7	1.1	1.4
Projections of Education Statistics to 2018	0.4	0.7	0.8	1.1
Projections of Education Statistics to 2019	#	0.1	0.2	†
Projections of Education Statistics to 2020	0.2	0.4	†	†
	Mean absolute percentage error			
Example	0.2	0.5	0.7	1.3

† Not applicable.
# Rounds to zero.
NOTE: The mean absolute percentage errors presented on this table are for illustrative purpose only. Calculations are based on unrounded numbers.
SOURCE: U.S. Department of Education, National Center for Education Statistics, Common Core of Data (CCD), "State Nonfiscal Survey of Public Elementary/Secondary Education," 2005–06 through 2010–11; and *Projections of Education Statistics*, various editions. (This table was prepared March 2012.)