LAST SET OF ESTIMATES BEFORE 2020 APPORTIONMENT
Births down; deaths up; net migration down; overseas unclear

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CLARK BENSEN[1]
POLIDATA ® Political Data Analysis

Executive Summary. For the final time before the first results are released from the upcoming federal Census of 2020, the Bureau of the Census has released their last set of state-level annual estimates. Based upon the release of the estimates as of July 1, 2019 the general trends of the past few decades of population shifting away from the Northeast and Midwest regions to the South and West continue.

By using the latest estimates the most recent growth trends can be extended out nine months to April 1, 2020 to project what seat shifts are likely to occur once the data from the full count is released at the end of that year. The apportionment that will be made after the 24th federal census will determine the number of members of the U.S. House for the 118th Congress to be elected in 2022 and the number of electoral votes for the 2024 and 2028 presidential elections.

These projections are subject to some margin of error for several reasons but if the growth patterns over the previous year, i.e., based simply on the rates from July 2018 to July 2019, continue, 17 states would likely experience actual shifts in the number of members in their delegations. Ten states would lose one seat each; five states would gain one seat each; and two states (FL and TX) would gain two and three seats, respectively. Seven of the ten states losing a seat are in the Northeast or Midwest (RI, NY, PA, OH, MI, IL, and MN). All seven of the states gaining at least a seat are in the South and West (NC, FL, TX, CO, AZ, MT, and OR). The others losing a seat include WV, AL, and, for the first time, CA.

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[1] Clark H. Bensen, B.A., J.D., is a consulting data analyst and attorney doing business as POLIDATA ® Political Data Analysis and a publisher of data volumes operating as POLIDATA ® Demographic and Political Guides. POLIDATA has been analyzing the annual estimates and using projections for apportionment since the 1980s. (See http://www.polidata.org/news.htm).

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Growth Trends. Nationally, the one-year growth was a net 1.5 million persons, a rate of 0.5%, which means 328.2 million persons for the 50 states and DC. If this rate continues through to the 2020 Census date there would be 329.4 million persons in the nation; a growth rate of 6.7% for the decade. In comparison the national growth rate for the 2000-2010 period was 9.7% and the rate for the 1990-2000 period was 13.1%. The growth rate for this decade, which was about 0.7% annually, slowed after the release of the 2017 estimates to 0.5% with this most recent release. This means that the average persons per member of the U.S. House, which was anticipated to be 762,000 persons as recently as 2017, would now be 756,000.

States that experienced a growth rate similar to the nation include Indiana, North Dakota, New Hampshire, and Nebraska. The five states with the highest rates over the past year include Idaho (2.1%), Nevada (1.7%), Arizona (1.7%), Utah (1.7%), and Texas (1.3%). Ten states experienced zero net growth or an actual net loss of population: West Virginia (-0.7%), Alaska (-0.5%), New York and Illinois (-0.4%), Hawaii (-0.3%), Connecticut, Mississippi, and Louisiana (-0.2), and Vermont (-0.1%). Even in some more populous states, including California, Pennsylvania, Ohio, and Michigan, the net growth was 0.1% or less.

At this rate there would be eight states, including the District of Columbia, that would see an increase of more than 15% by 2020: District of Columbia (at 17.8%), Utah (17.4%), Texas (16.4%), Idaho (15.8%), Nevada and Colorado (15.5%), Arizona (15.3%), and Florida (15.2%). California will remain the most populous state for some time because at 39.6 million persons it would be far ahead of second-place Texas at 29.3 million. Third place would continue to be Florida at 21.7 million which has now outdistanced the former holder of that spot, New York with 19.4 million in fourth.

The states in spots five to ten are more evenly sized, from fifth-place Pennsylvania at 12.8M; Illinois at 12.6M; Ohio at 11.7M; Georgia at 10.7M; North Carolina at 10.6M; and Michigan at 10.0M. Yet, despite disparate growth patterns in these 10 states, they would still collectively account for 54% of the nation's population.

There would be seven states and DC below 1,000,000 by 2020. The two smallest states would be Wyoming at 580,000 and Vermont at 624,000. DC would be next in line at 709,000; then Alaska at 729,000; North Dakota at 765,000; South Dakota at 890,000; and Delaware at 980,000. The District and North Dakota experienced the largest growth of these least populous states while Vermont would be the only one of these to have a net loss of population over the decade.

Components of Change. Regionally, the Northeast and Midwest would gain about 1.6% (1.1% and 2.2% respectively) over the decade while the South and West would gain about 9.8% over the decade (10.3% and 9.4% respectively). More on these numbers can be discerned by reviewing the estimate charts which illustrate the components of change which include the rates (per thousand persons) for births, deaths (which are net natural increase) foreign migration, and domestic migration (which is net migration).

In all four regions births exceeded deaths each year over the decade though with a birth rate of 4.24 per 1,000 persons in the West, the balance was the greatest in favor of births. With respect to the comparison of foreign migration to domestic migration, the West also had the edge because it had a rate of 2.5 for foreign and 1.1 for domestic migration. In the South these two rates were nearly in balance at 2.9 and 3.1 respectively. However, in both the Northeast and Midwest the two rates were on the opposite side of the scale. The Northeast had a rate of 3.6 foreign migration and -4.9 domestic migration; the Midwest saw a similar trend at 1.8 and -2.6 respectively.

As can be gleaned from the above discussion, numerous states have seen a negative net domestic migration each year through the decade. As an example of this trend, New York has seen a net gain of 58k from births over deaths, with a net gain of 46k from foreign migration, but a net loss of 181k from domestic migration. The three states with the highest net foreign migration rates are FL, MA, and DC. The three states with the highest net domestic in-migration are ID, NV, and AZ. The three with the highest net domestic out-migration are AK, HI, and NY.

Overall, the ratio of natural increase to net migration has become far more balanced this decade though still in favor of natural increase. This is largely due to a) a slight dip in the births with a corresponding increase in deaths which results in a decline in the natural increase while b) the average net

migration has stayed about the same. However, both of these factors are at a low point for the end of each decade with the number of births over deaths at 0.956 million for 2019 and the net migration with a net of 0.595 million immigrants from July 1, 2018 to July 1, 2019.

For the last five years of estimates from the previous decade, 2005-2009, while the average population was 302 million, the average natural increase (births minus deaths) was 1.8 million and the average foreign migration was 1.0 million, a ratio of 1.80 in favor of natural increase. For the corresponding five years for this decade, 2015-2019, while the average population was 325 million, the average natural increase (births minus deaths) was 1.2 million and the average foreign migration was again about 1.0 million, a ratio of 1.23 in favor of natural increase. On average, while the ratio of natural increase over net migration was greater in favor of natural increase for the 2000s (1.80), the births over deaths decreased while the net migration stayed the same and thus the ratio decreased (1.23).

Projections. The most basic of projections uses the one-year growth rate and extends it out, in a year-by-year compounding manner, to the last year of the decade; this is the A-series. The only generic adjustment is thus applying 75% of the last year's growth to account for the fact that as the record date for the census is April 1 and thus the last 'year' is only nine months long.

Other means of projection can easily be employed and the two used here for comparative purposes to the A-series are the B-series in which a simple average of the two-year rates is used as the compounding factor or the C-series in which a weighted average (using the most recent rate at twice the value of the previous rate) is used as the projection factor. In most situations the differences between the three series, if any, are no more than one or possibly two seats. As this is the last set of the decade, the differences in the projections were minor.

Overseas Persons. Additional considerations for projections include some adjustment for the overseas population. This may include those serving in the military; non-military federal government personnel; and others. The difficulty here is that there is no estimate of these persons throughout the decade and they are only available, or have been so far, at the end of the decade from a review of administrative records. Some similar issues arise with group quarters populations.

In addition, there has been some change in the manner by which this information will be reported for the 2020 Census. Obviously, these numbers could affect the apportionment depending on the state to which each overseas person is assigned. There were 1.04M overseas persons added to the 2010 Apportionment numbers with TX, FL, and CA accounting for about 1/3 of them. There is some inconsistency in this information and such persons were not included for the 1980 Apportionment. Nevertheless, because the apportionment formula is sensitive to small differences in persons, the addition of overseas personnel can shift a seat. Of course, any gain in a state's population may be offset by a gain in another state so it is more than simple arithmetic based upon the current projections.

An additional complication is that while these persons may be included in the apportionment population, they are not included in the redistricting population base when lines are drawn in each state. This is basically due to the mission of the Census Bureau to count every person, count them only once, and in the right place, i.e., the census block that contains their place of usual residence. Overseas persons are not resident in the state for purposes of districting and do not have their 'own' member of the U.S. House, although their 'residence' in the state may well affect representation for the state in the House. In sum, it is unclear at this point just what additional population could be used to provide a better prognostication for the actual apportionment.

Apportionment Formula. The operative concept for the apportionment formula, the method of equal proportions, is relativity. States which experience a population growth or loss much higher or lower than the nation are most likely to be affected by the shift in seats but the purpose of the apportionment formula is to minimize the relative difference in population per member as between any pair of states.

However, regardless of the relative differences, there are absolute standards which come into play by the application of the formula. Even though a state may experience a growth rate larger than the nation that does not mean it will get an additional seat. Absolute growth, in terms of actual persons, is a limiting

factor. Likewise, as California, still the nation's largest state, gains many millions of persons, it must be remembered that millions of persons would be needed just to keep pace with the nation's relative growth rate.

State Summary. As mentioned above, seventeen states are likely to see a shift in seats based upon the most-recent growth rates. Obviously, there is no guarantee these shifts will occur though the odds are in favor of most as they are already occurring with these estimates. The unforeseen shifts that can upset the 'expected' shifts can be caused by several factors: a) a change in the direction or quantity of the most-recent growth rate of a state; b) the addition of the overseas personnel; c) states for which the current last seat rank is near the 435 cutoff; and d) simply due to the lack of precision on the estimates or the projections. In fact, the rate of growth has been slowing since the estimates released in 2017.

As the annual estimates are released, they include revisions of the previously released estimates. In most cases there is a clear trend in each set of releases. However, in others the trends appear mixed, akin to a hurricane prediction map. An example of this is New York for which the releases through 2017 provided a consensus of steady growth in the state. However, with the 2018 and 2019 releases the high estimate, from 2017 of 19.849 million was reduced 19.590 million for 2017. Thus, the 2019 estimate of 19.454 million is 0.4 million short of the previous estimate for 2017. Other examples for which there is a lack of convergence as to the population trends over the decade include CT, IL, MI, MS, NH, NJ, NM, PA, RI, and VT. It is worth mentioning that several of these are states where a unit below the county is the operative level for such information.

As an example of how the states close to the "bubble" of the 435th seat might change, even without any overseas personnel, consider which states are the closest in terms of additional persons and the trend of that state over the decade. For example, AL is seat 436 based upon these projections, short 10k persons. The apportionment chart for the state based upon the estimates for all years illustrates that it has been close to dropping below the 435 mark for several years.

Similarly, MN has struggled to get above 435, being a few ranks short since the beginning of the decade. Contrast this to the growth patterns of the two states at priority ranks 435 and 436 for the 2010 Apportionment. MN, at 435, had 9k additional persons to have 8 seats while NC, at 436, was 16k persons short. But, unlike MN, which 'lost' the 8th seat at the outset of the decade, NC 'won' the 14th seat at the outset and has continued to growth steadily. However, this is hindsight and irrelevant as the point of the formula is to apportion based upon real numbers at a definitive point in time.

Groups of States by Likely Outcomes: Based upon the estimates from the 2019 release several states have already 'won' or 'lost' a seat based upon the estimates alone or the current projections. These groups are based upon the newly release data which may mean the previously reported 'wins' or 'losses' may not have occurred at the same time as reported in previous analyses. These can be classified into several groups:

1) Gainers:
    a. Already gained: AZ to 10 in 2018; CO to 8 in 2017; FL to 28 in 2016; MT to 2 in 2019; NC to 14 in 2011; OR to 6 in 2015; TX to 37 in 2014; TX to 38 in 2016.
    b. Soon to gain: FL to 29 in 2020; TX to 39 in 2020.
    c. Likely to change soon after 2020: FL to 30 by 2024; ID to 3 by 2022; TX to 40 by 2023; UT to 5 by 2024; WA to 11 by 2023.
2) Losers:
    a. Already lost: CA to 52 in 2019; IL to 17 in 2016, MI to 13 in 2016; MN to 7 in 2011; NY to 26 in 2016; PA to 17 in 2014; RI to 1 in 2018; WV to 2 in 2017.
    b. Soon to lose: AL to 6 in 2020; OH to 15 in 2020.
    c. Likely to change soon after 2020: IL to 16 by 2022; NJ to 11 by 2024; NY to 25 by 2024; PA to 16 by 2024.
3) Too close to call:
    a. Cliffhangers at this point: AL to stay at 7; MN to stay at 8; MT to gain 1 for 2; RI to lose 1 to be a single member at-large state.
    b. Overseas population: even though 1/3 of the numbers from 2010 coming from TX, FL, and CA it is an open question how the revised means of getting these counts may affect other states near the 435 cutoff.

4) Others, trends to mention:
   a. CA was trending slightly up to stay at 53 but began to move downward in 2018.
   b. MI was trending down to 14 seats through 2015 but has leveled off since then.
   c. NJ was trending down slowly through 2017 but has increased the trend since then.
   d. NC saw little increase in the strength of a 14th seat through 2013 but has increased since then.
   e. OH was slowly decreasing in strength through 2013 but has increase since then.
   f. SC saw little increase in the strength of a 7th seat through 2012 but has increased since then.
   g. VA was trending up to 12 through 2012 but then stabilized and decreased.
   h. WA saw little increase in the strength of a 10th seat through 2012 but has increased since then.

Other Apportionment Bases. While the discussion contained herein has focused exclusively on the use of total population, based upon the constitutional term of inhabitants, for the apportionment process, several other population bases may be considered to illustrate the role of two other variables: age and citizenship status and how the different mix of demographics in states affect the political landscape. After all, apportionment is about the distribution of political power for both the seats in the U.S. House and thus the Electoral College.

For example, districts are generally created using the total resident population (i.e., excluding Americans overseas) so that each district has approximately the same number of census persons. For congressional districts there is generally an almost zero tolerance for any deviation but stakeholders disagree over the range of tolerance for other districts from state legislatures to local city councils. The point here is that equality on the basis of census persons affords relative equality in representation to the residents of the districts, regardless of age or citizenship, but it does not necessarily afford equality of electoral weight as not all census persons are entitled to register to vote.

There are three obvious alternative bases which can be used to assess the impact of demographics and growth patterns. These include *voting age population* (VAP); *citizen population*, (CPOP); and *citizen voting age population* (CVAP). The Bureau now releases a separate breakout of the population estimates for the first of these, VAP. The other two require data reported from the American Community Survey (ACS) which is somewhat more complicated operationally and raises questions as to which dataset is the appropriate one.

This is not an endorsement of using the factors for the apportionment process but a means by which the demographic mix does affect apportionment and may also affect redistricting. Due to the large concentrations of noncitizens in a small number of states the recent trend has been that these states are more likely to get a bonus of seats due to the presence of this subset of census persons. However, such analysis will require more discussion and a supplement will be forthcoming.

Electoral College: Of course, seat shifts in an apportionment are likely to have some effect on the presidential elections as well but not much due to the offset of states. The apportionment following the 2020 Census will be used for the 2024 and 2028 elections. Based up these projections the shift in the 2016 election, leaving aside faithless electors, would have shifted a net of 3 votes to the Republicans. Of the 20 states (excludes DC) won by Hillary Clinton there would be a net of -3 (+2 and -5) in seven states and of the 30 states won by Donald Trump there would be a net of +3 (+8 and -5) in ten states. This results in 227 for Clinton and 308 for Trump; an increase of 1 for Trump compared to previous reviews.

Summary: Even though the above observations are discussed in the context of likelihood as if demographic trends do not change they should be reviewed with caution. While it is true that current trends are unlikely to shift too much, especially given the nearness to Census Day, and thus most of the observations will become fact, there are other factors that come into play. Yet, as the growth rates and the apportionment formula stress relativity, the degree to which projections will not play out generally is limited. The main unknown factors for this set of projections include both the overseas population and the degree to which the population estimates will comport with the actual enumeration of the inhabitants of America. Hopefully this discussion of possible scenarios will assist stakeholders in the several states to prepare for the upcoming redistricting phase of the constitutionally mandated apportionment process.

See more about the study at http://www.polidata.org/census/est019dl.htm .