FILED
2021 Feb-17 PM 09:43
U.S. DISTRICT COURT
N.D. OF ALABAMA

EXHIBIT 1

IN THE UNITED STATES DISTRICT COURT FOR THE NORTHERN DISTRICT OF ALABAMA SOUTHERN DIVISION

STATE OF ALABAMA, et al., Plaintiffs, v. UNITED STATES DEPARTMENT OF COMMERCE, et al., Defendants, and DIANA MARTINEZ, et al., Defendant-Intervenors, COUNTY OF SANTA CLARA, CALIFORNIA, et al., Defendant-Intervenors, and STATE OF NEW YORK, et al., Defendant-Intervenors.	Civil Action No. 2:18-cv-00772-RDP

SWORN DECLARATION AND EXPERT REPORT OF D. SUNSHINE HILLYGUS

Sworn Declaration and Expert Report of D. Sunshine Hillygus

I. Qualifications

I am a Professor of Political Science and Public Policy at Duke University. I earned a Ph.D. in political science from Stanford University in 2003. From 2003-2009, I was a faculty member at Harvard University in the Department of Government. In 2009, I joined the faculty at Duke University as an associate professor and was promoted to full professor in 2015.

I have more than 20 years of experience in survey design, implementation, and analysis. Of relevance to this report, I have published research on the topics of census participation, survey methodology, survey non-response, and data quality. This work has been funded by the National Science Foundation and published in respected academic journals including *Public Opinion Quarterly*, *Journal of Survey Statistics and Methodology*, *Statistical Science*, *Political Analysis*, and *Annals of Applied Statistics*. I am co-author of *The Hard Count: The Political and Social Challenges of Census Mobilization*.[1] My other experience of relevance includes serving as associate principal investigator of the American National Election Study, on the editorial boards of several academic journals, and as director of the Initiative on Survey Methodology at Duke University. I was also founding director of the Program on Survey Research at Harvard University. From 2012-2018, I served as a member of the Census Scientific Advisory Committee (the "CSAC"), a committee that advises the director of the U.S. Census Bureau (the "Census Bureau") on the uses of scientific developments in statistical data collection, survey methodology, geospatial and statistical analysis, econometrics, cognitive psychology, business operations, and computer science as they pertain to the full range of Census Bureau programs and activities, including census tests, policies, and operations.

[1] Hillygus, D.S., Nie, N.H., Prewitt, K. & Pals, H. (2006). *The hard count: The political and social challenges of census mobilization*, Russell Sage Foundation, New York.

I have previously served as an expert witness *in League of Women Voters of North Carolina, et al. v. North Carolina, et al.*, No. 1:13-CV-00660-TDS-JEP (M.D.N.C.); *State of New York, et al., v. United States Department of Commerce, et al.*, No. 18-CV-2921-JMF (S.D.N.Y.)*;* and *NAACP, et al. v. Bureau of the Census*, No. 18-CV-891-PWG (D. Md.). A copy of my curriculum vitae is attached.

II. Retainer Information and Summary of Opinions

Defendant-Intervenors in this action, and Martinez Intervenors in the cross claim brought against the federal government, retained me to evaluate (1) the claims made by Dr. Dudley Poston in his expert report for the State of Alabama ("Alabama" or "Plaintiff") that inclusion of undocumented immigrants[2] in the total population for apportionment after the 2020 decennial count will cause a loss of one congressional seat in the U.S. House of Representatives (the "House") for Alabama, whereas exclusion of undocumented immigrants from the apportionment count will result in Alabama retaining seven seats; and (2) whether exclusion of undocumented immigrants from the 2020 apportionment count is possible. My compensation in this case is $350 per hour.[3]

Based on the knowledge I have amassed over my education, training, and experience, as well as a detailed review of government and academic research, data, and reports, I have reached the following opinions:

[2] For the purposes of this report, I use the term "undocumented immigrant" to include foreign-born non-citizens that reside in the U.S. but do not have formal legal status. Pew Research Center refers to these individuals as "unauthorized immigrants." I recognize that those with Deferred Action for Childhood Arrivals, or some other form of lawful presence, may or may not be categorized as undocumented immigrants, depending on the context. I offer no opinion as to the legal significance of these various classifications.

[3] To formulate an expert opinion in this case, I reviewed a variety of materials from academic, governmental, legal, and media sources, *see* References, including the Complaint for Declaratory Relief and the exhibits in the Depositions of Karen Battle on January 16, 2020 and March 2, 2020 in *Alabama et al. v. United States Department of Commerce et al.*, No. 2:18-cv-00772-RDP (N.D. Al. 2018). Moreover, I relied on my own experiences and familiarity with survey practices and standards and Census Bureau programs and activities.

First, Dr. Poston does not demonstrate, to any degree of reasonable certainty, that Alabama will (a) lose a congressional seat because of the inclusion of undocumented immigrants in the 2020 apportionment count, or (b) maintain a congressional seat because of the exclusion of undocumented immigrants in the 2020 apportionment count.

Second, there is no reliable way to exclude undocumented immigrants from the 2020 apportionment count because (a) there is currently no reliable methodology or data product that the Census Bureau may use to do so; (b) no administrative records are of sufficient quality to use to exclude undocumented immigrants from the 2020 apportionment count; and (c) the nature, scope, and methodology of the statistical modeling needed to produce estimates of the undocumented population is fundamentally different from the statistical modeling currently used in producing the apportionment population, and would result in a less accurate and reliable enumeration.

In this report, I first provide background with respect to the Census Bureau's relevant responsibilities and standards, as related to the apportionment count. I then explain why Dr. Poston's methodology, data, and key conclusions are unreliable, and cannot be used to demonstrate that Alabama will likely lose a congressional seat because of the inclusion of undocumented immigrants in the 2020 apportionment count, or maintain a congressional seat if undocumented immigrants are excluded from the 2020 apportionment count. Finally, I explain why I conclude that there is currently no feasible way to reliably exclude undocumented immigrants from the apportionment count.[4]

III. Relevant Background

A. The Census Bureau's Relevant Responsibilities

[4] I am not an attorney and my references to constitutional and statutory provisions and court cases are for the purposes of providing factual context.

Article 1, Section 2 of the U.S. Constitution requires that an "actual enumeration" of the population be taken every 10 years for the purpose of apportioning seats in the House among the states, with the provision that each state must have at least one Representative. The 14th Amendment states that "[r]epresentatives shall be apportioned among the several States according to their respective numbers, counting the whole number of persons in each State."

The Census Bureau has the responsibility of both counting the population in the decennial census, and using the results to calculate the number of House seats each state is entitled to have based on that population count. The Census Bureau counts all people (citizens and foreign-born immigrants) who are living in the state at the time of the census.[5] This total resident population, along with the overseas federal employees and their dependents, make up the apportionment population count for each state. To count all people, the Census Bureau uses a multi-part process that starts with (1) creating the Master Address File (the "MAF")—a database containing every known housing unit in the country, then (2) asking every household in the MAF to self-respond with information about their household, followed by (3) employing the Non-Response Follow-up (the "NRFU") operation, which attempts to enumerate all non-responding households through an in-person visit,[6] and, finally, (4) applying count imputation to any remaining uncounted households to estimate the number of household members using information from neighboring households. By law, the Census Bureau must submit the apportionment count to the President within nine months of the census date. For the 2020 Census, the census date is April 1, 2020, and the President will receive the counts by December 31, 2020.

[5] Immigrants, called "foreign-born" by the Census Bureau, include naturalized U.S. citizens, lawful permanent residents, temporary migrants (such as foreign students), refugees and asylees, and undocumented immigrants.
[6] If a household is not enumerated after one visit, administrative records will be used to enumerate the household in those cases in which multiple, high-quality records are available. If administrative records cannot be used, at least two more in-person visits are attempted before the household becomes eligible to be enumerated through a proxy, such as a neighbor or landlord.

Since 1940, the Census Bureau has used the Equal Proportions Method to allocate the number of Representatives among the states—after each state is assigned the one seat it is entitled to receive, the remaining 385 seats are assigned sequentially, on the basis of a list of descending "priority values" that are calculated based on each state's share of the total U.S. population.[7] Because apportionment is based on population size relative to other states, under- or over- counting the population in one state has implications for the fair distribution of representation among all states.[8]

Within one year of the census date—April 1, 2021 for the 2020 Census—the Census Bureau is also required to make redistricting data available to the states. Whereas the apportionment count is produced using the Census Unedited File (the "CUF"), the redistricting data products are produced using the Census Edited File (the "CEF"), which applies characteristic imputation—statistically imputing missing or conflicting information about the people in the household (i.e., race, ethnicity, age, date of birth, sex, tenure, and relationship).[9] The redistricting data are also altered to meet the confidentiality requirements of Title 13 of the United States Code.[10]

[7] This method ensures that no additional transfer of a seat (from one state to another) will reduce the ratio between the numbers of persons per representative in any two states. For more detail, *see* https://www.census.gov/population/apportionment/about/faq.html and https://www.census.gov/population/apportionment/about/computing.html.

[8] Prewitt, K. (2010). The US decennial census: Politics and political science. Annual Review of Political Science, 13, 237-254.

[9] The total resident population count in the CUF and CEF has applied count imputation—an estimate of the number of household members—for the limited number of households not enumerated in the decennial count. In 2010, count imputation accounted for only 0.39% of the total population. 2020 Census Operational Plan: A New Design for the 21st Census, v. 4. (December 2018), available at https://www2.census.gov/programs-surveys/decennial/2020/program-management/planning-docs/2020-oper-plan4.pdf.

[10] The data are processed through the disclosure avoidance system that injects noise into the estimates, creating uncertainty in the numbers to protect confidentiality. *See* https://www.census.gov/newsroom/blogs/research-matters/2018/08/protecting_the_confi0.html.

Neither the CUF nor the CEF has information about the citizenship or legal status[11] of the population.

Following President Trump's July 2019 Executive Order 13880,[12] the Census Bureau plans to use administrative records to separately produce data on block-level Citizen Voting-Age Population ("CVAP data" or "CVAP") by race and ethnicity.[13] As of the date of this report, the methodology to produce this data product is still under development.[14]

B. The Census Bureau's Quality Standards

The Census Bureau has formal standards for data quality governing all information products and the processes that generate them.[15] These guidelines require that all information collected and disseminated by the Census Bureau be designed to ensure and maximize the utility, objectivity, and integrity of the information. *Utility* or "fitness of use" refers to the "usefulness of the information for its intended users;" *objectivity* means the information is "accurate, reliable, and unbiased, and is presented in an accurate, clear, complete, and unbiased manner;" and *integrity* refers to the security of the information, including protection of such information from unauthorized access or revision.[16]

---

[11] For the purposes of this report, I use the term "legal status" to encompass determinations of whether individuals are immigrants with formal legal status, or immigrants without formal legal status. I offer no opinion as to the legal significance of these various classifications.

[12] *See* 84 Fed. Reg. 33,821 (July 11, 2019).

[13] *See* https://www2.census.gov/programs-surveys/decennial/rdo/technical-documentation/special-tabulation/CVAP_Post2020_Census_documentation_v5.pdf?. The Census Bureau previously provided CVAP tables annually from each year's most recent 5-year American Community Survey ("ACS") data. The Post-2020 Census CVAP Special Tabulation will replace CVAP tables based on the ACS that would have been released in February 2021. A census block is the smallest geographic unit used by the Census Bureau. Census blocks are defined by geographic features, such as roads, so they vary in the exact number of households they contain—many contain no population. More than 11 million census blocks were enumerated in 2010. *See* https://transition.fcc.gov/form477/Geo/more_about_census_blocks.pdf.

[14] *See* https://www.census.gov/programs-surveys/decennial-census/about/voting-rights/cvap/Post-2020-CVAP.html.

[15] *See* U.S. Census Bureau Statistical Quality Standards (July 2013), https://www.census.gov/content/dam/Census/about/about-the-bureau/policies_and_notices/quality/statistical-quality-standards/Quality_Standards.pdf. These standards were established to incorporate and adhere to Policy Directive No. 1 of the Office of Management and Budget ("OMB"). *See* https://www.govinfo.gov/content/pkg/FR-2014-12-02/pdf/2014-28326.pdf.

[16] *See* U.S. Census Bureau Statistical Quality Standards (July 2013), i-ii.

These formal standards govern the Census Bureau's mission to "count everyone once, only once, and in the right place" in the decennial census.[17] Critically, objectivity refers not only to the overall accuracy of the information, but also to distributional accuracy—a complete and accurate count across geography and population subgroups so that the proportional distribution of the population is correct.[18] If the Census Bureau misses more people living in one state than another, the census count is not only inaccurate, it is will also be unfair for apportionment in violation of both the utility and objectivity quality standards.

IV. Dr. Poston's Data, Methodology and Key Conclusions Are Not Credible.

Dr. Poston opines that in 2020, Alabama will receive six seats if undocumented persons are included in the apportionment count, compared to seven seats if undocumented persons are excluded from the apportionment count.[19] To reach these opinions, Dr. Poston's analysis hypothetically apportions congressional seats for all states using a projected 2020 total population count, and then compares the results to a hypothetical apportionment of congressional seats using a 2020 projected population count that excludes undocumented persons.[20] Dr. Poston's conclusions depend on: (1) projections of total population numbers of each state (including the overseas population) in 2020 based on 2010 Census Bureau apportionment counts, and 2018 and 2019 Census Bureau population estimates; and (2) projections of the population of undocumented immigrants in each state in 2020 based on estimates in 2016 of the undocumented immigrant population from Pew Research Center ("Pew"), an independent American think tank founded in 2004 by pollster Andrew Kohut.

---

[17] *See* https://www.census.gov/programs-surveys/decennial-census/about/why.html.
[18] Prewitt, K. (2010). The US decennial census: Politics and political science. *Annual Review of Political Science*, 13, 237-254.
[19] Sworn Declaration & Expert Report of Dudley L. Poston, Jr., Ph.D. (January 23, 2020) (the "Poston Report"), 3.
[20] Poston Report.

Dr. Poston's overall conclusions, methodology, and underlying data are unreliable. Dr. Poston fails to acknowledge massive uncertainty in his estimates, and he relies on flawed assumptions that are likely to bias his results. Statisticians and demographers readily acknowledge that projections of future populations figures can be unreliable.[21] Projection outside of known data requires assumptions that should be validated. Dr. Poston, however, fails to assess the reasonableness of the modeling and data assumptions that he makes.[22]

Moreover, Dr. Poston ignores the uncertainty in his estimates, in violation of basic statistical principles. All modeled estimates, like the projections Dr. Poston advances in his report, have uncertainty, which is a quantification of accuracy and precision, placing confidence limits, or bounds, on modeled estimates. Such uncertainty is especially critical to acknowledge in the context of apportionment because apportionment outcomes are sensitive to small changes in population counts. Statisticians have called this issue "the apportionment problem"— that very small inaccuracies in a state population can change the number of representatives received—and have shown this to be an "inescapable property of any method of apportionment that is a function of population."[23] This means that predictions about apportionment outcomes are often wrong given the difficulty of precisely projecting population. For example, prior to the 1990 Census, the Census Bureau correctly predicted only three of the five eventual seat

[21] Skerry, P. (2000). Counting on the census? Race, group identity, and the evasion of politics (Vol. 56). Brookings Institution Press, 131.
[22] For review of various approaches, *see* Hyndman, R. J., & Athanasopoulos, G. (2018). Forecasting: principles and practice. OTexts. A key assumption is the time frame that informs the forward projection, e.g., 2010-2018 versus 2017 to 2018. The other key assumption is the modeling of the trend, whether linear or exponential, for example.
[23] Keyfitz, N. (1979). Information and allocation: two uses of the 1980 census. *The American Statistician*, 33, 45-50. It is highly unlikely, but theoretically possible, that the omission of a single person from a state population could result in the loss of a representative. On the other hand, an omission of 100,000 persons would have a one in five chance of depriving that state of a representative.

changes.[24] The Census Bureau 2009 population estimates similarly did not predict all of the 12 seats gained and 12 seats lost.[25]

Below, I discuss in more detail the significant flaws in each of Dr. Poston's projections, and then explain how these errors contribute to massive uncertainty in his estimates, and result in unreliable and unconvincing conclusions.

A. Dr. Poston's Data and Methodology for Projecting Total Population Counts Are Flawed.

In projecting total population numbers for each state in 2020, Dr. Poston starts with Census Bureau population estimates for each state from July 2018, and, in his supplemental report, from July 2019.[26] In contrast to the actual enumeration that the Census Bureau conducts in each decennial census, these yearly population estimates from the Census Bureau are statistically modeled—i.e., they are adjustments to the decennial count made to attempt to account for births, deaths, and migration.[27] These population estimates can differ significantly from census counts, most notably because of the difficulty of estimating net international migration.[28]

Dr. Poston then assumes, without evidence, that each state's population will grow or decline in population at the same average annual rate between 2018 (or 2019 in the supplemental report) and 2020 as it did between 2010 to 2018 (or 2019 in the supplemental report).[29]

---

[24] According to Skerry (2000), 131.
[25] *See* https://www.psc.isr.umich.edu/dis/census/Features/apportionment/apportion_estimates.html.
[26] *See* Poston Report, 14; Supplement to Sworn Declaration & Expert Report of Dudley L. Poston, Jr., Ph.D. (Jan. 28, 2020) ("Poston Supplementary Report"), 3.
[27] *See* https://www2.census.gov/programs-surveys/popest/technical-documentation/methodology/2010-2018/2018-natstcopr-meth.pdf?#.
[28] In 1980 and 2000, for example, the population estimated underestimated relative to the census count by more than 2 percentage points. Tiffany Yowell and Jason Devine. (July 2013, Revised May 2014). Evaluating Current and Alternative Methods to Produce 2010 County Population Estimates, U.S. Census Bureau, https://www.census.gov/population/www/documentation/twps0100/E2%20County%20Totals_FINAL.pdf.
[29] Poston report, 14; Poston Supplementary Report, 3.

However, documentation of significant geographic and temporal variability in population change by the Census Bureau indicate that this is a flawed assumption. With respect to geography, there has been wide variability in population growth patterns across states within the decade; for example, the Census Bureau reports that, from 2010 to 2019, states have seen changes in total population growth and loss ranging from a 3.3% loss in population (West Virginia) to a 16% growth in population (Utah).[30] With respect to time, the nation's overall population growth rate, for instance, has slowed over the course of the decade.[31] And there is temporal variation in the population growth across states. For example, the state of New York saw population growth from 2010 until 2015, but population loss in the years since; in contrast, the state of Texas has seen population growth.[32] These inconsistent population growth patterns indicate that Dr. Poston's population projections are inaccurate and demonstrate the unreliability in Dr. Poston's estimates, undermining confidence in his conclusions.

Dr. Poston also assumes, without evidence, that a state's overseas population will be the same proportion of the population in 2020 as it was in 2010.[33] This too is inaccurate. In 2016, the number of active-duty U.S. military troops stationed overseas declined to its lowest level in at least 60 years.[34] A change in the residency rules affecting overseas-deployed military personnel also makes it untenable to assume the overseas population will be the same in 2010 as it was in 2020. Specifically, in 2010, deployed military personnel were counted in their "home of record" state (the address provided at the time of enrollment in the military). In 2020, by contrast, military personnel will be counted at their usual residence. This will likely increase the

[30] *See* https://www.census.gov/quickfacts/geo/chart/US/PST120219.
[31] *See* https://www.census.gov/library/visualizations/2019/comm/slower-growth-nations-pop.html.
[32] *See* https://www.census.gov/data/tables/time-series/demo/popest/2010s-state-total.html.
[33] Poston Report, 14.
[34] Bialik, Kristen. (August 22, 2017). U.S. Active-Duty Military Presence Overseas Is At Its Smallest In Decades. Pew Research Center. https://www.pewresearch.org/fact-tank/2017/08/22/u-s-active-duty-military-presence-overseas-is-at-its-smallest-in-decades/.

overseas populations of states with major military installations, which further emphasizes the uncertainty, of Dr. Poston's calculations.[35] And finally, as noted above, there has also been wide variability in population growth patterns across states, which means that the overseas population is likely to increase in some states but decrease in others in 2020. Dr. Poston concedes that he has not taken into account any of these issues with respect to the overseas population.[36]

In sum, the assumptions underlying Dr. Poston's total population projections are problematic, undermining the credibility of his calculations and highlighting the difficulty of accurately predicting apportionment outcomes.

B. Dr. Poston's Data and Methodology for Projecting Apportionment Counts Excluding Undocumented Immigrants is Flawed.

Dr. Poston next projects a population count for each state excluding undocumented immigrants by (1) relying on the flawed projection of the total population count, as described above, and (2) subtracting from that count a projected count of the undocumented immigrants in each state.[37] To reach a count of the undocumented immigrants in each state, Dr. Poston relies on 2016 state-level estimates of undocumented immigrants from Pew, and assumes that the proportion of the undocumented immigrant population in a state will be unchanged from the population proportion Pew estimated for a state in 2016.[38] This approach is flawed for a number of reasons, as follows.

---

[35] Jarosz, Beth. (October 28, 2019). How Does the U.S. Census Bureau Count People Who Have More Than One Address? PRB. https://www.prb.org/how-does-the-u-s-census-bureau-count-people-who-have-more-than-one-address/.

[36] Deposition of Dudley L. Poston, Jr., Ph.D. (Feb. 27, 2020), at 105-114.

[37] Poston report, 16.

[38] Pew defines unauthorized immigrants as "all foreign-born noncitizens residing in the country who are not `lawful immigrants…The vast majority of unauthorized immigrants entered the country without valid documents or arrived with valid visas but stayed past their visa expiration date or otherwise violated the terms of their admission." Passel et al. (2018), 2. This is the same definition I use throughout this report.

First, Dr. Poston's assumption that the proportion of the undocumented immigrant population in a state will not change between 2016 and 2020 is simply wrong. Most glaringly, the assumption contradicts Pew's own updated estimates for 2017.[39] Indeed, Pew reports significant variation across states and time in the undocumented population, including a continued decline in the overall numbers of undocumented immigrants in the United States.[40] As one example, Pew reports that California's undocumented immigrant population was 2.2 million in 2016, compared to 2.0 million in 2017—at the same time, the Census Bureau reports an overall growth in total population for the California between 2016 to 2017.[41] Moreover, there are substantial reasons to believe that the changes in immigration policy from 2010 to 2020 have had significant impacts on the undocumented immigrant populations in many states, none of which are taken into account by Dr. Poston's numbers.[42] Given the already mentioned variation in the total population change across states—the denominator for calculating the proportion of the undocumented immigrants in a state—some states will see their proportion of undocumented immigrants increase in 2020 relative to 2016, while others will likely see it decrease.

Second, and more fundamentally, Dr. Poston ignores the massive and undisputed uncertainty in Pew's estimates of undocumented immigrants. Uncertainty is a critical part of *every* statistical estimate, but it is especially remiss to ignore it when estimating the size of the undocumented immigrant population in the United States given that government agencies, scholars, and policy-makers widely acknowledge that this population is difficult to estimate.[43]

---

[39] 2017 estimates were released in June 2019 so it's unclear why Dr. Poston did not use the more recent estimates.
[40] *See* https://www.pewresearch.org/hispanic/interactives/unauthorized-trends/.
[41] *See* https://www.census.gov/content/dam/Census/library/visualizations/2017/comm/popest-idaho.pdf.
[42] Warren, Robert. (February 27, 2019). Sharp Multiyear Decline in Undocumented Immigration Suggests Progress at US-Mexico Border, Not a National Emergency. https://cmsny.org/publications/essay-warren-022719/.
[43] For review, *see* Woodrow-Lafield, K. A. (1998). Undocumented immigrants in the United States in 1990: Issues of uncertainty in quantification. International Migration Review, 32(1), 145-173. Demographers acknowledge that many methods fail to account for uncertainty, instead treated "values as if they were true" (Van Hook et al. 2015, 331). However, previous estimates have not be considered for use to determine political representation.

For example, while Pew estimated an undocumented population of 10.7 million in 2016, researchers at Yale estimated that the 2016 number of undocumented immigrants ranged from a conservative 16.7 million to a high of 27.5 million.[44] While Dr. Poston admits (in a footnote) that "there are inherent difficulties in counting undocumented immigrants," he fails to account for that uncertainty in his conclusions.[45] These massive uncertainties include (1) uncertainties with respect to Pew's overall methodological approach, and (2) uncertainties with respect to the specific data and methodology on which components of Pew's estimates rely, as described below.

1. Pew's Overall Methodology for Projecting Apportionment Counts Excluding Undocumented Immigrants Produces an Unreliable Estimate.

Estimates of the undocumented population vary widely depending on the methodological approach, assumptions, and underlying data used. Broadly, Pew relies on a method called the residual technique for estimating numbers of undocumented immigrants in the United States. The residual technique estimates the number of undocumented immigrants by subtracting the number of lawful immigrants—estimated from government records—from the total number of immigrants in the country, as estimated from self-report responses to government surveys. The residual technique is one that has also been used by the Department of Homeland Security ("DHS"),[46] the Migration Policy Institute, the Center for Migration Studies of New York, and, in previous years, by the Census Bureau.[47]

---

[44] Fazel-Zarandi, M. M., Feinstein, J. S., & Kaplan, E. H. (2018). The number of undocumented immigrants in the United States: Estimates based on demographic modeling with data from 1990 to 2016. PloS one, 13(9).
[45] Poston Report, 16 n.2.
[46] Prior to 2018, DHS population estimates referred to foreign-born non-citizens unlawfully present in the United States as "unauthorized immigrants." The 2018 report changes the term to "illegal aliens."
[47] *E.g.*, Baker, B. (2018). Population Estimates: Illegal Alien Population Residing in the United States: January 2015. Washington, DC: Department of Homeland Security. https://www.dhs.gov/sites/default/files/publications/18_1214_PLCY_pops-est-report.pdf.

Although the aggregate numbers of undocumented immigrants resulting from the residual technique can be somewhat similar—recent estimates ranging from 10.5 million to 12 million[48]—there is considerable variability within subgroups and at smaller geographies.[49] In recognition of the limitations of the residual technique, when the Census Bureau released 2001 residual estimates of the undocumented population, they provided the following disclaimer:

> "Although the residual technique . . . is based on the simple idea of subtracting the expected legal population from the counted foreign-born population at the census date, *the approach suffers from a number of limitations.* These limitations stem from anomalies and shortcomings in the data sets used, assumptions made to correct for data deficiencies or to derive intermediate estimates, and the exclusion of components that may prove to be relevant in the changing migration environment."[50]

Similarly, DHS also acknowledges that their estimates of undocumented populations are "subject to sampling error in the ACS and considerable non-sampling error because of uncertainty in some of the assumptions required for estimation . . . Caution is recommended."[51] A March 2019 DHS report explains:

> DHS's ability to describe the illegal alien population depends on its ability to describe the different population groups included in the residual methodology: the total foreign-born population and the subgroups that comprise the legally resident foreign-born population. *Data limitations mean that neither of these populations can be described with precision.*[52]

---

[48] Kamarck, Elaine and Christine Stenglein. (November 12, 2019). How many undocumented are in the United States and who are they? Brookings Institute. https://www.brookings.edu/policy2020/votervital/how-many-undocumented-immigrants-are-in-the-united-states-and-who-are-they/.

[49] Van Hook, J., Bachmeier, J. D., Coffman, D. L., & Harel, O. (2015). Can we spin straw into gold? An evaluation of immigrant legal status imputation approaches. Demography, 52(1); Baker, B. (2018). Population Estimates: Illegal Alien Population Residing in the United States: Jan. 2015. Washington, DC: Dep. of Homeland Security.

[50] Costanzo et al. Evaluating Components of International Migration: The Residual Foreign Born. June 2002, page 20. https://www.census.gov/content/dam/Census/library/working-papers/2001/demo/POP-twps0061.pdf (emphasis added). The Census Bureau emphasized that "Our assumptions include a great deal of uncertainty, especially for small migration components. Therefore, the residual may be quite different from the actual number of unauthorized migrants" (2).

[51] Office of Immigration Statistics, Homeland Security. (December 2018). Population Estimates: Illegal Aliens Population Residing in the United States: January 2015, 11. Although DHS produces an estimate of the undocumented immigrant population using a residual method similar to Pew, they do not produce population estimates for every state.

[52] Department of Homeland Security, "Potential Improvements to DHS Illegal Alien Population Estimates: Collection and Use of Data," Fiscal Year 2018 Report to Congress, March 5, 2019, page 1.

In employing the residual method, Pew estimates the number of undocumented immigrants by subtracting the number of immigrants with formal legal status—estimated from government records from DHS—from the total number of immigrants in the country, as estimated from self-report responses to the American Community Survey (the "ACS").[53] Because it is known that immigrants (especially undocumented immigrants) are harder to locate, harder to contact, harder to persuade, and harder to interview,[54] Pew then "augments and adjusts" their estimates in an attempt to account for the fact that surveys are more likely to miss immigrants.[55] To get state-level estimates, the legal status of each foreign-born respondent is imputed based on their survey responses and the total population estimates, aggregated, and then weighted to develop state-level estimates that take into account trends over time.[56] Additionally, Pew often makes revisions to previous estimates and the exact way in which it employs the residual method. For example, Dr. Poston used Pew's 2016 estimate of 55,000 for the undocumented population in Alabama in 2016; yet, their 2017 estimates report the 2016 undocumented population in Alabama to be 60,000.[57]

The accuracy of the residual technique estimates critically depends on the accuracy of the individual data components, and the assumptions used.[58] While Pew is not transparent about all of their data components and assumptions, those that can be scrutinized show that Pew's approach is error-prone and massively uncertain. It is not surprising, then, that demographers

[53] Passel et al. (2018), 37.
[54] Tourangeau, R., Edwards, B., Johnson, T. P., Wolter, K. M., & Bates, N. (Eds.). (2014). Hard-to-survey populations. Cambridge University Press.
[55] *See* https://www.pewresearch.org/hispanic/2018/11/27/u-s-unauthorized-immigrant-total-dips-to-lowest-level-in-a-decade/.
[56] Passel et al. (2018), 44.
[57] *See* https://www.pewresearch.org/hispanic/interactives/unauthorized-trends/.
[58] Margo Anderson and Stephen Feinberg (Who Counts?), 59: "The accuracy of the demographic analysis depends on the accuracy of the inputs. Several of the statistical inputs are incomplete.

call their estimates "difficult to replicate."[59] An evaluation of the approach also found significant biases in the resulting estimates.[60] One recent peer-reviewed academic research article explained that although Pew's estimates "have come to be trusted and widely cited outside of academia," the method has never been evaluated and "[t]he specific details of the Pew[ ] method are not publicly available, thus making it difficult for other researchers to replicate the method."[61] The authors conclude that "it is not possible to spin straw into gold."[62] The specific flaws in each of the components of Pew's estimates that contribute to the unreliability of Dr. Poston's conclusions are discussed in detail below.

2. The Data Components and Specific Method of Pew's Residual Approach Are Not Reliable.

i. Pew and Dr. Poston rely on unreliable and inaccurate ACS estimates of the total foreign-born population.

In estimating the number of undocumented immigrants using the residual technique, Pew starts by estimating the total number of foreign-born residents—anyone who was not a U.S. citizen from birth—from the ACS. The ACS is a nationwide survey designed and conducted by the Census Bureau that collects social, economic, housing, and demographic characteristics from approximately 1.6% of households annually.[63] The ACS asks about the citizenship status—but not the legal status—of each household member. The sampling errors and nonsampling errors in ACS, and Pew's undercount adjustments with respect to this population, undermine confidence in Pew's estimates of the total foreign-born population, on which Dr. Poston relies.

---

[59] Van Hook, J., Bachmeier, J. D., Coffman, D. L., & Harel, O. (2015). Can we spin straw into gold? An evaluation of immigrant legal status imputation approaches. Demography, 52(1), 333.
[60] *Ibid.*
[61] *Ibid*, 330.
[62] *Ibid*, 330.
[63] The ACS replaced the Census long form after 2000. The ACS is implemented as a continuous survey, with about 3.5 million household addresses contacted each year. The Census Bureau releases yearly estimates that allow for characteristic estimates for populations of 65,000 or more. The ACS accumulates sample into 5-year estimates for smaller geographic areas, including census tracts and block groups.

1. Sampling errors in underlying ACS estimates make Pew's numbers unreliable.

Because the ACS is a sample of the population, rather than a census, any resulting population estimates are subject to uncertainty from random sampling error.[64] That sampling error is often reported as a margin-of-error with survey statistics. The greater the margin of error, the less confidence one should have in the resulting statistical estimate.[65] For small population subgroups or geographies—such as state-level estimates of the foreign-born population—the sampling error in the ACS can be quite large.

Although Pew reports its estimates of undocumented immigrants with a sampling error,[66] Dr. Poston fails to acknowledge or account for such sampling error in his calculations. For example, Pew's estimate of the number of undocumented immigrants in Alabama in 2016 was 55,000 +/- 10,000.[67] That is, Pew's estimate has a 90% confidence interval of 45,000 to 65,000 undocumented immigrants in Alabama in 2016—revealing a large degree of uncertainty in the estimate, even before trying to make projections in the future.[68] To put that level of uncertainty into context, consider that in the 2000 Decennial Census, Utah would have needed fewer than 1,000 additional residents to qualify for the 435th and final congressional seat instead of North Carolina.[69] In other words, the margin of error on the number of undocumented immigrants was larger than the population difference between two states determining priority values for

[64] Groves, R. M., Fowler Jr, F. J., Couper, M. P., Lepkowski, J. M., Singer, E., & Tourangeau, R. (2011). Survey methodology (Vol. 561). John Wiley & Sons.
[65] Error has a statistical meaning—referencing the unknown difference between an estimate and its true value. Sampling error that there will be random sample-to-sample variation if one was to draw multiple samples from the population.
[66] Passel et al. (2018), 45.
[67] Passel et al. (2018) and https://www.pewresearch.org/hispanic/interactives/unauthorized-trends/.
[68] This means that 90% of the time, the true population estimate of undocumented immigrants in Alabama would fall between 45,000 to 65,000.
[69] *See* https://www.pewsocialtrends.org/2011/01/11/census-2010-the-last-seat-in-congress/.

apportionment.[70] Pew further reports that this margin of error *underestimates* the extent of uncertainty in the estimate because it captures only sampling, but not nonsampling, errors:

> "The ranges reported represent a 90% confidence interval around the estimates. They represent the sampling error associated with the survey-based estimate. Other sources of potential error—including the variability associated with the random assignment of statuses, potential errors in the status assignment process and non-sampling error in the surveys—are not represented in the reported margins of error. For this report, statistical tests rely on a 90% confidence level."[71]

2. Nonsampling errors in underlying ACS estimates make Pew's numbers unreliable and inaccurate.

There are a variety of other sources of error in Pew's estimates in addition to sampling errors that threaten the accuracy and reliability of Pew's estimates. Broadly called nonsampling errors, these include all other sources of error, such as those that arise from misreporting, incomplete coverage, or data processing. Although nonsampling errors can be more difficult to quantify than sampling errors, they still demonstrate the lack of precision in Pew's, and in turn, Dr. Poston's estimates of undocumented immigrants.

First, it is widely recognized that citizenship status is often inaccurately reported in government surveys.[72] One study using the Census Bureau's Current Population Survey estimated that 75 percent of those who reported being naturalized citizens and living in the U.S. fewer than five years were in fact non-citizens at the time of the survey.[73] In a recent comparison of administrative records from the Social Security Administration with individual

[70] *See* https://www.pewresearch.org/hispanic/interactives/unauthorized-trends/. Similarly, Pew estimates the number of undocumented immigrants in North Carolina in 2010 to be 350,000 +/- 15,000; the number in Minnesota was 90,000 +/- 10,000, so that the uncertainty again exceeds the population difference.
[71] Passel, J. S., & Cohn, D. (2018). US Unauthorized immigrant total dips to lowest level in a decade. Pew Research Center.
[72] Bachmeier, J. D., Van Hook, J., & Bean, F. D. (2014). Can we measure immigrants' legal status? Lessons from two US surveys. International Migration Review, 48(2), 538-566.
[73] Passel JS, Clark RL. How Many Naturalized Citizens Are Thee? An Assessment of Data Quality in the Decennial Census and CPS. Paper presented at the Annual Meeting of the Population Association of America; Washington, DC. March 1997, as reported in Brown et al. (2018).

responses to the ACS, census researchers found that 37.6 percent of those individuals who were recorded as non-citizens in administrative records had self-reported being U.S. citizens in the ACS.[74] As explained by the researchers, undocumented immigrants "have a strong incentive to provide an incorrect survey answer, if they answer at all, due to concerns about the data being used for enforcement."[75]

Second, and, even more problematic for Dr. Poston's apportionment estimates, misreporting is likely to vary by geography, raising concerns about the way that measurement error might disproportionately affect estimates of undocumented immigrants in some states more than others, and thus threaten the distributional accuracy of the resulting estimates. Census researchers acknowledge that "the extent of intentional misreporting is most likely to vary across geographical areas and over time, depending on the degree of concern about personal security."[76] Indeed, Census Bureau research finds that match rates between the ACS and administrative records is lower in Alabama than any other state—65% compared to a high of 89% in Maine.[77] This both highlights the inherent difficulty of estimating the undocumented immigrant population, and suggests that Pew, and in turn, Dr. Poston, underestimates the number of undocumented immigrants in Alabama compared to other states, which would lead to an overestimate of Alabama's apportionment population if undocumented immigrants are excluded.

---

[74] Moreover, this is likely an underestimate because the noncitizens able to be matched to administrative records are more likely to be legal noncitizens. Brown et al. (2018).

[75] J. Brown et. al., Working Paper: Understanding the Quality of Alternative Citizenship Data Sources for the 2020 Census, Center for Economic Studies, U.S. Census Bureau, 18–38 (2018), https://www2.census.gov/ces/wp/2018/CES-WP-18-38.pdf.

[76] Brown et al., 21.

[77] Bhaskar, R., Fernandez, L. E., & S. Rastogi. (2018). Assimilation and coverage of the foreign-born population in administrative records. Center for Administrative Records Research and Applications (CARRA) Working Paper Series #2015-02., April 21, 2015. Mulrow et al. (2011) similarly find considerable geographic variation in the ability match administrative records to ACS respondents. Mulrow, Edward, Ali Mushtaq, Santanu Pramanik, and Angela Fontes. 2011. "Final Report: Assessment of the U.S. Census Bureau's Person Identification Validation System," NORC at the University of Chicago, http://www.norc.org/PDFs/May%202011%20Personal%20Validation%20and%20Entity%20Resolution%20Conference/PVS%20Assessment%20Report%20FINAL%20JULY%202011.pdf.

In other words, in Dr. Poston's analysis, Alabama would inaccurately benefit from higher levels of misreporting in the state.

In sum, there is clear evidence that Pew's estimates are subject to large amounts of measurement error in the ACS estimates of foreign-born residents, jeopardizing the reliability of the resulting estimates. Misreporting of citizenship status is pervasive and appears to vary across states, resulting in biased estimates of an apportionment population with undocumented immigrants excluded.

3. Undercount adjustments in the total foreign-born population make Pew's numbers unreliable.

Another source of imprecision in the Pew estimates involves the statistical adjustment made to try to account for immigrants being disproportionately missed by the ACS. Surveys always miss some people, but immigrants (and especially undocumented immigrants) are especially likely to be undercounted—a source of error called coverage error. Unfortunately, the extent of the undercount is unknown and unknowable, so Pew has to make a guess as to how and how much to adjust their statistical estimates.

Pew reports that their adjustment increases the size of the undocumented immigrant population by 5% to 7% for the years 2010-16.[78] It is not possible to assess the reasonableness of Pew's statistical adjustment because the methodology is not disclosed. Pew simply states that undercount adjustments are based on "comparisons with Mexican data, U.S. mortality data and specialized surveys conducted at the time of the 2000 census."[79] For comparison, DHS assumes

[78] Passel et al. (2018), 44.

[79] *See* https://www.pewresearch.org/hispanic/wp-content/uploads/sites/5/2019/03/Pew-Research-Center_2018-11-27_U-S-Unauthorized-Immigrants-Total-Dips_Updated-2019-06-25.pdf, 44. Research shows, for example, that the undercount of young children varies across states and county size—undercounts are large in more populous counties than less populous ones. O'Hare, W. P. (2019). Differential undercounts in the US Census: Who is missed?. Cham: Springer Open.

that the undercount of undocumented immigrants is 10% based on a study about LA County in California in the 2000 decennial census.[80] It is, of course, also problematic to assume that the undercount hasn't changed since 2000, or that it is the same across the country as it is in Los Angeles,[81] given geographic variation in the size and nature of the immigrant population. In 2014, for example, the estimated share of undocumented immigrants from Mexico was 5% nationwide, but 70 percent in California, variation that is undoubtedly related to the undercount.[82] For their part, DHS acknowledges that "the exact degree of the undercount is unknown."[83]

The adjustments undergirding the Pew data further undermine confidence in Dr. Poston's estimates. Pew statistically adjusts estimates of the undocumented population to try to account for the undercount of this population; in contrast the total population estimates used by Dr. Poston have not been statistically adjusted for the undercount because the Census Bureau does not statistically adjust census numbers. Following the 2000 Census, the Census Bureau spent enormous resources to research whether statistical methods could be used to adjust for the undercount for use in redistricting and other purposes not related to reapportionment (given the Supreme Court's prohibition on its use for reapportionment).[84] In the end, the Census Bureau determined that the research could not conclude, with a high level of certainty, that the adjusted

[80] Enrico Marcelli, "2000 Census Coverage of Foreign-born Mexicans in Los Angeles County: Implications for Demographic Analysis," presented at 2000 Annual Meeting of the Population Association of American, Atlanta GA.
[81] *See* https://www.pewresearch.org/hispanic/wp-content/uploads/sites/5/2019/03/Pew-Research-Center_2018-11-27_U-S-Unauthorized-Immigrants-Total-Dips_Updated-2019-06-25.pdf, 44.
[82] *See* https://www.ppic.org/publication/undocumented-immigrants-in-california/.
[83] Department of Homeland Security, "Potential Improvements to DHS Illegal Alien Population Estimates: Collection and Use of Data," Fiscal Year 2018 Report to Congress, March 5, 2019, 3.
[84] Whitford, D. C. (2002) Chronologic Overview of the Census 2000 Adjustment Decision. Joint Statistical Meetings - Section on Survey Research. Methods. New York City. http://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.380.7478&rep=rep1&type=pdf.

census results would be more accurate than the unadjusted results.[85] Any requests for the already-produced adjusted data acknowledged:

> [T]he adjusted estimates were determined to be so severely flawed that all potential uses of these data would be inappropriate. Accordingly, the Department of Commerce deems that these estimates should not be used for any purpose that legally require use of data from the decennial census and assumes no responsibility for the accuracy of the data for any purpose whatsoever.[86]

The very fact that the Census Bureau concluded statistical adjustment could reduce the accuracy of the census count undermines Pew's decision to adjust. It also highlights the inherent imprecision in Pew's estimates, and makes the components of Dr. Poston's calculations (total population count and total population count with undocumented immigrants excluded) incomparable, both of which contribute further to the lack of confidence in Dr. Poston's resulting estimates.[87]

ii. Pew and Dr. Poston rely on unreliable estimates of the lawful immigrant population.

From the total foreign-born population estimated from ACS, the residual technique subtracts the estimated population of naturalized citizens and immigrants with formal legal status—lawful naturalized citizens, legal permanent residents, temporary migrants (such as foreign students), and refugees and asylees—based on estimates from administrative records.[88] In the case of immigrants with formal legal status, lawful permanent residents are estimated using data from DHS's Office of Immigration Statistics, and refugees are estimated using data from the Office of Refugee Resettlement.[89]

---

[85] *See* U.S. Bureau of the Census (2001) Report: Recommendation Concerning the Methodology to be Used in Producing Tabulations of Population Reported to States and Localities Pursuant to 13 U.S.C. 141(c) (March 1) Washington, DC Department of Commerce https://www.census.gov/dmd/www/pdf/Escap2.pdf.
[86] *See* https://www.icpsr.umich.edu/icpsrweb/ICPSR/themes/census2000/disclaimer.jsp.
[87] *See* https://govinfo.library.unt.edu/cmb/cmbc/articles-archive/031201.asp.
[88] Administrative records refer to micro data records contained in files collected and maintained by administrative agencies, such as the U.S. Postal Service, Internal Revenue Service, or the Social Security Administration.
[89] *See* https://www.pewresearch.org/hispanic/2018/11/27/unauthorized-immigration-estimate-methodology/.

Scrutiny of Pew's documentation of its reliance on DHS data, and its method with respect to that data, reveals that its estimates are far from an actual count and involve considerable imprecision. Administrative data is incomplete and untimely. As the Census Bureau has recognized, DHS has "incomplete records prior to 2001. These data do not cover naturalizations occurring before 1988, and they miss some between 1988 and 2000."[90] Moreover, available records "do not always cover children under 18 at the time a parent became a naturalized U.S. citizen. These children automatically become U.S. citizens under the Child Citizenship Act of 2000."[91]

Because the administrative records are incomplete and unreliable, Pew estimates the number of legal immigrants by "applying demographic methods . . . with projections to current years, when necessary."[92] Pew makes statistical adjustments to the estimates from administrative records to account for deaths and departures from the country. Once again, the accuracy of the estimates depends on the accuracy of the individual components of the underlying data—yet these components are not known quantities, nor can they assumed to be stable across time or geography. In calculating its own estimates of the undocumented population, DHS admits that the agency "does not know how many lawfully admitted aliens have deceased or departed the United States."[93] Mortality rates are a source of considerable controversy and disagreement among demographers.[94] Departures from the country also vary across time and geography. Pew makes projections, but the exact assumptions underlying those projections are not disclosed and it is clear that precise numbers simply do not exist.

---

[90] Brown et al., 18.
[91] Brown et al., 18.
[92] Passel et al. (2018), 36.
[93] Department of Homeland Security, "Potential Improvements to DHS Illegal Alien Population Estimates: Collection and Use of Data," Fiscal Year 2018 Report to Congress, March 5, 2019, 3.
[94] Warren, R., & Warren, J. R. (2013). Unauthorized Immigration to the United States: Annual Estimates and Components of Change, by State, 1990 to 2010. International Migration Review, 47(2), 296–329.

In sum, the estimation of the population of immigrants with formal legal status from administrative records on which Pew relies is not an actual enumeration. Instead, such population is imprecisely estimated using a combination of incomplete administrative records and contentious assumptions. Taken together with the other sources of error outlined above, it is clear that the Pew estimates, and in turn Dr. Poston's results, are imprecise and error prone.

iii. Pew and Dr. Poston rely on unreliable estimates of undocumented immigrants at the state-level.

The state-level estimates of the undocumented immigrant populations that Dr. Poston uses require many additional steps after computation of the national residual estimate outlined above; although Pew treats these steps as deterministic, scrutiny of the complex and unverified set of modeling and data assumptions reveal the imprecision and uncertainty in such estimates.

Specifically, state-level estimates of undocumented immigrants are produced after assigning a legal status to all foreign-born respondents in the ACS. A variety of approaches are used in that assignment—logical decision rules, statistical imputation, and weighting adjustments. The initial categorization of someone as "potentially unauthorized" relies on decision rules using self-reported information about arrival year, country of origin, occupation, participation in government programs, and family relationships that could be indicators of legality. Here, again, Dr. Poston's estimates rest on strong assumptions that are unsubstantiated. For example, the survey responses can be inaccurate (e.g., there can be high levels of missingness and misreporting in arrival year). And the decision rules are not 100% accurate. Some immigrant veterans are deported[95]; some households have mixed immigration status; and some who should be eligible to adjust to lawful permanent resident status do not apply for such

[95] Zamudio, Maria. (June 21, 2019). Deported U.S. Veterans Feel Abandoned By The Country They Defended. NPR. https://www.npr.org/local/309/2019/06/21/733371297/deported-u-s-veterans-feel-abandoned-by-the-country-they-defended.

an adjustment, whether due to lack of money, language barriers, or other reasons.[96] Reflecting the imprecision of Pew's assignment process, Pew acknowledges that the resulting "number of potentially unauthorized immigrants typically exceeds the estimated number of unauthorized immigrants from the residual estimates by 20-35% nationally."[97] This mismatch between the assignment process and the national residual estimates demonstrates the inaccuracy of Pew's complex and opaque process, and highlights the extent to which their resulting population estimates are not precise counts.

To adjust the numbers of undocumented immigrants to bring them in line with the national residual estimates, Pew assigns legal status based on an estimated probability of being an undocumented immigrant, which is in turn based on the occupation distribution by age, sex, and state of residents from the 1989 Legalized Population Survey.[98] This survey benchmark is 30 years old, and overrepresents Mexicans and those in the Southwest.[99] To get state estimates, "the final estimated state totals for any given year take into account estimates for surrounding years; however, only a small number of state estimates require significant adjustment based on the trend analysis."[100] Critically for Dr. Poston's state-by-state count of the undocumented population on which his conclusions rely, Pew does not report which states have inaccurate outcomes that must be significantly adjusted.

[96] Frost, Amanda. (June 19, 2016). The Overlooked Pathways to Legal Status. The Atlantic. As reported, one study found individuals in removal proceedings with legal representation were 15 times more likely to apply for relief than those without lawyers and are 5.5 times more likely to be granted legal status.
[97] Passel and Cohn, 2018, 40.
[98] As reported in Van Hook et al. (2015).
[99] Van Hook, J., Bachmeier, J. D., Coffman, D. L., & Harel, O. (2015). Can we spin straw into gold? An evaluation of immigrant legal status imputation approaches. Demography, 52(1), 332.
[100] Passel and Cohn, 2018, 40.

3. Dr. Poston's Conclusions Are Not Credible.

As I have shown, the individual population projections underlying Dr. Poston's calculations are imperfect approximations subject to considerable uncertainty and sampling and nonsampling errors. To recap, Dr. Poston's projection of the total state population rests on flawed assumptions about population growth over time, geographic variation in population growth over time, and the overseas population, and fails to acknowledge inherent uncertainty in projecting population trends into the future. Regarding the estimates of the number of undocumented immigrants in each state, it is clear that the numbers are not counts, but rather rough and imprecise estimates calculated from incomplete and outdated data using an opaque methodology criticized by demographers. Although Dr. Poston's calculations give the illusion of precision, the individual data components underlying his analysis are error-prone and unreliable. Pew's estimates are not "fit for use" for apportionment; nor are they sufficiently reliable or accurate to support Dr. Poston's opinions that Alabama will lose a seat if undocumented immigrants are included in the population counts, or maintain a seat if they are included.

Given these outlined problems and the sensitivity of apportionment outcomes to small changes in population counts, as discussed above, Alabama's claim that they will lose a seat from the inclusion of undocumented immigrants in the apportionment count, or maintain a seat if undocumented immigrants are excluded, is only speculative. The lack of precision in the data means that different states could have reasonable claims to "priority" to the available seats depending on the particular assumptions made about the many and varying components that underlie Dr. Poston's estimates. Indeed, a 2015 analysis by the Congressional Research Service in which seats were hypothetically apportioned using the 2013 estimated citizen population

reported that Alabama received the same number of seats whether estimated numbers of non-citizens were included or excluded in the apportionment population.[101]

To highlight the uncertainty of Dr. Poston's estimates, sampling error alone is enough to undermine Dr. Poston's conclusion that Alabama is likely to lose a congressional seat if undocumented immigrants are included in the apportionment population, or to maintain a seat of undocumented immigrants are excluded. The reported margin of error on the estimate of the undocumented population ranged from 45,000 to 65,000—that confidence interval (spanning 20,000 persons) is in fact wider than the population difference of the approximately 10,000 additional persons that Election Data Services estimates Alabama would need to gain another congressional seat.[102]

In addition to the extensive uncertainty in the estimates, the geographic variation ignored by Dr. Poston means that both the total population projections and the undocumented population projections are likely to be overestimated in some states and underestimated in others (but not necessarily in the same direction for the two quantities).

V. There Is Currently No Feasible Way to Reliably Exclude Undocumented Immigrants From the 2020 Apportionment Count.

I also examined whether there is a feasible way in which undocumented immigrants could be excluded from the 2020 apportionment count. For numerous reasons, I conclude that there is currently no feasible method by which to exclude undocumented immigrants from the 2020 apportionment count. Specifically, I conclude that excluding undocumented immigrants from the apportionment count in 2020 is impossible because (1) there is no current methodology or data product at the time of this writing that the Census Bureau can use to exclude

[101] Congressional Research Service. 7-5700. R41636. https://crsreports.congress.gov/product/pdf/R/R41636.
[102] *See* https://www.electiondataservices.com/wp-content/uploads/2019/12/NR_Appor19wTablesMaps.pdf, Appendix Main, Page 1.

undocumented immigrants from the 2020 apportionment count; (2) it is not currently feasible for the Census Bureau to produce estimates of undocumented immigrants from administrative records that would be of sufficient quality to use to exclude undocumented immigrants from the 2020 apportionment count; and (3) the nature, scope, and methodology of the statistical modeling needed to produce estimates of the undocumented population is fundamentally different from the statistical modeling currently used in producing the apportionment population, and would result in a less accurate and reliable enumeration.

A. Current Methodologies and Data Products Are Not Sufficient for Excluding Undocumented Immigrants from the Apportionment Count.

It is my opinion that there is no current methodology or data product at the time of this writing that the Census Bureau may use to reliably exclude undocumented immigrants from the 2020 apportionment count. First, as discussed above, the apportionment count is an "actual enumeration" of the population. The Pew methodology on which Dr. Poston relies, and the residual techniques currently used by the federal government to estimate undocumented populations are inadequate for the apportionment count because reliance on estimates from ACS controverts the prohibition on the use of statistical sampling in the production of apportionment population totals.[103] In *Department of Commerce v. U.S. House of Representatives* (1999), the Supreme Court ruled that the Census Act precluded the use of sampling to produce the apportionment count "[w]hether used as a 'supplement' or as a 'substitute.'"[104]

Second, there are no known data products from the 2020 Census that would identify the undocumented immigrant population that Alabama proposes to exclude from the apportionment count. The planned CVAP datafile, described above, is obviously not sufficient for excluding

[103] *Department of Commerce v. U.S. House of Representatives* (1999).
[104] *Department of Commerce v. U.S. House of Representatives* (1999), 24.

undocumented immigrants from the apportionment count because it only identifies the total number of citizens of voting age population. Subtracting the CVAP numbers from total population numbers does not provide the numbers to apportion excluding undocumented immigrants because CVAP does not distinguish undocumented immigrants from legal non-citizen residents, and it does not provide the citizenship or legal status of those younger than 18 years of age. Even if CVAP had sufficient data—which it does not—it is unlikely to be considered of sufficient quality for use in apportionment. In addition, the other data products, sources, and analysis that the Census Bureau is examining to fulfill the Executive Order are insufficient, as discussed below.

B. Reliance on Administrative Records to Exclude Undocumented Immigrants from the Apportionment Count is Not Sufficient for the 2020 Apportionment Count.

It is my opinion that it is not currently feasible for the Census Bureau to produce estimates of undocumented immigrants from administrative records that would be of sufficient quality to use as a basis to exclude undocumented immigrants from the 2020 apportionment count. To date, administrative record usage for purposes of enumerating households is limited to those nonresponding addresses where the Census Bureau has multiple "high-quality" administrative records available.[105] More importantly, the Census Bureau does not use administrative records *on their own*—administrative records are used only after giving the entire population an opportunity to self-respond and after an attempt to enumerate the household by field staff.[106]

[105] 2020 Census Operational Plan.
[106] Memorandum from Deborah M. Stempowski to The Record Regarding Use of Administrative Records in the 2018 End-to-End Census Test (Mar. 26, 2018), 7.

Although administrative records are being used to fulfill President Trump's executive order to produce block-level citizen voting age population estimates,[107] administrative records lack the coverage, accuracy, and reliability needed to produce an actual enumeration of the undocumented population, which would be necessary to exclude undocumented immigrants from the 2020 apportionment count. Specifically, as I explain below, (1) very few administrative records directly identify those individuals with undocumented status, and the few that do so are fundamentally flawed; and (2) administrative records that may theoretically be used to estimate the number of undocumented immigrants lack sufficient coverage, accuracy, and reliability for this purpose.

1. Direct Identification of Undocumented Immigrants from Administrative Records is Not Feasible.

Very few administrative records directly identify those with undocumented status. Indeed, administrative records are "weak in their coverage of undocumented aliens because programs typically require documentation that many undocumented aliens do not have."[108] The limited records available with respect to undocumented immigrants, described below, are woefully deficient because they are incomplete, outdated, and often inaccurate.

i. Administrative records from the Department of Justice

The Census Bureau is unable to attain a precise number of individuals who entered the country undetected, because it is likely to only have records for those individuals who are apprehended.[109] The Census Bureau expects to receive administrative records about

[107] *See generally* 84 Fed. Reg. at 33,891.
[108] Czajka, J. L. (2013). Can administrative records be used to reduce nonresponse bias? The ANNALS of the American Academy of Political and Social Science, 645(1), 171-184.
[109] Some research has attempted to roughly estimate this number by using annual number of apprehensions and estimating the probability that an undocumented migrant is apprehended along the U.S. Mexico border to produce an estimate of the number undocumented migrants from Mexico (e.g., Massey and Singer 1995). These estimates, however, only speak to migration across the Mexico border.

incarcerations and apprehensions of undocumented immigrants from the Department of Justice ("DOJ"),[110] but the most recent report (Alien Incarceration Report, Fiscal Year 2018 Q2, April 16, 2019) summarizing those records report only 43,519 individuals.[111] This is surely a far cry from the total number of undocumented immigrants in the country.

Scrutiny of these DOJ records also highlights the difficulty of obtaining complete, accurate, and timely information—even among those in federal custody. The report notes that an additional 16,426 individuals—27.4% of all "known or suspected aliens" in federal custody—were still under investigation by Immigration and Customs Enforcement to determine alienage, and many others are difficult to classify: 1,281 were legally present and undergoing removal proceedings, 1,100 were granted relief or protection from removal, and 4,903 were deemed undocumented but under adjudication.[112] If determination of undocumented status is difficult for Immigration and Customs Enforcement, the Census Bureau cannot be expected to make such determinations with incomplete and deficient administrative records.

Finally, it is worth noting the time lag of about a year from the date of the incarceration data to the report's release. Specifically, the April 16, 2019 report summarizes incarcerations as of the end of fiscal year 2018, Quarter 2. This is just one example of both the time it takes to process and analyze administrative records, and the fact that such records are outdated by the time they can be summarized. This lag in reporting—plus the large number of unresolved statuses—calls into question the ability of the Census Bureau to produce apportionment numbers that exclude undocumented immigrants in the required nine months from the date of the census.

---

[110] *See* Background Sheet 2: Creating an Interagency Working Group and Established Agreement for New Data. The Department of Interior is also sharing records on security interactions, although scant information about the coverage or quality of these records is available.
[111] Alien Incarceration Report, Fiscal Year 2018 Q2 (April 16, 2019). https://www.justice.gov/opa/page/file/1154711/download.
[112] Alien Incarceration Report, 2.

ii. Administrative records from the Department of Homeland Security

The Census Bureau is unable to attain a precise number of individuals who have overstayed their visas because DHS records are similarly unreliable. DHS is providing the Census Bureau with Arrival/Departure Information System and Visa Data, but these data do not completely or accurately identify visa overstays.[113] Record-keeping challenges make it difficult to match arrival and departure records for the same person, which could result in erroneously counting as an overstayer someone who actually left the country.[114] Consider the enormity of the task—more than 47 million people visit the United States from abroad for tourism and business.[115] When departure records are incompletely collected by the airlines and transmitted to DHS, errors result. The land borders are even harder to track, since the ports of entry are primarily focused on screening incoming traffic rather than checking who is departing. More than 254 million people annually pass through the border checkpoints (nearly 700,000 travelers on a given day)—mostly individuals who are legally able to "travel back and forth across the border for commercial trade, tourism, work, school, family visits or a simple trip to the store."[116] As admitted in the DHS Privacy Impact Assessment for the Immigration-Related Information Sharing with the U.S. Census Bureau: "Determining an individual's citizenship based on various DHS data is a challenging task . . . . Due to the decentralized nature of admission and immigration information, as well as the lack of a nationwide departure control system, [U.S.

[113] *See* Background Sheet 2: Creating an Interagency Working Group and Established Agreement for New Data.
[114] *See* https://thehill.com/opinion/immigration/447607-illegal-immigration-by-the-numbers-visa-violators-and-border-crossers.
[115] Morral, Anrew, Henry Willis, Peter Brownell. (2011). Measuring Illegal Border Crossing Between Ports of Entry: An Assessment of Four Promising Methods. Rand, Homeland Security and Defense Center. https://www.rand.org/content/dam/rand/pubs/occasional_papers/2011/RAND_OP328.pdf.
[116] Davis, Kristina. (April 7, 2019). "The impossible challenge of tracking visa overstays," The San Diego Union-Tribune. https://www.sandiegouniontribune.com/news/immigration/story/2019-04-06/the-impossible-challenge-of-tracking-visa-overstays.

Customs and Border Protection] collects different data points from different data set."[117] As a result, the classification of an individual as an overstayer is often inaccurate. Indeed, research by the Center for Migration Studies found nearly half the visa overstayers identified by DHS had likely left the U.S. unnoticed.[118] Others have emphasized that the data are quickly out of date because "many overstayers leave or adjust their status within a few months of their visa expiration date."[119] In the Memorandum of Agreement to share this data with the Census Bureau, DHS acknowledges that the shared information "is assumed to be accurate at the time it was collected. However, because DHS is providing information at a point in time, it is reasonable to believe that eventually data accuracy issues may arise."[120]

iii. Additional records with respect to undocumented status

In addition to the records described above, a handful of administrative records may have some information with respect to small groups of undocumented immigrants. One group with administrative records that identify immigrants without formal legal status are those with Deferred Action for Childhood Arrivals ("DACA") status, and who may be considered by some to fall under the category of "undocumented."[121] DACA recipients do not have formal legal status, but they are currently protected from deportation, and retain lawful presence in the U.S. Administrative records also exist for undocumented immigrants with pending asylum cases. The Census Bureau has not, however, requested DACA or records with respect to pending asylum

[117] Department of Homeland Security. (Dec. 20, 2019). Privacy Impact Assessment for the Department of Homeland Security Immigration-Related Information Sharing with the U.S. Census Bureau, 6.
[118] Warren, Robert (February 27, 2019). Sharp Multiyear Decline in Undocumented Immigration Suggests Progress at US-Mexico Border, Not a National Emergency. https://cmsny.org/publications/essay-warren-022719/
[119] Fazel-Zarandi, Feinstein, Kaplan 2018.
[120] Memorandum of Agreement Between the U.S. Department of Commerce, U.S. Census Bureau and United States Department of Homeland Security Regarding the Transfer of Immigration and Citizenship Related Data, 6.
[121] To be eligible, individuals needed to have arrived in the U.S. before turning 16 and must meet education and other related requirements.

cases.[122] In any event, both of these groups represent a tiny part of the undocumented population.

In sum, the limited number of administrative records that identify undocumented status mean it is impossible to directly enumerate the undocumented population from available administrative records.

2. Indirect Identification of Undocumented Immigrants from Administrative Records is Not Feasible.

The Census Bureau is also unable to produce an accurate and reliable enumeration of the undocumented population by indirectly estimating the undocumented immigrant population through a process of elimination based on information in administrative records. Doing so requires correct identification of citizens and the lawful non-citizen immigrant population—those persons granted lawful permanent residence, persons granted asylum, persons admitted as refugees, and persons admitted as nonimmigrants under classes of admission associated with residence (e.g., students and temporary workers, as opposed to tourists) and with authorized periods of admission in the future of any estimated date.[123]

Here, again, administrative records lack the necessary coverage, accuracy, and reliability to produce high quality estimates. Regarding the estimation of citizenship status, John Abowd, Chief Scientist of the Census Bureau, acknowledges that the Census Bureau "will most likely never possess a fully adequate truth deck to benchmark to."[124] Determining the specific legal

[122] *See* Background Sheet 2: Creating an Interagency Working Group and Established Agreement for New Data.
[123] Alabama has not clearly explained how to handle so-called quasi-legal cases, such as foreign nationals granted Temporary Protected Status (TPS) because they are from countries in which they cannot return home safely or those with DACA status, who have work authorization and protection against deportation. Pew includes in the authorized immigrant estimates those with temporary protection from deportation under DACA, TPS, and pending asylum cases. This would mean that a resident with 18-month temporary protected status (that could be extended) would be excluded from political representation but a student or temporary worker on a 12-month visa would be included.
[124] Memorandum from John M. Abowd, Chief Scientist & Assoc. Dir. for Research & Methodology, U.S. Census Bureau, to Wilbur L. Ross, Sec'y, U.S. Dep't of Commerce (Mar. 1, 2018).

status (undocumented or otherwise) among immigrants is even more difficult. DHS admits that "immigration status information is challenging, complicated, and dynamic . . . . No one source of citizenship information is complete and up-to-date"[125] In another report, DHS acknowledges, "while Census and DHS data provide a wealth of information on the total foreign-born population broken down by citizenship and on annual migration flows and status changes, national population data on the major subcategories of non-citizens, including lawful permanent residents, students, temporary workers, and unauthorized immigrants, are not readily available from any source and must be estimated."[126]

Below, I will show how the Census Bureau's most complete source of citizenship, the Numident, is inadequate, and then I will demonstrate that the other administrative records that the Bureau could consider using to fill the gaps in data are also insufficient.

i. The Numident

The Census Bureau's most complete source of citizenship data is the Census Numident file, a record of individual applications for Social Security cards and any changes subsequently made (such as change of name).[127] In an effort to evaluate the potential use of administrative records to estimate the citizenship status for the 2020 Census, the Census Bureau undertook extensive research evaluating the strengths and weaknesses of Numident. These results were reported in a 2018 white paper titled, "Understanding the Quality of Alternative Citizenship Data Sources for the 2020 Census" (hereinafter, "The Brown Memo"). As the Census Bureau found, there are several sources of error in these records. First, there will be individuals enumerated in the 2020 census who will not have information in the Numident. While this is more likely

[125] *See* Department of Homeland Security. (Dec. 20, 2019). Privacy Impact Assessment for the Department of Homeland Security Immigration-Related Information Sharing with the U.S. Census Bureau.
[126] *See* https://www.dhs.gov/sites/default/files/publications/lpr_population_estimates_january_2015.pdf, 2.
[127] See Layne, Wagner, and Rothaas (2014) and NORC (2011). Also Rastogi and Ohara (2012), Bond et al. 2014.

among undocumented immigrants, citizens and non-citizens with formal legal status can also be missing because of linkage errors, or incomplete identifying information provided by the household.[128] Of those enumerated in the 2010 census, the Brown Memo reports that 89.4% could be matched to the Numident file.[129]

A second issue is that some individuals in Numident have missing information about citizenship status. In 2017, 6.6 million persons born outside the U.S. have blank citizenship among those born in 1920 or later with no year of death.[130] Some of the individuals missing citizenship status could be undocumented immigrants, but a much higher share appear to be U.S. citizens.[131] The Brown Memo outlines the different groups of people who could have missing citizenship status in Numident, as follows:

1. U.S. citizens from birth with no Social Security number or U.S. passport;
2. U.S. citizens from birth born outside the U.S., who do not have a U.S. passport, and either applied for a Social Security number prior to 1974 and were 18 or older or applied before the age of 18 prior to 1978;
3. U.S. citizens who were automatically naturalized if they were under the age of 18 when their parents became naturalized in 2000 or later, and they did not inform USCIS or receive a U.S. passport;

[128] The internal unique person identifier is called the protected identification key or PIK.
[129] Brown et al, 14 (as reported, 91% can be assigned a PIK; once assigned, 98.2% could be matched to Numident).
[130] *See* https://www.supremecourt.gov/DocketPDF/18/18-966/91016/20190306200155135_18-966%20Commerce%20J.A.pdf, 153. In total, 20.0 percent of 2010 Numident records have missing citizenship status, but some of those will not be in the 2020 Census—either because they no longer reside in the U.S. (e.g., those who had temporary work status), or because they fail to respond.
[131] Memorandum from John M. Abowd, Chief Scientist & Assoc. Dir. for Research & Methodology, U.S. Census Bureau, to Wilbur L. Ross, Sec'y, U.S. Dep't of Commerce (Mar. 1, 2018).

4. U.S. citizens who were naturalized prior to 2001 and did not inform the Social Security Administration of their naturalization and had never applied for a Social Security number; and
5. Lawful permanent residents (LPR) who received that status prior to 2001 and had never applied for a Social Security number. [132]

The reason for the gap in citizenship status information is related to the history of the Social Security number, which was not created to track citizenship status, but rather created for the sole purpose of tracking earnings for use in determining benefit levels. Evidence of citizenship was not added to the Social Security application until 1974. Now, parents typically apply for an infant's Social Security number at the hospital where the infant is born, but there was variation across states in the rollout of this enumeration-at-birth ("EAB") program, which potentially resulted in geographic variation in the accuracy of the data.[133] For example, New Mexico, Indiana, and Iowa were early adopters of EAB in 1987, while California, Rhode Island, and Connecticut did not participate in EAB until 1995.[134] This means that late adopting states could be more likely to have citizens with missing citizenship status in Numident, potentially leading to their exclusion from apportionment numbers.

A third issue is inaccuracies in Numident. There are a number of cases where Numident indicates a person is a non-citizen, but the individual is in fact a citizen. This includes U.S. citizens who were naturalized prior to 2001 and who did not inform the Social Security Administration of their naturalization. Similarly, lawful permanent residents who received that

[132] Brown et al., 19.
[133] *See* https://www.ssa.gov/policy/docs/ssb/v69n2/v69n2p55.html.
Today, over 90 percent of parents use the EAB process, which is offered in all 50 states plus Puerto Rico and the District of Columbia. The Social Security Administration receives nearly three-quarters of original Social Security number applications through the EAB process and issues over 4 million Social Security numbers via EAB each year (Social Security Administration 2006).
[134] *See* https://www.ssa.gov/policy/docs/ssb/v69n2/v69n2p55.html.

status prior to 2001 and had applied for a Social Security number prior 1974 would also have inaccurate data. Of course, there can also be inaccuracies in which a non-citizen is listed as a citizen. According to a 2005 GAO report, the Social Security number system had quality control issues for many years.[135] Audits during the 2000s found widespread misuse, with millions of workers showing mismatches.[136]

In sum, Numident lacks coverage of the entire population, and missing citizenship in Numident is not a clear indication of undocumented status. The Census Bureau is receiving other administrative records from federal agencies and state governments to supplement Numident, but they do not completely fill in the gaps, as explained below. Moreover, these administrative records can introduce inconsistencies across data sources that have to be reconciled, as also explained below.

ii. Other administrative records

DHS offers the most complete information about legal non-citizens, but the records it is providing to the Census Bureau are still inadequate for the purpose of apportionment. DHS is providing the Census Bureau with the Lawful Permanent Resident File, Naturalization Data from the Citizen and Immigration Services, and Arrival/Departure Information System and Visa Data.[137] As outlined when discussing Pew's residual method, these records are incomplete and often outdated, and can only partially address Numident's weaknesses.[138] For example, these data "do not cover naturalizations occurring before 1988 . . . and do not always cover children under 18 at the time a parent became a naturalized U.S. citizen."[139] As another example, the

[135] *See* https://www.govinfo.gov/content/pkg/GAOREPORTS-GAO-05-115/html/GAOREPORTS-GAO-05-115.htm.
[136] *See* July 2004 OIG report, 25
[137] *See* Background Sheet 2: Creating an Interagency Working Group and Established Agreement for New Data.
[138] Memorandum from John M. Abowd, Chief Scientist & Assoc. Dir. for Research & Methodology, U.S. Census Bureau, to Wilbur L. Ross, Sec'y, U.S. Dep't of Commerce (Mar. 1, 2018).
[139] Brown et al., 18.

Worldwide Refugee Admission Processing System for the Department of State contains only some of the asylum cases.[140]

Other administrative records that the Census Bureau currently plans to use have considerable variability in availability and coverage across states. For example, Medicaid/Children's Health Insurance Program data from the Department of Health and Human Services ("HHS") has "some citizenship information potentially available."[141] However, Census Bureau research finds that the availability of HHS varies widely across states.[142] A similar issue arises in the use of state Department of Motor Vehicle ("DMV") records. The Census Bureau has requested DMV data, including with respect to citizenship status and eye color, but the citizenship data can be inaccurate.[143] For example, when Florida and Texas attempted to purge registered voters who were identified as having been noncitizens when they applied for the driver licenses from voter rolls, they found that most were naturalized citizens who had outdated information in DMV records.[144]

Finally, any reliance by the Census Bureau on commercial data (i.e. CoreLogic data) cannot fill the gaps.[145] CoreLogic fails to provide full coverage of the population and its availability and accuracy varies across states. Households of higher socioeconomic status are better represented among linked CoreLogic records than are households of lower socioeconomic

[140] Applicants obtain asylum in one of two ways: affirmatively through a USCIS asylum officer, or defensively in removal proceedings before an immigration judge of DOJ's Executive Office for Immigration Review. The database only contains state of residence information for those receiving affirmative asylum.
[141] *See* Background Sheet 2: Creating an Interagency Working Group and Established Agreement for New Data.
[142] Brown et al. 2018, 14.
[143] Wang, Hansi Lo. (November 20, 2019). Nebraska Is 1st State To Share Driver's License Records With Census Bureau. https://www.npr.org/2019/11/20/781373128/nebraska-1st-to-say-it-will-share-drivers-license-records-with-census-bureau.
[144] Lopez, Ashley. (February 14, 2019). There's No Easy Way For Texas To Vet Its List Of Alleged Noncitizen Voters. Just Ask Florida. National Public Radio Kut 90.5. https://www.kut.org/post/theres-no-easy-way-texas-vet-its-list-alleged-noncitizen-voters-just-ask-florida.
[145] *See* https://www.federalregister.gov/documents/2018/06/08/2018-12365/proposed-information-collection-comment-request-2020-census.

status.[146] Even more importantly, research finds that the availability and quality of these data vary across states, raising concerns about distributional accuracy.[147] One study evaluating the potential for commercial data in the 2020 census found that "the quality of the CoreLogic data varies between counties and townships around the country, both in the coverage of the CoreLogic data and in the correspondence between ACS and CoreLogic property tax values."[148]

Such variation in data availability and accuracy across states raises concerns about the fairness or distributional accuracy of the resulting population counts. The Census Bureau will have far more information available about the population of some states compared to others. As of this writing, for example, only Nebraska had provided DMV data to the Census Bureau.[149] Asymmetries in information about state populations could make it easier or harder to identify and exclude undocumented persons from apportionment populations. Consider, for instance, that some states, but not others, allow undocumented immigrants to obtain driver's licenses. To the extent those DMV records improve the ability to identify undocumented immigrants in a state, it will increase the chance that those states will be more likely to have undocumented immigrants identified and excluded from their apportionment total, jeopardizing the distributional accuracy of the resulting apportionment count.

---

[146] Bond, B., Brown, J. D., Luque, A. & O'Hara, A. (2014). The nature of the bias when studying only linkable person records: Evidence from the American Community Survey. CARRA Working Paper #2014-08. Washington, D.C.: U.S. Census Bureau. https://www.census.gov/content/dam/Census/library/working-papers/2014/adrm/carra-wp-2014-08.pdf. Similarly, Brummet (2014) found that 63.4 percent of records could be linked to the Master Address File, but the number varied across structure type—just 14.8 percent of multi-unit structure were linked, compared to 79 percent of single-unit structures. Brummet, Q. O. (2014). Comparison of survey, federal, and commercial address quality. CARRA Working Paper #2014-06. Washington, D.C.: U.S. Census Bureau. https://www.census.gov/content/dam/Census/library/working-papers/2014/adrm/carra-wp-2014-06.pdf.

[147] Moore, B. (2015). Preliminary research for replacing or supplementing the year built question on the American Community Survey with administrative records. Washington, D.C.: U.S. Census Bureau. https://www.census.gov/library/working-papers/2015/acs/2015_Moore_02.html.

[148] Seeskin, Z. H. (2016). Evaluating the Use of Commercial Data to Improve Survey Estimates of Property Taxes (No. 2016-06). Center for Economic Studies, US Census Bureau, 5.

[149] The Census Bureau reports that they had reached verbal agreements with about 1/3 of states. *See* Deposition Transcript of Karen Battle. (Mar. 2, 2020), 175, 201-02.

In sum, it is not possible to conduct an actual enumeration of the undocumented population using administrative records given their incomplete coverage of the population. Very few administrative records provide timely and accurate information about legal status. As a result, administrative records cannot be used to directly enumerate the population, and so any attempt to produce a count of the undocumented population for purposes of exclusion from the 2020 apportionment count would require extensive statistical modeling. In the next section, I explain how this modeling would differ in fundamental ways from that previously used to enumerate the apportionment population, and would result in a less accurate and reliable population enumeration.

C. Statistical Modeling to Exclude Undocumented Immigrants From the 2020 Apportionment Count Would Result in a Less Accurate and Reliable Enumeration.

It is my opinion that the use of statistical modeling to exclude undocumented immigrants would result in a less accurate and reliable enumeration. Below, I (1) explain how current statistical methods used in the enumeration process fundamentally differ from what would be required to estimate an apportionment population that excludes undocumented immigrants; and (2) explain why, in light of the Census Bureau Standards, implementation of any such statistical model would not be feasible for the 2020 apportionment count.

I start by first outlining what the Census Bureau currently plans with respect to estimating citizenship status to produce CVAP because that informs my understanding of the type of statistical modeling that might be considered, although I note that CVAP is not clearly being developed for the purpose of apportionment.[150] Given the shortcomings of available

[150] Trump's executive order calls for identification of citizenship status for states to use for "districting purposes," while acknowledging that it might not be permissible: "Whether that approach is permissible will be resolved when a State actually proposes a districting plan based on the voter-eligible population." 84 Fed. Reg. at 33,824. To date, no states have actually requested the data.

administrative records, explained above, the Census Bureau also must use modeling to estimate CVAP. Although the exact methodology for doing so has not been finalized, documents indicate that a model will be estimated for each person in the census "using the most current citizenship status from each available citizenship source for the person, as well as the person's other demographic, household, and location information as explanatory variables."[151] I presume that any model to estimate legal status would rely on a similar model specification.

1. The Extent of Any Planned Statistical Modeling to Exclude Undocumented Immigrants is Fundamentally Different than the Census Bureau's Current Uses of Statistical Modeling in Apportionment.

The current statistical methods used by the Census Bureau to address missing and erroneous values in the census include data editing and imputations. Data editing is the process of identifying missing, invalid, or inconsistent entries, and changing the entries according to checks of logical relationships.[152] For example, an individual who leaves blank the age question on the census form but completes information with respect to her date of birth would have age filled in through the process of editing. Statistical imputation is the process of filling in missing or conflicting values with a substitute. To produce population numbers from the decennial census, deterministic hot-deck count imputation is used in the small number of cases when an individual or a household does not answer a question, or when a household is not enumerated through self-completion or the Census Bureau's NRFU process, as described above.[153] The hot-

[151] *See* Department of Homeland Security (Dec. 20, 2019). Privacy Impact Assessment for the Department of Homeland Security Immigration-Related Information Sharing with the U.S. Census Bureau.
[152] This is sometimes called logical imputation. Editing can also rely on recontacts with the respondent or reliance on other data sources.
[153] Earlier in the data collection process, modeling on the basis of administrative records is used, for example, in the creation of the MAF and in the determination of a household as occupied or vacant. Count imputation occurs when the Census Bureau is unable to get information about an address in the MAF: (1) when records indicate housing unit is occupied but did not have number of residents; (2) when records say a housing unit exists, but they are unclear whether occupied or vacant, then the Bureau imputes both information with respect to if occupied and household size; (3) status imputation: if unclear if a unit exists, then impute if occupied, vacant, or nonexistent and then

deck procedure uses contemporaneous data from neighboring housing units to fill in deterministic values for the missing information.[154]

The nature of the statistical modeling that would be required for estimating legal status fundamentally differs from the statistical modeling currently used in producing population numbers for apportionment in several ways. First, excluding undocumented immigrants from the apportionment population requires imputing not just the household count, but also the characteristics (namely, citizenship status and legal status) of the household. As explained above, the Census Bureau currently produces apportionment numbers from the CUF, which only relies on count imputation. Characteristic imputation occurs in the CEF as a separate process, after the final population count is established and for the purposes of redistricting and other data tabulations.[155]

Second, the scope of any statistical modeling required to estimate the number of undocumented immigrants would be unprecedented for use in enumerating the apportionment population. For example, in 2010, 0.39% (less than one half of one percent) of the total population was added via count imputation; in 2000, 0.43% of total population was added using count imputation.[156] In other words, count imputation is used sparingly, and only after giving the entire population an opportunity to self-respond, and attempting to enumerate through NRFU.[157]

---

household size. For official statistics beyond apportionment numbers, the Census Bureau also conducts characteristic imputation, in which the characteristics of the household are imputed using hot-deck methods.

[154] In contrast, a cold-deck imputation procedure would use information from outside sources.

[155] Memorandum from Deborah M. Stempowski to The Record Regarding Use of Administrative Records in the 2018 End-to-End Census Test (Mar. 26, 2018), 8.

[156] *See* https://www.pewsocialtrends.org/2011/05/04/imputation-adding-people-to-the-census/.

[157] Relatedly, the Census Bureau acknowledges in the 2020 Operational Plan that "[t]he accuracy and usefulness of the data collected for the 2020 Census are dependent upon the ability to obtain information from the public, which is influenced partly by the public's perception of how well their privacy and confidentiality concerns are being addressed . . . . If a substantial segment of the public is not convinced that the Census Bureau can safeguard their response data against data breaches and unauthorized use, then response rates may be lower than projected, leading to an increase in cases for follow-up and cost increases." For review of research on this topic, *see* U.S. Census Bureau, Privacy Research in Census 2000, Census 2000 Topic Report No. 1 (2003).

In contrast, estimation of the apportionment population excluding undocumented immigrants requires extensive modeling to account for gaps and inconsistencies in administrative records. With almost no administrative records directly identifying undocumented persons, the Census Bureau would need to impute the vast majority of the population to be excluded. The Census Bureau also acknowledges the inaccuracy of the models for those in the 2020 Census who are unable to be linked to administrative records. These individuals will have their citizenship probability "estimated based on local area information and the person's demographic characteristics, but not the person's citizenship, which makes the estimate much less accurate."[158]

Third, the shortcomings of the inputs to any model to estimate undocumented status would seriously implicate the accuracy of the outputs to such a model. All of the issues outlined above regarding the accuracy, reliability, and timeliness of administrative records will impact the predictive accuracy of the model results. Census research acknowledges that the modeling of missing information on citizenship will be challenging, with the accuracy of the models "not known."[159] Critically, the concern is not just with the accuracy and reliability of information about citizenship and legal status in administrative records, but also the other information from the administrative records that might be used in building the predictive model—such as race, ethnicity, sex, age, or country of origin.[160] If there are errors in the other explanatory variables, the model results can be biased and unreliable.

[158] Memorandum of Agreement Between the U.S. Department of Commerce, U.S. Census Bureau and United States Department of Homeland Security Regarding the Transfer of Immigration and Citizenship Related Data, 17.
[159] Brown et al, 44.
[160] As explained in Memorandum of Agreement Between the U.S. Department of Commerce, U.S. Census Bureau and United States Department of Homeland Security Regarding the Transfer of Immigration and Citizenship Related Data, 17: "A model will be estimated for each person using the most current citizenship status from each available citizenship source for the person, as well as the person's other demographic, household, and location information as explanatory variables."

Specifically, one key input of concern is the quality of the measures of race and ethnicity in administrative records. The quality of the race and ethnicity data in Numident is poor.[161] The race data included in the Numident file is collected at the time an application is made to obtain a Social Security number. Prior to 1980, the application form only permitted the racial categories of white, black, and other.[162] Individuals added to Numident through state vital records (the EAB program)—roughly one-fourth of the population—are typically missing race entirely because states do not transfer that information.[163] Also problematic is that Hispanic origin data are indirectly estimated through country of birth—a flawed assumption given that Hispanics often select more than one race or "some other race."[164] Given the problems with Hispanic ethnicity in Numident, census research has warned that statistical imputation could result in "bias in the resulting proportion of persons who are Hispanic," which could, in turn, bias estimates of citizenship and legal status.[165]

Finally, there are critical unanswered questions about how unverifiable modeling assumptions will be translated into any model results that would be used to exclude individuals from apportionment counts. The modeling of legal status seems likely to follow the same modeling strategy taken for estimating citizenship status, in which the planned model will result

[161] The Census Bureau has built an internal Best Race and Hispanic Origin file, a composite from various government and commercial sources that uses a rules-based approach to resolve unique race and Hispanic origin codes for person records where those values vary across different files. Unfortunately, the content and quality of this file "is mysterious to observers." Czajka, J. L. (2013). Can administrative records be used to reduce nonresponse bias?. The ANNALS of the American Academy of Political and Social Science, 645(1), 171-184.
[162] The current OMB race and ethnicity categories were not used until 1997.
[163] Czajka, J. L. (2013). Can administrative records be used to reduce nonresponse bias?. The ANNALS of the American Academy of Political and Social Science, 645(1), 171-184.
[164] Czajka, J. L. (2013). Can administrative records be used to reduce nonresponse bias?. The ANNALS of the American Academy of Political and Social Science, 645(1), 171-184.
[165] Richard A. Griffin. (2014). "Issues Concerning Imputation of Hispanic Origin due to Administrative Record Enumeration for the 2020 Census," Proceedings of the Survey Research Methods Section, American Statistical Association, available at http://ww2.amstat.org/sections/srms/proceedings/y2014/Files/311893_88330.pdf.

in a probability of best citizenship status.[166] This means that the model output for each individual is a value that ranges from 0 to 1, where 0 would indicate a 0% chance of being a citizen and 1 would indicate a 100% chance of being a citizen, but where most values will fall somewhere in between. It is unclear, however, how the Census Bureau will decide on the threshold that will be used to classify an individual as a citizen or not based on their predicted probability.[167] Any appropriate rate of false positives and false negatives that would be considered acceptable in producing an apportionment population based on such probabilities are unclear. Indeed, a probabilistic model inherently implies error in the underlying data and clearly contravenes an actual enumeration of "whole number of persons in each State." And it is unclear how the uncertainty in the prediction will be accounted for in the enumeration count. What is clear, however, is that the resulting population count from the use of such probabilities will be less reliable than the existing method of counting the population, given that these modeling decisions will introduce uncertainty and bias into the resulting population numbers.

In sum, there are fundamental differences in the statistical modeling that would be necessary to produce apportionment populations excluding undocumented immigrants compared to the current use of statistical modeling in the enumeration process. The nature and scope of the statistical modeling required to produce estimates of undocumented immigrants from incomplete and outdated administrative records requires untested modeling approaches and unverified modeling assumptions that will inherently result in a population count that is less reliable and less accurate than the current enumeration methods.[168]

---

[166] Memorandum of Agreement Between the U.S. Department of Commerce, U.S. Census Bureau and United States Department of Homeland Security Regarding the Transfer of Immigration and Citizenship Related Data, 17.

[167] For example, it is unclear if, say, a 50%, 70%, or 90% predicted chance of being a legal non-citizen would be considered sufficient for inclusion in the apportionment population.

[168] Additionally, any attempt to exclude the undocumented immigrant population from the apportionment count threatens the accuracy and reliability of the apportionment population by reducing cooperation with the decennial census. The very exercise of asking the Census Bureau to use administrative records beyond their originally

2. Any Implementation of a Statistical Model to Exclude Undocumented Immigrants from the 2020 Apportionment Count is Not Feasible in the Limited Available Time.

The Census Bureau's Statistical Quality Standards govern the development and implementation of statistical methods in the design, collection, and dissemination of census products. These standards require an explicit plan that addresses (1) requirements for the editing and imputation systems; (2) verification and testing of the editing and imputation systems; and (3) monitoring and evaluation of the quality of the editing and imputation operations.[169] To date, there is no indication that sufficient planning and evaluation of the statistical modeling required to estimate an apportionment population that excludes undocumented immigrants has occurred, and there is likely not time for it to occur prior to December 31, 2020. It is telling to consider the time typically required to produce estimates of undocumented populations. For example, the most recent DHS estimate of the undocumented population—from December 2018—reports on numbers considered current as of July 2015.

With respect to the Census Bureau's timing, consider, as a point of comparison, that the Census Bureau began investigating methods for utilizing administrative records in NRFU operations shortly after the 2010 census. By the time the 2018 Operational Plan was drafted, the

---

intended purpose to identify the legal status of the population will stoke fears about confidentiality and will undermine trust in the Census Bureau. As the former director of the Census John Keane explained: "If the Census Bureau were directed to enumerate undocumented aliens separately in order to remove them from the apportionment count, we would run the risk of being perceived as an enforcement agency . . . . The Census Bureau goes to great lengths to avoid misperception that could adversely affect cooperation. We must convince the population that it is safe to be included in the census." John G. Keane. Statement of the Director of the Bureau of the Census Before the Subcommittee on Energy, 5. Research shows that attitudes about privacy and confidentiality are strong predictors of census self-response—those individuals reporting higher levels of concern about the confidentiality of census data are less likely to return their census forms, more likely to skip individual questions, and more likely to provide inaccurate responses. *E.g.*, Singer, E., Mathiowetz, N. A., & Couper, M. P. (1993). The impact of privacy and confidentiality concerns on survey participation: The case of the 1990 U.S. census. Public Opinion Quarterly, 57, 465–482. Lower levels of self-response, in turn, increase the cost and reduce the quality of the census count. Brown, J. D., Heggeness, M. L., Dorinski, S. M., Warren, L., & Yi, M. (2019). Predicting the Effect of Adding a Citizenship Question to the 2020 Census. Demography, 56(4), 1173-1194.

[169] *See* https://www.census.gov/about/policies/quality/standards/standardc2.html.

use of administrative records had undergone years of research led by a team of census researchers (i.e. the Administrative Records Modeling Team), extensive testing in large-scale tests, engagement with stakeholders (e.g., I served on an administrative records working group for the Census Scientific Advisory Committee), publication and presentation in professional outlets, and significant revisions in light of the results of that research.[170] Such a process is simply not possible before apportionment population numbers are due to the President on December 31, 2020.

VI. Conclusion

To reiterate my opinions:

First, Dr. Poston does not demonstrate, to any degree of reasonable certainty, that Alabama will (a) lose a congressional seat because of the inclusion of undocumented immigrants in the 2020 apportionment count, or (b) maintain a congressional seat because of the exclusion of undocumented immigrants in the 2020 apportionment count.

Second, there is no reliable way to exclude undocumented immigrants from the 2020 apportionment count because (a) there is currently no reliable methodology or data product that the Census Bureau may use to do so; (b) no administrative records are of sufficient quality to use to exclude undocumented immigrants from the 2020 apportionment count; and (c) the nature, scope, and methodology of the statistical modeling needed to produce estimates of the undocumented population is fundamentally different from the statistical modeling currently used in producing the apportionment population, and would result in a less accurate and reliable enumeration.

[170] The final 2020 Census Operational Plan scaled back the plans to use administrative records compared to initial plans in the 2015 version 1.1. Operational Plan.

Executed on March 13, 2020 at Durham, NC.

I declare under penalty of perjury that the foregoing is true and correct.

D. Sunshine Hillygus, Ph.D

References

Abowd, John. September 4, 2018. Protecting the Confidentiality of America's Statistics: Ensuring Confidentiality and Fitness-for-Use. Blog Post at U.S. Census Bureau. https://www.census.gov/newsroom/blogs/research-matters/2018/08/protecting_the_confi0.html.

Anderson, M., & Fienberg, S. E. (1999). *Who counts?: The politics of census-taking in contemporary America*. Russell Sage Foundation.

Bachmeier, J. D., Van Hook, J., & Bean, F. D. (2014). Can we measure immigrants' legal status? Lessons from two US surveys. *International Migration Review*, 48(2), 538-566.

Baker, B. (2018). *Population Estimates: Illegal Alien Population Residing in the United States: January 2015*. Washington, DC: Department of Homeland Security. https://www.dhs.gov/sites/default/files/publications/18_1214_PLCY_pops-est-report.pdf.

Bhaskar, R., Fernandez, L. E., & S. Rastogi. (2018). Assimilation and coverage of the foreign-born population in administrative records. Center for Administrative Records Research and Applications (CARRA) Working Paper Series #2015-02., April 21, 2015. https://www.census.gov/content/dam/Census/library/working-papers/2015/adrm/carra-wp-2015-02.pdf.

Bialik, Kristen. (August 22, 2017). U.S. Active-Duty Military Presence Overseas Is At Its Smallest In Decades. Pew Research Center. https://www.pewresearch.org/fact-tank/2017/08/22/u-s-active-duty-military-presence-overseas-is-at-its-smallest-in-decades/.

Bond, B., Brown, J. D., Luque, A. & O'Hara, A. (2014). The nature of the bias when studying only linkable person records: Evidence from the American Community Survey. CARRA Working Paper #2014-08. Washington, D.C.: U.S. Census Bureau. https://www.census.gov/content/dam/Census/library/working-papers/2014/adrm/carra-wp-2014-08.pdf.

Brown, J, Heggeness, M, Dorinski, S, Warren, L & Yi, M (2018). *Understanding the Quality of Alternative Citizenship Data Sources for the 2020 Census*, Center for Economic Studies, U.S. Census Bureau Working Paper 18-38. Available at https://www2.census.gov/ces/wp/2018/CES-WP-18-38.pdf.

Brown, J. D., Heggeness, M. L., Dorinski, S. M., Warren, L., & Yi, M. (2019). Predicting the Effect of Adding a Citizenship Question to the 2020 Census. Demography, 56(4), 1173-1194.

Brummet, Q. O. (2014). Comparison of survey, federal, and commercial address quality. CARRA Working Paper #2014-06. Washington, D.C.: U.S. Census Bureau. https://www.census.gov/content/dam/Census/library/working-papers/2014/adrm/carra-wp-2014-06.pdf.

Cohn, D'vera. (May 4, 2011). "Imputation: Adding People to the Census," Pew Research Center. https://www.pewsocialtrends.org/2011/05/04/imputation-adding-people-to-the-census/.

Cohn, D'Vera. (January 11, 2011). "Census 2010: The Last Seat in Congress." https://www.pewsocialtrends.org/2011/01/11/census-2010-the-last-seat-in-congress/.

Collecting Information About Citizenship Status in Connection With the Decennial Census, 84 Fed. Reg. 33,821 (July 11, 2019).

Crocker, Royce (Oct 30, 2015). Apportioning Seats in the U.S. House of Representatives Using the 2013 Estimated Citizen Population. Congressional Research Service. 7-5700. R41636. https://crsreports.congress.gov/product/pdf/R/R41636.

Costanzo et al. (June 2002). Evaluating Components of International Migration: The Residual Foreign Born. https://www.census.gov/content/dam/Census/library/working-papers/2001/demo/POP-twps0061.pdf.

Czajka, J. L. (2013). Can administrative records be used to reduce nonresponse bias? *The ANNALS of the American Academy of Political and Social Science*, 645(1), 171-184.

Davis, Kristina. (April 7, 2019). "The impossible challenge of tracking visa overstays," The San Diego Union-Tribune. https://www.sandiegouniontribune.com/news/immigration/story/2019-04-06/the-impossible-challenge-of-tracking-visa-overstays.

Department of Commerce v. U.S. House of Representatives (1999).

Department of Homeland Security (March 5, 2019). "Potential Improvements to DHS Illegal Alien Population Estimates: Collection and Use of Data," Fiscal Year 2018 Report to Congress.

Department of Homeland Security (Dec. 20, 2019). Privacy Impact Assessment for the Department of Homeland Security Immigration-Related Information Sharing with the U.S. Census Bureau.

Department of Homeland Security. (April 16, 2019). Alien Incarceration Report Fiscal Year 2018, Quarter 2. https://www.justice.gov/opa/page/file/1154711/download.

Department of Homeland Security. (May 2019). Population Estimates. https://www.dhs.gov/sites/default/files/publications/lpr_population_estimates_january_2015.pdf.

Deposition of Dudley L. Poston, Jr., Ph.D. (Feb. 27, 2020). *Alabama et al. v. United States Department of Commerce et al.*, No. 2:18-cv-00772-RDP (N.D. Al. 2018).

Deposition Transcript of Karen Battle. (Jan. 16, 2020). *Alabama et al. v. United States Department of Commerce et al.*, No. 2:18-cv-00772-RDP (N.D. Al. 2018).

Deposition Transcript of Karen Battle. (Mar. 2, 2020). *Alabama et al. v. United States Department of Commerce et al.*, No. 2:18-cv-00772-RDP (N.D. Al. 2018).

Election Data Services. Montana Gains California's Seat With New 2019 Census Estimates; But Alabama & Ohio to also lose by 2020. https://www.electiondataservices.com/wp-content/uploads/2019/12/NR_Appor19wTablesMaps.pdf.

Fazel-Zarandi, M. M., Feinstein, J. S., & Kaplan, E. H. (2018). The number of undocumented immigrants in the United States: Estimates based on demographic modeling with data from 1990 to 2016. PloS one, 13(9).

Frost, Amanda. (June 19, 2016). The Overlooked Pathways to Legal Status. The Atlantic. https://www.theatlantic.com/politics/archive/2016/06/the-overlooked-pathways-to-legal-status/487682/.

Griffin, Richard (2014), "Issues Concerning Imputation of Hispanic Origin due to Administrative Record Enumeration for the 2020 Census," Proceedings of the Survey Research Methods Section, American Statistical Association. Available at http://ww2.amstat.org/sections/srms/proceedings/y2014/Files/311893_88330.pdf.

Groves, R. M., Fowler Jr, F. J., Couper, M. P., Lepkowski, J. M., Singer, E., & Tourangeau, R. (2011). Survey methodology (Vol. 561). John Wiley & Sons.

Hillygus, DS, Nie, NH, Prewitt, K & Pals, H (2006). *The hard count: The political and social challenges of census mobilization*, Russell Sage Foundation, New York.

Hyndman, R. J., & Athanasopoulos,G. (2018). Forecasting: principles and practice. OTexts.

Jarosz, Beth. (October 28, 2019). How Does the U.S. Census Bureau Count People Who Have More Than One Address? PRB. https://www.prb.org/how-does-the-u-s-census-bureau-count-people-who-have-more-than-one-address/.

Joint Appendix in *Department of Commerce, et al. v. State of New York, et al.*, No. 18-966 (Jan. 25, 2019), https://www.supremecourt.gov/DocketPDF/18/18-966/91016/20190306200155135_18-966%20Commerce%20J.A.pdf.

Kamarck, Elaine and Christine Stenglein (November 12, 2019). How many undocumented are in the United States and who are they? Brookings Institute. https://www.brookings.edu/policy2020/votervital/how-many-undocumented-immigrants-are-in-the-united-states-and-who-are-they/

Keane, John G. (Sept. 18, 1985). Statement of the Director of the Bureau of the Census Before the Subcommittee on Energy, Nuclear Proliferation, and Government Processes.

Keyfitz, Nathan. (1979). Information and Allocation: Two Uses of The 1980 Census," The American Statistician, 33.

Layne, M., Wagner, D., & Rothhaas, C. (2014). Estimating record linkage false match rate for the Person Identification Validation System. Center for Administrative Records Research and Applications Working Paper.

Lopez, Ashley. (February 14, 2019). There's No Easy Way For Texas To Vet Its List Of Alleged Noncitizen Voters. Just Ask Florida. National Public Radio Kut 90.5. https://www.kut.org/post/theres-no-easy-way-texas-vet-its-list-alleged-noncitizen-voters-just-ask-florida.

Marcelli, Enrico. (2000). "2000 Census Coverage of Foreign-born Mexicans in Los Angeles County: Implications for Demographic Analysis," presented at the 2000 Annual Meeting of the Population Association of American, Atlanta GA.

Massey, D. S., & Singer, A. (1995). New estimates of undocumented Mexican migration and the probability of apprehension. Demography, 32(2), 203-213.

Memorandum of Agreement Between the U.S. Department of Commerce, U.S. Census Bureau and United States Department of Homeland Security Regarding the Transfer of Immigration and Citizenship Related Data.

Memorandum from John M. Abowd, Chief Scientist & Assoc. Dir. for Research & Methodology, U.S. Census Bureau, to Wilbur L. Ross, Sec'y, U.S. Dep't of Commerce (Mar. 1, 2018).

Memorandum from Deborah M. Stempowski to The Record Regarding Use of Administrative Records in the 2018 End-to-End Census Test (Mar. 26, 2018).

Michigan Population Studies Center: Institute for Social Research. (2020). Expect the Unexpected: Apportionment Projections based on the Census Bureau Estimates. https://www.psc.isr.umich.edu/dis/census/Features/apportionment/apportion_estimates.html.

Michigan Institute for Social Research. (2020). Disclaimer for Census 2000 Adjusted Data. https://www.icpsr.umich.edu/icpsrweb/ICPSR/themes/census2000/disclaimer.jsp.

More About Census Blocks. (Mar. 6, 2015). https://transition.fcc.gov/form477/Geo/more_about_census_blocks.pdf.

Morral, Anrew, Henry Willis, Peter Brownell. (2011). Measuring Illegal Border Crossing Between Ports of Entry: An Assessment of Four Promising Methods. Rand, Homeland Security and Defense Center.

Moore, B. (2015). Preliminary research for replacing or supplementing the year built question on the American Community Survey with administrative records. Washington, D.C.: U.S. Census Bureau. https://www.census.gov/library/working-papers/2015/acs/2015_Moore_02.html.

Mulrow, Edward, Ali Mushtaq, Santanu Pramanik, and Angela Fontes. (2011). "Final Report: Assessment of the U.S. Census Bureau's Person Identification Validation System," NORC at the University of Chicago, http://www.norc.org/PDFs/May%202011%20Personal%20Validation%20and%20Entity%20Resolution%20Conference/PVS%20Assessment%20Report%20FINAL%20JULY%202011.pdf.

Office of Immigration Statistics, Homeland Security (December 2018). Population Estimates: Illegal Alien Population Residing in the United States: January 2015, 11.
Office of the Inspector General. https://oig.ssa.gov/sites/default/files/audit/full/pdf/A-07-04-24094.pdf.

O'Hare, W. P. (2019). Differential undercounts in the US Census: Who is missed?. Cham: Springer Open.

Passel JS, Clark RL. (March 1997). How Many Naturalized Citizens Are Thee? An Assessment of Data Quality in the Decennial Census and CPS. Paper presented at the Annual Meeting of the Population Association of America; Washington, DC.

Passel, J. S., & Cohn, D. (2018). US Unauthorized immigrant total dips to lowest level in a decade. Pew Research Center. https://observatoriocolef.org/wp-content/uploads/2018/11/Pew-Research-Center_U.S.-Unauthorized-Immigrants-Total-Dips_2018-11-27.pdf.

Pew Research Center. (June 12, 2019). Unauthorized immigrant population trends for states, birth countries and regions. https://www.pewresearch.org/hispanic/interactives/unauthorized-trends/.

Prewitt, K. (2010). The US decennial census: Politics and political science. Annual Review of Political Science, 13, 237-254.

Puckett, Carolyn. (2009). "The Story of the Social Security Number," *Social Security Bulletin*, Vol. 69, No. 2.

Public Policy Institute of California. (March 2017). Undocumented Immigrants in California. https://www.ppic.org/publication/undocumented-immigrants-in-california/.

Rappaport, Nolan. (June 9, 2019). "Illegal immigration, by the numbers: Visa violators and border crossers." The Hill. https://thehill.com/opinion/immigration/447607-illegal-immigration-by-the-numbers-visa-violators-and-border-crossers.

Rastogi, S., & O'Hara, A. (2012). Census match study. 2010 census program for evaluations and experiments. Center for Administrative Records Research and Applications.

Seeskin, Z. H. (2016). Evaluating the Use of Commercial Data to Improve Survey Estimates of Property Taxes (No. 2016-06). Center for Economic Studies, US Census Bureau.

Singer, E., Mathiowetz, N. A., & Couper, M. P. (1993). The impact of privacy and confidentiality concerns on survey participation: The case of the 1990 U.S. census. Public Opinion Quarterly, 57, 465–482.

Skerry, P. (2000). Counting on the census? Race, group identity, and the evasion of politics (Vol. 56). Brookings Institution Press, 131.

Social Security Administration Office of the Inspector General (July 2004). Enumeration of Children Under Age 1: Opportunity to Reduce the Risk of Improper Social Security Number Attainment, A-08-04-14043.

Social Security: Office of Retirement and Disability Policy. (2009). The Story of the Social Security Number. https://www.ssa.gov/policy/docs/ssb/v69n2/v69n2p55.html.

Supplement to Sworn Declaration & Expert Report of Dudley L. Poston, Jr., Ph.D. (Jan. 28, 2020). *Alabama et al. v. United States Department of Commerce et al.*, No. 2:18-cv-00772-RDP (N.D. Al. 2018).

Sworn Declaration & Expert Report of Dudley L. Poston, Jr., Ph.D. (January 23, 2020). *Alabama et al. v. United States Department of Commerce et al.*, No. 2:18-cv-00772-RDP (N.D. Al. 2018).

Tourangeau, R., Edwards, B., Johnson, T. P., Wolter, K. M., & Bates, N. (2014). Hard-to-survey populations. Cambridge University Press.

U.S. Census Bureau. Background Sheet 2: Creating an Interagency Working Group and Established Agreement for New Data.

U.S. Census Bureau. Congressional Apportionment. Frequently Asked Questions. https://www.census.gov/population/apportionment/about/faq.html.

U.S. Census Bureau. Congressional Apportionment. Computing Apportionment. https://www.census.gov/population/apportionment/about/computing.html.

U.S. Census Bureau. Idaho is Nation's Fastest-Growing State: Population Change from July 1, 2016 to July 1, 2017. https://www.census.gov/content/dam/Census/library/visualizations/2017/comm/popest-idaho.pdf.

U.S. Census Bureau. (July 2013). Statistical Quality Standards https://www.census.gov/content/dam/Census/about/about-the-bureau/policies_and_notices/quality/statistical-quality-standards/Quality_Standards.pdf.

U.S. Census Bureau. (December 2018). 2020 Census Operational Plan: A New Design for the 21st Census, v. 4. https://www2.census.gov/programs-surveys/decennial/2020/program-management/planning-docs/2020-oper-plan4.pdf.

U.S. Census Bureau (Feb. 2020). Post-2020 Census Citizen Voting Age Population by Race and Ethnicity (CVAP) Special Tabulation. https://www2.census.gov/programs-surveys/decennial/rdo/technical-documentation/special-tabulation/CVAP_Post2020_Census_documentation_v5.pdf?

U.S. Census Bureau (Feb. 2020). Post-2020 Census Citizen Voting Age Population by Race and Ethnicity (CVAP) Special Tabulation. https://www.census.gov/programs-surveys/decennial-census/about/voting-rights/cvap/Post-2020-CVAP.html.

U.S. Census Bureau. (2018). Methodology For The United States Population Estimates: Vintage 2018. https://www2.census.gov/programs-surveys/popest/technical-documentation/methodology/2010-2018/2018-natstcopr-meth.pdf?.

U.S. Census Bureau, Privacy Research in Census 2000, Census 2000 Topic Report No. 1 (2003).

U.S. Census Bureau. (June 08, 2018). Proposed Information Collection; Comment Request; 2020 Census. Federal Register. https://www.federalregister.gov/documents/2018/06/08/2018-12365/proposed-information-collection-comment-request-2020-census.

U.S. Census Bureau. (July 1, 2019). Quick Facts. https://www.census.gov/quickfacts/geo/chart/US/PST120219.

U.S. Census Bureau. (Dec. 30, 2019). Slower Growth for Nation's Population. https://www.census.gov/library/visualizations/2019/comm/slower-growth-nations-pop.html.

U.S. Census Bureau. (Dec. 30, 2019): State Population Totals and Components of Change: 2010-2019. https://www.census.gov/data/tables/time-series/demo/popest/2010s-state-total.html.

U.S. Census Bureau. (May 8, 2015). Statistical Quality Standard C2: Editing and Imputing Data. https://www.census.gov/about/policies/quality/standards/standardc2.html.

U.S. Census Bureau. (Oct. 28, 2019). Why We Conduct the Decennial Census. https://www.census.gov/programs-surveys/decennial-census/about/why.html.

U.S. Bureau of the Census (2001) Report: Recommendation Concerning the Methodology to be Used in Producing Tabulations of Population Reported to States and Localities Pursuant to 13 U.S.C. 141(c) (March 1) Washington, DC Department of Commerce https://www.census.gov/dmd/www/pdf/Escap2.pdf

U.S. Census Monitoring Board. (Mar. 21, 2001). Statistical Adjustment of the 2000 Census: What We Know. https://govinfo.library.unt.edu/cmb/cmbc/articles-archive/031201.asp.

U.S. GAO Report. (January 2005). Actions Needed to Strengthen Processes for Issuing Social Security Numbers to Children. GAO-05-115.

https://www.govinfo.gov/content/pkg/GAOREPORTS-GAO-05-115/html/GAOREPORTS-GAO-05-115.htm.

Van Hook, J., Bachmeier, J. D., Coffman, D. L., & Harel, O. (2015). Can we spin straw into gold? An evaluation of immigrant legal status imputation approaches. Demography, 52(1).

Wang, Hansi Lo. (November 20, 2019). Nebraska Is 1st State To Share Driver's License Records With Census Bureau. https://www.npr.org/2019/11/20/781373128/nebraska-1st-to-say-it-will-share-drivers-license-records-with-census-bureau.

Warren, Robert. (February 27, 2019). Sharp Multiyear Decline in Undocumented Immigration Suggests Progress at US-Mexico Border, Not a National Emergency. https://cmsny.org/publications/essay-warren-022719/.

Warren, R., & Warren, J. R. (2013). Unauthorized Immigration to the United States: Annual Estimates and Components of Change, by State, 1990 to 2010. International Migration Review, 47(2), 296–329.

Whitford, D. C. (2002). Chronologic Overview of the Census 2000 Adjustment Decision. Joint Statistical Meetings - Section on Survey Research. Methods. New York City. http://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.380.7478&rep=rep1&type=pdf.

Woodrow-Lafield, K. A. (1998). Undocumented immigrants in the United States in 1990: Issues of uncertainty in quantification. International Migration Review, 32(1), 145-173.

Yowell, Tiffany and Jason Devine. (July 2013, Revised May 2014). Evaluating Current and Alternative Methods to Produce 2010 County Population Estimates, U.S. Census Bureau, Population Division Working Paper.

Zamudio, Maria. (June 21, 2019). Deported U.S. Veterans Feel Abandoned By The Country They Defended. NPR. https://www.npr.org/local/309/2019/06/21/733371297/deported-u-s-veterans-feel-abandoned-by-the-country-they-defended.

D. SUNSHINE HILLYGUS

Department of Political Science
Duke University
Box 90204, Durham, NC 27708
919-660-4341 (phone) 919-660-4330 (fax)
hillygus@duke.edu

ACADEMIC APPOINTMENT

Duke University
Professor of Political Science, July 2015-
Professor of Public Policy (by courtesy), Nov 2015-
Associate Professor of Political Science, July 2009-2015
Director, Duke Initiative on Survey Methodology, July 2010-

Harvard University
Frederick S. Danziger Associate Professor of Government, July 2007-June 2009
Director, Program on Survey Research, July 2005-June 2009
Assistant Professor of Government, July 2003-June 2007

EDUCATION

Stanford University
Ph.D., Political Science, 2003
M.A., Political Science, 2000
Dissertation: Understanding Receptivity to Political Campaigns: Three Essays on Voter Decision Making in Election 2000.
Committee: Morris Fiorina (chair), Norman Nie, Simon Jackman, David Brady

University of Arkansas
M.A., Political Science, May 1998
B.A., Political Science and B.A., Spanish, *Summa Cum Laude*, May 1996

BOOKS

Holbein, J. and D.S. Hillygus. *Making Young Voters: Converting Civic Attitudes into Civic Action*. Cambridge University Press, 2020.

Hillygus, D.S. and T. Shields. *The Persuadable Voter: Wedge Issues in Presidential Campaigns*. Princeton University Press, 2008. Paperback, 2009.
Winner of the 2009 Robert E. Lane Award.
Excerpt reprinted in *Controversies in Voting Behavior*, 5th edition(2011).

Hillygus, D.S., N. Nie, K. Prewitt, and H. Pals. *The Hard Count: The Political and Social Challenges of Census Mobilization*. Russell Sage Foundation, 2006.

JOURNAL PUBLICATIONS

Bail, C.A., Guay, B., Maloney, E., Combs, A., Hillygus, D.S., Merhout, F., Freelon, D. and Volfovsky, A., 2020. Assessing the Russian Internet Research Agency's impact on the political attitudes and behaviors of American Twitter users in late 2017. *Proceedings of the National Academy of Sciences*, 117(1).

Madson, G. and D.S. Hillygus. 2019. "Who Trusts the Polls? Motivated Reasoning in Evaluations of Polling Results," *Political Behavior*.

Carlson, C., V. Dounoucos, and D.S. Hillygus. 2019. "The Message and the Medium: The Communication Effects of Twitter Commentary," *Journal of Information Technology & Politics*.

Holbein, J., D.S. Hillygus, C. Gibson-Davis, M. Lenard, and D. Hill. 2018. "The Development of Students' Engagement in School, Community, and Democracy," *British Journal of Political Science*.

Hillygus, D.S. 2018. "Navigating Scholarly Exchange in Today's Media Environment," *Journal of Politics* 80(3), 1064-1068(editor-reviewed).

Xing, Z. D.S. Hillygus and L. Carin. 2017. "Evaluating U.S. Electoral Representation with a Joint Statistical Model of Congressional Roll-Calls, Legislative Text, and Voter Registration Data," *Proceedings of the 23nd ACM SIGKDD Conference on Knowledge Discovery and Data Mining (KDD)*, 1205-1214.

Knutson, K, J. Phelan, M. Paskow, A. Roach, K. Whiton, G. Langer; D.S. Hillygus, M. Mokrzycki, W.A. Broughton, S. Chokroverty, K.L. Lichstein, M. Hirshkowitz. 2017. "The National Sleep Foundation's Sleep Health Index," *Sleep Health* 3 (4): 234-40.

DeYoreo, M., Reiter, J. and D.S. Hillygus. 2017."Nonparametric Bayesian Models With Focused Clustering for Mixed Ordinal and Nominal Data," *Bayesian Analysis*.

Hillygus, D.S., McKee, S., and M. Young. 2017. "Reversal of Fortune: The Political Behavior of White Migrants to the South," *Presidential Studies Quarterly*.

Henderson, M. and D.S. Hillygus. 2016. "Contextual Factors in Time of Decision in the 2008 Presidential Election," *Public Opinion Quarterly*.

Holbein, J. and D.S. Hillygus. 2016. "Making Young Voters: The Impact of Preregistration on Youth Turnout," *American Journal of Political Science*.

Ballard, A., D.S. Hillygus, and T. Konitzer. 2016. "Campaigning Online: Web Display Ads in the 2012 Presidential Campaign," *PS: Political Science & Politics*.

Si, Y., J. Reiter, and D.S. Hillygus. 2016. "Bayesian Latent Pattern Mixture Models For Handling Attrition In Panel Studies With Refreshment Samples," *Annals of Applied Statistics*.

Schifeling, T. C. Cheng, J. Reiter and D.S. Hillygus. 2015. "Accounting for Nonignorable Unit Nonresponse and Attrition in Panel Studies with Refreshment Samples," *Journal of Survey Statistics and Methodology*.

Gerber, A., K. Arceneaux, C. Boudreau, C. Dowling, and D.S. Hillygus. 2015."Reporting Balance Tables, Response Rates and Manipulation Checks in Experimental Research: A Reply from the Committee that Prepared the Reporting Guidelines," *Journal of Experimental Political Science*.

Johnston, C., D.S. Hillygus, and B. Bartels. 2014. "Ideology, The Affordable Care Act Ruling, and Supreme Court Legitimacy," *Public Opinion Quarterly*, 78 (4): 963-973.

Gerber, A., K. Arceneaux, C. Boudreau, C. Dowling, D.S. Hillygus, T. Palfrey, D. Biggers, D. Hendry. 2014. "Reporting Guidelines for Experimental Research: A Report from the Experimental Research Section Standards Committee," *Journal of Experimental Political Science*, 1(1): 81-98.

Si, Y., J. Reiter and D.S. Hillygus. 2014. "Semi-parametric Selection Models for Potentially Non-ignorable Attrition in Panel Studies with Refreshment Samples," *Political Analysis*, 23(1): 92-112.

Frankel, L. and D.S. Hillygus. 2014. "Panel Attrition and the Survey Experience," *Political Analysis*, 22(3): 336-353.

Hillygus, D.S. and S. Treul. 2014. "Assessing Strategic Voting in the 2008 Presidential Primaries," *Public Choice*, 161(3): 517-536.

Aldrich, J., B. Bishop, R. Hatch, D.S. Hillygus, and D. Rohde. 2013. "Blame, Responsibility, and the Tea Party in the 2010 Midterm Elections," *Political Behavior*, 36(3), 471-491.

Deng, Y., D.S. Hillygus, J. Reiter, and Y. Si. 2013. "Handling Attrition in Longitudinal Studies: The Case for Refreshment Samples," *Statistical Science*, 28(2): 238-256.

Hillygus, D.S. 2011. "The Evolution of Election Polling in the United States," *Public Opinion Quarterly*, 75(5): 962-981.

Henderson, M. and D.S. Hillygus. 2011. "The Dynamics of Health Care Opinion, 2008-2010: Partisanship, Self-Interest, and Racial Resentment," *Journal of Health Politics, Policy, and Law*, 36(6): 945-960.

Henderson, M., D.S. Hillygus, and T. Tompson. 2010. "'Sour Grapes' or Rational Voting? Voter Decision Making Among Thwarted Primary Voters in 2008," *Public Opinion Quarterly*, 74(3): 499-529.

Ellis, R., D.S. Hillygus and N. Nie. 2010. "Retrospective and Prospective Candidate Evaluations and the Dynamics of Vote Choice in 2008," *Electoral Studies* 29(4): 582-593.

Hillygus, D.S. and M. Henderson. 2010. "Policy Issues and the Dynamics of Vote Choice in the 2008 Presidential Election," *Journal of Elections, Public Opinion, and Parties*, 20(2): 241-269.

Treier, S. and D.S. Hillygus. 2009. "The Nature of Political Ideology in the Contemporary Electorate," *Public Opinion Quarterly*, 73(4):679-703.

Burden, B. and D.S. Hillygus. 2009. "Opinion Formation, Polarization, and Presidential Reelection." *Presidential Studies Quarterly*, 39: 619-35.

Hillygus, D.S. and T. Shields. 2008. "Southern Discomfort? Regional Differences in Voter Decision Making in the 2000 Presidential Election," *Presidential Studies Quarterly*, 38(3): 506-520.

Hillygus, D.S. 2007. "The Dynamics of Voter Decision Making Among Minor Party Supporters: The 2000 U.S. Presidential Election," *British Journal of Political Science*, 37(2): 225-244.

Hillygus, D.S. 2005. "Campaign Effects and the Dynamics of Turnout Intention in Election 2000," *Journal of Politics*, 66(1): 50-68.

Hillygus, D.S. 2005. "The Missing Link: Exploring the Relationship between Higher Education and Political Behavior," *Political Behavior*, 27(1): 25-47.

Hillygus, D.S. and T. Shields. 2005. "Moral Issues and Voter Decision Making in the 2004 Presidential Election," *PS: Political Science and Politics*, 38(2): 201-10.
Reprinted in *Quantitative Methods in Practice*, D. Rochefort (ed) CQ Press, 2006.

Hillygus, D.S. and S. Jackman. 2003. "Voter Decision Making in Election 2000: Campaign Effects, Partisan Activation, and the Clinton Legacy," *American Journal of Political Science*, 47(4): 583-596.

Nie, N. and D.S. Hillygus. 2002. "Where Does Internet Time Come From?: A Reconnaissance," *IT & Society*, 1(2): 1-20.

Nie, N. and D.S. Hillygus. 2002. "The Impact of Internet Use on Sociability: Time-Diary Findings," *IT & Society*, 1(1): 1-29.

OTHER PUBLICATIONS

Zhou, J., D.S. Hillygus, and J. Aldrich. 2019. "Understanding the Trump Win: Populism, Partisanship, and Polarization in the 2016 Election," *Publications of the Bavarian American Academy*, Heidelberg University Press.

Guay, B. and D.S. Hillygus. 2018. "Online Public Opinion Polling," *Oxford Bibliographies*

Hillygus, D.S. and S. Snell. 2018. "Longitudinal Surveys: Issues and Opportunities," *Oxford Handbook on Polling and Polling Methods*. L. Atkeson and M. Alvarez, eds. New York: Oxford University Press.

Hillygus, D.S. and B. Guay. 2016. "The Virtues and Limitations of Election Polling in the United States," *Seminar Magazine*.

Hillygus, D.S. 2016. "The Practice of Survey Research: Changes and Challenges," *New Directions in Public Opinion*, second edition. Adam Berinsky, ed. Routledge Press.

Hillygus, D.S., N. Jackson, and M. Young. 2014. "Professional Respondents in Online Survey Panels," *Online Panel Research: A Data Quality Perspective*. M.Callegaro, R. Baker, P. Lavrakas, J. Krosnick, J. Bethlehem, and A. Göritz, eds.

Frankel, L. and D.S. Hillygus. 2014. "Niche Communication in Political Campaigns," *Oxford Handbook on Political Communication*. Kathleen Hall Jamieson and Kate Kenski, eds. New York: Oxford University Press.

Hillygus, D.S. and B. Burden. 2013. "Mass Polarization in the Bush Presidency," *The Presidency of George W. Bush: Perspectives on the Forty-Third President of the United States*, D. Kelly and T. Shields, eds. Texas A&M Press.

Hillygus, D.S. 2011. "The Practice of Survey Research: Changes and Challenges" *New Directions in Public Opinion*. Adam Berinsky, ed. Routledge Press.

Bishop, B. and D.S. Hillygus. 2011. "Campaigning, Debating, Advertising," *Oxford Handbook on Public Opinion and Media*. Larry Jacobs and Robert. Shapiro, eds. New York: Oxford University Press.

Hillygus, D.S. 2010. "Campaign Effects on Vote Choice," *Oxford Handbook on Elections and Political Behavior*. Jan Leighly and George C. Edwards III, eds. Oxford University Press.

Bishop, B., A. Cooper, and D.S. Hillygus. 2009. "Innovative Survey Methodologies for the Study of Attitudes Toward Terrorism and Counterterrorism Strategies," Institute for Homeland Security Solutions, Duke University.

Hillygus, D.S. 2009. "Guest Editor Introduction: Understanding the 2008 Presidential Election," *Public Opinion Quarterly* 73: 841-844.

Hillygus, D.S. 2009. "The Need for Survey Reporting Standards in Political Science," *The Future of Political Science: 100 Perspectives*, G. King, N. Nie, and K. Schlozman (eds).

Hillygus, D.S. 2008. "Internet and Politics 2008: Microtargeting," *The Publius Project*, The Berkman Center.

Hillygus, D.S. and T. Shields. 2008. "Moderation or Polarization in Candidates' Campaign Agendas?" *The Polling Report*, 24(15).

Hillygus, D.S. 2007. "Moral Values: Media, Voters, and Candidate Strategy," in *A Matter of Faith? Religion in the 2004 Presidential Election*, Brookings Institution Press.

Hillygus, D.S. 2004. Review of Models of Voting in Presidential Elections: The 2000 Election, H. Weisberg and C. Wilcox (eds), in *Presidential Studies Quarterly*, 34(3).

Brady, D. and D.S. Hillygus. 2004. "Assessing the Clinton Presidency: The Political Constraints of Legislative Policy" in *The Clinton Riddle: Perspectives on the 42nd President*, Shields, Whayne, and Kelley (eds). U of Arkansas Press.

Nie, N., D.S. Hillygus, and L. Erbring. 2003."Internet Use, Interpersonal Relations and Sociability: A Time Diary Study" in *The Internet in Everyday Life*, Wellman and Haythornthwaite (eds). Oxford: Blackwell Publishers.

Nie, N. and D.S. Hillygus. 2001. "Education and Democratic Citizenship," in *Making Good Citizens: Education and Civil Society*, Ravitch and Viteritti (eds). Yale University Press.

CURRENT PROJECTS

Valentino, N., K. Zhirkov, D.S. Hillygus, B. Guay. "Personality Differences between Face-to-Face and Online Samples," R&R, *Public Opinion Quarterly*.

Olanrewaju A., G. Madson, D.S. Hillygus and J. Reiter. "Leveraging Auxiliary Information on Marginal Distributions in Nonignorable Models for Item and Unit Nonresponse in Surveys," under review.

Lopez, J. and D.S. Hillygus. "Why So Serious?: Survey Trolls and Political Misinformation" available at SSRN.

Endres, K. D.S. Hillygus, and S. Snell, "Big Data, Big Problems: Overcoming Barriers to Consent for Data Linking."

HONORS/AWARDS

Duke University Howard D. Johnson Distinguished Teaching Award, 2019.

National Science Foundation, Political Science Program ($3.9m) "ANES Web: American National Election Study," (Co-PI with PI S. Iyengar), 2018-2021.

Provost "Together Duke" Initiative ($454,000), "Duke Polarization Lab" (Co-PI with K. Heller, J. Moody, G. Sapiro, A. Volfovsky and PI C. Bail), 2018-2019

National Science Foundation, Political Science Program, Grant SES-1657821 ($335,690), "Making Young Voters: Policy Reforms to Increase Youth Turnout" (PI with Co-PI J. Holbein) 2017-2019

National Science Foundation, MMS Program, Grant SES-1733835 ($300,000), "Leveraging Auxiliary Information on Marginal Distributions in Multiple Imputation for Survey Nonresponse" (Co-PI with PI J. Reiter) 2017-2019

Bass Connections, Education and Human Development grant ($23,000), 2017-2019

Facebook Academic Program gift ($25,000), 2016

National Science Foundation, Political Science Program, Grant SES-1416816 ($249,999), "Education, Engagement, and Well-being among Adolescents" (PI with Co-PI C. Gibson-Davis) 2014-2016

National Science Foundation, MMS Program, Grant SES-1131897 supplement ($199,000), "Conducting Research Using the Survey of Income and Program Participation (SIPP) Panel Study," 2013-2015

Information Initiative at Duke, Research Incubator Award ($75,000) "Using Big Data to Understand the American Electorate," (with L. Carin), 2013-2015

National Science Foundation, MMS Program, Grant SES-1131897 ($2,997,591), "Triangle Census Research Network" (Senior Co-Investigator with L. Cox, D. Dunson, J. Hotz, F. Li, and PI J. Reiter and Co-PI A. Karr), 2011-2016

National Science Foundation, MMS Program, Grant SES-1061241 ($160,000), "Multiple Imputation Methods for Handling Missing Data in Longitudinal Studies with Refreshment Samples." (with PI J. Reiter), 2011-2012

National Science Foundation, Political Science Program, SES-1110341"Balancing Innovation and Continuity in Longitudinal Surveys"($38,235), 2011

IHSS Award, Innovative Survey Methodologies($25,081), 2009

Robert E. Lane Award for best book published in political psychology in 2008

CAPS Junior Faculty Seed Grant ($5000), 2008

Shorenstein Center for Press and Politics Fellow, Fall 2005

Program on the Global Demography of Aging Grant ($17,130), 2005-06

Institute for Quantitative Social Science Research Grant ($10,000), 2005-06

Institutional Development Initiative ($10,000), 2005-06

Blair Center for Southern Politics, 2004 Election Survey Funding ($85,000)

CAPS Junior Faculty Seed Grant ($5000), 2004-2005

Milton Fund Grant, Harvard University ($3500), 2004-2005

Harvard University Cooke-Clark Grant ($6000)

Westview Paper Prize, 2003 Midwest Political Science Meeting

Heinz Eulau Political Behavior Fellowship, 2002-2003

Best Graduate Student Poster Award, 2002 Political Methodology Meeting

National Conference of State Legislators Women's Graduate Fellowship, 1998

PROFESSIONAL SERVICE

Associate PI, American National Election Study, 2018-2021
Associate Editor, *Political Analysis*, 2018-
Chair, POQ Advisory Committee, 2011-
Methods, Measurement, and Statistics Advisory Panel, National Science Foundation, 2018-2020
Board Member, American National Election Studies, 2010-2013, 2014-2017
Scientific Advisory Committee, U.S. Census Bureau, 2012-2018
Political Science Advisory Panel, National Science Foundation, 2010-2012
Member, Executive Council, Midwest Political Science Association, 2014-17
Member, Executive Council, Southern Political Science Association, 2014-17
Editorial Board, *American Political Science Review*, 2016-
Editorial Board, *Journal of Politics*, 2010-
Editorial Board, *Public Opinion Quarterly*, 2008-
Editorial Board, *Political Communication*, 2015-

Editorial Board, *Journal of Experimental Political Science*, 2013-
Editorial Board, *Political Behavior*, 2011-
Editorial Board, *Journal of Elections, Public Opinion and Parties*, 2008-
Editorial Board, *Political Science Network*, 2007-
Editorial Board, *The Forum*, 2011-
Editorial Board, *Political Analysis*, 2015-2017
Editorial Board, *American Journal of Political Science*, 2009-2012
Guest Editor, *Public Opinion Quarterly* 2009 Special Issue
AAPOR Journals Committee (2019)
APSA EPOVB Best Article in Political Behavior Award Committee (2019)
APSA Experimental Research Section: Reporting Standards Committee (2011)
APSA Political Meth Section: Nominations Committee (2010-2012), Diversity Committee (2005-08, 2011-12), Miller Prize (2017), Emerging Scholar (2018-2020)
SPSA, VO Key Award Committee, 2013
APSA Gladys M. Kammerer Award Committee, 2012
APSA Philip Converse Book Award Committee, 2009, 2010 and 2012
SPSA Program Committee, 2009 and 2012
JOP Best Paper Award Committee, 2011
AAPOR Book Award Committee, 2011, 2016

CONFERENCES ORGANIZED

International Total Survey Error Workshop (6/18)
Conducting Research Using the Survey of Income and Program Participation (SIPP) Panel Study, Durham, NC (2/14)
Balancing Innovation and Continuity in Longitudinal Surveys, Durham, NC (2/11)
Assessing Survey Quality, Cambridge, MA (4/09)
Surveying Multiethnic America, Cambridge, MA (4/07)
Advances in Questionnaire Design, Cambridge, MA (2/06)

Expert Witness Work

League of Women Voters v. State of North Carolina, Case No. 1:13-CV-660
NAACP et al. v. Bureau of the Census et al., Case No. 8:18-CV-00891
New York Immigration Coalition v. Dept. of Commerce, Case No. 18-CV-5025

INVITED PRESENTATIONS(last 5 years)

Plenary, Pacific Association of Public Opinion Research Meeting (12/19)
Massachusetts Institute of Technology (10/19)
Michigan State University (9/19)
Plenary, American Association of Public Opinion Research Meeting (5/19)
University of North Carolina (2/19)
Emory University (11/18)
Duke Alumni Association of Philadelphia (4/18)
Duke Alumni Association of Los Angeles (6/17)
Duke Alumni Association of Austin (6/17)
Duke Alumni Association of Denver (5/17)
Fordham University (4/17)
Qualtrics Innovation Summit, Salt Lake City (3/17)
Stanford Alumni Association, Durham (2/17)

Duke Alumni Association of San Diego (11/16)
Wake Forest University (11/16)
Reed College (10/16)
UNC-Wilmington (10/16)
Duke Alumni Association of North Texas (9/16)
Duke Alumni Association of Charlotte (5/16)
Dept of Political Science, MIT (4/16)
Center for the Study of Democratic Politics, Princeton (3/16)
Appalachian State University (3/16)
Computers, Privacy, and Data Protection Conference, Brussels (1/16)
Political Persuasion Conference, Laguna Beach, CA (1/16)
Duke Alumni Association of Tampa (1/16)
Keynote, Australian Society for Quantitative Political Science, Melbourne (12/15)
Dept of Communication, U. of Michigan (11/15)
Dept of Political Science, UNC-Greensboro (11/15)
Microsoft Panel on Campaign Technology, D.C. (11/15)
Political Science Dept, U. Texas (12/14)
ElectionsLive!, Duke University (11/14)
American Politics Research Group, UNC (11/14)
American Politics Workshop, UCLA (01/14)
The American Panel Survey Workshop, Wash U (11/13)
Intro to Survey Methods, Shanghai Jiao Tong University (06/13)
Senior Scholar Career Presentation, Visions in Methodology, FSU (04/13)
American Politics Workshop, Yale University (03/13)
Google Political Innovation Summit, New York (01/13)

DEPARTMENTAL AND UNIVERSITY SERVICE

Founding Director, Duke Initiative on Survey Methodology, 2010-
Associate Director, Institutional Review Board, Duke University, 2010-
Social Science Research Institute Steering Committee, 2011-
Duke Advisory Committee on Investment Responsibility, 2017-
EHD-Bass Connections Team Leader, 2017-2020
Standing Committee for Misconduct in Research, 2019-2022
Social Science Research Institute (SSRI) Director Search chair, 2018
Faculty Fellow, Duke Alumni Association, 2015-2018
POLIS steering committee, 2015-2017
Social Science Research Institute Planning Committee, 2012
Behavior and Identity Field Chair, 2011-2012, 2014, 2016-2018
Behavior and Identity Workshop Organizer, 2010-2012, 2016
American Politics Field Organizer, 2010-2012
REP Search Committee, Duke Political Science, 2013, 2017
China Search Committee, Duke Political Science, 2011
Graduate Admissions Committee, Duke Political Science, 2009, 2014
Undergraduate Curriculum Committee, Duke Political Science, 2009
Faculty Organizer, Duke Political Science Graduate Orientation, 2009
Harvard University Faculty Advisory Group for Metrics and Analysis, 2006-2009
Faculty Advisory Board for the Social Sciences, Harvard FAS, 2008-2009

Executive Committee, Center for American Political Studies, 2003-2009
Organizer, Political Psychology and Behavior Workshop, 2003-2008
Standing Committee on Women, Harvard FAS 2004-2005