

Online Appendix for

The Malapportionment of the House of Representatives: 1940-2020

Table OA1: Apportionment Results under Different Methods, 1920*

	State	Apportionment Population	Huntington-Hill's method	Webster's method	Diff (Webs-Hill)	Jefferson's method	Diff (Jeff - Hill)
1	New York	10380589	42	43	1	45	3
2	Pennsylvania	8720017	36	36		37	1
3	Illinois	6485280	27	27		28	1
4	Ohio	5759394	24	24		25	1
5	Texas	4663228	19	19		20	1
6	Massachusetts	3852356	16	16		16	
7	Michigan	3668412	15	15		15	
8	California	3426031	14	14		14	
9	Missouri	3404055	14	14		14	
10	New Jersey	3155900	13	13		13	
11	Indiana	2930390	12	12		12	
12	Georgia	2895832	12	12		12	
13	Wisconsin	2631305	11	11		11	
14	North Carolina	2559123	10	11	1	11	1
15	Kentucky	2416630	10	10		10	
16	Iowa	2404021	10	10		10	
17	Minnesota	2385656	10	10		10	
18	Alabama	2348174	10	10		10	
19	Tennessee	2337885	10	10		10	
20	Virginia	2309187	9	10	1	10	1
21	Oklahoma	2028283	8	8		8	
22	Louisiana	1798509	7	7		7	
23	Mississippi	1790618	7	7		7	
24	Kansas	1769257	7	7		7	
25	Arkansas	1752204	7	7		7	
26	South Carolina	1683724	7	7		7	
27	West Virginia	1463701	6	6		6	
28	Maryland	1449661	6	6		6	
29	Connecticut	1380631	6	6		6	
30	Washington	1354596	6	6		5	-1
31	Nebraska	1296372	5	5		5	

32	Florida	968470	4	4		4	
33	Colorado	939161	4	4		4	
34	Oregon	783389	3	3		3	
35	Maine	768014	3	3		3	
36	North Dakota	643953	3	3		2	-1
37	South Dakota	631239	3	3		2	-1
38	Rhode Island	604397	3	2	-1	2	-1
39	Montana	541511	2	2		2	
40	Utah	448388	2	2		1	-1
41	New Hampshire	443083	2	2		1	-1
42	Idaho	430442	2	2		1	-1
43	New Mexico	353428	2	1	-1	1	-1
44	Vermont	352428	2	1	-1	1	
45	Arizona	309495	1	1		1	
46	Delaware	223003	1	1		1	
47	Wyoming	193487	1	1		1	
48	Nevada	75820	1	1		1	
Total # of difference:					6		16

Population information and apportionment results obtained from Balinski and Young (2001).

* In 1920 there were 48 states in the union. It was the first year in which the number of House seats was raised and capped at 435. It was previously 433.

Table OA2: Apportionment Results under Different Methods, 1930*

	State	Apportionment Population	Huntington-Hill's method	Webster's method	Diff (Webs-Hill)	Jefferson's method	Diff (Jeff - Hill)
1	New York	12587967	45	45		47	2
2	Pennsylvania	9631299	34	34		36	2
3	Illinois	7630388	27	27		28	1
4	Ohio	6646633	24	24		25	1
5	Texas	5824601	21	21		21	
6	California	5668241	20	20		21	1
7	Michigan	4842052	17	17		18	1
8	Massachusetts	4249598	15	15		15	
9	New Jersey	4041319	14	14		15	1
10	Missouri	3629110	13	13		13	
11	Indiana	3238480	12	12		12	
12	North Carolina	3167274	11	11		11	
13	Wisconsin	2931721	10	10		11	1
14	Georgia	2908446	10	10		10	
15	Alabama	2646242	9	9		9	
16	Tennessee	2616497	9	9		9	
17	Kentucky	2614575	9	9		9	
18	Minnesota	2551583	9	9		9	
19	Iowa	2470420	9	9		9	
20	Virginia	2421829	9	9		9	
21	Oklahoma	2382222	9	9		8	-1
22	Louisiana	2101593	8	8		7	-1
23	Mississippi	2008154	7	7		7	
24	Kansas	1879498	7	7		7	
25	Arkansas	1854444	7	7		6	-1
26	South Carolina	1738760	6	6		6	
27	West Virginia	1729199	6	6		6	
28	Maryland	1631522	6	6		6	
29	Connecticut	1606897	6	6		6	
30	Washington	1552423	6	6		5	-1
31	Florida	1468191	5	5		5	
32	Nebraska	1375123	5	5		5	
33	Colorado	1034849	4	4		3	-1
34	Oregon	950379	3	3		3	
35	Maine	797418	3	3		2	-1
36	Rhode Island	687497	2	2		2	
37	North Dakota	673340	2	2		2	
38	South Dakota	673005	2	2		2	

39	Montana	524729	2	2		1	-1
40	Utah	505741	2	2		1	-1
41	New Hampshire	465292	2	2		1	-1
42	Idaho	441536	2	2		1	-1
43	New Mexico	395982	1	1		1	
44	Arizona	389375	1	1		1	
45	Vermont	359611	1	1		1	
46	Delaware	238380	1	1		1	
47	Wyoming	223630	1	1		1	
48	Nevada	86390	1	1		1	
Total # of difference:					0		18

Population information and apportionment results obtained from Balinski and Young (2001).

* In 1930 there were 48 states in the union.

Table OA3: Apportionment Results under Different Methods, 1940*

	State	Apportionment Population	Huntington-Hill's method	Webster's method	Diff (Webs-Hill)	Jefferson's method	Diff (Jeff - Hill)
1	New York	13479142	45	45		47	2
2	Pennsylvania	9900180	33	33		34	1
3	Illinois	7897241	26	26		27	1
4	Ohio	6907612	23	23		24	1
5	California	6907387	23	23		24	1
6	Texas	6414824	21	21		22	1
7	Michigan	5256106	17	18	1	18	1
8	Massachusetts	4316721	14	14		15	1
9	New Jersey	4160165	14	14		14	
10	Missouri	3784664	13	13		13	
11	North Carolina	3571623	12	12		12	
12	Indiana	3427796	11	11		12	1
13	Wisconsin	3137587	10	10		11	1
14	Georgia	3123723	10	10		10	
15	Tennessee	2915841	10	10		10	
16	Kentucky	2845627	9	9		9	
17	Alabama	2832961	9	9		9	
18	Minnesota	2792300	9	9		9	
19	Virginia	2677773	9	9		9	
20	Iowa	2538268	8	8		8	
21	Louisiana	2363880	8	8		8	
22	Oklahoma	2336434	8	8		8	
23	Mississippi	2183796	7	7		7	
24	Arkansas	1949387	7	6	-1	6	-1
25	West Virginia	1901974	6	6		6	
26	South Carolina	1899804	6	6		6	
27	Florida	1897414	6	6		6	
28	Maryland	1821244	6	6		6	
29	Kansas	1801028	6	6		6	
30	Washington	1736191	6	6		6	
31	Connecticut	1709242	6	6		5	-1
32	Nebraska	1315834	4	4		4	
33	Colorado	1123296	4	4		3	-1
34	Oregon	1089684	4	4		3	-1
35	Maine	847226	3	3		2	-1
36	Rhode Island	713346	2	2		2	
37	South Dakota	642961	2	2		2	
38	North Dakota	641935	2	2		2	

39	Montana	559456	2	2		1	-1
40	Utah	550310	2	2		1	-1
41	New Mexico	531818	2	2		1	-1
42	Idaho	524873	2	2		1	-1
43	Arizona	499261	2	2		1	-1
44	New Hampshire	491524	2	2		1	-1
45	Vermont	359231	1	1		1	
46	Delaware	266505	1	1		1	
47	Wyoming	250742	1	1		1	
48	Nevada	110247	1	1		1	
Total # of difference:					2		21

Population information and apportionment results obtained from Balinski and Young (2001).

* In 1940 there were 48 states in the union.

Table OA4: Apportionment Results under Different Methods, 1950*

	State	Apportionment Population	Huntington-Hill's method	Webster's method	Diff (Webs-Hill)	Jefferson's method	Diff (Jeff - Hill)
1	New York	14830192	43	43		45	2
2	California	10586223	30	31	1	32	2
3	Pennsylvania	10498012	30	30		31	1
4	Illinois	8712176	25	25		26	1
5	Ohio	7946627	23	23		24	1
6	Texas	7711194	22	22		23	1
7	Michigan	6371766	18	18		19	1
8	New Jersey	4835329	14	14		14	
9	Massachusetts	4690514	14	14		14	
10	North Carolina	4061929	12	12		12	
11	Missouri	3954653	11	11		11	
12	Indiana	3934224	11	11		11	
13	Georgia	3444578	10	10		10	
14	Wisconsin	3434575	10	10		10	
15	Virginia	3318680	10	10		10	
16	Tennessee	3291718	9	9		9	
17	Alabama	3061743	9	9		9	
18	Minnesota	2982483	9	9		9	
19	Kentucky	2944806	8	8		8	
20	Florida	2771305	8	8		8	
21	Louisiana	2683516	8	8		8	
22	Iowa	2621073	8	8		7	-1
23	Washington	2378963	7	7		7	
24	Maryland	2343001	7	7		7	
25	Oklahoma	2233351	6	6		6	
26	Mississippi	2178914	6	6		6	
27	South Carolina	2117027	6	6		6	
28	Connecticut	2007280	6	6		6	
29	West Virginia	2005552	6	6		6	
30	Arkansas	1909511	6	6		5	-1
31	Kansas	1905299	6	5	-1	5	-1
32	Oregon	1521341	4	4		4	
33	Nebraska	1325510	4	4		4	
34	Colorado	1325089	4	4		4	
35	Maine	913774	3	3		2	-1
36	Rhode Island	791896	2	2		2	
37	Arizona	749587	2	2		2	
38	Utah	688862	2	2		2	

39	New Mexico	681187	2	2		2	
40	South Dakota	652740	2	2		1	-1
41	North Dakota	619636	2	2		1	-1
42	Montana	591024	2	2		1	-1
43	Idaho	588637	2	2		1	-1
44	New Hampshire	533242	2	2		1	-1
45	Vermont	377747	1	1		1	
46	Delaware	318085	1	1		1	
47	Wyoming	290529	1	1		1	
48	Nevada	160083	1	1		1	
Total # of difference:					2		16

Population information and apportionment results obtained from Balinski and Young (2001).

* In 1950 there were 48 states in the union.

Table OA5: Apportionment Results under Different Methods, 1960

	State	Apportionment Population	Huntington-Hill's method	Webster's method	Diff (Webs-Hill)	Jefferson's method	Diff (Jeff - Hill)
1	New York	16782304	41	41		42	1
2	California	15717204	38	38		40	2
3	Pennsylvania	11319366	27	27		28	1
4	Illinois	10081158	24	24		25	1
5	Ohio	9706397	24	24		24	
6	Texas	9579677	23	23		24	1
7	Michigan	7823194	19	19		20	1
8	New Jersey	6066782	15	15		15	
9	Massachusetts	5148578	12	13	1	13	1
10	Florida	4951560	12	12		12	
11	Indiana	4662498	11	11		11	
12	North Carolina	4556155	11	11		11	
13	Missouri	4319813	10	10		11	1
14	Virginia	3966949	10	10		10	
15	Wisconsin	3951777	10	10		10	
16	Georgia	3943116	10	10		10	
17	Tennessee	3567089	9	9		9	
18	Minnesota	3413864	8	8		8	
19	Alabama	3266740	8	8		8	
20	Louisiana	3257022	8	8		8	
21	Maryland	3100689	8	8		7	-1
22	Kentucky	3038156	7	7		7	
23	Washington	2853214	7	7		7	
24	Iowa	2757537	7	7		7	
25	Connecticut	2535234	6	6		6	
26	South Carolina	2382594	6	6		6	
27	Oklahoma	2328284	6	6		5	-1
28	Kansas	2178611	5	5		5	
29	Mississippi	2178141	5	5		5	
30	West Virginia	1860421	5	5		4	-1
31	Arkansas	1786272	4	4		4	
32	Oregon	1768687	4	4		4	
33	Colorado	1753947	4	4		4	
34	Nebraska	1411330	3	3		3	
35	Arizona	1302161	3	3		3	
36	Maine	969265	2	2		2	
37	New Mexico	951023	2	2		2	
38	Utah	890627	2	2		2	

39	Rhode Island	859488	2	2		2	
40	South Dakota	680514	2	2		1	-1
41	Montana	674767	2	2		1	-1
42	Idaho	667191	2	2		1	-1
43	Hawaii	632772	2	2		1	-1
44	North Dakota	632446	2	2		1	-1
45	New Hampshire	606921	2	1	-1	1	-1
46	Delaware	446292	1	1		1	
47	Vermont	389881	1	1		1	
48	Wyoming	330066	1	1		1	
49	Nevada	285278	1	1		1	
50	Alaska	226167	1	1		1	
Total # of difference:						2	17

Population information and apportionment results obtained from Balinski and Young (2001).

Table OA6: Apportionment Results under Different Methods, 1970

	State	Apportionment Population	Huntington-Hill's method	Webster's method	Diff (Webs-Hill)	Jefferson's method	Diff (Jeff - Hill)
1	California	20098863	43	43		44	1
2	New York	18338055	39	39		41	2
3	Pennsylvania	11884314	25	25		26	1
4	Texas	11298787	24	24		25	1
5	Illinois	11184320	24	24		25	1
6	Ohio	10730200	23	23		24	1
7	Michigan	8937196	19	19		20	1
8	New Jersey	7208035	15	15		16	1
9	Florida	6855702	15	15		15	
10	Massachusetts	5726676	12	12		12	
11	Indiana	5228156	11	11		11	
12	North Carolina	5125230	11	11		11	
13	Missouri	4718034	10	10		10	
14	Virginia	4690742	10	10		10	
15	Georgia	4627306	10	10		10	
16	Wisconsin	4447013	9	9		9	
17	Tennessee	3961060	8	8		8	
18	Maryland	3953698	8	8		8	
19	Minnesota	3833173	8	8		8	
20	Louisiana	3672008	8	8		8	
21	Alabama	3475885	7	7		7	
22	Washington	3443487	7	7		7	
23	Kentucky	3246481	7	7		7	
24	Connecticut	3050693	6	7	1	6	
25	Iowa	2846920	6	6		6	
26	South Carolina	2617320	6	6		5	-1
27	Oklahoma	2585486	6	6		5	-1
28	Kansas	2265846	5	5		5	
29	Mississippi	2233848	5	5		5	
30	Colorado	2226771	5	5		4	-1
31	Oregon	2110810	4	5	1	4	
32	Arkansas	1942303	4	4		4	
33	Arizona	1787620	4	4		4	
34	West Virginia	1763331	4	4		3	-1
35	Nebraska	1496820	3	3		3	
36	Utah	1067810	2	2		2	
37	New Mexico	1026664	2	2		2	
38	Maine	1006320	2	2		2	

39	Rhode Island	957798	2	2		2	
40	Hawaii	784901	2	2		1	-1
41	New Hampshire	746284	2	2		1	-1
42	Idaho	719921	2	2		1	-1
43	Montana	701573	2	1	-1	1	-1
44	South Dakota	673247	2	1	-1	1	-1
45	North Dakota	624181	1	1		1	
46	Delaware	551928	1	1		1	
47	Nevada	492396	1	1		1	
48	Vermont	448327	1	1		1	
49	Wyoming	335719	1	1		1	
50	Alaska	304067	1	1		1	
Total # of difference:						4	17

Population information and apportionment results obtained from Balinski and Young (2001).

Table OA7: Apportionment Results under Different Methods, 1980

	State	Apportionment Population	Huntington-Hill's method	Webster's method	Diff (Webs-Hill)	Jefferson's method	Diff (Jeff - Hill)
1	California	23668562	45	45		48	3
2	New York	17557288	34	34		35	1
3	Texas	14228383	27	27		28	1
4	Pennsylvania	11866728	23	23		24	1
5	Illinois	11418461	22	22		23	1
6	Ohio	10797419	21	21		22	1
7	Florida	9739992	19	19		19	
8	Michigan	9258344	18	18		18	
9	New Jersey	7364158	14	14		15	1
10	North Carolina	5874429	11	11		11	
11	Massachusetts	5737037	11	11		11	
12	Indiana	5490179	10	11	1	11	1
13	Georgia	5464265	10	10		11	1
14	Virginia	5346279	10	10		10	
15	Missouri	4917444	9	9		10	1
16	Wisconsin	4705335	9	9		9	
17	Tennessee	4590750	9	9		9	
18	Maryland	4216446	8	8		8	
19	Louisiana	4203972	8	8		8	
20	Washington	4130163	8	8		8	
21	Minnesota	4077148	8	8		8	
22	Alabama	3890061	7	7		7	
23	Kentucky	3661433	7	7		7	
24	South Carolina	3119208	6	6		6	
25	Connecticut	3107576	6	6		6	
26	Oklahoma	3025266	6	6		6	
27	Iowa	2913387	6	6		5	-1
28	Colorado	2888834	6	6		5	-1
29	Arizona	2717866	5	5		5	
30	Oregon	2632663	5	5		5	
31	Mississippi	2520638	5	5		5	
32	Kansas	2363208	5	5		4	-1
33	Arkansas	2285513	4	4		4	
34	West Virginia	1949644	4	4		3	-1
35	Nebraska	1570006	3	3		3	
36	Utah	1461037	3	3		2	-1
37	New Mexico	1299968	3	2	-1	2	-1
38	Maine	1124660	2	2		2	

39	Hawaii	965000	2	2		1	-1
40	Rhode Island	947154	2	2		1	-1
41	Idaho	943935	2	2		1	-1
42	New Hampshire	920610	2	2		1	-1
43	Nevada	799184	2	2		1	-1
44	Montana	786690	2	2		1	-1
45	South Dakota	690178	1	1		1	
46	North Dakota	652695	1	1		1	
47	Delaware	595225	1	1		1	
48	Vermont	511456	1	1		1	
49	Wyoming	470816	1	1		1	
50	Alaska	400481	1	1		1	
Total # of difference:						2	22

Population information and apportionment results obtained from Balinski and Young (2001).

Table OA8: Apportionment Results under Different Methods, 1990

	State	Apportionment Population	Huntington-Hill's method	Webster's method	Diff (Webs-Hill)	Jefferson's method	Diff (Jeff - Hill)
1	California	29839250	52	52		54	2
2	New York	18044505	31	31		33	2
3	Texas	17059805	30	30		31	1
4	Florida	13003362	23	23		23	
5	Pennsylvania	11924710	21	21		21	
6	Illinois	11466682	20	20		21	1
7	Ohio	10887325	19	19		19	
8	Michigan	9328784	16	16		17	1
9	New Jersey	7748634	13	13		14	1
10	North Carolina	6657630	12	12		12	
11	Georgia	6508419	11	11		11	
12	Virginia	6216568	11	11		11	
13	Massachusetts	6029051	10	11	1	11	1
14	Indiana	5564228	10	10		10	
15	Missouri	5137804	9	9		9	
16	Wisconsin	4906745	9	9		8	-1
17	Tennessee	4896641	9	9		8	-1
18	Washington	4887941	9	9		8	-1
19	Maryland	4798622	8	8		8	
20	Minnesota	4387029	8	8		8	
21	Louisiana	4238216	7	7		7	
22	Alabama	4062608	7	7		7	
23	Kentucky	3698969	6	6		6	
24	Arizona	3677985	6	6		6	
25	South Carolina	3505707	6	6		6	
26	Colorado	3307912	6	6		6	
27	Connecticut	3295669	6	6		6	
28	Oklahoma	3157604	6	5	-1	5	-1
29	Oregon	2853733	5	5		5	
30	Iowa	2787424	5	5		5	
31	Mississippi	2586443	5	5		4	-1
32	Kansas	2485600	4	4		4	
33	Arkansas	2362239	4	4		4	
34	West Virginia	1801625	3	3		3	
35	Utah	1727784	3	3		3	
36	Nebraska	1584617	3	3		2	-1
37	New Mexico	1521779	3	3		2	-1
38	Maine	1233223	2	2		2	

39	Nevada	1206152	2	2		2	
40	Hawaii	1115274	2	2		2	
41	New Hampshire	1113915	2	2		2	
42	Idaho	1011986	2	2		1	-1
43	Rhode Island	1005984	2	2		1	-1
44	Montana	803655	1	1		1	
45	South Dakota	699999	1	1		1	
46	Delaware	668696	1	1		1	
47	North Dakota	641364	1	1		1	
48	Vermont	564964	1	1		1	
49	Alaska	551947	1	1		1	
50	Wyoming	455975	1	1		1	
Total # of difference:						2	16

Population information and apportionment results obtained from Balinski and Young (2001).

Table OA9: Apportionment Results under Different Methods, 2000

	State	Apportionment Population	Huntington-Hill's method	Webster's method	Diff (Webs-Hill)	Jefferson's method	Diff (Jeff - Hill)
1	California	33930798	53	53		55	2
2	Texas	20903994	32	32		33	1
3	New York	19004973	29	29		30	1
4	Florida	16028890	25	25		26	1
5	Illinois	12439042	19	19		20	1
6	Pennsylvania	12300670	19	19		19	
7	Ohio	11374540	18	18		18	
8	Michigan	9955829	15	15		16	1
9	New Jersey	8424354	13	13		13	
10	Georgia	8206975	13	13		13	
11	North Carolina	8067673	13	13		13	
12	Virginia	7100702	11	11		11	
13	Massachusetts	6355568	10	10		10	
14	Indiana	6090782	9	9		9	
15	Washington	5908684	9	9		9	
16	Tennessee	5700037	9	9		9	
17	Missouri	5606260	9	9		9	
18	Wisconsin	5371210	8	8		8	
19	Maryland	5307886	8	8		8	
20	Arizona	5140683	8	8		8	
21	Minnesota	4925670	8	8		7	-1
22	Louisiana	4480271	7	7		7	
23	Alabama	4461130	7	7		7	
24	Colorado	4311882	7	7		7	
25	Kentucky	4049431	6	6		6	
26	South Carolina	4025061	6	6		6	
27	Oklahoma	3458819	5	5		5	
28	Oregon	3428543	5	5		5	
29	Connecticut	3409535	5	5		5	
30	Iowa	2931923	5	5		4	-1
31	Mississippi	2852927	4	4		4	
32	Kansas	2693824	4	4		4	
33	Arkansas	2679733	4	4		4	
34	Utah	2236714	3	3		3	
35	Nevada	2002032	3	3		3	
36	New Mexico	1823821	3	3		3	-1
37	West Virginia	1813077	3	3		3	-1
38	Nebraska	1715369	3	3		2	-1

39	Idaho	1297274	2	2		2	
40	Maine	1277731	2	2		2	
41	New Hampshire	1238415	2	2		2	
42	Hawaii	1216642	2	2		1	-1
43	Rhode Island	1049662	2	2		1	-1
44	Montana	905316	1	1		1	
45	Delaware	785068	1	1		1	
46	South Dakota	756874	1	1		1	
47	North Dakota	643756	1	1		1	
48	Alaska	628933	1	1		1	
49	Vermont	609890	1	1		1	
50	Wyoming	495304	1	1		1	
Total # of difference:						0	13

Population information and apportionment results obtained from Balinski and Young (2001).

Table OA10: Apportionment Results under Different Methods, 2010

	State	Apportionment Population	Huntington-Hill's method	Webster's method	Diff (Webs-Hill)	Jefferson's method	Diff (Jeff - Hill)
1	California	37341989	53	53		54	1
2	Texas	25268418	36	36		37	1
3	New York	19421055	27	27		28	1
4	Florida	18900773	27	27		27	
5	Illinois	12864380	18	18		19	1
6	Pennsylvania	12734905	18	18		18	
7	Ohio	11568495	16	16		17	1
8	Michigan	9911626	14	14		14	
9	Georgia	9727566	14	14		14	
10	North Carolina	9565781	13	14	1	14	1
11	New Jersey	8807501	12	12		13	1
12	Virginia	8037736	11	11		11	
13	Washington	6753369	10	10		10	
14	Massachusetts	6559644	9	9		9	
15	Indiana	6501582	9	9		9	
16	Arizona	6412700	9	9		9	
17	Tennessee	6375431	9	9		9	
18	Missouri	6011478	8	8		8	
19	Maryland	5789929	8	8		8	
20	Wisconsin	5698230	8	8		8	
21	Minnesota	5314879	8	8		7	-1
22	Colorado	5044930	7	7		7	
23	Alabama	4802982	7	7		7	
24	South Carolina	4645975	7	7		6	-1
25	Louisiana	4553962	6	6		6	
26	Kentucky	4350606	6	6		6	
27	Oregon	3848606	5	5		5	
28	Oklahoma	3764882	5	5		5	
29	Connecticut	3581628	5	5		5	
30	Iowa	3053787	4	4		4	
31	Mississippi	2978240	4	4		4	
32	Arkansas	2926229	4	4		4	
33	Kansas	2863813	4	4		4	
34	Utah	2770765	4	4		4	
35	Nevada	2709432	4	4		4	
36	New Mexico	2067273	3	3		3	
37	West Virginia	1859815	3	3		2	-1
38	Nebraska	1831825	3	3		2	-1

39	Idaho	1573499	2	2		2	
40	Hawaii	1366862	2	2		2	
41	Maine	1333074	2	2		1	-1
42	New Hampshire	1321445	2	2		1	-1
43	Rhode Island	1055247	2	1	-1	1	-1
44	Montana	994416	1	1		1	
45	Delaware	900877	1	1		1	
46	South Dakota	819761	1	1		1	
47	Alaska	721523	1	1		1	
48	North Dakota	675905	1	1		1	
49	Vermont	630337	1	1		1	
50	Wyoming	568300	1	1		1	
Total # of difference:						2	14

Population information obtained from census.gov. Apportionment results calculated by author.

Table OA11: Apportionment Results under Different Methods, 2020

	State	Apportionment Population	Huntington-Hill's method	Webster's method	Diff (Webs-Hill)	Jefferson's method	Diff (Jeff - Hill)
1	California	39576757	52	52		54	2
2	Texas	29183290	38	38		40	2
3	Florida	21570527	28	28		29	1
4	New York	20215751	26	27	1	28	2
5	Pennsylvania	13011844	17	17		18	1
6	Illinois	12822739	17	17		17	
7	Ohio	11808848	15	16	1	16	1
8	Georgia	10725274	14	14		14	
9	North Carolina	10453948	14	14		14	
10	Michigan	10084442	13	13		13	
11	New Jersey	9294493	12	12		12	
12	Virginia	8654542	11	11		11	
13	Washington	7715946	10	10		10	
14	Arizona	7158923	9	9		9	
15	Massachusetts	7033469	9	9		9	
16	Tennessee	6916897	9	9		9	
17	Indiana	6790280	9	9		9	
18	Maryland	6185278	8	8		8	
19	Missouri	6160281	8	8		8	
20	Wisconsin	5897473	8	8		8	
21	Colorado	5782171	8	8		8	
22	Minnesota	5709752	8	8		7	-1
23	South Carolina	5124712	7	7		7	
24	Alabama	5030053	7	7		6	-1
25	Louisiana	4661468	6	6		6	
26	Kentucky	4509342	6	6		6	
27	Oregon	4241500	6	6		5	-1
28	Oklahoma	3963516	5	5		5	
29	Connecticut	3608298	5	5		5	
30	Utah	3275252	4	4		4	
31	Iowa	3192406	4	4		4	
32	Nevada	3108462	4	4		4	
33	Arkansas	3013756	4	4		4	
34	Mississippi	2963914	4	4		4	
35	Kansas	2940865	4	4		4	
36	New Mexico	2120220	3	3		2	-1
37	Nebraska	1963333	3	3		2	-1
38	Idaho	1841377	2	2		2	

39	West Virginia	1795045	2	2		2	
40	Hawaii	1460137	2	2		2	
41	New Hampshire	1379089	2	2		1	-1
42	Maine	1363582	2	2		1	-1
43	Rhode Island	1098163	2	1	-1	1	-1
44	Montana	1085407	2	1	-1	1	-1
45	Delaware	990837	1	1		1	
46	South Dakota	887770	1	1		1	
47	North Dakota	779702	1	1		1	
48	Alaska	736081	1	1		1	
49	Vermont	643503	1	1		1	
50	Wyoming	577719	1	1		1	
A critical divisor (not unique):			762995	760000		721300	
Total # of difference:					4		15

Population information obtained from census.gov. Apportionment results calculated by author.

A detailed explanation of the Alabama Paradox

Table OA12: Hamilton's Method and the Alabama Paradox

	Population	Apportionment using Hamilton's method	
Large State	552,200	55	56 (+1)
Medium State	343,700	34	35 (+1)
Small State	104,100	11	10 (-1)
Total	1,000,000	100	101
Standard divisor/ Average district size:		10,000	9,901

In the above example, the total population size remains the same while the House increases from 100 to 101 seats. The House Monotonicity criterion suggests that, as the result of the House size increase, one state should gain a seat, and the other two should have the same number of seats. Hamilton's method, however, leads to two states (Large and Medium) gaining one seat each and one state (Small) losing a seat.¹ The violation of the House Monotonicity criterion shows that Hamilton's method is inconsistent

¹ The calculation process is as follows: given a total population of 1,000,000 and a House of 101 seats, the standard quota/average district size is $\frac{1,000,000}{101} = 9,901$. Dividing Large State's population with this standard quota yields: $\frac{552,200}{9,901} = 55.77$ seats, which rounds down to an initial 55 seats, with a loss of 0.77 seats. Similarly, Medium state gets 34 initial seats with a loss of 0.71 seats, and Small State gets 10 initial seats with a loss of 0.51 seats. The states' initial seats only add up to 99: $55+34+10=99$ so there are two more seats to distribute. To distribute the last two seats, the states' losses are ranked from highest to lowest: Large State 0.77, Median State 0.71, Small State 0.51. Large and Medium State gets compensated with one seat each, bringing up their final numbers of seats to 56 and 35 respectively.

A detailed explanation of the Oklahoma Paradox

Table OA13: Hamilton's Method and the Oklahoma Paradox

	Population		Apportionment using Hamilton's method	
	Large State	552,200	552,200	55
Medium State	343,700	343,700	34	35 (+1)
Small State	104,100	104,100	11	10 (-1)
New State		127,900		13
Total	1,000,000	1,127,900	100	113
Standard divisor/Average district size:			10,000	9,981

In the above example, the addition of New State increases the total population by 127,900, which is 12.7 districts based on existing district size, consequently the House is enlarged by 13 seats to a total of 113 seats to accommodate. Using Hamilton's method, New State would indeed acquire 13 house seats, but the shuffle also makes Small State lose a seat to Medium State, even though these two states' populations remain unchanged.²

² The calculation process is as follows: given a total population of 1,279,000 and a House of 113 seats, the standard quota/average district size is $\frac{1,279,000}{113} = 9,981$. Dividing Large State's population with this standard quota yields: $\frac{552,200}{9,981} = 55.32$ seats, which rounds down to an initial 55 seats, with a loss of 0.32 seats. Similarly, Medium state gets 34 initial seats with a loss of 0.435 seats, Small State gets 10 initial seats with a loss of 0.429 seats, and New State gets 12 initial seats with a loss of 0.81 seats. The states' initial seats only add up to 99: $55+34+10+12=111$ so there are two more seats to distribute. To distribute the last two seats, the states' losses are ranked from highest to lowest: New State 0.81, Medium State 0.435, Small State 0.429, Large State 0.32. New and Medium State gets compensated with one seat each, bringing up their final numbers of seats to 13 and 35 respectively.