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Amelia Hadfield and Andrej J. Zwitter (Eds.)

COGITATIO

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Editorial

Governing Big Data

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Abstract
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Issue
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2.5 quintillion bytes of data are created every day through pictures, messages, gps-data, etc. (Zicari, 2012). "Big Data" is seen simultaneously as the new Philosophers Stone and Pandora's box: a source of great knowledge and power, but equally, the root of serious problems. While corporate and public agencies have long been concerned with this phenomenon since the beginning of the communication age, the debate about big data has recently risen in prominence as a result of the NSA Prism scandal, itself something of a follow-on from the Wikigate and Edward Snowden saga. Among one of the most prominent current challenges in contemporary politics is the question of how to deal with big data. The recent Snowden revelations about NSA surveillance of foreign heads of states have caused inter-national tensions between Indonesia and Australia (Deutsche Welle, 2013), Brazil and Germany, the latter levelling accusations at the United States of America, with backlashes from a range of EU actors, and indeed the United Nations General Assembly (Lynch, Harris, & Hudson, 2013). Following on from our previous editorial, in which we debated the challenges associated with open access publishing, we now briefly explore the ways in which Big Data—as a polyvalent empirical research tool—and its associated issue of attenuated or enhanced Data Security now confronts current researchers in the area of governance and politics.

The 'inputs' of Big Data are generated on a daily basis—largely involuntarily by individuals in the process of simple and complex interactions with all forms of information communication technology (ICT). The 'outputs' of Big Data, however, are more troublesome to understand. A vast majority is clearly being deliberately accrued and retained by a wide range of commodity and financial service providers, as well as those in the internet and wider security sectors (data harvesting). In contrast to traditional datasets for statistical analysis based on purposely selected variables, Big Data is the accumulation of purposefully selected and random data of individuals and groups, longitudinal data, and many other forms of information. The use of Big Data in various forms (e.g. data mining) reveals clear and interesting profiles about individuals, and indeed groups, when consolidated into data pools in longitudinal form.

Illustrating economic, social, and even political and cultural preferences, as well as personal identification, much of a highly sensitive nature, Big Data researchers now have access to a seemingly endless swathe of sensitive information, the collection of which would—prior to the unregulated impunity of the Big Data age—likely have been prohibited by any decent ethics committee. The behavioural algorithms generated via longitudinal data pools reveal the intimate sensibilities, preferences, and future likely procurement patterns and societal behaviour of individuals and groups in any range of geographical, political, socio-cultural, religious and economic categories.

The **negative ramifications** are obvious. Much is taken without knowledge or consent, for the purposes of guiding, managing (largely online) commercial choice to ensure online consumers can easily buy exactly what they were looking for, and find it hard to resist buying a great deal that they weren't looking for. Hard on the heels of a global financial crisis that spun out of control largely due to chronically ill-informed consumers being peddled unsustainable mortgages and loans, Big Data gathering by both commercial and security actors (principally in North America and Europe) is the insidious spin-off of a private sector desperate to rebuild itself in the wake of such a macro-financial catastrophe.

But the **positive potential** is also enormous, from the perspective of basic data analysis within politics and governance studies. Raw data on personal, political, procurement patterns, suggest a new-found ability to look in-depth at a wide variety of social behaviour never previously attempted. Researchers in politics, governance, and international relations could indeed benefit from ethically-sound (i.e. anonymized and voluntarily provided) Big Data for distilling information about the interrelation between micro- and macro-level variables, combining individual, national and international actors, and shed empirical light on complex interactions previously hardly researchable.

Other 'political positives' suggest themselves, both via Big Data and from the untrammeled expansion of Social Media as a form of political communication and leverage. Clearly Big Data, and the ability to access, analyze and control based on the results, is a tremendous new source of political, economic, and even military power. Social Networks, which operate as some of the strongest generators of Big Data (e.g. Social Network Analysis) not only provide fascinating raw material on the social and political preferences of its users (if indeed it could be used as such a research tool), but have been effectively used to generate political outcomes. Attempts by the Chinese Communist Party to restrain the national use of Google to the use Facebook and Twitter during a variety of Arab Spring uprisings, and Egypt's response of cutting off all internet and mobile communication between demonstrators all illustrate the profound ability of interlinked communication to generate a political that is anything but virtual (Richtel, 2011). The sheer range of Big Data's impact is still largely untapped as a tool to further political and governance studies. In response, an MIT project called "Immersion" now makes it more possible for users to experience the entire scope of information gathering and networking analysis possible based merely on one's own email contacts (without even going into the content) ("Immersion: A People-centric View", n.d.). Is this the first cut at turning the insidious nature of Big Data to a more palatable, objective use as the raw empirical data for studies within social and political science? Do we ourselves as researchers see, understand and support the need for this new avenue?

Is Big Data poised to become the raw material of empirical investigation for politics and governance researchers? Does its research utility balance the tremendous power of its market reach? Much remains at odds, from the imbalance of ethics, security, surveillance, and lack of overarching code of conduct to assist in the governance of this troublesome area. Indeed, the most pressing issues to date are the difficulties encountered in governing the use and misuse of Big Data effectively. Would codes of conduct specifically for corporations, and codes of ethics for science and applied research help clarify this area? Watch this space. Carefully…

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Article

The Devil's in the Details: Evaluating the One Person, One Vote Principle in American Politics

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Abstract
Ever since the Supreme Court instituted the one person, one vote principle in congressional elections based on its decision in *Wesberry v. Sanders* (1964), intrastate deviations from equal district populations have become smaller and smaller after each decennial reapportionment. Relying on equal total population as the standard to meet the Court's principle, though, has raised some constitutional and practical questions stemming from, most basically, not every person has the right to vote. Specifically, there is considerable deviation between the current redistricting practices and a literal interpretation of this constitutional principle. This study systematically analyzes the differences between districts' total populations and their voting age populations (VAPs). Further, we consider how congressional reapportionments since 1972 would change if, instead of states' total populations, the standard for reapportioning seats were based on the VAP or the voting eligible population (VEP). Overall, the results indicate that the debate surrounding the appropriate apportionment and redistricting standard is not just normative, it also has notable practical consequences.

1. Introduction

It is no surprise that the question of representation has been one of the greatest concerns at and since the Constitutional Convention. The laws establishing the number of representatives and their electoral jurisdictions determine, in part, which voters have the most influence in affecting the political process and by extension the type, quality, and tenor of representation. Both congressional reapportionment and redistricting are currently guided—though to varying degrees—by the principle, as solidified by the 14th Amendment, of population equality as determined by the total number of enumerated individuals within a state or district, respectively. But, American legal history is replete with examples of challenges to how political equality is defined and implemented. These include normative, legal, political, and computational issues and each may have profound practical consequences.

In this study we address some of the potential consequences of some of the challenges to the current standards and definitions used for congressional apportionment and redistricting.

First, we briefly explore the historical changes to and the debates over these standards and definitions. In doing so, we argue that although congressional apportionment and redistricting are, of course, distinct processes with their own legal foundations, there are still a number of normative, constitutional, and empirical ties between them, which leaves open the possibility of future changes to them and makes an alternative analysis of each a worthy endeavor.

Second, we empirically assess the one person, one vote principle in American redistricting by comparing the legal status quo of total population equality to an alternative measure: voting age population (VAP). We do so for when the use of VAP is legally required in determining majority-minority districts, as well as when it is not, in evaluations of the one person, one vote principle.

Third, while acknowledging the constitutional difficulties of such a change, we empirically assess congressional apportionment by comparing the legal status quo of apportioning U.S. House seats according to total population to the consequences of apportioning on VAP or voting eligible population (VEP).

Fourth, we empirically evaluate the one person, one vote standard as applied to congressional apportionment for all three of these population measures. Fifth, we estimate the effect that any of these apportionment changes would have on the distribution of Electoral College votes.

Overall, the intrastate analyses show that despite notable reductions in district deviations from equal total population, there has not been a corresponding decline in deviations away from equal voting age population. The interstate analyses reveal that reapportionments based on the VAP and VEP would considerably alter the redistribution of U.S. House seats and this would marginally benefit the Democratic Party in presidential elections.

2. The Defining of "Total Population" and "One Person, One Vote"

As any introductory American government textbook explains, the issue of representation carried the most importance among the various debates at the 1787 Constitutional Convention. The opposing positions of delegates representing large states (i.e., Virginia) and small states (i.e., New Jersey) were eventually resolved, appropriately enough by the Connecticut Compromise, a medium-sized state led by Roger Sherman, who successfully advocated for an upper chamber with representation set at two Senators per state and a lower chamber whose representation was based on a state's population. This "Great Compromise" not only mollified the opposition to tying representation to population in one chamber, but just as fundamental, by denoting slaves as three-fifths of a person in the

apportionment process, the opposing interests of northern and southern delegates were temporarily assuaged. In many important and fundamental ways, achieving this compromise did not preclude, of course, many highly contested subsequent political battles and changes in an attempt to make congressional representation, among other things, align more closely with the founding's democratic ideals.

The most significant and obvious change to congressional apportionment occurred with the passage of the 14th Amendment to the Constitution in 1868, which repealed the "original sin" of the Great Compromise and finally included all African Americans as whole persons in the apportionment of seats to the U.S. House of Representatives. But much of 19th and early 20th century American history is replete with other contestations of congressional apportionment, such as over which apportionment formula is fairer as well as when and where to add "bonus" seats (Balinski & Young, 2001). For instance, after the 1870 Census, 283 seats were apportioned by population while an additional nine seats were added to a few states as a political favor. The distribution of these resulting 292 seats was not possible with either of the apportionment formulas used at the time and these bonus seats ended up making the difference in the 1876 presidential election. Despite many changes in the formula and except for the few bonus seats, since 1868 congressional apportionment has been assigned to each state according to their total population.

Yet, the definition of "total population" since passage of the 14th Amendment continues to undergo changes and challenges (Anderson, 1988). For example, it was not until 1940 that the U.S. Attorney General declared that all Native Americans were considered taxed and thus all were included in the apportionment enumeration by the U.S. Census (39 Op. Att'y Gen. 518 (1940)). And, the definition of a state's total apportionment population was officially augmented in 1970, but not in 1980, and was again from 1990 to the present defined to include some individuals overseas. This includes U.S. military personnel as well as Federal civilian employees and their dependents living with them. Others who are overseas, such as the Merchant Marines, fishing trawlers, floating processors, tuna boats, etc., were counted in their state's total population, but not included in the state's apportionment total populations (Mills, 1993).[1] Interestingly, none of these overseas populations are included in the "total populations" used for redistricting.

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[1] The definition and inclusion of the overseas populations is more complicated and nuanced than the summary text description. For instance, many overseas individuals were simply added to the Census counts in 1870, 1880, and 1900. After the 1990 Census, the Commonwealth of Massachusetts sued to exclude overseas populations. The Supreme Court, in *Franklin v. Massachusetts* (1992), declared their inclusion constitutional.

Also, more recently, there have been Supreme Court challenges to the Census's calculation of total population and its use of data imputation, statistical sampling, and the use of unadjusted figures (see *Utah v. Evans* 2002; *Department of Commerce v. United States House* 1999; *Wisconsin v. City of New York et al.* 1996) as well as to the constitutionality of including non-immigrant foreign nationals in a state's apportionment enumeration (*Louisiana v. Bryson* 2011). In sum, while the standard for congressional apportionment of total population is defined in the Constitution and would likely require a constitutional amendment to considerably alter it, we also should not think of it as immutable.

Whatever the definition of and the procedures used to calculate the total population of a state, that figure (based on the apportionment formula) is then used to allocate to each state its number of U.S. House seats. And, the districting of those seats within a state has witnessed a history of contestations similar to those associated with apportionment. For instance, intrastate population equality among districts was not a particularly valued principle for much of the first half of the 20th century; in fact, northern and southern politicians alike often actively opposed any change toward greater equality. Both parties had many districts outside of major urban centers with proportionally fewer residents; these rural voters' interests, thus, received outsized attention (Ansolabehere, Gerber, & Snyder, 2002). In partisan terms, this meant that congressional districts in the North were often biased in favor of Republicans and U.S. House boundaries in the South perpetuated the longstanding hegemony of rural Democrats (Cox & Katz, 2002). Rare was the state that considered redistricting in accordance with population equality. Rather the status quo was generally upheld, and this included often incorporating newly apportioned U.S. House seats as at-large districts—covering the entire state.

Failure to adjust district boundaries to satisfy a principle of population equality was met with growing resistance among those constituents residing in more populous metropolitan settings, and in 1946 the Supreme Court addressed the issue of district malapportionment. In the famous 4-to-3 decision handed down by Justice Frankfurter in *Colegrove v. Green*, the Supreme Court chose not to wade into the "political thicket" of setting the criteria for crafting legislative districts. The ruling in this case was not, of course, the last word, and in the 1962 *Baker v. Carr* decision not only did the Court deem redistricting a justiciable issue but also endorsed a principle of apportionment based on the criterion that each person deserved an equal vote (Levinson, 1985). Hence the principle of one person, one vote was established.

On its face, the notion and conception of the one person, one vote principle seems straightforward and hardly controversial—much like "total population". Court rulings and scholarly opinions, however, have here too injected considerable nuance and complexity as to what this tenet actually means in reconfiguring these districts following the decennial Census and subsequent apportionment. If we merely take the principle at its word, for example, we might expect that equal representation demands a remarkably precise distribution of *voters*—indeed, such that an equal number of voters populate each district in any state that contains enough residents to warrant multiple districts. But from this seemingly simplistic interpretation the matter is complicated by two realities, one legal and the other empirical.

First, legal precedent has never held that redistricting in accordance with the one person, one vote principle should be tied to anything other than some definition of total population—regardless of how many actual voters are present. No finer differentiation of the defined total population—such as, based on age, citizenship, or any other criterion—has become the default standard in determining congressional redistricting. Yet, the Court has allowed, in a few particular cases, districting arrangements that are performed on the basis of a finer measure of voter equality than simple total population. For example, in the 1966 case of *Burns v. Richardson* the Court agreed "that a jurisdiction could satisfy one-person, one-vote by drawing districts…[with] equal numbers of registered voters" (quoted in Persily, 2011).

Despite opening this legal possibility, in the ruling of the 2011 case of *Lepak v. City of Irving*, which the Supreme Court declined to hear, the Fifth Circuit United States Court of Appeals refused to overturn the reapportionment plan for the city council districts even though the one majority Hispanic district was approximately equal to its counterparts with respect to total population but almost half as large if the measure is based on the citizen voting age population. This north Texas municipality is an instance where the one person, one vote principle—as typically interpreted—is upheld, while it—as literally interpreted—appears to be violated. In other words, Irving, Texas achieved total population equality among its districts while undermining voter equality. Its actions may empower a minority population, but it does so, ironically, at the expense of diluting the votes of the majority segment of Anglo residents. Hence, on the most basic level, there seems to be some tension between the Court's jurisprudence and possible interpretations of the classic democratic principle of one person, one vote.

This ties directly into the second issue that the one person, one vote principle must contend. Not only do finer measures of voter equality entangle the legal profession in debates about salient tradeoffs regarding, for instance, minority representation, but the Census is also not currently administered and designed in

such a manner that it can adequately extract reliable data on voter eligibility or citizenship at finer levels of political geography, including congressional districts (Persily, 2011)[2]. Thus, if we again take the notion of one person, one vote in its most literal sense and desire the redistribution of voters in geographic settings so that these boundaries contain the same number of eligible voters or citizens, we cannot, at least at this time, perform such a task because the data are not there.

Beyond the issues with legal precedents and empirical limitations, we should also state the commonly understood reality that a Census count constitutes no more than a static picture of the population conducted over a very short span of time. In other words, even if we are confident in the Census count of the American population (admittedly this is a big "if"), it is of course dynamic—with tremendous variation in residential mobility, incarceration rates, birth rates, death rates, migration, and all of these components varying by differences in the demography of any given locality. This reality obviously also serves to undermine any attempt to meet the one person, one vote principle. In other words, the moment the Census is completed, it is outdated.

It is then, at least, a curiosity that the Court has used the slogan of "one person, one vote" to label their position first established in *Baker v. Carr* (1962) and reinforced since the 1960s. But, there are reasons to think that it could be more than just a curiosity. There are creditable arguments that a standard narrower than total population—and more closely aligned with the number of actual voters—better models some democratic norms (Fishkin, 2012).[3] And, there is some legal precedence for these prescriptions as well. For

example, the Voting Rights Act defines majority-minority districts by VAP, not total population.

To be clear, congressional apportionment and redistricting are two distinct processes with largely distinct legal foundations, but they do share similar normative and empirical goals and use similar data to try to achieve them. The use of total population in congressional apportionment is constitutionally codified by the 14th Amendment, though its definition has historically been somewhat malleable. Once each state is notified of the number of congressional districts it has been apportioned for the next decade, it is required by the jurisprudence of the Supreme Court to construct its districts in accordance with the one person, one vote principle—that is, each district is to have "as mathematically equal as reasonably possible" the same portion of the state's total population (quoted in *White v. Weiser*, 1973).

Although the redistricting total population can have the same intertemporal malleability as the apportionment total population, there are currently also slight differences between them (e.g., the overseas populations are excluded from the former). Nonetheless, both processes rest on a similar normative and constitutional understanding. Intrastate congressional redistricting was brought under the one person, one vote principle in the 1964 *Wesberry v. Sanders* decision: "the command of Art. I, 2, that Representatives be chosen 'by the People of the several States' means that as nearly as is practicable one man's vote in a congressional election is to be worth as much as another's". And, the Court, in *Department of Commerce v. Montana* (1992), tentatively connected this same principle to interstate congressional apportionment: "there is some force to the argument that the same historical insights that informed our construction of Article I, 2, in the context of intrastate districting should apply here as well. As we interpreted the constitutional command that Representatives be chosen 'by the People of the several States' to require the State to pursue equality in representation, we might well find that the requirement that Representatives be apportioned among the several States 'according to their respective Numbers' would also embody the same principle of equality".

All of the above normative, legal, definitional, and empirical interconnections between and variations within congressional apportionment and redistricting continue to leave open the possibility—as slight as it may be—that the application of the democratic and constitutional principle of one person, one vote could continue to be challenged and maybe even augmented for one or both of them in the future. To better understand some of the possible empirical consequences, the remainder of this article agnostically explores—with the best available data, some of which is unfortunately limited—the recent history of U.S. congressional apportionment and redistricting (1972–2012). We

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[2] In the same article, Persily explains the shortcomings of Census data on the number of citizens in a given locality at lower levels of geographic aggregation. For one, the Census data for congressional redistricting do not indicate citizenship and, in order to make estimates at the congressional district level requires use of American Community Survey (ACS) data, which is not reliable because the surveys are not representative of constituents residing in America's 435 U.S. House districts. So, with regard to considering estimates of, for example, the Latino citizen voting age population (CVAP), Persily concludes that "the only relevant citizenship data available from the census gives ballpark figures, at best, and misleading and confusing estimates at worst" (p. 776).

[3] Explicitly, we mean that one person who is able to vote (eligible) should have a commensurate influence (weight) given to their vote in District X as the weight afforded another eligible voter situated in District Y. Admittedly, the proposition that a single voter has much (if any) influence on affecting who represents them is miniscule to the point of approximating zero and hence it is really a matter of the aggregation of eligible voters in any two districts in a given state being as equal as possible. For an interesting critique of the notion that votes for individuals should essentially carry the same weight see Fishkin (2012). Fishkin recognizes that with the vast expansion of the eligible electorate, the courts have moved away from defending the principle of virtual representation (that minors and others ineligible to vote deserve equal representation) and decidedly in favor of a one person, one vote standard predicated on the population of eligible voters.

compare and contrast the current legal standard of total population with the implications of applying a more literal definition of one person, one vote—specifically the use of voting age population and voting eligible population to assess the degree of intrastate and interstate malapportionment in American politics.

3. The Reapportionment Revolutions

In this section we discuss the historical and political contexts that shaped the legal arguments propping up the two major pillars guiding contemporary congressional redistricting: equal population and safeguards for minority voting rights.

Scholars speak of *Baker v. Carr* as initiating a revolution (Cox & Katz, 2002; Fenno, 1978), because of its wide reaching effects on district-based elections. The reassignment of residents on the basis of equal population clearly could and would, alter the outcomes of elections both in terms of the incumbency advantage (Desposato & Petrocik, 2003) and partisan control (McKee, 2008). But this was not the only reapportionment revolution. Thirty years after *Baker v. Carr*, with the equal population rule firmly in place, the second reapportionment revolution occurred with the massive increase in the number of majority-minority districts created for the 1992 congressional elections (McKee, 2004).

The principle guiding the first reapportionment revolution was of course technically colorblind, but the context surrounding its advocacy had much to do with the issue of race (Levinson, 2002). Especially in southern states, congressional district populations variedly enormously (Bullock, 2010). This was not by accident, rather the historical strength of the Democratic Solid South resided in rural counties that often contained relatively large, and primarily disfranchised, African American populations (Key, 1949). The whites in these rural settings knew that readjustment of district boundaries on the basis of equal population would weaken their hold on political power. Not surprisingly, the triumvirate of cases (*Baker v. Carr*; *Reynolds v. Sims*; and *Wesberry v. Sanders*) forming the backbone of the one person, one vote principle involved lawsuits from southern states (Tennessee, Alabama, and Georgia, respectively). Redrawing district lines to better suit the one person, one vote principle would eventually bolster the clout of African Americans (Bullock & Gaddie, 2009) and whites residing in burgeoning metropolitan areas (Black & Black, 2002).

Enforcement of the equal population standard as espoused in *Baker*, centered on the simple counting of the number of people residing in a given district. As we will demonstrate, compliance with this standard has increased with every subsequent reapportionment in response to essentially a zero-tolerance policy laid out by the Supreme Court in *Karcher v. Daggett* (1983). In this case the Court ruled that even miniscule deviations from equal total population violated the Constitution because the state of New Jersey could clearly comply with implementing a plan with more equal district populations. Specifically, the population difference between the largest and smallest congressional district in New Jersey was 3,674 individuals, which was just 0.7% of the state's ideal district size.

With practically no justifiable wiggle room from the equal total population standard established by the Court in *Karcher*, the question of minority vote dilution reemerged in the 1986 case of *Thornburg v. Gingles*. Responding to a history of southern apportionment and districting schemes that were devised to weaken the likelihood that African Americans would have the opportunity to elect candidates of their choice (Davidson, 1984; Parker, 1990), in *Thornburg v. Gingles*[4] the Supreme Court laid out a set of criteria, that if met, would allow for the creation of districts controlled by minority populations (for details see Butler, 2002; McKee and Shaw, 2005). Because of the timing of the decision, the 1992 U.S. House elections would be the first to occur with a large expansion in the number of newly created majority-minority districts.

Table 1 displays data on the number of majority black and majority Hispanic congressional districts—legally defined by a district's voting age population—from 1972 to 2012. Whereas there were eight majority black districts in 1972 and twelve in 1982, in the wake of the *Thornburg* decision the number increased to 27 in 1992. Most of the new majority black districts were located in southern states covered by the 1965 Voting Rights Act (VRA). Under the Preclearance Provision in Section 5 of the VRA, the Department of Justice oversaw redistricting plans, and during the 1990s round it insisted that certain southern states maximize their number of majority black districts (Bullock, 2010; Butler, 2002). In 2002 the total is reduced to 21, but went up to 24 in 2012. The decline in the total number of majority black districts since 1992 is partly due to slower population growth among the African American population vis-à-vis other minority groups (especially compared to Asians and Latinos) and also a response to the *Shaw v. Reno* (1993) decision and subsequent rulings (e.g., *Miller v. Johnson* 1995; *Bush v. Vera* 1996; *Hunt v. Cromartie* 2001) that declared several majority black districts unconstitutional racial gerrymanders (Butler, 2002).

In contrast with majority black districts, the large jump in the number of majority Hispanic districts from 1982 (N = 6) to 1992 (N = 16) is followed by another increase from 21 in 2002 to 30 by 2012. Also, since 1982, the average percent Hispanic VAP (HVAP) increases and it is notably higher than the average percent black VAP (BVAP) in these years in these majority-minority districts.

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[4] This was a North Carolina case.

Table 1. Majority Black and Majority Hispanic U.S. House Districts, 1972 to 2002.

Statistics	1972	1982	1992	2002	2012
Majority Black Districts					
Average BVAP	66%	66%	59%	57%	54%
Median BVAP	62	66	58	57	54
Maximum BVAP	86	90	72	63	61
Minimum BVAP	58	51	50	51	50
Range	28	39	22	12	11
Standard Deviation	10	11	6	3	4
N	8	12	27	21	24
Majority Hispanic Districts					
Average HVAP	60%	57%	61%	64%	64%
Median HVAP	60	56	58	64	61
Maximum HVAP	69	66	79	75	82
Minimum HVAP	52	50	53	52	50
Range	17	16	26	23	32
Standard Deviation	12	5	7	7	9
N	2	6	16	21	30

Note: Data calculated by the authors from the U.S. Census Bureau. The 2012 results were computed from the data made available by Stephen Wolf as posted on the Daily Kos website: www.dailykos.com/story/2013/04/08/1200099/-113th-Congress-Guide-w-Demography-Pronunciation-08-12-Pres-12-House-06-12-Downballot-by-CD

Furthermore, the maximum, range, and standard deviations of the HVAP remain much higher than the corresponding BVAP statistics for majority black districts. One obvious explanation for the differences is that Hispanic populations have much higher rates of non-citizen voting age populations.

Against the backdrop of the equal total population rule, the increase in majority-minority districts, as numerous studies have documented (Black and Black, 2002; Lublin, 1997; Epstein and O'Halloran, 1999; Hill, 1995; Petrocik and Desposato, 1998), necessarily reduced the overall number of congressional districts won by Democratic candidates. This was because minority voters, especially African Americans, are the most Democratic in their voting preferences and thus concentrating them into fewer districts increased the portion of Republican voters in adjoining districts.

The progression of case law squarely rests the metric of the one person, one vote principle on counting the total population in a state and then dividing it by the assigned number of congressional districts. By contrast, the question of apportioning districts where minority vote dilution comes into play is an ever-evolving legal issue. Suffice it to say that it has become a highly contentious and partisan-laden dispute because the concentration of minority populations generally benefits the Republican Party in congressional elections, at least in the aggregate (but see Shotts, 2001). And given the 2013 ruling in *Shelby County v. Holder*, which threw out the Section 4 criteria used for

determining Section 5 preclearance under the VRA, it remains to be seen what future redistricting plans will look like and what, if any, new districting standard may be added.

To be sure, minority vote dilution remains a constitutional violation (as articulated in *Thornburg v. Gingles* 1986), but by rendering Section 4 of the VRA unconstitutional, it is likely that Republican-controlled legislatures will now be more inclined to pack minority voters (Latinos and African Americans) into fewer districts with even higher non-citizen residents and others ineligible to vote, especially in the case of Hispanics. A switch from districting based on a standard of total population to one according to VAP, for instance, would likely lessen to some extent, the effectiveness of this type of partisan gerrymander. From the vantage of Democrats seeking an electoral advantage, expect the persistence of intra-party disputes between minorities (blacks and Hispanics) and Anglos. Some minority Democrats will insist on protecting racially descriptive representation through the maintenance and further creation of majority-minority districts, whereas Anglo Democrats will advocate for less concentration of minority populations so their more equally distributed presence across multiple districts enhances the aggregate win/loss record of Democrats in U.S. House races. Changing from a total population standard to VAP would, perhaps, make Democrats even more attentive to the common tradeoff between minority representation and partisan competitiveness.

4. Empirical Assessments of the One Person, One Vote Principle

We first seek to determine the extent to which congressional districts that are redistricted on the total population standard of the one person, one vote principle approximate equality when viewed by other standards.

Specifically, we begin with an analysis that shows just how much variability exists between measures of equal district total population versus one based on the district voting age population. The disparities are notable because the VAP standard gets us, arguably, closer to the literal one person, one vote ideal, which, as in the *Wesberry* decision, intends that "one man's [sic] vote in a congressional election is to be worth as much as another's". This, then, raises questions about the constitutionality between the goals and the means of democratic equality as pronounced by the Court.

Second, we demonstrate what the reapportionment of House seats would look like if it were based on the VAP and the VEP, instead of total population, what the resulting malapportionment is for each, and what the implications would be for the partisan allocation of Electoral Votes in presidential contests.

5. Intrastate Deviations

Beginning with *Wesberry* and continuing through current jurisprudence, the Court has insisted that U.S. House districts within a state be drawn, as mathematically as possible, with equal populations. This constitutional requirement has become increasingly refined since the 1960s equality revolution, because (1) the U.S. Census has provided considerably more micro-level data and (2) these data work in conjunction with advances in computer software technologies that employ Geographic Information Systems (GIS) to map populations. Today, the constitutional principle of population equality is interpreted for most states[5] to mean that a state's congressional districts should not deviate in their apportionment population by more than a single person.[6]

Table 2 documents the increasing precision with which one-person, one-vote⸺based on the total population standard⸺has been applied. In 1972, the first reapportionment and redistricting after *Wesberry*, 62.3% of congressional House districts deviated from their state's ideal district population by less than

0.25% and the average deviation for all House districts was 3.88%. Yet, in 1972, there were still 8.81% of districts that deviated by 1% or more from this standard and a maximum deviation of 7.34%. As the Court continued to press for greater and greater equality, the rates and size of deviation dropped precipitously. After the 2012 reapportionment, 99.07% of all House districts were within 0.25% of their state's ideal populations. In fact, the average deviation for all House districts was just 0.01%; the maximum deviation was just 0.94%.

For several reasons, the one-person, one-vote revolution has been a tremendous success. It eliminated the democratically corrupting practice of "silent gerrymandering" that allowed for increasingly rotten districts to proliferate as well as the partisan advantages that they engendered. It avoided the "political thicket", of which Justice Frankfurter was so fearful of in *Colegrove v. Green* (1946), by reengaging the political practice of redistricting. And, it reduced the deviation in apportionment populations in states' House districts to nearly zero.

Chief Justice Earl Warren, in fact, wrote in his *Memoirs* that the seminal *Baker* decision was the most important decision in his entire tenure on the Court⸺more so than, for instance, *Brown v. Board of Education* (1954), *Gideon v. Wainwright* (1963), or *Miranda v. Arizona* (1966). In summing these accomplishments, Ansolabehere and Snyder (2008) conclude that American democracy is entering an "age of fairness" and the end of inequality.

Table 2 clearly demonstrates that inequality is nearly vanquished—at least as measured by the total number of individuals in the congressional districts for each state. Nonetheless, this measure does not easily equate to the constitutional principle of one person, one vote. As Levinson (2002) argues, this principle "most certainly does not hold true either as a description of the electorate or even as a normative guide to deciding which persons should be awarded the franchise and what weight their votes should actually have in the electoral process."

In other words and in the most basic interpretation, the numerical count for the standard—the total population as defined—includes many "persons" who cannot vote, for instance, individuals below the age of 18, individuals who are not U.S. citizens, and many felons. This is considerably more than just a semantic concern⸺in other words, perhaps "one person, one vote" may be more than just a poor choice of words. The constitutional and normative underpinnings of the principle are central to the efficacy of a democracy: equality and the right to vote. Levinson concludes by arguing that the constitutional principle of one person, one vote is a democratic mantra in need of a meaning.

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[5] Iowa is a notable exception. Iowa passed a state constitutional amendment requiring their U.S. House districts to contain whole counties as long as the population deviations are not greater than 1%. The maximum deviation in Iowa's post-2010 districts was 76 individuals.

[6] This deviation is allowed when a state's apportioned population is not perfectly divisible by the number of congressional districts allocated to the state.

Table 2. Increasing Precision of the Equal Population Requirement, 1972-2012.

Percent Deviation from State Average District Population	1972 (93rd Congress)	1982 (98th Congress)	1992 (103rd Congress)	2002 (108th Congress)	2012 (113th Congress)
Districts with Deviations of…					
Less than 0.25 percent	62.38%	77.18%	97.18%	98.59%	99.07%
0.25 to 0.5 percent	16.9	12.24	2.82	1.17	0.23
0.5 to 1 percent	11.9	7.53	--	0.23	0.7
1 to 5 percent	8.57	3.06	--	--	--
5 percent or more	0.24	--	--	--	--
Average % deviation	3.88%	1.93%	0.36%	0.01%	0.01%
Maximum % deviation below	-4.81	-1.47	-0.46	-0.34	-0.67
Maximum % deviation above ideal population	7.34	1.65	0.47	0.66	0.94
N	420	425	426	426	428

Note: Data include all districts except those that were either at-large or in states that did not redistrict for the relevant election: 1972: at-large states were AK, DE, NV, ND, VT, and WY; HI (N=2), ME (N=2), NE (N=3), and NM (N=2) did not redistrict for the 1972 elections. 1982: at-large states were AK, DE, ND, SD, VT, and WY; ME (N=2) and MT (N=2) did not redistrict for the 1982 elections. 1992 and 2002: at-large states were AK, DE, MT, ND, SD, VT, and WY; ME (N=2) did not redistrict for the 1992 and 2002 elections. 2012: at-large states were AK, DE, MT, ND, SD, VT, and WY.

Table 3. Variations in Voting Age Populations, 1972-2012.

Percent Deviation from State Average District VAP	1972 (93rd Congress)	1982 (98th Congress)	1992 (103rd Congress)	2002 (108th Congress)	2012 (113th Congress)
Districts with Deviations of…					
Less than 0.25 percent	4.76%	6.35%	6.10%	10.80%	7.94%
0.25 to 0.5 percent	3.81	7.29	8.45	9.39	8.18
0.5 to 1 percent	10.24	12.47	15.96	14.55	16.36
1 to 5 percent	58.33	59.53	55.87	51.64	56.54
5 percent or more	22.86	14.35	13.62	13.62	10.98
Average % deviation	3.53%	2.69%	2.58%	2.39%	2.26%
Maximum % deviation below	-16.38	-13.26	-13.04	-13.06	-10.34
Maximum % deviation above ideal population	26.77	17.4	17.31	17.96	16.17
Average VAP %	65.61%	71.87%	74.43%	74.31%	75.95%
Minimum VAP %	57.31	60.05	62.29	63.38	66.81
Maximum VAP %	86.02	86.05	88.91	86.75	88.62
N	420	425	426	426	428

Note: Data include all districts except those that were either at-large or in states that did not redistrict for the relevant election: 1972: at-large states were AK, DE, NV, ND, VT, and WY; HI (N=2), ME (N=2), NE (N=3), and NM (N=2) did not redistrict for the 1972 elections. 1982: at-large states were AK, DE, ND, SD, VT, and WY; ME (N=2) and MT (N=2) did not redistrict for the 1982 elections. 1992 and 2002: at-large states were AK, DE, MT, ND, SD, VT, and WY; ME (N=2) did not redistrict for the 1992 and 2002 elections. 2012: at-large states were AK, DE, MT, ND, SD, VT, and WY.

Table 3 taps into this concern with the most straight-forward data available for congressional districts: voting age population (VAP). Table 3 provides a similar break-down of states' districts as Table 2, but now with the VAP as the measurement. In 1972, just 4.76% of House districts were within 0.25% of their state's ideal VAP.[7] Furthermore, 81.19% of the districts had VAPs that deviated by 1.0% or more from their state's ideal VAP, of which 22.86% deviated by 5% or more. The greatest deviation in 1972 was 26.77%.

The deviations in Table 2 are greatest in 1972, but the total population deviations were still considerably smaller than these corresponding VAP deviations displayed in Table 3. In addition, the total population deviations were minimized over time, but these VAP deviations have not been systematically reduced.

In 2012, the percent of districts within the 0.25% threshold increase, but only to 7.94%—compared to 99.07% for the comparable statistic in Table 2, and 67.52% of the districts were above the 1% threshold. The maximum deviation in 2012 was 16.17%.

These VAP deviations are considerable and stand in sharp contrast with the results from Table 2. Specifically, instead of witnessing the diminishing deviations in total populations over time, variations in states' district VAPs show little change over time as well as a wide variation in districts' VAP.

Together, these tables suggest that a more literal standard of one person, one vote is currently far from being met. Despite the strict overall population equality of districts within states, these figures show that some districts are "packed" with more minors who cannot vote and some with fewer minors—up to more than a 26% difference between districts within a state. In districts that are packed with relatively more minors, there are fewer remaining potential voters as compared to districts with relatively fewer minors. This results in the over-representation of the former voters and the under-representation of the latter voters.

The presence of demonstrable and predictable variation in the VAP among various societal groups —including those protected by the VRA—produces, be it random or systematic, districts of an unequal number of potential voters and thus perpetuates vote dilution. *Baker* and subsequent decisions declared districts with unequal populations to be unconstitutional; but this standard does not create districts in which one potential voter's vote is equal to another's.

Basing redistricting on the VAP, for instance, would create its own set of issues—most obvious

being greater total population deviations among districts. It would also, in all likelihood, not eliminate other measures of intrastate malapportionment. On the other hand, VAP-based allocations may arguably bring states' districts in closer compliance with the words of "one person, one vote."

6. Interstate Deviations

The above section documented the presence of consistent and considerable intrastate malapportionment for VAP at levels far greater than those declared unconstitutional for total population. Intrastate malapportionment, though, is but one form of malapportionment. It is the form, however, that is almost exclusively considered by the Court, politicians, and scholars. Interstate malapportionment, though, is the population deviation across the states, and as argued in the *Department of Commerce v. Montana* (1992) case, it very well may be susceptible to the same type of constitutional standards, tests, and proscriptions as intrastate malapportionment. And, there is plenty of evidence that the current levels of interstate malapportionment may be constitutionally suspect (Ladewig & Jasinski, 2008; Ladewig, 2011) (also see *Clemens v. Department of Commerce* 2010). For example, after the 2010 reapportionment and the equalization of total populations within states (as demonstrated in Table 2), the maximum deviation in the ideal population sizes among House districts across states was still 463,132 individuals, which is 65.38% of the national ideal district size. This deviation is about 9600% larger than the deviation declared unconstitutional in *Karcher* and over 46 million% larger than the typical intrastate deviation allowed today. Paradoxically, the current levels of interstate malapportionment persist and grow despite the Court's efforts in minimizing the intrastate malapportionment of the total population.

If the same one person, one vote principle of congressional redistricting also applies to congressional apportionment, then a similar critique of which standard to apply and analyze is also possible. Given that only state-level data are necessary for apportionment analyses, the data are more extensive. As such, we can conduct VAP analyses, similar to that presented in Table 3, as well as analyses based on the voting eligible population data—which are not available at the district level (thus we were not able to analyze intrastate VEP malapportionment).

Given the distribution of House seats after the 2010 reapportionment, interstate malapportionment as measured with the VAP of each state persists—similar to the numbers displayed in the preceding paragraph (see Appendix Tables 1 through 5 for details). The maximum deviation in states' ideal VAPs with the current apportionment decreases by two-hundredths of a percent, to 65.33%, of the national ideal district size.

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[7] Each state is currently required to apportion to the state's ideal population, which is calculated by dividing the state's apportionment population by the number of districts the state will have. The ideal VAP is calculated similarly, the state's total voting age population divided by the number of districts the state is allocated.

Reapportioning the House with the VAP data, however, would have decreased the maximum deviation percent to 57.47%. As mentioned, the VAP is still not an entirely accurate enumeration of potential votes—though certainly closer to a literal interpretation than total population—because it includes noncitizens, felons, etc. The VEP measure is even closer to the literal interpretation of one person, one vote. And, the 2010 interstate malapportionment figures increase substantially if VEP is evaluated for each state and its current apportionment. In this case, the maximum deviation in states' ideal VEP jumps to 77.31% of the national ideal district size. Furthermore, given the state variations in population, eligibility, and the number of House districts, the 2010 apportionment provides each eligible voter in Rhode Island with just about twice the voting power of each eligible voter in Montana—the voter equivalency ratio. It is difficult to reconcile the current implementation of "one person, one vote" when these variations create foreseeable results in which "one Rhode Islander, two votes" vis-à-vis a Montanan.

Amending the Constitution to apportion on potential voters, either with the VAP or the VEP, would also have deep implications for reapportionment. Tables 4 through 8 provide the number of House seats that each state would receive in each reapportionment from 1970 to 2010[8] as well as the number of seat changes among the three population measures: Apportionment Population (AP)—which is currently used, VAP, and VEP[9] (see Appendix Tables 6 through 10 for population details). Specifically, in 1970 if the U.S. House had been apportioned with VAP instead of AP, 10 House seats would have been changed: five states (CT, NJ, NY, OR, and PA) would have gained seats and five states (LA, MI, SC, SD, and TX) would have lost one seat. In 1980, there is a 6-seat difference between AP and VAP, a 10-seat difference between AP and VEP, and a 10-seat difference between VAP and VEP. Overall, the apportionment of 11 states is affected by which measure is used (AP, VAP, or VEP) to approximate the one person, one vote standard.

The question of which population standard to use becomes even more consequential starting with the 1990 reapportionment. For the 1990 reapportionment, there would have been 10 seat changes if VAP were used instead of AP, 18 seat changes if VEP would have been used instead of AP, and 18 seat changes if VEP would have been used instead of VAP. Overall, the population used affects the apportionment of 17 states. And, for the 2000 reapportionment, there would have been 6 seat changes if VAP were used instead of AP, 40

seat changes if VEP were used instead of AP, and 36 seat changes if VEP would have been used instead of VAP. Finally, for the 2010 reapportionment, there would have been 10 seat changes if VAP were used instead of AP, 26 seat changes if VEP were used instead of AP, and 22 seat changes if VEP would have been used instead of VAP. Overall, the population standard used affects the apportionment across these decades for 34 states—and, some quite dramatically. For example, in 2000 California has a high of 53 seats (AP) and a low of 45 seats (VEP).

Changing the population used for the apportionment from, say, AP to VAP or VEP would arguably bring the practice of apportionment closer in line with the literal meaning of "one person, one vote". It also would have brought it numerically closer—though, there is no guarantee that this would persist for future apportionments. In 2010, if the VEP was used as the apportionment population (resulting in the district distribution found in Table 8), the interstate malapportionment measurement of the maximum deviation percent (the most commonly used statistic by the Supreme Court to assess intrastate malapportionment) in states' ideal VEP would drop to 55.20% of the national ideal district size (see Appendix Table 5 for details). Any change would also have numerous effects in the U.S. Congress and state politics. But, one of the most direct effects would be on the President through the Electoral College.

Table 9 displays the Electoral College vote as it was with the actual Apportionment Population from 1972 through 2012 and recalculates the vote if the House had been reapportioned with VAP or VEP. If VAP had been used, the vote would have changed in more than half of the eleven Presidential elections. Even though five of the six instances in which a vote change occurred, the same President would have been elected, the 2000 Presidential election would have ended in a 268 to 269 split.[10] This split gives neither Republican George W. Bush nor Democrat Al Gore an absolute majority of 270 Electoral College votes to win the Presidency. In this case, the 2000 presidential election would have been decided in the U.S. House of Representatives. If the VEP had been the population measure, then four of the eight presidential elections for which we have data would have witnessed a change in the Electoral College vote, but none of the outcomes—including the 2000 election—would have changed. Nonetheless, the U.S. House of Representatives and the Electoral College would arguably have more closely reflected the literal interpretation of the democratic norm enshrined in the constitutional principle of one person, one vote.

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[8] The Hill Method of Equal Proportions was used to apportion the 435-seat U.S. House. See U.S. Code 2 Section 2a.

[9] The AP and VAP data are from the U.S. Census Bureau. The VEP data are from the Public Mapping Project (see www.publicmapping.org). Unfortunately, the Public Mapping Project does not have VEP for 1970.

[10] Gore's count omits the faithless elector from Washington, D.C. who abstained from the actual 2000 Electoral College vote. However, given the VAP results, she probably would have cast her ballot—thereby giving Gore 269 Electoral Votes. Either way, the absolute majority of 270 votes would not have been garnered by either presidential candidate.

Table 4. Apportionment in 1972 by Different Population Measures.

State	AP Districts	VAP Districts	Change #1	|Change #1|
Alabama	7	7	0	0
Alaska	1	1	0	0
Arizona	4	4	0	0
Arkansas	4	4	0	0
California	43	43	0	0
Colorado	5	5	0	0
Connecticut	6	7	1	1
Delaware	1	1	0	0
Florida	15	15	0	0
Georgia	10	10	0	0
Hawaii	2	2	0	0
Idaho	2	2	0	0
Illinois	24	24	0	0
Indiana	11	11	0	0
Iowa	6	6	0	0
Kansas	5	5	0	0
Kentucky	7	7	0	0
Louisiana	8	7	-1	1
Maine	2	2	0	0
Maryland	8	8	0	0
Massachusetts	12	12	0	0
Michigan	19	18	-1	1
Minnesota	8	8	0	0
Mississippi	5	5	0	0
Missouri	10	10	0	0
Montana	2	2	0	0
Nebraska	3	3	0	0
Nevada	1	1	0	0
New Hampshire	2	2	0	0
New Jersey	15	16	1	1
New Mexico	2	2	0	0
New York	39	40	1	1
North Carolina	11	11	0	0
North Dakota	1	1	0	0
Ohio	23	23	0	0
Oklahoma	6	6	0	0
Oregon	4	5	1	1
Pennsylvania	25	26	1	1
Rhode Island	2	2	0	0
South Carolina	6	5	-1	1
South Dakota	2	1	-1	1
Tennessee	8	8	0	0
Texas	24	23	-1	1
Utah	2	2	0	0
Vermont	1	1	0	0
Virginia	10	10	0	0
Washington	7	7	0	0
West Virginia	4	4	0	0
Wisconsin	9	9	0	0
Wyoming	1	1	0	0
Total	435	435	0	10

Note: shaded states experience a change in one of the three change measures. AP: Apportionment Population; VAP: Voting Age Population. 1. Change of VAP – AP.

Table 5. Apportionment in 1982 by Different Population Measures.

State	AP Districts	VAP Districts	VEP Districts	Change #1	|Change #1|	Change #2	|Change #2|	Change #3	|Change #3|
Alabama	7	7	7	0	0	0	0	0	0
Alaska	1	1	1	0	0	0	0	0	0
Arizona	5	5	5	0	0	0	0	0	0
Arkansas	4	4	4	0	0	0	0	0	0
California	45	46	43	1	1	-2	2	-3	3
Colorado	6	6	6	0	0	0	0	0	0
Connecticut	6	6	6	0	0	0	0	0	0
Delaware	1	1	1	0	0	0	0	0	0
Florida	19	20	19	1	1	0	0	-1	1
Georgia	10	10	10	0	0	0	0	0	0
Hawaii	2	2	2	0	0	0	0	0	0
Idaho	2	2	2	0	0	0	0	0	0
Illinois	22	22	22	0	0	0	0	0	0
Indiana	10	10	11	0	0	1	1	1	1
Iowa	6	6	6	0	0	0	0	0	0
Kansas	5	5	5	0	0	0	0	0	0
Kentucky	7	7	7	0	0	0	0	0	0
Louisiana	8	8	8	0	0	0	0	0	0
Maine	2	2	2	0	0	0	0	0	0
Maryland	8	8	8	0	0	0	0	0	0
Massachusetts	11	11	11	0	0	0	0	0	0
Michigan	18	17	18	-1	1	0	0	1	1
Minnesota	8	8	8	0	0	0	0	0	0
Mississippi	5	5	5	0	0	0	0	0	0
Missouri	9	10	10	1	1	1	1	0	0
Montana	2	2	2	0	0	0	0	0	0
Nebraska	3	3	3	0	0	0	0	0	0
Nevada	2	2	2	0	0	0	0	0	0
New Hampshire	2	2	2	0	0	0	0	0	0
New Jersey	14	14	14	0	0	0	0	0	0
New Mexico	3	2	2	-1	1	-1	1	0	0
New York	34	34	33	0	0	-1	1	-1	1
North Carolina	11	11	12	0	0	1	1	1	1
North Dakota	1	1	1	0	0	0	0	0	0
Ohio	21	21	21	0	0	0	0	0	0
Oklahoma	6	6	6	0	0	0	0	0	0
Oregon	5	5	5	0	0	0	0	0	0
Pennsylvania	23	23	24	0	0	1	1	1	1
Rhode Island	2	2	2	0	0	0	0	0	0
South Carolina	6	6	6	0	0	0	0	0	0
South Dakota	1	1	1	0	0	0	0	0	0
Tennessee	9	9	9	0	0	0	0	0	0
Texas	27	26	26	-1	1	-1	1	0	0
Utah	3	3	3	0	0	0	0	0	0
Vermont	1	1	1	0	0	0	0	0	0
Virginia	10	10	11	0	0	1	1	1	1
Washington	8	8	8	0	0	0	0	0	0
West Virginia	4	4	4	0	0	0	0	0	0
Wisconsin	9	9	9	0	0	0	0	0	0
Wyoming	1	1	1	0	0	0	0	0	0
Totals	435	435	435	0	6	0	10	0	10

Note: Shaded states experience a change in one of the three change measures. AP: Apportionment Population; VAP: Voting Age Population; VEP: Voting Eligible Population. 1. Change of VAP − AP; 2. Change of VEP − AP; 3. Change of VEP − VAP.

Table 6. Apportionment in 1992 by Different Population Measures.

State	AP Districts	VAP Districts	VEP Districts	Change #1	|Change #1|	Change #2	|Change #2|	Change #3	|Change #3|
Alabama	7	7	7	0	0	0	0	0	0
Alaska	1	1	1	0	0	0	0	0	0
Arizona	6	6	6	0	0	0	0	0	0
Arkansas	4	4	4	0	0	0	0	0	0
California	52	52	45	0	0	-7	7	-7	7
Colorado	6	6	6	0	0	0	0	0	0
Connecticut	6	6	6	0	0	0	0	0	0
Delaware	1	1	1	0	0	0	0	0	0
Florida	23	24	23	1	1	0	0	-1	1
Georgia	11	11	12	0	0	1	1	1	1
Hawaii	2	2	2	0	0	0	0	0	0
Idaho	2	2	2	0	0	0	0	0	0
Illinois	20	20	20	0	0	0	0	0	0
Indiana	10	10	10	0	0	0	0	0	0
Iowa	5	5	5	0	0	0	0	0	0
Kansas	4	4	4	0	0	0	0	0	0
Kentucky	6	6	7	0	0	1	1	1	1
Louisiana	7	7	7	0	0	0	0	0	0
Maine	2	2	2	0	0	0	0	0	0
Maryland	8	9	9	1	1	1	1	0	0
Massachusetts	10	11	11	1	1	1	1	0	0
Michigan	16	16	17	0	0	1	1	1	1
Minnesota	8	8	8	0	0	0	0	0	0
Mississippi	5	4	5	-1	1	0	0	1	1
Missouri	9	9	9	0	0	0	0	0	0
Montana	1	1	2	0	0	1	1	1	1
Nebraska	3	3	3	0	0	0	0	0	0
Nevada	2	2	2	0	0	0	0	0	0
New Hampshire	2	2	2	0	0	0	0	0	0
New Jersey	13	14	14	1	1	1	1	0	0
New Mexico	3	3	3	0	0	0	0	0	0
New York	31	32	31	1	1	0	0	-1	1
North Carolina	12	12	12	0	0	0	0	0	0
North Dakota	1	1	1	0	0	0	0	0	0
Ohio	19	19	20	0	0	1	1	1	1
Oklahoma	6	5	6	-1	1	0	0	1	1
Oregon	5	5	5	0	0	0	0	0	0
Pennsylvania	21	21	22	0	0	1	1	1	1
Rhode Island	2	2	2	0	0	0	0	0	0
South Carolina	6	6	6	0	0	0	0	0	0
South Dakota	1	1	1	0	0	0	0	0	0
Tennessee	9	9	9	0	0	0	0	0	0
Texas	30	29	28	-1	1	-2	2	-1	1
Utah	3	3	3	0	0	0	0	0	0
Vermont	1	1	1	0	0	0	0	0	0
Virginia	11	11	11	0	0	0	0	0	0
Washington	9	8	9	-1	1	0	0	1	1
West Virginia	3	3	3	0	0	0	0	0	0
Wisconsin	9	8	9	-1	1	0	0	1	1
Wyoming	1	1	1	0	0	0	0	0	0
Total	435	435	435	0	10	0	18	0	18

Note: shaded states experience a change in one of the three change measures. AP: Apportionment Population; VAP: Voting Age Population; VEP: Voting Eligible Population. 1. Change of VAP − AP; 2. Change of VEP − AP; 3. Change of VEP − VAP.

Table 7. Apportionment in 2002 by Different Population Measures.

State	AP Districts	VAP Districts	VEP Districts	Change #1	|Change #1|	Change #2	|Change #2|	Change #3	|Change #3|
Alabama	7	7	7	0	0	0	0	0	0
Alaska	1	1	1	0	0	0	0	0	0
Arizona	8	8	6	0	0	-2	2	-2	2
Arkansas	4	4	4	0	0	0	0	0	0
California	53	51	45	-2	2	-8	8	-6	6
Colorado	7	7	6	0	0	-1	1	-1	1
Connecticut	5	5	6	0	0	1	1	1	1
Delaware	1	1	1	0	0	0	0	0	0
Florida	25	26	23	1	1	-2	2	-3	3
Georgia	13	13	12	0	0	-1	1	-1	1
Hawaii	2	2	2	0	0	0	0	0	0
Idaho	2	2	2	0	0	0	0	0	0
Illinois	19	19	20	0	0	1	1	1	1
Indiana	9	9	10	0	0	1	1	1	1
Iowa	5	5	5	0	0	0	0	0	0
Kansas	4	4	4	0	0	0	0	0	0
Kentucky	6	6	7	0	0	1	1	1	1
Louisiana	7	7	7	0	0	0	0	0	0
Maine	2	2	2	0	0	0	0	0	0
Maryland	8	8	9	0	0	1	1	1	1
Massachusetts	10	10	11	0	0	1	1	1	1
Michigan	15	15	17	0	0	2	2	2	2
Minnesota	8	8	8	0	0	0	0	0	0
Mississippi	4	4	5	0	0	1	1	1	1
Missouri	9	9	9	0	0	0	0	0	0
Montana	1	1	2	0	0	1	1	1	1
Nebraska	3	3	3	0	0	0	0	0	0
Nevada	3	3	2	0	0	-1	1	-1	1
New Hampshire	2	2	2	0	0	0	0	0	0
New Jersey	13	13	14	0	0	1	1	1	1
New Mexico	3	3	3	0	0	0	0	0	0
New York	29	30	31	1	1	2	2	1	1
North Carolina	13	13	12	0	0	-1	1	-1	1
North Dakota	1	1	1	0	0	0	0	0	0
Ohio	18	18	20	0	0	2	2	2	2
Oklahoma	5	5	6	0	0	1	1	1	1
Oregon	5	5	5	0	0	0	0	0	0
Pennsylvania	19	20	22	1	1	3	3	2	2
Rhode Island	2	2	2	0	0	0	0	0	0
South Carolina	6	6	6	0	0	0	0	0	0
South Dakota	1	1	1	0	0	0	0	0	0
Tennessee	9	9	9	0	0	0	0	0	0
Texas	32	31	28	-1	1	-4	4	-3	3
Utah	3	3	3	0	0	0	0	0	0
Vermont	1	1	1	0	0	0	0	0	0
Virginia	11	11	11	0	0	0	0	0	0
Washington	9	9	9	0	0	0	0	0	0
West Virginia	3	3	3	0	0	0	0	0	0
Wisconsin	8	8	9	0	0	1	1	1	1
Wyoming	1	1	1	0	0	0	0	0	0
Total	435	435	435	0	6	0	40	0	36

Note: shaded states experience a change in one of the three change measures. AP: Apportionment Population; VAP: Voting Age Population; VEP: Voting Eligible Population. 1. Change of VAP − AP; 2. Change of VEP − AP; 3. Change of VEP − VAP.

Table 8. Apportionment in the 2012 by Different Population Measures.

State	AP Districts	VAP Districts	VEP Districts	Change #1	|Change #1|	Change #2	|Change #2|	Change #3	|Change #3|
Alabama	7	7	7	0	0	0	0	0	0
Alaska	1	1	1	0	0	0	0	0	0
Arizona	9	9	9	0	0	0	0	0	0
Arkansas	4	4	4	0	0	0	0	0	0
California	53	52	47	-1	1	-6	6	-5	5
Colorado	7	7	7	0	0	0	0	0	0
Connecticut	5	5	5	0	0	0	0	0	0
Delaware	1	1	1	0	0	0	0	0	0
Florida	27	27	26	0	0	-1	1	-1	1
Georgia	14	13	13	-1	1	-1	1	0	0
Hawaii	2	2	2	0	0	0	0	0	0
Idaho	2	2	2	0	0	0	0	0	0
Illinois	18	18	18	0	0	0	0	0	0
Indiana	9	9	10	0	0	1	1	1	1
Iowa	4	4	5	0	0	1	1	1	1
Kansas	4	4	4	0	0	0	0	0	0
Kentucky	6	6	7	0	0	1	1	1	1
Louisiana	6	6	7	0	0	1	1	1	1
Maine	2	2	2	0	0	0	0	0	0
Maryland	8	8	8	0	0	0	0	0	0
Massachusetts	9	10	10	1	1	1	1	0	0
Michigan	14	14	15	0	0	1	1	1	1
Minnesota	8	7	8	-1	1	0	0	1	1
Mississippi	4	4	4	0	0	0	0	0	0
Missouri	8	8	9	0	0	1	1	1	1
Montana	1	2	2	1	1	1	1	0	0
Nebraska	3	3	3	0	0	0	0	0	0
Nevada	4	4	4	0	0	0	0	0	0
New Hampshire	2	2	2	0	0	0	0	0	0
New Jersey	12	13	12	1	1	0	0	-1	1
New Mexico	3	3	3	0	0	0	0	0	0
New York	27	28	27	1	1	0	0	-1	1
North Carolina	13	13	14	0	0	1	1	1	1
North Dakota	1	1	1	0	0	0	0	0	0
Ohio	16	16	17	0	0	1	1	1	1
Oklahoma	5	5	5	0	0	0	0	0	0
Oregon	5	6	6	1	1	1	1	0	0
Pennsylvania	18	18	19	0	0	1	1	1	1
Rhode Island	2	2	2	0	0	0	0	0	0
South Carolina	7	7	7	0	0	0	0	0	0
South Dakota	1	1	1	0	0	0	0	0	0
Tennessee	9	9	9	0	0	0	0	0	0
Texas	36	34	31	-2	2	-5	5	-3	3
Utah	4	4	4	0	0	0	0	0	0
Vermont	1	1	1	0	0	0	0	0	0
Virginia	11	11	12	0	0	1	1	1	1
Washington	10	10	10	0	0	0	0	0	0
West Virginia	3	3	3	0	0	0	0	0	0
Wisconsin	8	8	8	0	0	0	0	0	0
Wyoming	1	1	1	0	0	0	0	0	0
Total	435	435	435	0	10	0	26	0	22

Note: shaded states experience a change in one of the three change measures. AP: Apportionment Population; VAP: Voting Age Population; VEP: Voting Eligible Population. 1. Change of VAP − AP; 2. Change of VEP − AP; 3. Change of VEP − VAP.

Table 9. The Electoral College Vote Based on Three Different Measures of Reapportioned State Population, 1972–2008.

Measure	1972	1976	1980	1984	1988	1992	1996	2000	2004	2008	2012
Apportioned Population											
Democratic Votes	17	297	49	13	111	370	379	266	251	365	332
Republican Votes	520	240	489	525	426	168	159	271	286	173	206
Winner	R	D	R	R	R	D	D	R	R	D	D
Voting Age Population											
Democratic Votes	17	296	49	13	111	372	382	268	251	366	334
Republican Votes	520	241	489	525	426	166	156	269	286	172	204
Winner	R	D	R	R	R	D	D	*Neither*	R	D	D
Voting Eligible Population											
Democratic Votes	--	--	--	13	111	372	379	264	256	368	332
Republican Votes	--	--	--	525	426	166	159	273	281	170	206
Winner	--	--	--	R	R	D	D	R	R	D	D

Note: Data on Electoral Vote returns from 1972-2004 are from CQ's *Guide to U.S. Elections* (2005) and the 2008 returns are from Dave Leip's Atlas of U.S. Presidential Elections (uselectionatlas.org/RESULTS/). Shaded vote returns indicate a different distribution or result than the official returns based on the apportioned population. According to a reapportionment based on the VAP, in 2000 there would not have been an outright winner since both Bush and Gore would not have secured a 270-vote majority. Hence, the 2000 contest would have been decided in the U.S. House of Representatives.

7. Conclusion

In this study we have taken empirical inventory of the one person, one vote principle in congressional reapportionment and redistricting. The established legal precedent for intrastate redistricting relies on minimizing deviations away from a measure of total population. To be sure, in states with multiple districts, they now exhibit hardly any deviation from the equal total population standard. But the current equal total population standard is not the only possible one. Instead, other standards are possible, and some of these (such as VAP or VEP) arguably more closely reflect the literal interpretation of the democratic norm and constitutional principle of "one-person, one-vote". We have also shown that the current use of total population and its intrastate equalization has not led concomitantly to similar equalizations in the variance of voting age populations (VAPs). This is an important finding in and of itself. The Court should be clear in what it means by its continued usage of the "one-person, one-vote" principle. The different measures that are employed and can be inferred from the principle are far from commensurate.

In addition to finding that intrastate deviations in the VAP have not been systematically reduced in recent congressional redistrictings, we also demonstrate that measures of state populations that are more closely aligned with actual voters would considerably alter decennial reapportionments. For instance, if we were to reallocate U.S. House seats on the basis of the VAP or the VEP, two measures that afford actual voters

a more "equally weighted" vote, then there would be substantial changes in the redistribution of congressional districts. Further, the differences in seat allocations based on the different population standards have grown in more recent cycles because many of the high population growth states contain demographic groups with lower citizenship rates and lower VAPs (e.g., Hispanic growth in Arizona and Texas). This means that certain slow growth northern states (e.g., New Jersey and Pennsylvania) with higher VAPs and VEPs are shortchanged congressional representation according to these alternative standards.

We have also shown that in several presidential elections the two-party Electoral College vote totals would be somewhat altered if House seats were reallocated according to an alternative standard, such as VAP or VEP. And since the high growth states are generally located in the Sun Belt where the GOP is stronger but the resident populations are disproportionately younger,[11] the redistribution of congressional districts according to the VAP and VEP would likely advantage—at least in the near term—the Democratic Party since it is electorally stronger in low growth northern states. In fact, if the 2000 presidential election results were based on a congressional reapportionment tied to state voting age population, then neither party would have won an Electoral College majority—meaning the next president would have been determined by the U.S. House of Representatives.

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[11] California is the exception to this rule, a "blue" state with a significantly lower voting eligible population.

Our findings in this study make it clear that the current apportionment and redistricting standard based on total population, whether at the district- or state-level, is but just one possible standard. Furthermore, we argue that the definition of "total population" has not been constant, complete, or consistent between the two processes. As such, other definitions and standards are possible, and they may even be more consistent with some of our democratic principles. As importantly, these other definitions and standards produce different results—that is, the interpretation and explanations of the Court matter significantly in practical terms. As for any potential standard closer to a literal interpretation of one person, one vote, the Census only now is beginning to provide the requisite data to analyze the consequences of such a change.

To be sure, however, any population standard will leave us well short in one manner or another of meeting such a lofty and perhaps impractical principle. For example, even though the Court has made tremendous progress in basically eliminating intrastate malapportionment among U.S. House districts, this equalization is largely limited to one defined standard of one person, one vote. Assessing the "equalized" districts on other logical and credible standards demonstrates much less equality, and thus, leaves a backdoor open that could allow line drawers considerable leeway to manipulate maps for partisan gain (Winburn, 2008). As such, in a matter as central to our democracy as the equality of the vote, more reliable and precise data as well as much more scholarship and jurisprudence are necessary to more fully understand this debate—much less resolve it.

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Conflicts of Interest

The authors declare no conflicts of interest in conducting this research.

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Appendixes

Appendix Table 1. 2012 Interstate Malapportionment: AP Districts and AP Population.

State	Apportionment Population	Number of MCs	State Ideal District Size	Deviation from Ideal	Absolute Deviation from Ideal	% Deviation form Ideal
Alabama	4,779,736	7	682,819	25,557	25,557	3.61%
Alaska	710,231	1	710,231	-1,854	1,854	-0.26%
Arizona	6,392,017	9	710,224	-1,848	1,848	-0.26%
Arkansas	2,915,918	4	728,980	-20,603	20,603	-2.91%
California	37,253,956	53	702,905	5,472	5,472	0.77%
Colorado	5,029,196	7	718,457	-10,080	10,080	-1.42%
Connecticut	3,574,097	5	714,819	-6,443	6,443	-0.91%
Delaware	897,934	1	897,934	-189,557	189,557	-26.76%
Florida	18,801,310	27	696,345	12,032	12,032	1.70%
Georgia	9,687,653	14	691,975	16,401	16,401	2.32%
Hawaii	1,360,301	2	680,151	28,226	28,226	3.98%
Idaho	1,567,582	2	783,791	-75,414	75,414	-10.65%
Illinois	12,830,632	18	712,813	-4,436	4,436	-0.63%
Indiana	6,483,802	9	720,422	-12,046	12,046	-1.70%
Iowa	3,046,355	4	761,589	-53,212	53,212	-7.51%
Kansas	2,853,118	4	713,280	-4,903	4,903	-0.69%
Kentucky	4,339,367	6	723,228	-14,851	14,851	-2.10%
Louisiana	4,533,372	6	755,562	-47,185	47,185	-6.66%
Maine	1,328,361	2	664,181	44,196	44,196	6.24%
Maryland	5,773,552	8	721,694	-13,317	13,317	-1.88%
Massachusetts	6,547,629	9	727,514	-19,138	19,138	-2.70%
Michigan	9,883,640	14	705,974	2,402	2,402	0.34%
Minnesota	5,303,925	8	662,991	45,386	45,386	6.41%
Mississippi	2,967,297	4	741,824	-33,448	33,448	-4.72%
Missouri	5,988,927	8	748,616	-40,239	40,239	-5.68%
Montana	989,415	1	989,415	-281,038	281,038	-39.67%
Nebraska	1,826,341	3	608,780	99,596	99,596	14.06%
Nevada	2,700,551	4	675,138	33,239	33,239	4.69%
New Hampshire	1,316,470	2	658,235	50,142	50,142	7.08%
New Jersey	8,791,894	12	732,658	-24,281	24,281	-3.43%
New Mexico	2,059,179	3	686,393	21,984	21,984	3.10%
New York	19,378,102	27	717,707	-9,331	9,331	-1.32%
North Carolina	9,535,483	13	733,499	-25,122	25,122	-3.55%
North Dakota	672,591	1	672,591	35,786	35,786	5.05%
Ohio	11,536,504	16	721,032	-12,655	12,655	-1.79%
Oklahoma	3,751,351	5	750,270	-41,894	41,894	-5.91%
Oregon	3,831,074	5	766,215	-57,838	57,838	-8.16%
Pennsylvania	12,702,379	18	705,688	2,689	2,689	0.38%
Rhode Island	1,052,567	2	526,284	182,093	182,093	25.71%
South Carolina	4,625,364	7	660,766	47,610	47,610	6.72%
South Dakota	814,180	1	814,180	-105,803	105,803	-14.94%
Tennessee	6,346,105	9	705,123	3,254	3,254	0.46%
Texas	25,145,561	36	698,488	9,889	9,889	1.40%
Utah	2,763,885	4	690,971	17,405	17,405	2.46%
Vermont	625,741	1	625,741	82,636	82,636	11.67%
Virginia	8,001,024	11	727,366	-18,989	18,989	-2.68%
Washington	6,724,540	10	672,454	35,923	35,923	5.07%
West Virginia	1,852,994	3	617,665	90,712	90,712	12.81%
Wisconsin	5,686,986	8	710,873	-2,497	2,497	-0.35%
Wyoming	563,626	1	563,626	144,751	144,751	20.43%

Appendix Table 1. Cont.

State	Apportionment Population	Number of MCs	State Ideal District Size	Deviation from Ideal	Absolute Deviation from Ideal	% Deviation form Ideal
Totals	308,143,815	435	708,377			
Voter Equivalency Ratio			1.88			
Most Underrepresented				-281,038		-39.67%
Most Overrepresented				182,093		25.71%
Maximum Deviation				463,132		
% Max Deviation						65.38%
Mean Absolute Deviation					43,308	
% Mean Abs Deviation						6.11%

Appendix Table 2. 2012 Interstate Malapportionment: AP Districts and VAP Population.

State	Apportionment Population	Number of MCs	State Ideal District Size	Deviation from Ideal	Absolute Deviation from Ideal	% Deviation form Ideal
Alabama	3,647,277	7	521,040	17,037	17,037	3.17%
Alaska	522,853	1	522,853	15,223	15,223	2.83%
Arizona	4,763,003	9	529,223	8,854	8,854	1.65%
Arkansas	2,204,443	4	551,111	-13,035	13,035	-2.42%
California	27,958,916	53	527,527	10,550	10,550	1.96%
Colorado	3,803,587	7	543,370	-5,293	5,293	-0.98%
Connecticut	2,757,082	5	551,416	-13,340	13,340	-2.48%
Delaware	692,169	1	692,169	-154,093	154,093	-28.64%
Florida	14,799,219	27	548,119	-10,043	10,043	-1.87%
Georgia	7,196,101	14	514,007	24,069	24,069	4.47%
Hawaii	1,056,483	2	528,242	9,835	9,835	1.83%
Idaho	1,138,510	2	569,255	-31,179	31,179	-5.79%
Illinois	9,701,453	18	538,970	-893	893	-0.17%
Indiana	4,875,504	9	541,723	-3,646	3,646	-0.68%
Iowa	2,318,362	4	579,591	-41,514	41,514	-7.72%
Kansas	2,126,179	4	531,545	6,531	6,531	1.21%
Kentucky	3,315,996	6	552,666	-14,590	14,590	-2.71%
Louisiana	3,415,357	6	569,226	-31,150	31,150	-5.79%
Maine	1,053,828	2	526,914	11,162	11,162	2.07%
Maryland	4,420,588	8	552,574	-14,497	14,497	-2.69%
Massachusetts	5,128,706	9	569,856	-31,780	31,780	-5.91%
Michigan	7,539,572	14	538,541	-465	465	-0.09%
Minnesota	4,019,862	8	502,483	35,593	35,593	6.61%
Mississippi	2,211,742	4	552,936	-14,859	14,859	-2.76%
Missouri	4,563,491	8	570,436	-32,360	32,360	-6.01%
Montana	765,852	1	765,852	-227,776	227,776	-42.33%
Nebraska	1,367,120	3	455,707	82,370	82,370	15.31%
Nevada	2,035,543	4	508,886	29,190	29,190	5.42%
New Hampshire	1,029,236	2	514,618	23,458	23,458	4.36%
New Jersey	6,726,680	12	560,557	-22,480	22,480	-4.18%
New Mexico	1,540,507	3	513,502	24,574	24,574	4.57%
New York	15,053,173	27	557,525	-19,449	19,449	-3.61%
North Carolina	7,253,848	13	557,988	-19,912	19,912	-3.70%
North Dakota	522,720	1	522,720	15,356	15,356	2.85%
Ohio	8,805,753	16	550,360	-12,283	12,283	-2.28%
Oklahoma	2,821,685	5	564,337	-26,261	26,261	-4.88%
Oregon	2,964,621	5	592,924	-54,848	54,848	-10.19%
Pennsylvania	9,910,224	18	550,568	-12,492	12,492	-2.32%
Rhode Island	828,611	2	414,306	123,771	123,771	23.00%

Appendix Table 2. Cont.

State	Apportionment Population	Number of MCs	State Ideal District Size	Deviation from Ideal	Absolute Deviation from Ideal	% Deviation form Ideal
South Carolina	3,544,890	7	506,413	31,663	31,663	5.88%
South Dakota	611,383	1	611,383	-73,307	73,307	-13.62%
Tennessee	4,850,104	9	538,900	-824	824	-0.15%
Texas	18,279,737	36	507,770	30,306	30,306	5.63%
Utah	1,892,858	4	473,215	64,862	64,862	12.05%
Vermont	496,508	1	496,508	41,568	41,568	7.73%
Virginia	6,147,347	11	558,850	-20,773	20,773	-3.86%
Washington	5,143,186	10	514,319	23,758	23,758	4.42%
West Virginia	1,465,576	3	488,525	49,551	49,551	9.21%
Wisconsin	4,347,494	8	543,437	-5,361	5,361	-1.00%
Wyoming	428,224	1	428,224	109,852	109,852	20.42%
Totals	234,063,163	435	538,076			
Voter Equivalency Ratio			1.85			
Most Underrepresented				-227,776		-42.33%
Most Overrepresented				123,771		23.00%
Maximum Deviation				351,547		
% Max Deviation						65.33%
Mean Absolute Deviation					33,953	
% Mean Abs Deviation						6.31%

Appendix Table 3. 2012 Interstate Malapportionment: AP Districts and VEP Population.

State	Apportionment Population	Number of MCs	State Ideal District Size	Deviation from Ideal	Absolute Deviation from Ideal	% Deviation form Ideal
Alabama	3,472,784	7	496,112	-7,958	7,958	-1.63%
Alaska	492,159	1	492,159	-4,005	4,005	-0.82%
Arizona	4,220,784	9	468,976	19,178	19,178	3.93%
Arkansas	2,081,031	4	520,258	-32,104	32,104	-6.58%
California	22,921,454	53	432,480	55,673	55,673	11.40%
Colorado	3,529,590	7	504,227	-16,074	16,074	-3.29%
Connecticut	2,514,825	5	502,965	-14,811	14,811	-3.03%
Delaware	648,840	1	648,840	-160,686	160,686	-32.92%
Florida	12,939,596	27	479,244	8,909	8,909	1.83%
Georgia	6,464,406	14	461,743	26,410	26,410	5.41%
Hawaii	960,041	2	480,021	8,133	8,133	1.67%
Idaho	1,071,526	2	535,763	-47,609	47,609	-9.75%
Illinois	8,788,929	18	488,274	-120	120	-0.02%
Indiana	4,698,660	9	522,073	-33,920	33,920	-6.95%
Iowa	2,232,917	4	558,229	-70,076	70,076	-14.36%
Kansas	2,009,563	4	502,391	-14,237	14,237	-2.92%
Kentucky	3,198,138	6	533,023	-44,869	44,869	-9.19%
Louisiana	3,246,213	6	541,036	-52,882	52,882	-10.83%
Maine	1,038,335	2	519,168	-31,014	31,014	-6.35%
Maryland	3,999,682	8	499,960	-11,807	11,807	-2.42%
Massachusetts	4,681,091	9	520,121	-31,968	31,968	-6.55%
Michigan	7,248,403	14	517,743	-29,590	29,590	-6.06%
Minnesota	3,803,802	8	475,475	12,678	12,678	2.60%
Mississippi	2,131,049	4	532,762	-44,609	44,609	-9.14%
Missouri	4,365,737	8	545,717	-57,564	57,564	-11.79%
Montana	758,805	1	758,805	-270,651	270,651	-55.44%
Nebraska	1,305,876	3	435,292	52,862	52,862	10.83%
Nevada	1,750,950	4	437,738	50,416	50,416	10.33%

Appendix Table 3. Cont.

State	Apportionment Population	Number of MCs	State Ideal District Size	Deviation from Ideal	Absolute Deviation from Ideal	% Deviation form Ideal
New Hampshire	1,000,167	2	500,084	-11,930	11,930	-2.44%
New Jersey	5,819,152	12	484,929	3,224	3,224	0.66%
New Mexico	1,407,025	3	469,008	19,145	19,145	3.92%
New York	13,121,745	27	485,991	2,163	2,163	0.44%
North Carolina	6,791,748	13	522,442	-34,289	34,289	-7.02%
North Dakota	517,347	1	517,347	-29,193	29,193	-5.98%
Ohio	8,568,112	16	535,507	-47,353	47,353	-9.70%
Oklahoma	2,669,051	5	533,810	-45,657	45,657	-9.35%
Oregon	2,762,313	5	552,463	-64,309	64,309	-13.17%
Pennsylvania	9,567,164	18	531,509	-43,356	43,356	-8.88%
Rhode Island	762,810	2	381,405	106,749	106,749	21.87%
South Carolina	3,387,826	7	483,975	4,178	4,178	0.86%
South Dakota	599,838	1	599,838	-111,684	111,684	-22.88%
Tennessee	4,621,221	9	513,469	-25,315	25,315	-5.19%
Texas	15,492,550	36	430,349	57,805	57,805	11.84%
Utah	1,776,843	4	444,211	43,943	43,943	9.00%
Vermont	489,123	1	489,123	-969	969	-0.20%
Virginia	5,658,358	11	514,396	-26,243	26,243	-5.38%
Washington	4,724,989	10	472,499	15,655	15,655	3.21%
West Virginia	1,442,796	3	480,932	7,222	7,222	1.48%
Wisconsin	4,174,726	8	521,841	-33,687	33,687	-6.90%
Wyoming	416,693	1	416,693	71,461	71,461	14.64%
Totals	212,346,783	435	488,154			
Voter Equivalency Ratio			1.99			
Most Underrepresented				-270,651		-55.44%
Most Overrepresented				106,749		21.87%
Maximum Deviation				377,400		
% Max Deviation						77.31%
Mean Absolute Deviation					40,327	
% Mean Abs Deviation						8.26%

Appendix Table 4. 2012 Interstate Malapportionment: VAP Districts and VAP Population.

State	VAP	Number of MCs	State Ideal District Size	Deviation from Ideal	Absolute Deviation from Ideal	% Deviation form Ideal
Alabama	3,647,277	7	521,040	17,037	17,037	3.17%
Alaska	522,853	1	522,853	15,223	15,223	2.83%
Arizona	4,763,003	9	529,223	8,854	8,854	1.65%
Arkansas	2,204,443	4	551,111	-13,035	13,035	-2.42%
California	27,958,916	52	537,671	405	405	0.08%
Colorado	3,803,587	7	543,370	-5,293	5,293	-0.98%
Connecticut	2,757,082	5	551,416	-13,340	13,340	-2.48%
Delaware	692,169	1	692,169	-154,093	154,093	-28.64%
Florida	14,799,219	27	548,119	-10,043	10,043	-1.87%
Georgia	7,196,101	13	553,546	-15,470	15,470	-2.88%
Hawaii	1,056,483	2	528,242	9,835	9,835	1.83%
Idaho	1,138,510	2	569,255	-31,179	31,179	-5.79%
Illinois	9,701,453	18	538,970	-893	893	-0.17%
Indiana	4,875,504	9	541,723	-3,646	3,646	-0.68%
Iowa	2,318,362	4	579,591	-41,514	41,514	-7.72%
Kansas	2,126,179	4	531,545	6,531	6,531	1.21%
Kentucky	3,315,996	6	552,666	-14,590	14,590	-2.71%

Appendix Table 4. Cont.

State	VAP	Number of MCs	State Ideal District Size	Deviation from Ideal	Absolute Deviation from Ideal	% Deviation form Ideal
Louisiana	3,415,357	6	569,226	-31,150	31,150	-5.79%
Maine	1,053,828	2	526,914	11,162	11,162	2.07%
Maryland	4,420,588	8	552,574	-14,497	14,497	-2.69%
Massachusetts	5,128,706	10	512,871	25,206	25,206	4.68%
Michigan	7,539,572	14	538,541	-465	465	-0.09%
Minnesota	4,019,862	7	574,266	-36,190	36,190	-6.73%
Mississippi	2,211,742	4	552,936	-14,859	14,859	-2.76%
Missouri	4,563,491	8	570,436	-32,360	32,360	-6.01%
Montana	765,852	2	382,926	155,150	155,150	28.83%
Nebraska	1,367,120	3	455,707	82,370	82,370	15.31%
Nevada	2,035,543	4	508,886	29,190	29,190	5.42%
New Hampshire	1,029,236	2	514,618	23,458	23,458	4.36%
New Jersey	6,726,680	13	517,437	20,639	20,639	3.84%
New Mexico	1,540,507	3	513,502	24,574	24,574	4.57%
New York	15,053,173	28	537,613	463	463	0.09%
North Carolina	7,253,848	13	557,988	-19,912	19,912	-3.70%
North Dakota	522,720	1	522,720	15,356	15,356	2.85%
Ohio	8,805,753	16	550,360	-12,283	12,283	-2.28%
Oklahoma	2,821,685	5	564,337	-26,261	26,261	-4.88%
Oregon	2,964,621	6	494,104	43,973	43,973	8.17%
Pennsylvania	9,910,224	18	550,568	-12,492	12,492	-2.32%
Rhode Island	828,611	2	414,306	123,771	123,771	23.00%
South Carolina	3,544,890	7	506,413	31,663	31,663	5.88%
South Dakota	611,383	1	611,383	-73,307	73,307	-13.62%
Tennessee	4,850,104	9	538,900	-824	824	-0.15%
Texas	18,279,737	34	537,639	437	437	0.08%
Utah	1,892,858	4	473,215	64,862	64,862	12.05%
Vermont	496,508	1	496,508	41,568	41,568	7.73%
Virginia	6,147,347	11	558,850	-20,773	20,773	-3.86%
Washington	5,143,186	10	514,319	23,758	23,758	4.42%
West Virginia	1,465,576	3	488,525	49,551	49,551	9.21%
Wisconsin	4,347,494	8	543,437	-5,361	5,361	-1.00%
Wyoming	428,224	1	428,224	109,852	109,852	20.42%
Totals	234,063,163	435	538,076			
Voter Equivalency Ratio			1.81			
Most Underrepresented				-154,093		-28.64%
Most Overrepresented				155,150		28.83%
Maximum Deviation				309,243		
% Max Deviation						57.47%
Mean Absolute Deviation					30,774	
% Mean Abs Deviation						5.72%

Appendix Table 5. 2012 Interstate Malapportionment: VEP Districts and VEP Population.

State	VEP	Number of MCs	State Ideal District Size	Deviation from Ideal	Absolute Deviation from Ideal	% Deviation form Ideal
Alabama	3,472,784	7	496,112	-7,958	7,958	-1.63%
Alaska	492,159	1	492,159	-4,005	4,005	-0.82%
Arizona	4,220,784	9	468,976	19,178	19,178	3.93%
Arkansas	2,081,031	4	520,258	-32,104	32,104	-6.58%
California	22,921,454	47	487,691	463	463	0.09%
Colorado	3,529,590	7	504,227	-16,074	16,074	-3.29%

State	VEP	Number of MCs	State Ideal District Size	Deviation from Ideal	Absolute Deviation from Ideal	% Deviation form Ideal
Connecticut	2,514,825	5	502,965	-14,811	14,811	-3.03%
Delaware	648,840	1	648,840	-160,686	160,686	-32.92%
Florida	12,939,596	26	497,677	-9,523	9,523	-1.95%
Georgia	6,464,406	13	497,262	-9,108	9,108	-1.87%
Hawaii	960,041	2	480,021	8,133	8,133	1.67%
Idaho	1,071,526	2	535,763	-47,609	47,609	-9.75%
Illinois	8,788,929	18	488,274	-120	120	-0.02%
Indiana	4,698,660	10	469,866	18,288	18,288	3.75%
Iowa	2,232,917	5	446,583	41,570	41,570	8.52%
Kansas	2,009,563	4	502,391	-14,237	14,237	-2.92%
Kentucky	3,198,138	7	456,877	31,277	31,277	6.41%
Louisiana	3,246,213	7	463,745	24,409	24,409	5.00%
Maine	1,038,335	2	519,168	-31,014	31,014	-6.35%
Maryland	3,999,682	8	499,960	-11,807	11,807	-2.42%
Massachusetts	4,681,091	10	468,109	20,044	20,044	4.11%
Michigan	7,248,403	15	483,227	4,927	4,927	1.01%
Minnesota	3,803,802	8	475,475	12,678	12,678	2.60%
Mississippi	2,131,049	4	532,762	-44,609	44,609	-9.14%
Missouri	4,365,737	9	485,082	3,072	3,072	0.63%
Montana	758,805	2	379,403	108,751	108,751	22.28%
Nebraska	1,305,876	3	435,292	52,862	52,862	10.83%
Nevada	1,750,950	4	437,738	50,416	50,416	10.33%
New Hampshire	1,000,167	2	500,084	-11,930	11,930	-2.44%
New Jersey	5,819,152	12	484,929	3,224	3,224	0.66%
New Mexico	1,407,025	3	469,008	19,145	19,145	3.92%
New York	13,121,745	27	485,991	2,163	2,163	0.44%
North Carolina	6,791,748	14	485,125	3,029	3,029	0.62%
North Dakota	517,347	1	517,347	-29,193	29,193	-5.98%
Ohio	8,568,112	17	504,007	-15,853	15,853	-3.25%
Oklahoma	2,669,051	5	533,810	-45,657	45,657	-9.35%
Oregon	2,762,313	6	460,386	27,768	27,768	5.69%
Pennsylvania	9,567,164	19	503,535	-15,381	15,381	-3.15%
Rhode Island	762,810	2	381,405	106,749	106,749	21.87%
South Carolina	3,387,826	7	483,975	4,178	4,178	0.86%
South Dakota	599,838	1	599,838	-111,684	111,684	-22.88%
Tennessee	4,621,221	9	513,469	-25,315	25,315	-5.19%
Texas	15,492,550	31	499,760	-11,606	11,606	-2.38%
Utah	1,776,843	4	444,211	43,943	43,943	9.00%
Vermont	489,123	1	489,123	-969	969	-0.20%
Virginia	5,658,358	12	471,530	16,624	16,624	3.41%
Washington	4,724,989	10	472,499	15,655	15,655	3.21%
West Virginia	1,442,796	3	480,932	7,222	7,222	1.48%
Wisconsin	4,174,726	8	521,841	-33,687	33,687	-6.90%
Wyoming	416,693	1	416,693	71,461	71,461	14.64%
Totals	212,346,783	435	488,154			
Voter Equivalency Ratio			1.71			
Most Underrepresented				-160,686		-32.92%
Most Overrepresented				108,751		22.28%
Maximum Deviation				269,438		
% Max Deviation						55.20%
Mean Absolute Deviation					28,443	
% Mean Abs Deviation						5.83%

Appendix Table 6. Apportionment Populations in 1970.

State	AP	VAP	State	AP	VAP
Alabama	3,475,885	2,205,486	Montana	701,573	440,583
Alaska	304,067	180,582	Nebraska	1,496,820	973,236
Arizona	1,787,620	1,123,322	Nevada	492,396	318,151
Arkansas	1,942,303	1,264,709	New Hampshire	746,284	482,655
California	20,098,863	13,300,316	New Jersey	7,208,035	4,777,221
Colorado	2,226,771	1,429,241	New Mexico	1,026,664	607,575
Connecticut	3,050,693	2,007,601	New York	18,338,055	12,368,821
Delaware	551,928	350,952	North Carolina	5,125,230	3,312,968
Florida	6,855,702	4,671,090	North Dakota	624,181	390,141
Georgia	4,627,306	2,938,518	Ohio	10,730,200	6,902,333
Hawaii	784,901	492,986	Oklahoma	2,585,486	1,718,812
Idaho	719,921	447,806	Oregon	2,110,810	1,391,451
Illinois	11,184,320	7,303,995	Pennsylvania	11,884,314	7,932,551
Indiana	5,228,156	3,346,442	Rhode Island	957,798	647,196
Iowa	2,846,920	1,845,655	South Carolina	2,617,320	1,628,670
Kansas	2,265,846	1,498,187	South Dakota	673,247	422,664
Kentucky	3,246,481	2,099,823	Tennessee	3,961,060	2,590,564
Louisiana	3,672,008	2,246,435	Texas	11,298,787	7,177,011
Maine	1,006,320	647,166	Utah	1,067,810	632,973
Maryland	3,953,698	2,536,241	Vermont	448,327	286,767
Massachusetts	5,726,676	3,802,869	Virginia	4,690,742	3,051,904
Michigan	8,937,196	5,611,114	Washington	3,443,487	2,244,939
Minnesota	3,833,173	2,416,752	West Virginia	1,763,331	1,159,497
Mississippi	2,233,848	1,367,736	Wisconsin	4,447,013	2,827,453
Missouri	4,718,034	3,117,564	Wyoming	335,719	212,233
			Total	204,053,325	132,750,957
			National Ideal District Size	469,088	305,175

Appendix Table 7. Apportionment Populations in 1980.

State	AP	VAP	VEP	State	AP	VAP	VEP
Alabama	3,890,061	2,731,640	2,726,249	Montana	786,690	554,795	554,636
Alaska	400,481	271,106	270,122	Nebraska	1,570,006	1,122,655	1,115,142
Arizona	2,717,866	1,926,728	1,890,167	Nevada	799,184	584,694	573,118
Arkansas	2,285,513	1,615,061	1,610,104	New Hampshire	920,610	662,528	660,560
California	23,668,562	17,278,944	15,610,966	New Jersey	7,364,158	5,373,962	5,123,773
Colorado	2,888,834	2,081,151	2,071,959	New Mexico	1,299,968	884,987	873,515
Connecticut	3,107,576	2,284,657	2,201,356	New York	17,557,288	12,870,209	12,006,100
Delaware	595,225	427,743	421,344	North Carolina	5,874,429	4,224,031	4,203,817
Florida	9,739,992	7,386,688	7,088,658	North Dakota	652,695	461,726	462,223
Georgia	5,464,265	3,816,975	3,791,652	Ohio	10,797,419	7,703,310	7,637,813
Hawaii	965,000	689,108	646,583	Oklahoma	3,025,266	2,170,406	2,162,051
Idaho	943,935	637,270	633,624	Oregon	2,632,663	1,910,048	1,880,863
Illinois	11,418,461	8,183,481	7,868,300	Pennsylvania	11,866,728	8,740,599	8,664,166
Indiana	5,490,179	3,871,906	3,846,321	Rhode Island	947,154	704,303	675,067
Iowa	2,913,387	2,087,935	2,070,935	South Carolina	3,119,208	2,179,854	2,176,721
Kansas	2,363,208	1,714,644	1,704,420	South Dakota	690,178	485,162	484,328
Kentucky	3,661,433	2,578,047	2,562,572	Tennessee	4,590,750	3,292,560	3,285,608

Appendix Table 7. Cont.

State	AP	VAP	VEP	State	AP	VAP	VEP
Louisiana	4,203,972	2,875,432	2,868,792	Texas	14,228,383	9,923,085	9,572,904
Maine	1,124,660	803,273	799,746	Utah	1,461,037	920,932	915,484
Maryland	4,216,446	3,049,445	2,964,704	Vermont	511,456	366,138	363,143
Massachusetts	5,737,037	4,246,648	4,110,721	Virginia	5,346,279	3,872,484	3,830,887
Michigan	9,258,344	6,510,092	6,374,955	Washington	4,130,163	2,992,796	2,923,670
Minnesota	4,077,148	2,904,162	2,882,406	West Virginia	1,949,644	1,390,008	1,387,231
Mississippi	2,520,638	1,706,441	1,704,163	Wisconsin	4,705,335	3,347,947	3,322,053
Missouri	4,917,444	3,554,203	3,529,489	Wyoming	470,816	324,004	326,644
				Total	225,867,174	162,296,003	157,431,825
				National Ideal District Size	519,235	373,094	361,912

Appendix Table 8. Apportionment Populations in 1990.

State	AP	VAP	VEP	State	AP	VAP	VEP
Alabama	4,062,608	2,981,799	2,956,385	Montana	803,655	576,961	573,045
Alaska	551,947	377,699	364,419	Nebraska	1,584,617	1,149,373	1,131,746
Arizona	3,677,985	2,684,109	2,523,614	Nevada	1,206,152	904,885	858,018
Arkansas	2,362,239	1,729,594	1,710,799	New Hampshire	1,113,915	830,497	814,549
California	29,839,250	22,009,296	18,156,500	New Jersey	7,748,634	5,930,726	5,429,251
Colorado	3,307,912	2,433,128	2,366,650	New Mexico	1,521,779	1,068,328	1,026,902
Connecticut	3,295,669	2,537,535	2,383,795	New York	18,044,505	13,730,906	12,271,903
Delaware	668,696	502,827	486,760	North Carolina	6,657,630	5,022,488	4,938,968
Florida	13,003,362	10,071,689	9,145,312	North Dakota	641,364	463,415	461,711
Georgia	6,508,419	4,750,913	4,588,953	Ohio	10,887,325	8,047,371	7,975,680
Hawaii	1,115,274	828,103	770,836	Oklahoma	3,157,604	2,308,578	2,251,719
Idaho	1,011,986	698,344	690,154	Oregon	2,853,733	2,118,191	2,057,833
Illinois	11,466,682	8,484,236	8,029,525	Pennsylvania	11,924,710	9,086,833	8,962,083
Indiana	5,564,228	4,088,195	4,080,236	Rhode Island	1,005,984	777,774	725,084
Iowa	2,787,424	2,057,875	2,030,935	South Carolina	3,505,707	2,566,496	2,537,384
Kansas	2,485,600	1,815,960	1,783,412	South Dakota	699,999	497,542	494,849
Kentucky	3,698,969	2,731,202	2,722,356	Tennessee	4,896,641	3,660,581	3,624,940
Louisiana	4,238,216	2,992,704	2,959,148	Texas	17,059,805	12,150,671	11,034,190
Maine	1,233,223	918,926	910,982	Utah	1,727,784	1,095,406	1,086,050
Maryland	4,798,622	3,619,227	3,397,126	Vermont	564,964	419,675	415,564
Massachusetts	6,029,051	4,663,350	4,384,671	Virginia	6,216,568	4,682,620	4,512,504
Michigan	9,328,784	6,836,532	6,693,069	Washington	4,887,941	3,605,305	3,421,256
Minnesota	4,387,029	3,208,316	3,136,830	West Virginia	1,801,625	1,349,900	1,347,723
Mississippi	2,586,443	1,826,455	1,824,156	Wisconsin	4,906,745	3,602,787	3,541,548
Missouri	5,137,804	3,802,247	3,740,308	Wyoming	455,975	318,063	312,961
				Total	249,022,783	184,615,633	173,644,393
				National Ideal District Size	572,466	424,404	399,183

Appendix Table 9. Apportionment Populations in 2000.

State	AP	VAP	VEP	State	AP	VAP	VEP
Alabama	4,461,130	3,323,678	2,956,385	Montana	905,316	672,133	573,045
Alaska	628,933	436,215	364,419	Nebraska	1,715,369	1,261,021	1,131,746
Arizona	5,140,683	3,763,685	2,523,614	Nevada	2,002,032	1,486,458	858,018
Arkansas	2,679,733	1,993,031	1,710,799	New Hampshire	1,238,415	926,224	814,549
California	33,930,798	24,621,819	18,156,500	New Jersey	8,424,354	6,326,792	5,429,251
Colorado	4,311,882	3,200,466	2,366,650	New Mexico	1,823,821	1,310,472	1,026,902
Connecticut	3,409,535	2,563,877	2,383,795	New York	19,004,973	14,286,350	12,271,903
Delaware	785,068	589,013	486,760	North Carolina	8,067,673	6,085,266	4,938,968
Florida	16,028,890	12,336,038	9,145,312	North Dakota	643,756	481,351	461,711
Georgia	8,206,975	6,017,219	4,588,953	Ohio	11,374,540	8,464,801	7,975,680
Hawaii	1,216,642	915,770	770,836	Oklahoma	3,458,819	2,558,294	2,251,719
Idaho	1,297,274	924,923	690,154	Oregon	3,428,543	2,574,873	2,057,833
Illinois	12,439,042	9,173,842	8,029,525	Pennsylvania	12,300,670	9,358,833	8,962,083
Indiana	6,090,782	4,506,089	4,080,236	Rhode Island	1,049,662	800,497	725,084
Iowa	2,931,923	2,192,686	2,030,935	South Carolina	4,025,061	3,002,371	2,537,384
Kansas	2,693,824	1,975,425	1,783,412	South Dakota	756,874	552,195	494,849
Kentucky	4,049,431	3,046,951	2,722,356	Tennessee	5,700,037	4,290,762	3,624,940
Louisiana	4,480,271	3,249,177	2,959,148	Texas	20,903,994	14,965,061	11,034,190
Maine	1,277,731	973,685	910,982	Utah	2,236,714	1,514,471	1,086,050
Maryland	5,307,886	3,940,314	3,397,126	Vermont	609,890	461,304	415,564
Massachusetts	6,355,568	4,849,033	4,384,671	Virginia	7,100,702	5,340,253	4,512,504
Michigan	9,955,829	7,342,677	6,693,069	Washington	5,908,684	4,380,278	3,421,256
Minnesota	4,925,670	3,632,585	3,136,830	West Virginia	1,813,077	1,405,951	1,347,723
Mississippi	2,852,927	2,069,471	1,824,156	Wisconsin	5,371,210	3,994,919	3,541,548
Missouri	5,606,260	4,167,519	3,740,308	Wyoming	495,304	364,909	312,961
				Total	281,424,177	208,671,027	173,644,393
				National Ideal District Size	646,952	479,704	399,183

Appendix Table 10. Apportionment Populations in 2000.

State	AP	VAP	VEP	State	AP	VAP	VEP
Alabama	4,779,736	3,647,277	3,472,784	Montana	989,415	765,852	758,805
Alaska	710,231	522,853	492,159	Nebraska	1,826,341	1,367,120	1,305,876
Arizona	6,392,017	4,763,003	4,220,784	Nevada	2,700,551	2,035,543	1,750,950
Arkansas	2,915,918	2,204,443	2,081,031	New Hampshire	1,316,470	1,029,236	1,000,167
California	37,253,956	27,958,916	22,921,454	New Jersey	8,791,894	6,726,680	5,819,152
Colorado	5,029,196	3,803,587	3,529,590	New Mexico	2,059,179	1,540,507	1,407,025
Connecticut	3,574,097	2,757,082	2,514,825	New York	19,378,102	15,053,173	13,121,745
Delaware	897,934	692,169	648,840	North Carolina	9,535,483	7,253,848	6,791,748
Florida	18,801,310	14,799,219	12,939,596	North Dakota	672,591	522,720	517,347
Georgia	9,687,653	7,196,101	6,464,406	Ohio	11,536,504	8,805,753	8,568,112
Hawaii	1,360,301	1,056,483	960,041	Oklahoma	3,751,351	2,821,685	2,669,051
Idaho	1,567,582	1,138,510	1,071,526	Oregon	3,831,074	2,964,621	2,762,313
Illinois	12,830,632	9,701,453	8,788,929	Pennsylvania	12,702,379	9,910,224	9,567,164
Indiana	6,483,802	4,875,504	4,698,660	Rhode Island	1,052,567	828,611	762,810
Iowa	3,046,355	2,318,362	2,232,917	South Carolina	4,625,364	3,544,890	3,387,826
Kansas	2,853,118	2,126,179	2,009,563	South Dakota	814,180	611,383	599,838

Appendix Table 10. Cont.

State	AP	VAP	VEP	State	AP	VAP	VEP
Kentucky	4,339,367	3,315,996	3,198,138	Tennessee	6,346,105	4,850,104	4,621,221
Louisiana	4,533,372	3,415,357	3,246,213	Texas	25,145,561	18,279,737	15,492,550
Maine	1,328,361	1,053,828	1,038,335	Utah	2,763,885	1,892,858	1,776,843
Maryland	5,773,552	4,420,588	3,999,682	Vermont	625,741	496,508	489,123
Massachusetts	6,547,629	5,128,706	4,681,091	Virginia	8,001,024	6,147,347	5,658,358
Michigan	9,883,640	7,539,572	7,248,403	Washington	6,724,540	5,143,186	4,724,989
Minnesota	5,303,925	4,019,862	3,803,802	West Virginia	1,852,994	1,465,576	1,442,796
Mississippi	2,967,297	2,211,742	2,131,049	Wisconsin	5,686,986	4,347,494	4,174,726
Missouri	5,988,927	4,563,491	4,365,737	Wyoming	563,626	428,224	416,693
				Total	308,143,815	234,063,163	212,346,783
				National Ideal District Size	708,377	538,076	488,154

Article

Engaging the Public in Policy Research: Are Community Researchers the Answer?

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Abstract
A case has been made for engaging the public in scientific research as co-producers of knowledge. These arguments challenge elite models of policy research and suggest the need for an ambitious expansion of more inclusive scientific public policy research. Enabling the public to be meaningfully involved in complex policy research remains a challenge. This paper explores a range of attempts to involving the public in public policy research. It uses a binary framing to typify some key debates and differences in approaches between community-based participatory research, and citizen science. Approaches to community-based participatory research in the social sciences offer a set of engagement principles which are an alternative to an elite model of policy research. Citizen science offers a focus on the use of scientific methods by lay people, but this approach is currently under-utilized in public policy research and could be expanded. How could the strengths of each be more fully integrated and harnessed? A case study of community policy research is presented, in which an attempt was made to use a more fully integrated approach in a local policy context, identifying the potential and challenges. Based on a framework of three features of democratic and scientific policy research, it argues that more public participation in public policy research would be helped by more attention to the strengths of the democratic potential emphasised by participatory community-based research, alongside the potential of scientific robustness emphasised by citizen science. One conclusion drawn is that a professional and scientific orientation to public policy research can be retained without necessarily being professionally dominated. Research methods and skills are tools to which more people outside the profession could have access, if academics facilitate the process of democratization of policy research.

1. The Challenges of Democratizing Policy Science

As a society we face a number of public policy challenges, from citizens' increasing expectations of government and public services at a time of pressure on public spending, to major crises of urban and environmental sustainability. Multiple new uncertainties in public life and the pluralisation of spaces for political dialogue and protest suggest the need for new participatory approaches to policy challenges. Internationally, there are signs of growing support for research projects across the natural and social sciences which involve citizens in some way.[1] Public participation in

[1] Thousands of universities across America are committed up to to improve their practice of civic engagement and engaged scholarship, for example through the Campus Compact Initiative, and Community-Campus Partnerships for Health. The UK has a National Co-ordinating Centre for Public Engagement which promotes Beacons of engagement practice, and policy

policy research and analysis is part of a 'more open and democratic process of knowledge production' (Brock & McGee, 2002, p. 8). There is now a growing body of work which argues for a wider role for various publics in scientific research as co-producers of knowledge (Nutley, Walter, & Davies, 2007; Armstrong & Alsop, 2010; Martin, 2010).

A pressing case has been made for the democratization of the policy sciences (DeLeon, 1994). One irony of political science research on citizen participation in the production of public goods is just how little participation there is in that research. This is a long-standing dilemma of the 'paradox' of sciences which 'owe their origins to practice' but which rarely produces knowledge enhance that practice (Dunn, 1996, p. 255). Understanding the evidence-policy gap as not a problem of knowledge transfer, but of knowledge production, offers a route to engaged scholarship (Boyer, 1996; van de Ven, 2007). This builds on a longer tradition of engaged scholarship, following Lasswell, to overcome disconnection between analysis and politics (Bennett & Roberts, 2004; Boud, Keogh, & Walker, 1985; Kolb, 1984; Robb, 2002; Schön, 1983). Yet, policy research and analysis by both professional and academic elites continues to be dominated by what Wagenaar describes as a 'high-handed, technocratic style of policy making […] in which the citizens […] are […] disenfranchised from the governance of their own environment' (Wagenaar, 2007, p. 22). How to enable the public to be meaningfully involved in research which contributes to complex policy discussions remains a serious challenge. Who should policy-makers listen to—policy scientists with robust evidence, or citizens' grassroots insights? How could an ambitious expansion of more inclusive and high quality scientific public policy research be achieved?

The normative case for making our own discipline more exemplary of the democratic values it often advocates is seen here as relatively unobjectionable. How this actually works is a more complex challenge. This article explores a range of attempts to involving the public in public policy research. It focuses on approaches which typify some of the debates and key differences: community-based participatory research;

and citizen science. It uses this binary framing to argue that the many positive moves towards democratization of research and policy knowledge are hampered by divides within the scientific community on approaches to public participation. Approaches to community-based participatory research in the social sciences offer a set of engagement principles which are an alternative to an elite model of policy research. Citizen science offers a focus on the use of scientific methods by lay people, but this approach is currently under-utilized in public policy research and could be expanded. How could the strengths of each be more fully integrated and harnessed?

A case study of community policy research is presented, in which an attempt was made to use a more fully integrated approach in a local policy context, identifying the potential and challenges. Based on a framework of three features of democratic and scientific policy research, one conclusion is that more public participation in public policy research would be helped by more attention to the strengths of the democratic potential emphasised by participatory community-based research, alongside the strengths of the scientific method emphasised by citizen science.

2. Strengths and Challenges in Community-Based Participatory Research (CBPR)

Some of the key strengths of CBPR are that it has created platforms for more democratic research processes, by opening up spaces for the public to participate.[2] In these ways, CBPR contributes to democratization of research and overcoming an elite-dominated model. CBPR offers a radical critique of more traditional and non-participatory research, as well putting forward positive alternatives for researchers who wish to work in ways which do not compromise their values. These core strengths have seen participatory approaches gain international popularity and become widely used in a range of social science disciplines, including health and social policy, cultural history, anthropology, and sociology.

CBPR is defined by some writers in non-schematic way, and is based instead on a set of principles and values (Minkler, 2004), underpinned by a principle that research is a relationship between equals. Others set

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and community engagement is one of the metrics for grading of universities, which also affect funding allocations. Participatory research approaches, such as Participatory Action Research (PAR) developed originally in the global south are also migrating to marginalized communities in the global north through community-based participatory research projects across the UK, US and Europe, with examples such as the Detroit Community-Academic Urban Research Centre based in University of Michigan School of Public Health. Numerous networks exist such as the Global Alliance for Community-Engaged Research, Living Knowledge (an international network of 'Science Shops'), and other country-based groupings.

[2] Notions of what constitutes the public, communities, citizens, non-professionals, lay people etc, are extremely complex. One issue is who has the power to define these concepts. Even setting firm boundaries between scientists or researchers, and the public or communities, is a troublesome proposal, which neglect the porosity of boundaries. For example, some individuals span boundaries between worlds or roles, such as 'academic-activists' or 'pracademics'. For simplicity's sake, the use of the term public here broadly includes people or groups of people who are primarily based outside recognised academic institutions.

out a continuum of degrees of community power and control over research, from data collection at the lowest end, to identifying research questions at the higher end (Goodson & Phillimore, 2012). CBPR is considered to be participatory and empowering of participants. Explicit articulations of the locations of power in research are offered (cf. Cornwall & Jewkes, 1995) proposing a: 'deconstruction of power and the democratization of knowledge such that the experiential knowledge of community members is valued and knowledge that previously was the purview of scholars is accessible physically and intellectually to community participants' (Minkler, 2004, p. 686). CBPR challenges the notion that academic research is 'the exclusive domain of objective scientists' (Goodson & Phillimore, 2012, p. 8), and so create scope for lay people to be more equal participants in research. In Lindblom and Cohen's (1979) attack on the dominance of professional social inquiry they pose ordinary knowledge, 'common sense, casual empiricism or thoughtful speculation and analysis' (p. 12) as an alternative.

2.1. Challenges for CBPR Approaches in Policy Research

CBPR poses critical and much needed questions about inequalities in power and relationships in knowledge production. It is reassuringly consistent to see academic colleagues exemplify the participatory and democratic values promoted by political science in the discipline's own work. However, some leading writers associated with this set of approaches take this logic one step further. They come close to relinquishing a belief in the highest standards of scientific evidence. For example, reclaiming of citizens' and scientists 'cultural rationality', where lay people's cognition is based on 'personal and familiar experiences', in the face of scientists misplaced belief in their own technical rationality and 'faith in empirical evidence and the scientific method' (Fischer, 2005, p. 55). Despite claims by some in this camp to be pro-knowledge rather than anti-science (Cozzens & Woodhouse, 1995), the concept of cultural- over technical rationality comes dangerously close to a rejection of science per se. This creates a particular issue for policy-orientated research, where controversial, high-risk, and politically-driven public policy debates demand the ability to make bold claims about knowledge and/or evidence. What suffers in some CBPR approaches is the ability to gain purchase on mainstream public policy audiences because of the failure to overcome the limits of approximate knowledge. Policy research gains from the enhanced democratic potential in CBPR, but arguably can lose traction from the ambivalence around the 'scientific method'.

This challenge to and for CBPR comes with many qualifications. There are many nuanced variations within CBPR approaches. Research and researchers adhere more or less to a broad set of underlying principles. It could best be described as an 'idiom with breadth and elasticity' (Jasanoff, 2004, p. 6). The challenges set out here are clearly not all equally applicable to all pieces of research that would loosely style themselves as somewhere along the CBPR continuum. However, it is possible to see some common threads. One thread is about the relative absence of certain research methods. The literature emphasises the need for appropriate scholarship to transform what, would otherwise be engagement into engaged scholarship (Commission on Community-Engaged Scholarship in the Health Professions, 2005). An argument has been made that CBPR 'is not a method per se but an orientation to research that *may* employ any of a number of qualitative and quantitative methodologies' (Minkler, 2004, p. 685, emphasis added). However, examples of the 'variety of approaches to research' are 'collaborative inquiry, participatory action research (PAR), feminist participatory research, and action research'. What are missing in this list are some key methods for policy research, particularly field experimental research.[3] For research which speaks directly to the concerns of public policy-makers, a cogent argument has been made elsewhere that methods could and should include experimental designs.[4] Where there have been exceptions, and experiments have been used, there remain doubts about the legitimacy and ethical position of these methods. For example, innovative work on participatory forms of randomized controlled trials (RCTs) (Katz, Murimi, Gonzalez, Njike, & Green, 2011), have been critiqued as placing CBPR in a subservient and instrumental position to the RCT (Trickett, 2011).

It could be a relatively simple matter to broaden out the range of research designs and methods used within participatory research to guarantee appropriate scholarship and reliable knowledge for policy use. However, for some advocates of CBPR, their challenges to conventional notions of 'robust science' go deeper than debates about choice of research design. Some participatory approaches are based on a fundamental rejection of 'positivism'. This is a deep thread that can be found in the work of leading writers who are associated with CBPR, or who are cited by those who promote CBPR. These authors included such distinguished academics as John Dryzek, Frank Fischer, Andrew Van de Ven, Peter deLeon, Donald Schön. Indeed, DeLeon (1994), Dryzek (1990), Fischer (1993) and others blame the positivist turn for a tyrannical and anti-democratic stance in policy science. Policy science, they argue, has concentrated on elite-dominated policy processes, and is itself a powerful elite. Arguments have been made against the 'relics of positivism and logical empiricism'

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[3] For a discussion of experimental methods, see Green (2013).
[4] For example, see discussion in John et al. (2011).

(Kenworthy-U'ren, 2005, p. 361), 'the residual of scientism and positivism in citizen science' (Mueller, Tippins, & Bryan, 2012, p. 3), and of romanticised notions of scientism (Weinstein, 2012, p. 1). CBPR is said by some to have a strong association with ideas of interpretive social science (Jasanoff, 2004, p. 4). The idiom is grounded in a critical realist philosophy of science (van de Ven, 2007), where a lack of epistemological legitimacy is seen as being derived from knowledge which is isolated from social practices and public participation (Schön, 1995), and knowledge based on positivism.

2.2. Challenges for CBPR in Democratizing Research

There is another issue with the democratizing potential of CBPR. Community research is premised on the ideas of culturally situated or local knowledge, and experiential or lived expertise. CBPR is said to improve 'the quality and validity of research by engaging local knowledge and local theory based on the experience of people involved' (Commission on Community-Engaged Scholarship in the Health Professions, 2005, p. 12). Community researchers are seen as having a privileged claim to accessing, generating and interpreting data. In doing this, what frequently results is that community researchers act instead as respondents. There are many examples in practice of positioning of community researchers as both researchers and respondents, e.g. see Institute for Community Research (2007).

Conflation of researcher and respondent roles, and privileged claims for data access, collection and interpretation may paradoxically lead us away from the democratizing impulses of CBPR. At the very least, several troubling issues and dilemmas are raised by this conflation and privileging. Tensions are made explicit in one project which integrated secondary analysis of national quantitative datasets with new primary in-depth qualitative data on the links between long-term ill health and poverty. Some of the qualitative data was produced in collaboration with community researchers. An official report on the research (Salway, Platt, Chowbey, Harriss, & Bayliss, 2007) did not cover methodological challenges of working with community researchers, and the authors outside the main report say that the underlying challenges are 'rarely discussed' (Ismail, Salway, & Chowbey, 2011a). In presentations about the research process, the project academics identified tensions between community researchers' roles as respondents or researchers as a key complexity and challenge (Salway, Harriss, & Chowbey, 2006). They pointed to overlaps in roles for the participants as community researchers, community members, and also community leaders or advocates, resulting in the 'underlying challenges' of the participant lacking 'detachment from personal views' and having 'difficulties 'stepping back' and being reflexive'. Lines between the researcher and respondents were 'blurr[ed]' by 'a desire to speak on behalf of their community', and there was 'a tendency to essentialise their own communities

and exaggerate the differences between themselves and other 'groups' (Ismail, Salway, Chowbey, 2011b). These would seem to be serious risks to the research process, and even challenge the validity of the data collected, analysed and presented. In a pure academic context, a review which presented these challenges to the objectivity of the research would be rather damming. Full democratization should have the same standards, for example on data quality and analysis, for research done by professionals and research undertaken by communities and citizens. If there are dual standards, one possible consequence is the risk of reinforcing rather than overcoming outside/professional and insider/non-professional divides. Therefore, where community researchers' roles lie between researchers and respondents, there is a danger that they may not be fully empowered as researchers, and recognised as scientists.

CBPR sees community researchers' memberships of respondent groups, and insider status as enhancing research access and the ability to elicit data, (Cornwall & Jewkes, 1995, p. 14), premised on the idea that the relationship between outsider professional researchers and respondents is 'all too often characterise[d]' by 'mistrust and unfamiliarity' (O'Brien, 2011). Community partners are guarantors of the 'trustworthyness' of the professional researchers (Institute for Community Research, 2007, p. 44). Where snowball sampling via community members' networks was used in one project, it was felt to result in 'the research team [...] acquir[ing] rich information that would be more difficult, if not impossible, with only outside researchers' (p. 60). One question these claims raise is whether participants might be disempowered rather than empowered by a reliance on their group membership or status to elicit valid responses on sensitive subjects rather than being given access to different research methods specifically designed for this purpose? However, another serious challenge is whether claims of privileged access result in better quality research. There have been very few studies which test these ideas empirically. One study used secondary analysis of sample disposition data from two area probability surveys of the same community areas, one involving community interviewers in a fully collegial CBPR study and the other using professional interviewers. Its findings were that there were higher cooperation and lower refusal rates for the CBPR study than data collected by professional interviewers, but that the sample produced by CBPR interviewers overrepresented certain population groups (Rucinski et al., 2011).

In citizen science, one does not necessarily need to be a bee, or a beekeeper, to be a member of the research team. Data collection and analysis protocols are based on scientific research methods, albeit methods that are backed and protected by the monopoly power of the academy. Citizens are amateur scientists rather

than respondents. What additional strengths are offered to policy research by a citizen science approach?

3. Strengths and Challenges in Citizen Science in Public Policy Research

Citizen science, as the term is used here,[5] and is often popularly used, describes one set of approaches within Public Participation in Scientific Research (PPSR).[6] Citizen science has typically had the benefits of operating on a large-scale with mass citizen involvement in research, using an empirical and scientific approach to research. Internationally there are now large-scale citizen science projects ranging from involvement in astronomy to ornithology, biochemistry, astronomy, and mathematics. Citizen scientists across STEM subjects are featured as US Government 'Champions of Change'. Citizen science has been dominated by natural science—counting shellfish, bees, water quality, acid rain, birds, weather patterns, stars and planets. Some attributes of research projects 'ideally suited to citizen science' are: 'data collection is labor intensive; quantitative measurements/observations are needed; protocols are well designed and easy to learn and execute; large data sets are needed' (Gommerman & Monroe, 2012, p. 2). Given this, it is understandable that much of citizen science is with non-human subjects, and non-qualitative work, working outside a policy context or without direct policy engagement.

The scientific methods used in citizen science have much to offer social science disciplines, but have so far been under-utilized in political science and public policy research. Many of the natural science citizen science projects, particularly earth sciences and environmental studies, are directly relevant to public policy. For example, in the field of environmental governance, there are surveys of wildlife conducted by citizens, including one long-standing annual survey of birds in the United States called the Audubon Christmas Bird Count. Organisers of the Bird Count argue on their website that their work has contributed to 'the implementation of policies that safeguard birds, other wildlife and the resources that sustain us all', including 'innovative policies that balance habitat protection with green energy development on millions of acres (National Audubon Society, n.d.). But for many academics that identify themselves as political scientists or policy analysts, citizen science has yet to make the same impact in these disciplines as in the natural sciences. We see very few citizen science projects with human subjects in the social sciences.

3.1. What Citizen Science Could Learn from CBPR

However, there remains a key problem with citizen science; it fails to provide a sufficiently empowering process for the citizen participants. Partly, this is because the field has been dominated by what has been called here citizen science, and also known as contributory PPSR projects, where citizens are not fully involved in all aspects of the research process, and where professionals or academics retain overall control. Not all PPSR projects are in the contributory category, and many excellent examples can be found of PPSR research projects towards the 'collaborative' and 'co-created' end of the citizen science spectrum (Bonney at al., 2009, p. 18). However, some evidence suggests co-created cases are more exceptional than widespread in PPSR work: 'Most projects labelled citizen science fall into the 'contributory project' model of 'researcher-driven data-collection projects', where scientists ask the question, determine the protocols, do the analysis, and members of the public collect relevant data (Bonney at al., 2009, p. 18). Some have challenged mainstream citizen science because of the lack of full citizen participation in setting research question, developing research designs and methods, analysing data or being credited in publications (Mueller et al., 2012, p. 3). Many in citizen science are mostly transparent about the roles of volunteers as 'field assistants in scientific studies', who 'typically, […] do not analyze data or write scientific papers' (Cohn, 2008, p. 193). It is argued that many undertake the work unpaid as an everyday volunteering activity (Cohn, 2008). Citizens may choose to participate in the collection of data for scientists as a civic act, which in itself is part of the wider goal of strengthening democracy through civic participation. Many forms of volunteering are still welcome even if volunteers do not participate in organisational governance. However, an empowering approach to

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[5] It is important to note that the term citizen science has been used differently elsewhere. This includes the work of Alan Irwin, e.g. his 1995 book called 'Citizen Science' (Oxon, Routledge), which associates the term with both science which focuses on the concerns of citizens, as well as citizens' contextual knowledges generated outside formal scientific institutions.

[6] Citizen science is used here to refer to projects that would be categorised as contributory projects under one typology of PPSR (Cohn, 2008),which suggests three models: 'Contributory projects, which are generally designed by scientists and for which members of the public primarily contribute data; Collaborative projects, which are generally designed by scientists and for which members of the public contribute data but also may help to refine project design, analyze data, or disseminate findings; and Co-created projects, which are designed by scientists and members of the public working together and for which at least some of the public participants are actively involved in most or all steps of the scientific process.' (p. 11). Other adaptations of this schema add research by professional researchers which is commissioned by communities (termed contractual projects), and, collegial projects where research is conducted by non-credentialed individuals outside of the academy which may or may not be recognised by 'institutionalized science' (Shirk et al., 2012).

policy research, as highlighted by CBPR, suggests the involvement of citizen scientists across all stages of the research process, and more equal relationships between citizen scientists and professional researchers.

Going beyond this, there are some more fundamental barriers to promoting more collaborative and co-created PPSR projects. CBPR argues for a deconstruction of power in the research process. A commitment to equality in relationships between citizens or community researchers and professional scientists is seen as crucial. However, framings for PPSR approaches retain power and control over 'science' for professional scientists, and within academic institutions; all the hallmarks of an academic elite-dominated model are implied by the PPSR schema. For example, the insistence on tight delineations between members within the academic profession and those outside it, and the monopoly role of the institution in scientific investigations (Bonney at al., 2009, p. 11). Where research is conducted by non-credentialed individuals outside of the academy, this may or may not be recognised by institutionalized science (Shirk et al., 2012). PPSR fails to overcoming the institutional separation of 'a select group of expert knowers' from 'the lay public' in a more democratic approach to the production of knowledge (Barker, 2004, p. 125). The role of scientist is assumed to be inhabited by a delineated set of professionals, leaving less space for community participants to play meaningful roles in research. If the tools of science are to be fully democratized, then the idea of science as the sole province of the professional scientist needs to be questioned.

3.2. A Framework for Integrating Strengths from CBPR and Citizen Science Approaches to Research

How could we use the potential for expansion of public participation suggested by citizen science, maintaining a scientific approach, together with the democratic principles suggested by participatory research, while applying them to research with human subjects on public policy topics? Looking again at what the literatures and approaches might imply, there are several features which have the potential to more deeply integrate the strengths of both sets of approaches for policy research.

First, a commitment to the values and principles of empowerment and participation, and equality in relationships between academics and non-professional researchers, including full co-design at all stages of the research process. Secondly, to do this while also maintaining the primacy of the 'scientific method' over the identity or background of the researcher, and the separation of the community researcher and respondent roles. This requires efforts not to displace one form of knowledge and expertise with another, integrating lived expertise as a form of data in the method, rather than personal experience substituting for the method.

Thirdly, the implementation of these features in public policy research, with human subjects, and a direct policy orientation.

We now turn to a case study of a research project to develop public policy in an English local government. This project attempted to incorporate participatory principles, while maintaining a separation of researchers and respondents and privileging research methods above the identity of the researchers.

4. Case Study of an Attempt to Use a more Integrated Approach

The author was the team leader for research to develop healthcare strategy and interventions in a local government area in the North West of England. A local public sector partnership commissioned the work, which was paid for by the local statutory public health body. It was a small project with a budget for the research of £5,000 which paid for the academic input, which was supplemented by help-in-kind such as staff time from five local government workers, venue costs for team meetings and materials. The project worked with a team of seven community researchers to undertake the work. Efforts were made to put co-design into practice at all stages of the research process for the case study community research project, subsequent to the brief for the work. The community research project was a primarily qualitative study of public perceptions on alcohol misuse to inform the development of policy. It is used here as a revelatory case study of an attempt to use a more fully integrated approach.

4.1. Methodology

The methodology for the community research itself is described below as part of the description of the case study. The methodology for the case study was an analysis of documentary material from the research project, including: official documents such as the brief and specification for the project; research team training meeting materials, such as research skills information sheets and facilitator programmes for meetings; minutes of research team meetings and other meetings throughout the project; copies of private correspondence between team members, and between team members and the commissioners. Minutes of the research team meetings were operational documents produced by different members of the team, not including the author, to record discussions, decisions and action points. These documents also included appended verbatim notes of discussions, and observational data recorded by the author. Documentary analysis was then done against the three features of a more fully integrated approach to public engagement in policy science: commitment to empowerment principles; primacy of the method and separation of re-

spondent and researcher roles; and direct policy orientation. The use of the community research project as a case study was conducted solely by the author, and had no participatory element.

The next sections present a summary descriptive account of the case study research project, before turning to an exploration of how the project attempted to implement a participatory, empowering yet scientific piece of policy-focused research.

4.2. Case Study Description

The overall aim of tackling alcohol harm research was to develop feasible and concrete proposals for public, voluntary and community sector services on the development of behavioural change techniques to address harm from alcohol misuse. The research was intended to gather detailed and qualitative public perception data to supplement existing local datasets, which covered administrative data such as numbers of alcohol-related hospital admissions. The local public sector partnership which commissioned the work used existing statistics to identify a geographical area of around 2,000 households in a disadvantaged neighbourhood that experienced higher than average levels of severe alcohol-related problems. Open advertising was used to recruit community members from the neighbourhood to be volunteer community researchers. The research team was made up of the community researchers, an academic (the author) and local government workers. A purposive sample of groups at risk of experiencing harm from alcohol was identified by the research team, based on health data and known risk factors. Qualitative data was gathered by the team in four ways. First, vox pop interviews, which are short qualitative 'mini-interviews', often conducted on the street. Seventy four vox pop interviews were completed across seven public locations. The vox pop interviews were used to recruit a smaller sample for in-depth qualitative interviews. A total of eleven in-depth interviews were completed. The third method was self-completion postcards which were handed out in specific residential locations at different times and days of the week, with 'drop boxes' placed nearby for completed responses. A total of eighty-five completed postcards were collected. Finally, the fourth method was two focus groups, one with five younger people, and the other with parents of young children. After collation, a sample of the data was blind coded, the codes reconciled to create the coding framework, leading to a thematic analysis of the data. A draft of the emerging findings was tested in a practitioner workshop. An amended final report was presented by the research team to the partnership which had commissioned the research, which was also the decision-making body for the local alcohol harm reduction strategy.

4.3. Analysis of the Case Study for Public Engagement in Public Policy Research

In itself, the research project is relatively unremarkable, although it did yield some powerful insights into low-income residents' perceptions about a personal and sensitive issue. What is more noteworthy are the attempts made to address some of the issues identified earlier in the debates between citizen science and community-based participatory research. Using the framework identified earlier, we now explore the project in terms of the implementation of three features of democratic and engaged public policy research.

4.3.1. Empowerment, Equality of Relationships and Co-Design of Research

The community researchers were members of marginalized groups which were typically absent from traditional policy consultation exercises in the neighbourhood. The individuals had chosen to take part in the project on a voluntary basis. Recruitment advertisements were circulated to a range of local citizen organisations, public forums, and in public locations. In the recruitment material, a basic volunteer role description was outlined. People who expressed an interest were then invited to a taster session, which was used to engage participants in the substantive content of the research, and discuss possible sampling approaches. Of the twenty citizens who attended the taster sessions, 12 then signed up for the project, of whom seven then participated to completion. Five of the community researchers had never been involved in any research-related activity previously; two had done some relevant work in adult education courses but not a primary research project, research design or conducting fieldwork. At least three had personal experience of alcohol harm and/or poor mental health. At least two of the team had problems with basic skills (functional literacy and numeracy). All were from the study neighbourhood. Each member of the core community researcher team was supported by a local government worker (five support workers in total) who were also part of the research team.

A commitment to the values of empowerment was also demonstrated through the provision of qualifications. Six of the seven community researchers completed a qualification in research skills which was awarded through a quality-assured accreditation system for informal or community-based education that exists in the UK.[7] Five of the local government workers who were part of the research team gained assessor status for community-based qualifications. Some of the

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[7] The accrediting body is called the National Open College Network.

team also gave a presentation to undergraduate students at the University as part of students' research skills training as a form of reverse service learning.

Equality in relationships was facilitated in two key ways: the creation of a standard research team; and attempts at co-design at all stages of the research process subsequent to the initial specification by the client. All participants were full members of the research team, with the academic as research team leader as would be usual in a research project with a lead Project Investigator. However, the other team members had co-investigator status, rather than being the equivalent of research assistants. Six research team training meetings were used to provide basic training on research skills, and to design or complete each stage of the research as a group. Efforts were made to put co-design into practice in all stages of the research project. Co-design or co-production was used to: design the research and agree research methods; select the sample; draw up detailed research questions; select suitable study sites and access to respondents; create and adapt the research instruments; complete the fieldwork; develop the coding framework and analyse the data; prepare the findings, recommendations and presentations to the policy-makers. All members of the team conducted fieldwork. Some co-design was achieved using simple but generic techniques. For example the specific research questions were the result of an individual brainstorming exercise, and team discussion. Research skills training and other facilitation was also provided to help make more technically challenging aspects of the co-design a genuine and meaningful process for inexperienced community researchers and local government workers. For example, to introduce the concepts of coding and thematic analysis, a session involved the group interpreting and coding lyrics from popular music songs about alcohol harm. Following this introduction, all members of the research team worked in pairs to blind code a sample of the data across all four research methods.[8] The coding framework was then created by reconciling the six sets of codes as a group in one of the team meetings using a simple chart. During a team meeting, the team then spilt into smaller groups to include members with more or less advanced literacy skills. Each group fully coded a section of the data. The coded data was used to create a thematic analysis. Participatory research has less commonly achieved full co-design in the initial and latter stages of research, including analysis and writing up (Beebeejaun, Durose, Rees, Richardson, & Richardson, 2013). 'Song lyrics' training meant that the coding framework and coding of data leading to the analysis

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[8] Some pairs were made up of two community researchers; others were one community researcher and one local government worker; one team was two local government workers.

was a genuinely collective effort. However, the project team leader (i.e. the academic) took the majority of responsibility for writing up the analysis done by the team. Divisions of labour for writing up research are complex on any project, and this may or may not represent a power inequality for the case study. However, it is the case that this gap was not adequately addressed in the case study. Although, the drafts were subsequently checked verbally with the team, and circulated for written comments. Amendments for the final report were agreed verbally by the whole team after the feedback from the workshop. Verbal presentations on the findings were given by community members of the research team.

The basic specifications for the project were not co-designed with citizens. Pre-project contract negotiations between the academic and commissioners highlighted their concerns about this element of the participatory ethics of project. Some commissioners felt that there was a tension between the co-design principles of the project and the constraints of the brief and commission. Specifically, they were unsure whether it was acceptable to recruit the research team on the basis of a pre-set specification for the research topic (alcohol harm) and research aims (gather perception data to generate policy recommendations on behaviour change). One resolution was to make these specifications transparent in the recruitment materials and taster sessions. An effective counter-argument was that many 'professional' academic pieces of research are equally constrained by funders' specifications and research interests. Employing the principles of equal relationships meant trusting that the community members of the team would be able to understand and appreciate this reality. Minutes of the taster sessions show that participants had been attracted by the content of the brief as much as the opportunity to develop new skills and engage in voluntary work, and were therefore comfortable with the constraints of the project.

Beyond their participation in producing the report of the project, the community researchers team declined an offer of co-producing and co-authoring this academic output. Their stated reasons for this were that they felt their time would be more productively invested in the other follow-up activities such as the dissemination of project findings through a community play, new deliberative research through a citizens' jury, and exploring income-generating opportunities for the team to work as a research consultancy.

4.3.2. Primacy of the Method and Separation of Researchers and Respondent Roles

Research team training sessions were structured to maintain the primacy of the method. In one session, an exercise to identify potential samples first drew on the

community researchers' existing local knowledge of groups at risk or experiencing harm from alcohol, and then tested this against existing secondary analysis of local administrative health data. Their local knowledge was not the basis for the sample selection, but instead was used as a way of applying research methods training. The idea behind this was to build research skills in an empowering way by grounding the discussion in people's existing experiential assets. All of the possible samples generated by the group also appeared in the health data as priority groups for existing alcohol harm (e.g. mortality rates and hospital admissions). However, as the group reviewed the available data, they found that it only included adults over 18 years, and was based on indicators which measured harmful outcomes rather than risk factors. A research aim was to identify targets for preventative work, and other data and intelligence held by the local government team also suggested that children and young people from this deprived neighbourhood were a high-risk group. Therefore, a result of the data review was an amended sample for the research. The sample consisted of three groups either currently at most risk of harm from alcohol, and/or where preventative early intervention could be effective: younger people (teenagers and young adults) aged between approximately 13 to 25 years; parents of younger children; isolated and/or vulnerable single older people (over age 50 years).

Another approach used to maintain scientific methods, given the skills and capacities of the group, was the use of projective techniques in the research instruments in the qualitative fieldwork. Projective techniques are broadly defined as the presentation of ambiguous stimuli to respondents. They include use of materials such as video clips, photographs, or objects to prompt discussion, as well as qualitative instruments where respondents undertake self-completion exercises. The project used projective techniques in the vox pop interviews, postcards, and focus groups. Examples of the specific projective techniques included questions in the vox pop interviews which asked respondents to complete the sentences 'Drinking is enjoyable because…' and 'Drinking causes harm because…'. The self-completion postcards requested written responses to an open ended question. Postcards invited people to 'anonymously contribute a secret about alcohol. Your secret can be a: regret; fear; betrayal; confession; desire; or childhood humiliation. Reveal anything as long as it's true'. Focus groups used photographs and images of people drinking alcohol to prompt discussion.

Conventionally, these techniques are used because of their advantages in eliciting open responses from respondents. For the purposes of community research, they also had the advantage of being accessible for relatively inexperienced researchers. They offered a simplified and easy to execute set of research protocols. These research instruments did not require sophis-

ticated literacy skills, or rely too heavily on individual researchers' ability to phrase appropriate questions. Therefore, they helped to reduce the risk of inconsistency in the conduct of fieldwork across different researchers. In comparison, the in-depth semi-structured interviews demanded higher levels of literacy and qualitative research skills. To address this, several measures were taken, all of which were more time- and technology-intensive for the project. Additional intensive research skills training was completed by team members undertaking this method. Interviews were conducted by phone, and could therefore be recorded, with the recording used to double-check the transcribed handwritten notes. Technology was arranged that allowed two interviewers to conduct interviews to overcome residual research skills and literacy issues.

Throughout the project, the issue of the separation of researcher and respondent roles arose in different symptomatic ways. There were several ways in which the community researchers themselves appeared to drive for a clear separation of roles, and also some suggestions that the commissioners wanted to push them towards being respondents. For example, early in the project a seemingly minor debate in the team meetings was about how the researchers would identify themselves during fieldwork. A decision was reached by the team that all members would be referred to as have an institutional affiliation as 'University of X' researchers. The community participants in particular did not want to be identified as local residents, but as researchers, and requested University-branded identification badges. Community researchers also were reluctant to conduct fieldwork in parts of the neighbourhood closest to where they lived, as they felt their familiarity with the people and place could be a hindrance to getting good quality data, rather than a help. In response, fieldwork was allocated to study sites outside the community researchers' immediate home location.

Most crucially, initial attempts by the commissioners to place community researchers in the position of respondents were rejected by the community researchers on the grounds that this would poor quality research, based on a small and biased sample. Their personal interests and motivations were to investigate wider community perspectives.

It was more challenging to maintain the separation of roles in the later stages of the project. Despite efforts to focus policy discussions on the research findings and recommendations, the commissioning partnership was ambivalent, and sought to focus on the community researchers' views as respondents, rather than focusing on the data. Policy discussions veered between the content of the research report, and questions about the personal experiences of individual community researchers. This switching between anecdote and evidence can also be seen in policy discussions be-

tween decision-makers and professional academic researchers; it is not peculiar to community research, but is equally problematic for policy research.

4.3.3. Public Policy Research and Policy Engagement

One of the challenges was to design methods that combined some of the features of citizen science in the natural sciences with research with human subjects. For example, inexperienced non-professional researchers collecting sensitive and personal data from field situations using easy to learn and execute protocols. In the alcohol research, the methodology was designed specifically to address this challenge. For example, the projective techniques were effective in eliciting further qualitative material of the most sensitive nature. Self-completion postcards yielded some of the richest and most personal data, with in-depth accounts of childhood abuse, family violence, personal stigma and other issues. With a very simple protocol of a request to complete the postcard, it reduced the level of complex fieldwork skills needed to generate quality data on this topic.

Having a commissioned project specifically aimed at developing policy recommendations anchored the research into an ongoing public policy discussion, which included a formal presentation of the findings and recommendations to the commissioners. However, being commissioned is no guarantee that evidence will be heard or used by policy-makers, as there are many barriers (Richardson, 2013). Additional meetings were held with one member of the commissioning body employed by the organisation which had provided funding for the research. These meetings, held during the research design stage and in the early development of findings resulted in the commissioner then advocating for the research to the wider group of decision-makers inside and outside of formal meetings.

Another strategy used by the team in the case study project was to test and refine draft findings with intended policy and practice recipients. The brief for the research was to develop recommendations for interventions by public and voluntary sector organisations. The team was directed by the client to focus on specific organisations that had already agreed in principle to deliver alcohol harm reduction action plans. Therefore, a workshop with service providers across sectors was used to shape the findings into priority policy recommendations which were likely to find purchase with the organisations that would be asked to implement them. It involved a group of around 25 people who were paid professionals as well as voluntary practitioners from a wide range of services, including specialist alcohol services, family services, front-line neighbourhood services e.g. the police and services for young people. The service providers included organisations in public, voluntary and community sectors. In

the workshop participants assessed each of the research findings in relation to relevance and salience to their work, and how effectively the issue was being dealt with by their service. These responses were plotted using a two way matrix with each service placing their provision in the appropriate quadrant on a chart. Of the ten key findings some presented more of a challenge to existing thinking by professionals, while other reinforced what was already known. Reactions from practitioners in the workshop were that all of the findings were salient, and were the basis for priorities for action. These stark findings on the inter-generational effects of alcohol harm gave added impetus to practitioners already moving towards 'whole family' approaches rather than working separately with individual family members. Fresh insights from the research included the finding that it was possible to get some residents in the neighbourhood to talk openly about sensitive and personal alcohol issues, contrary to the original pessimistic view of professionals that this would not be achievable. Recommendations arising from the findings were amended based on feedback from the workshop.

Following this iterative process, the report and recommendations were presented by the whole team to the commissioners and decision-makers. They accepted the longer list of recommendations for action, but amended the ordering of policy priorities. They also then agreed to invest further resources in community research approaches, by commissioning an adapted citizens' jury-method to explore policies on health eating. The statutory public health organisation also commissioned the findings from the alcohol research to be made into a play, with community members as actors, to be performed in the locality.

5. Conclusions

Echoes of Lindblom and Cohen's 1979 critique of elite models of research can be heard in current debates between different approaches to public engagement in science. They are framed here as a binary between the strengths of, and challenges for, both citizen science and CBPR. One key conclusion drawn is that a professional and scientific orientation to social inquiry, or in this case public policy research, can be retained without necessarily being professionally dominated or professionalized. Research methods and skills are tools to which more people outside the profession could have access, if we as professionals facilitate the process of democratization of policy research.

An argument has been made for the implementation of three core features of a more fully integrated approach to public engagement in policy science: commitment to empowerment principles; primacy of the method and separation of respondent and researcher roles; and direct policy orientation. How to

translate debates about epistemology and principles into practice is an area for further discussion. Expanding this type of research requires other changes, including to the infrastructure for ethical approval and peer review which is currently structured around the academic profession and disciplines. This is a case study about participatory research that has been produced with permission, but without participation of the original research team. A desire to produce on peer reviewed journal article outputs is not necessarily shared with such fervour by our community and practitioner partners. The rest of the research team in the case study accepted the value of peer review as a guarantor of quality, and understood its reputational benefits. In this case, their astute recognition of a powerful academic incentive structure for publication meant they were able to prioritise other activities. It would be interesting to see what trade-offs different parties would have made in different circumstances. For example, if alternative formats for academic outputs such as drama were more widely accepted in academia, or if peer review was structured differently. More broadly, this discussion highlighted the presumption of a hierarchy of outputs from research, which privileges outputs which are perhaps more obviously suited to the further academic careers and the academy, rather than achieve a broader set of personal or social objectives for those inside and outside Universities.

Another issue is that part of the nervousness around PPSR-style approaches has been a sense that if citizens are merely research assistants rather than privileged respondents, then they are at risk of exploitation. One attraction to commissioners of the community researchers in the alcohol project was that the project had fewer cash costs than a conventionally conducted project, with estimates of between £20,000 and £25,000 savings in this case. Plans to generate salaries for the community researchers by creating a not-for-profit research consultancy business were some way off being developed. However, some of those who have raised the issue of 'mass exploitation' themselves agree this is a rather crude framing, and wish to 'capture another side […] rarely remarked upon […] strong feelings of love and appreciation between many citizen scientists and the [research] community they are serving' (Weinstein, 2012, p. 1).

Beyond these operational issues, the potentialities are unlikely to be realized in the absence of a commitment by academics to a fuller integration of the principles of both empowerment of citizens, and scientific empirical policy research. Our starting point was the complex ongoing challenge of how to open up academic research to include citizens in meaningful ways. More needs to be done to persuade academic elites that policy research could and should look beyond academia for help in creating robust policy-relevant knowledge. However, well-intentioned attempts to recognise the value of people's lived experience and experiential expertise could, perversely, reinforce the exclusion of citizen researchers from professionals. Even those who claim that academics need to acknowledge their own inherent biases and forms of 'truth' as partial do not advocate that professional researchers simply rely on their own experiences for data. Re-visiting Lindblom and Cohen's critique, 'common sense' abilities of ordinary people could also help them to perform research to a good standard. Citizens' impulses towards 'casual empiricism', where they exist, could be directed towards more formalized empirical public policy research. 'Thoughtful speculation' is an analytical skill which has the potential to be transformed into scientific analysis using data. In these ways, public participation in public policy research could gain expand and gain strength, without either losing its integrity.

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Conflicts of Interest

The author declares no conflict of interest.

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Book Review

In Search for Four Roads to Regionalism

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Abstract
Book Review: Roads to Regionalism: Genesis, Design, and Effects of Regional Organizations. By Tanja A. Börzel, Lukas Goltermann, Mathis Lohaus and Kai Striebinger (Eds.). Burlington, UK: Ashgate, 2012, 294 pp.; ISBN: 978-1-4094-3464-1.

Issue
This book review is part of a regular issue of Politics and Governance, edited by Professor Andrej J. Zwitter (University of Groningen, The Netherlands) and Professor Amelia Hadfield (Canterbury Christ Church University, UK).

During the past few decades, the proliferation of regional organizations has generated a tremendous surge in regionalism studies. Recently published book *Roads to Regionalism: Genesis, Design, and Effects of Regional Organizations,* edited by Tanja A. Börzel, Lukas Goltermann, Mathis Lohaus and Kai Striebinger, presents an eclectic volume of non-European regionalism insights into academic debate. The book aims at four questions' framework—four distinct perspectives, or so-called 'roads', to study regionalism. In brief, from the authors' perspective, the analysis of genesis (why to set up, join or leave regional organization), institutional design (how institutions are created), domestic factors (how state's behavior affects regional organization) and effects (what is the impact of regional organization) allows grasping multiple dimensions of the compound nature of regionalism. This young scholars' volume is also organized around these four 'roads', mapping development patterns of regional organizations' (ROs) outside Europe. Chapter by chapter draws a sound picture of mostly undiscovered issues and features of ROs worldwide, mainly of ASEAN, MERCOSUR, NAFTA and ECOWAS.

The first 'road' maps the way of the creation of ROs and their development and growth worldwide. Three different cases dwell on regionalism initiatives in post-

Soviet Eurasia, South-East Asia and Latin America, revealing the reasons for establishing and/or joining RO, ways of integration and their results. The second question of institutional design is addressed by exploring the differences and similarities between ASEAN and NAFTA, and between ECOWAS and the Arab League. The answers to a question "why?" are complemented by the explorations of possible answers to "how?". The third block of chapters contributes to the discussion of the importance and the effects of state factors and behavior for regionalism, in particular exploring state's capacity and democratization effects in ROs in East Asia and Africa. Subsequently, the debate of effects is reversed, and the collection of the case studies examines ROs' impact and the effects on Member States (MS) in MERCOSUR, ASEAN and NAFTA.

The book's strengths stem from its four questions, theoretical eclecticism and a variety of ROs' cases analyzed. Research gaps in regionalism studies, indicated by Mansfield and Solingen (2010), like the necessity of understanding the direction of regionalisms and their autonomies in globalization, the role of hegemon, and the state and non-state actors are adequately covered in the *Roads to Regionalism*. In fact, the volume's thesis of "genesis, design and effects" completely reflects their call for the analysis of sources, forms and conse-

quences. Some chapters provide insights into the effects of ROs, regarding human rights, accountability, democracy and transparency; while the reversed impact is analyzed in remaining part of the book. Correspondingly, *Roads to Regionalism* fills the gap of non-European regionalism studies. On top of that, the linkages between political/security regionalism and economic regionalism are also analyzed and explained, for instance post-Soviet space, East Asia and other regions. In a nutshell, the book provides extensive explorations of ROs worldwide, like ASEAN, NAFTA, and MERCOSUR. The volume gives quite a broad and wide picture of the different kinds of regionalisms and their common ground.

However, several remarks should be made regarding weak sides of the book. As much as it seems theoretically eclectic volume from the first glance, *Roads to Regionalism* does not provide a sufficient combination and integration of qualitative and quantitative methods in the case studies. Although, quantitative methods or their combination with qualitative ones would have helped answering important questions more extensively. In addition, the only application of statistical analysis is slightly unconvincing: it is unclear what exact statistical methods were used to reveal the trends, what kind of relationship was modeled, and how missing data was interpreted in the study. Simultaneously, it is apparent the lack of referencing to more than one political economy theory (in this case Mattli's work), and their explanations of regional cooperation, as well as New Institutional Economics School's findings regarding functioning of institutions. Moreover, there is some bias in example of European integration. Regionalism *per se* is defined as a state-led project, whereas simultaneously authors look for the evidence of re-

gionalization (market integration) like in the EU, even though, as Breslin and Higgott (2010) show that market integration is not necessarily a result of policies. Likewise, the question remains why is the comparison with the EU introduced only in some cases, if in fact there are more similarities than differences. One should not be surprised to discover how many similarities to the EU emerge, when old regionalism framework is applied for so-called new regionalism cases. To sum up, more combination of methods and reference to other literature would have made this volume even stronger handbook for interested in regionalism.

To conclude, as editors introduced and summarized, this volume shows not only the emergence of regionalism as a field of study, but also the importance of analyzing regionalism processes in other parts of the world. The goal of the book is ambitious and one will find new data exploration and many ideas and prospects for future research. A reader might feel discontented with some mismatches or ambiguous reasoning, like the statement about ECOWAS delegating more political authority to ROs than the EU MS (p. 260), or about powerful states' interests and benefits, for eg., Nigeria (p. 259) in the case of using RO for its own purposes. Someone might also find himself losing the point or skipping some parts in the text due to sporadically very long sentences or paragraphs. Nonetheless, interested in regionalism readers will find the volume helpful and inspiring. *Roads to Regionalism* paves the way for future regionalism studies, pioneers by contributing to the field with the analysis and presentation of multiplicity and complexity of ROs worldwide, and reassures the importance of three different aspects of ROs – genesis, design and multi-sided effects.

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