THE HANDBOOK FOR RADICAL LOCAL DEMOCRACY

RadicalxChange

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1 Introduction

A HANDBOOK OF NEW SOCIAL TECHNOLOGIES FOR COLLABORATING ACROSS DIFFERENCE

Good governance means striking a good balance between public power and private power. Public power has the potential to be exceptionally fair and democratic. But governments sometimes wield their power counterproductively. Private power, conversely, has the potential to be uniquely flexible and efficient. But private actors sometimes wield their power without regard for democratic values and the general welfare.

In many ways, the politics of the past century was characterized by a long tug-of-war between public and private power. But these debates have passed their sell-by date. What we need now is a fresh perspective — a new methodology for mixing, blending, and balancing public and private power.

History offers some clues. During the industrial era, technological disruption placed immense strains on society and hastened the need for new ways of governing. The resultant reforms included the expansion of democracy toward universal suffrage; the end of child labor and the rise of unions; the rise of antitrust law; and the beginnings of the welfare state. These new modes of social organization helped society accommodate radical changes in technology.

These changes were not “pro-government” or “anti-government”. Rather, they were social innovations based on democratic values. Their common feature was that they pushed power outwards, away from sites of highly concentrated public or private power, and into the hands of individuals and communities. They enabled new, more responsive, and more genuinely democratic institutions to support technological progress — while also main-

taining an open and free society. They served as a counterweight against the tendency of new technologies to generate concentrations of power in either government or industry — and the corresponding tendencies of those power concentrations to push societies toward anti-democratic modes of government.

By mixing and balancing public power and private power in new ways, while empowering communities, the reformers of the first part of the 20th century bolstered civil society, and helped the United States navigate — however imperfectly — many of the challenges that pushed other societies into totalitarianism.

We need similar social innovations today. In recent years, social technologists have been developing new ways of striking an attractive balance between public and private power. A few of these ideas are the subject of this short handbook. While they may be a bit unfamiliar, the values and the way of thinking behind them are not. For democracy to function, everyone needs to have a voice, and everyone needs to be encouraged to engage with civic processes that allow collaboration across difference.

To revitalize democracy, we desperately need updates to our basic mechanisms of collective decision-making and resource sharing. That is what these ideas strive for. We hope you will find something inspiring here.

Quadratic Voting

WHAT IS QUADRATIC VOTING?

Quadratic voting is a twist on normal voting procedures, which allows voters to express their wishes with more precision. It lets voters trade some of their overall voting power for the right to "speak louder" on the issues they deem most important. A growing body of academic work and real-world use cases[1] indicates that quadratic voting captures more precise and useable information than simple voting. For example, in 2019 the Democratic Caucus of the Colorado House of Representatives successfully used quadratic voting to decide which spending bills to prioritize.[2] The experiment was a success, and cutting-edge institutions[3] all over the world are now adopting quadratic voting for both internal and public decision-making processes.

THE RATIONALE BEHIND QUADRATIC VOTING

Simply Allowing Voters To "Reallocate" Votes Creates A Problem

Letting voters reallocate votes to issues they care more about is an old idea with a clear appeal. It would obviously be a boon to democracy if people could indicate *how strongly they felt* about issues, in addition to which choice they preferred. For example, if a voter cares weakly about one issue, but strongly about another, why shouldn't they be able to vote twice on the one she cares strongly about, while abstaining from the other?

1 See Wikipedia for a partial list of examples *https://en.wikipedia.org/wiki/Quadratic_voting.*
2 See, e.g., A New Way of Voting That Makes Zealotry Expensive, Bloomberg (May 1, 2019), *https://www.bloomberg.com/news/articles/2019-05-01/a-new-way-of-voting-that-makes-zealotry-expensive*.
3 Official site of the Taiwan's 2019 Presidential Hackathon *https://presidential-hackathon.taiwan.gov.tw/en/.*

Yet, simply allowing people to concentrate their votes on single issues has failed to become a popular democratic practice, because it leads to a serious problem. Namely, people and groups who aggressively concentrate their votes nearly always win their favorite issues. It encourages everyone to concentrate their votes on single issues as much as they can stand to, meaning that the ballots stop capturing voters' views on other issues, which they care about more moderately. It ultimately impoverishes the voting process.

Quadratic Voting Addresses It

Quadratic voting retains the flexibility and benefits of allowing vote reallocation — but it solves the "loudest voices in the room" problem. It does so by (1) allowing voters to reallocate their votes, while also (2) imposing a precisely calibrated, non-monetary cost on voters who choose to do so. The "cost" increases with the degree of concentration so that ***the more they concentrate their votes, the fewer votes they get to cast overall.***

HOW DOES IT WORK?

In quadratic voting, each voter starts with an equal budget of "voting credits". They can then allocate these credits to different voting issues as they please. To illustrate, picture a ballot with 10 issues or questions on it. Each voter likewise has 10 voting credits, and each vote "costs" one voting credit. So, they may simply choose to spend her 10 voting credits by casting one vote on each issue. But if she prefers to concentrate her voting power on a particular issue, she must pay a special cost for doing so. This cost is calculated as the **square of the number of votes cast.** In other words, if she chooses to vote twice on an issue, she must spend four voting cred-

its (because two squared equals four). Similarly, if she chooses to vote three times on an issue, she must spend nine voting credits (because three squared equals nine). This dynamic is illustrated in the graphic below.

Credits	Votes
●○○○○○○○○○	1
●●●●○○○○○○	2
●●●●●●●●●○	3

In this illustration, we have three verified voters (corresponding to the three rows), each voting on the same bill. Each has a budget of 10 voting credits. The first voter spends one credit — which buys one vote — and has nine left credits left over to vote on other bills. The second voter spends four credits, which buys two votes on the bill. The third voter spends nine credits, buying three votes on the bill, but leaving her with only one voting credit to allocate towards other bills.

WHAT KINDS OF SITUATIONS CALL FOR QUADRATIC VOTING?

Small group decisions by town councils, corporate boards, or cooperatives

Instead of taking simple up-down votes on a series of issues, collect the issues on a single ballot and present this ballot to the voting members. After all the issues have been discussed and debated, have the voting members vote privately, and submit their votes simultaneously. If there are rules such as bylaws governing how decisions need to be taken, simply conduct a quadratic

vote, and then "endorse" the results through a conventional majority vote per the bylaws.

Large group decisions such as public elections

Quadratic voting can be done in large groups as well as small. As with any election, it is important that the voting be done privately and that the identity of the voters be verified so that no one can vote more than once.

Surveys

Quadratic voting has been shown to outperform[4] the typical methods of preference-strength measuring (i.e., rating on a scale of 1-5?). We recommend asking people to allocate a budget of voice credits across different statements, according to how strongly they agree. This permits respondents to indicate where they actually feel most strongly.

LIKERT SCALE

1	Strongly Disagree	
		40% Negative
2	Disagree	
3	Undecided	20% Neutral
4	Agree	
		40% Positive
5	Strongly Agree	

4 Charlotte Cavaillé, Daniel L. Chen, Karine Van der Straeten, Towards a General Theory of Survey Response: Likert Scales vs. Quadratic Voting for Attitudinal Research, The University of Chicago Law Review, 2019, forthcoming (Nov. 19, 2018), *https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3307327*.

The following illustrations, from research by David Quarfoot,[5] illustrate the advantages of quadratic voting over a conventional survey methodology (called Likert scales). Using the conventional Likert scales, many respondents assert that they feel strongly negatively or strongly positively (figure X). But a quadratic voting survey asking the same question reveals that respondents' strength of feeling is much more closely clustered around the midpoint — indicating weakly positive or weakly negative preferences (figure Y). This result is actually not surprising. Using conventional surveys, respondents can express extreme views at no cost. In quadratic voting, however, respondents must pay in voice credits to express an extreme view. This incentivizes them to think carefully about which issues really matter the most to them, thus providing much richer information to the survey-taker.

Ranking or prioritization exercises

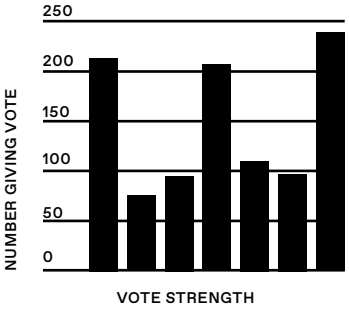
Quadratic voting can be used to help a group rank or prioritize a long list of options. Simply allow each group member to allocate their voting credit budget across the options, with the voting credits representing the square of the "counted" votes. Compared to other methods, this yields more detailed and nuanced information about the group's level of support for each of the options.

5 David Quarfoot et. al., Quadratic Voting in the Wild: Real People, Real Votes (unpublished manuscript) (Mar. 30, 2016), *https://papers.ssrn.com/sol3/papers.cfm?abstract_id=2755844*.

COMPARING QUADRATIC VOTING RESULTS USING WITH LIKERT SCALE POLLS

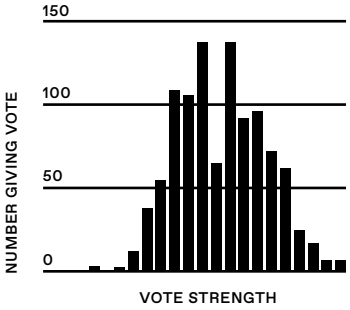
Likert Votes for repeal Obamacare

FIGURE X

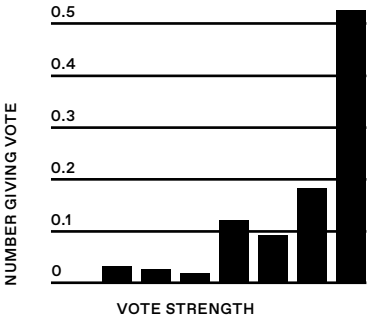


QV votes for repeal Obamacare

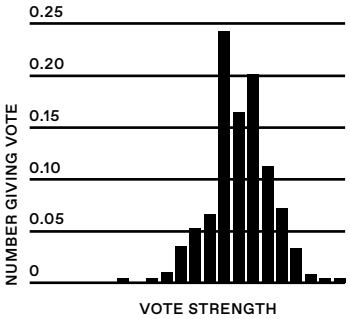
FIGURE Y



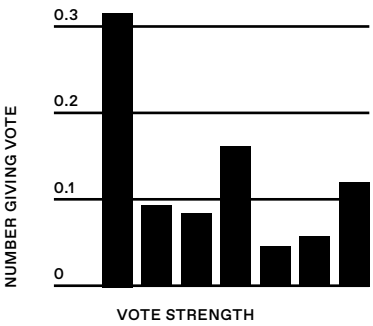
Likert Votes for Pay Woman Equally



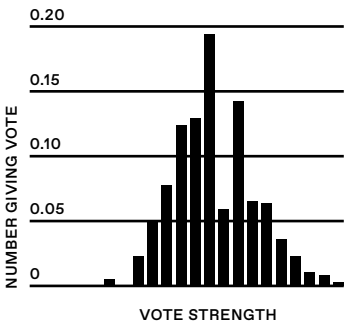
QV Votes for Pay Woman Equally



Likert Votes for Ban Abortion



QV Votes for Ban Abortion



The next graph shows the smooth prioritization curve that the quadratic voting process yielded for the Democratic Caucus in the Colorado State Representatives, who used it to prioritize a long list of spending bills in 2019.[6] This solves a very clear problem. In 2018, before using quadratic voting, the Democratic Caucus used a different process where each representative simply received 15 votes to cast for the 15 bills that they felt deserved funding. That process generated what Representative Chris Hansen called a "big blob" of bills with roughly the same number of votes,[7] and no clear preferences between them. By contrast, quadratic voting generated a clearly ordered list, showing which bills have the most support and how steeply the support declines as one proceeds down the list. It is easy to think of other examples where this kind of prioritization curve would be desirable. For example, consider the front office of a sports team, which needs to decide not only how it orders an upcoming class of draft prospects, but also where in that ordered list the largest quality "drop-offs" occur. A quadratic vote would allow the whole scouting team to combine its assessments of a long list of draft prospects, thus identifying the quality drop-off points, and giving accurate information about the team's degree of enthusiasm for each different player.

6 See, e.g., A New Way of Voting That Makes Zealotry Expensive, Bloomberg (May 1, 2019), *https://www.bloomberg.com/news/articles/2019-05-01/a-new-way-of-voting-that-makes-zealotry-expensive*.

7 See, e.g., $120 million in requests and $40 million in the bank. How an obscure theory helped prioritize the Colorado budget, Colorado Sun (May 28, 2019), *https://coloradosun.com/2019/05/28/quadratic-voting-colorado-house-budget/*.

Colorado 2019 Quadratic vote distribution

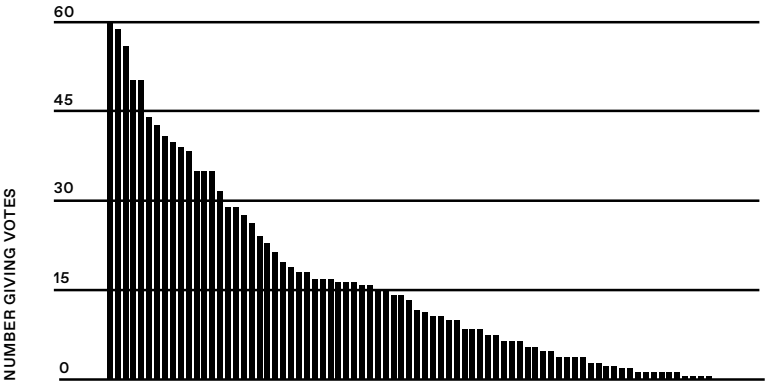


Table Of results For Colorado Quadratic vote (top 25)

60	Equal Pay For Equal Work Act
59	Demographic Notes For Certain Legislative Bills
55	CDPHE Maternal Mortality Review Committee
52	Youth Mental Health Ed & Suicide Prevention
52	Grants For Property Tax Rent & Heat
44	Mental Health Parity Insurance Medicaid
43	Health Care Cost Savings Act Of 2019
40	Increase Student Aid Application Completion Rates
38	School Nurse Grant Program
38	Comprehensive Human Sexuality Education
37	GreenHouse Gas Pollution Impact In Fiscal Notes
36	School Incentives To Use Colorado Food & Producers
33	Expand Child Nutrition School Lunch Protection Act
33	Sexual Assault While In Custody Or Detained
33	Office Of Public Guardianship Operation Conditions
31	State Court Administrator Reminder Program
29	Increase Tax Credit Allocation Affordable Housing
29	Modify Innovative Motor Vehicle Income Tax Credits
27	Wildfire Mitigation Wildland-Urban Interface Areas
25	Child Care Expanses Tax Credit Low-income Families
23	Investment In Primary Care To Reduce Health Cost
22	CO Child Abuse Response And Evaluation Network
29	Child & Youth Behavioral Health System Enhancement
29	Regulate Student Education Loan Servicers
18	Colorado Resiliency Office Reauthorization Funding

IMPLEMENTATION TIPS

Fraud, collusion, and vote-buying

Fraud, collusion, and vote-buying are problems in all democratic systems, and quadratic voting is no exception. The integrity of results and/or the benefits of quadratic voting can be undermined if parties agree in advance how to vote, or vote multiple times, or vote on behalf of others. Therefore, private voting and fraud-free voter rolls are essential to building a secure, unhackable system. While this is less imperative, keeping votes private even after they are cast also helps make the system more secure — because then malicious parties trying to buy others' votes cannot verify compliance.

How many issues, and which ones, should be on the ballot?

The more issues there are on the ballot, the more complex the tradeoffs voters can make, and the more nuanced information the process will yield. Therefore, where possible, it is a good idea to put a reasonably large and diverse set of questions on the ballot, touching different subject matter areas that are likely to have different levels of importance for different voters or groups of voters.

Whole numbers

The process of quadratic voting is easier for voters to understand using whole numbers. Therefore, it helps to force voters to allocate square numbers of voting credits to each option. For example, on each issue, you can permit them to allocate 1, 4, 9, 16, or 25 credits. This way, the ballot system can clearly communicate the costs of vote concentration by displaying that 16 credits → 4

votes, 25 credits → 5 votes, and so on. It might seem that compelling voters to use square numbers would reduce the flexibility of the process, but the disadvantages are extremely marginal.

Paper ballots

It is entirely possible to conduct quadratic voting using paper ballots, but it requires voters to check their own work to ensure that they are doing it properly. Simply provide a worksheet that maps the number of “counted” votes to the correct costs in voting credits, such as:

NUMBER OF VOTES	"VOTE CREDIT" COST
1	1
2	4
3	9
4	16
5	25

Then ask voters to indicate the number of votes they wish to cast on each issue, keeping track of spent voting credit on a simple worksheet. Ballots that “spend” more than their budget of voice credits should be returned to voters for correction if possible, but otherwise not counted.

Spreadsheets or simple surveys

Quadratic voting interfaces can be implemented in the form of simple spreadsheets[8] or programmable surveys.

Software applications and blockchains

Democracy Earth[9] builds robust quadratic voting platforms, including the one used by the Democratic Caucus of the Colorado House of Representatives. These platforms can readily be deployed by organizations or governments who are in a position to verify the identity of users.

Moreover, the potential for quadratic voting on decentralized blockchain applications is extremely exciting. However, as of this writing, there is no (decentralized) way of verifying that blockchain users are real, unique humans. This means blockchain-based quadratic voting still depends on some centralized, authoritative verification of voter identity.

Still, technologists are hard at work addressing the challenge of decentralized identity verification. This technology is likely to unlock exciting new possibilities for truly decentralized governance, and we believe quadratic voting will play a crucial role in these emerging systems.

8 See this template, *https://docs.google.com/spreadsheets/d/11JTCQwLATpqCsPBUgLETi2vLesz-S13uzqfyddQvBTg/edit?usp=sharing*.
9 See the Democracy Earth website, *https://democracy.earth/*.

Quadratic Finance

THE RATIONALE BEHIND QUADRATIC FINANCE

The difficulty of funding public goods

Public goods (that is, goods that benefit everyone, non-exclusively) are hard to fund through private markets. Because nobody can capture their benefits, everybody tries to "free ride" and supplies less than their fair share of the shared benefit. It is a classic problem in economics.

Centralized funders, like governments and philanthropists, often step in and try to correct this market failure. But they create issues of their own. Specifically, they sometimes fund things that the community would not have freely chosen.

The appeal of matching funds

Matching funds are a valuable tool fundraising tool for public goods, which helps address this problem. In essence, they allow centralized funders to collaborate with decentralized donors. Central funders (who provide matching funds) and small donors (who provide the "matched" funds) each use their money to incentivize one another in the service of a shared goal.

Matching funds have several clear benefits:

- → They harness decentralized information about what should be funded
- → They make philanthropic or government spending more efficient and responsive
- → They help maximize fundraising by giving central funders and small donors greater incentive to contribute

But most matching funds are unsystematic and sub-optimal

Matching funds usually use a basic template, with little or no optimization or design thinking. It goes like this: Donations are matched according to a simple ratio, such as 1-to-1, until the matching funds run out.

This can be dramatically improved upon. To see why, it's helpful to notice that traditional matching funds sometimes accomplish nothing. Suppose that there are two large donors for a cause. Donor One establishes a matching fund of $1,000,000. Donor Two then makes his donation of $1,000,000 — which he would have made anyway — exhausting the matching fund. The matching fund thus accomplished nothing. It did not increase the amount of money raised, nor increase the number of contributors to the cause.

For an example of an unsystematic matching fund system, look at the chart describing the New York City campaign finance matching funds from 2019:

	Mayor	Public Advocate and Comptroller	Borough President	City Council
Contribution limit	2000$	2000$	1500$	1500$
Matching rate		$8 to $1		
Maximum matchable per Contributor	250$	250$	175$	175$
Maximum matchable per Election	2000$	2000$	1400$	1400$
Maximum Public Founds Per Election	5,464,500$	3,461,250$	1,230,000$	142,000$

Who chose the 8-1 matching rate, and why? Why are the individual maximums set at these particular levels? They appear to have been arbitrarily chosen. There is a more efficient and optimized way of allocating matching funds.

WHAT IS QUADRATIC FINANCE?

A 2018 paper[10] by Vitalik Buterin, Zoe Hitzig, and Glen Weyl proposed a new mechanism design for matching funds. It optimizes their usefulness, among other things, by encouraging more broad-based participation in fund-raising drives.

It works based on a formula that seems complicated, but is not. Namely, the total funding for a proposal is ***the square roots of each private contribution, summed up, and then squared.*** Again: You take each donor's contribution, and find its square root. You then add those square roots up, and square the total. This operation gives the "total funding" for the proposal. The total funding, minus the sum of the individual contributions, gives you the amount of money that the matching fund allocates to the proposal.

The result of the formula is that proposals with few contributors get little or no match, while proposals with many contributors get large matches.

10 Vitalik Buterin, Zoe Hitzig & Eric Glen Weyl, Liberal Radicalism: A Flexible Design For Philanthropic Matching Funds (unpublished manuscript) (Dec. 2018), *https://ssrn.com/abstract=3243656*.

To illustrate the whole process more concretely: Let us say we have a matching fund of $50. There are three proposals (Fix Streets, Build Playground and Improve Cell Coverage), and three participants in the quadratic finance process (Alicia, Bertha, and Cecilia). Their contributions to the three proposals run as follows:

	Fix Streets	Build Playground	Improve Cell Coverage
Alicia	$9	$1	$1
Bertha	$1	—	$64
Charles	$4	$16	—
Pledged Amount	**$14**	**$17**	**$65**

First, think about why different individuals might value these three proposals differently. Likely, they derive different private benefits from the different public goods. Alicia really hopes to see the potholes fixed on the streets, but likes the other proposals as well. Bertha cares a little bit about the streets, and doesn't much want a playground in her neighborhood — however, she runs a business that requires her to drive around town and take phone calls constantly, so she is likely to become more successful if the cell coverage improves. Charles, meanwhile, really wants a playground — he has several children who lack good places to play.

The matching would work as follows. First, take the square roots of each of the contributions for each proposal, and add them up.

	Fix Streets	Build Playground	Improve Cell Coverage
Alicia	3	1	1
Bertha	1	—	8
Charles	2	4	—
Sum of Roots	**6**	**5**	**9**

Now, square each of those amounts to get the final funding amount:

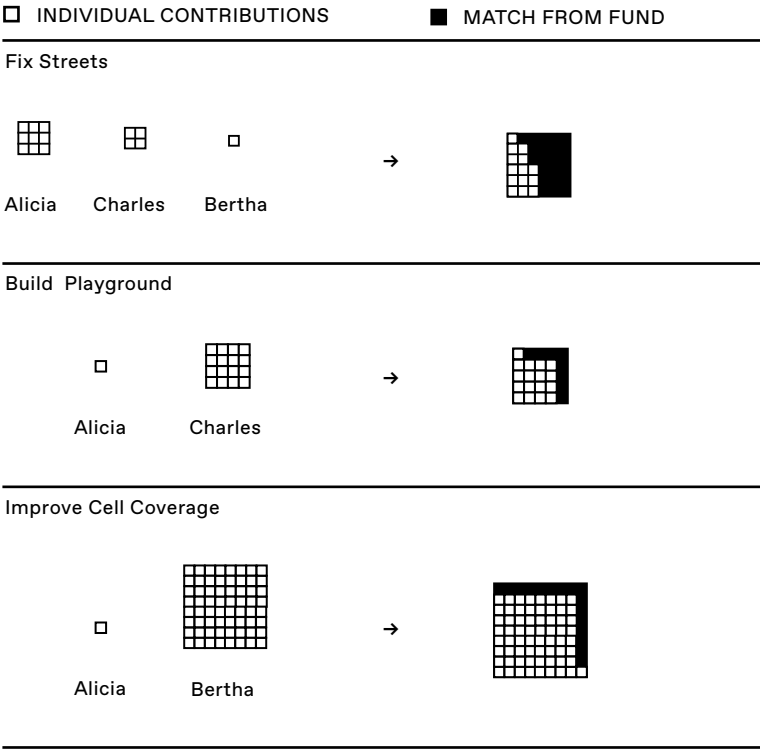
	Fix Streets	Build Playground	Improve Cell Coverage
Funding Amount	**$36**	**$25**	**$81**

Recall, however, that the quadratic finance matching fund only supplies the difference between the total funding amount and the pledged amount:

	Fix Streets	Build Playground	Improve Cell Coverage
Funding Amount	**$36**	**$25**	**$81**
Pledged Amount	**$14**	**$17**	**$65**
QF Match	**$22**	**$8**	**$16**

The total amount of matching funds allocated is $46, which is less than the available $50, so the remaining $4 may be saved. Notice that the cell coverage proposal got the smallest match to its contributions (16/65), while the street fixing proposal got the largest (22/14). That's because the cell coverage proposal had the most con-

centrated support (most coming from Bertha), while the street fixing proposal had comparatively even, broad-based support from Alicia, Bertha, and Charles. the street fixing proposal got the largest (22/14), as this illustration shows.



Limited Matching Budgets

In many cases, particularly where there are many participants, the quadratic finance formula will suggest very large matching amounts that exceed the matching budget. This is not a problem. You simply allocate the matching budget between the competing proposals “pro rata”, according to the matching amounts they would have received if you had an infinite budget. This remains a far

more optimized use of matching funds than doling them out according to a predetermined ratio, such as 1-1 or 2-1.

USE CASES FOR QUADRATIC FINANCE

In government

Every local government has a "wish list" of infrastructure projects, repairs, and other public goods to which it would like to allocate budgetary funds. Imagine if, instead of trying to prioritize these projects internally, and seeking additional funding sources ad hoc, it simply posted the "wish list" publicly, and called for donations. Then, the government could use its own budget as a pool of "matching funds" following quadratic finance. Not only would this help solicit private contributions, it would also better conform to democratic values by ensuring that the most broadly supported projects got the most public funding, and that the smallest donors benefited from the largest relative matches. The process would generate much more information about the community's true priorities.

A few attractive use cases:

- → ***Funding infrastructure investments or repairs:*** Quadratic finance has the potential to replace central analysis of infrastructure investment needs. A city or other authority could post a detailed list of possible infrastructure spending projects on a public portal. Citizens could then make pledges to the proposals that most appealed to them. The public budget would be allocated as a quadratic finance matching fund to the pledges.

- → ***Funding journalism:*** By allowing citizens to decide

which journalistic outlets they most wished to support, the government could subsidize journalist outlets without "picking winners" (or undermining journalism's ability to be critical of politicians).

→ ***Funding campaign finance:*** A matching fund could be set up to subsidize candidates' campaigns. The quadratic financing mechanism would ensure that candidates with a very narrow base of support — such as those with a small number of wealthy backers — would receive minimal public support.

In cooperatives, associations, and clubs

Cooperatives, associations, and clubs can apply quadratic finance in circumstances analogous to those of government.

A few examples:

→ ***Housing coop:*** A housing coop might use quadratic finance to allocate its budget for the improvement of common areas.

→ ***Software:*** An open-source software organization might use quadratic finance to allocate its budget to important projects.

→ ***Community Fund:*** A philanthropic fund supporting a community might invite members of that community to participate in a quadratic finance initiative to fund public goods.

IMPLEMENTATION TIPS

Maintaining the integrity of the system

The effectiveness of quadratic finance can be undermined when groups of people collude, or when one person pretends to be many. Therefore, it's important to have rules against collusion. Depending on the context, it might be enough to require contributors to certify that they are not acting on anyone else's behalf. But where sophisticated exploits are likely to be attempted, or the stakes are very high, something more robust might be required. For example, the size of the match can be reduced when the group supporting a given cause shares characteristics that make them likelier to be colluding, such as being members of the same family or having many social connections.

Connecting quadratic finance with other mechanisms

One of the most exciting possibilities for quadratic finance comes from linking it to a different, revenue-producing mechanism, called SALSA (below).

SALSA, as you will see, is a mechanism that asks the possessors of certain assets to pay a precise fee corresponding to the negative externality that their possession imposes on the rest of society. By collecting fees raised through SALSA, and using them as a source of quadratic finance matching funds, one can start to imagine a kind of self-sustaining public good funding ecosystem. (For example, heavy users of infrastructure pay a fee for their use; and those funds go into a matching pool that supports improvements to the same infrastructure.)

Self-Assessed Licenses Sold via Auction — SALSA

WHAT IS SALSA?

Imagine that a city decides it has space for 100 farmers market stalls, but there are 300 local food vendors interested in selling their products at the market. How should the city decide which 100 can operate? The city could take one of two traditional approaches.

1) First-come, first-served licenses: The city could set a flat fee for a stall and allocate the licenses to the first 100 vendors who complete some registration process.

2) Auction: The city could auction off the stall spaces to the 100 highest bidders.

Unfortunately, these two approaches both have significant shortcomings in terms of both efficiency *and* social equity (more on this below). Instead, we think that the city should allocate the licenses using a new mechanism called SALSA (Self-Assessed Licenses Sold via Auction). In this system, the stall spaces are sold to the 100 highest bidders via auction. Then, license-holders pay a yearly fee to continue holding the license — this fee is a percentage of each holder's own self-assessed value of the stall license. And — this is where the magic of SALSA happens — if any potential vendor would pay more for a license than the holder's declared self-assessment, the holder *must* sell the license at this new, higher value, unless she increases her own value (and subsequently pays the annual fee on this new, higher value).

Use Cases for SALSA in Local Government

In this section, we'll sketch out two more situations where local governments could apply a SALSA and then provide a list of many shorter ideas. We hope this section inspires some productive brainstorming on your part —

and we encourage you to let us know of any more applications you come up with!

1) Long-term street parking

Many municipalities offer long-term resident-only parking permits, which allow residents to park for longer periods of time than standard public parking (e.g., two-hour parking). Unfortunately, residential parking permits are frequently either free[11] or cheap.[12] This mechanism runs the risk of allocative inefficiency: for a fixed number of parking spaces/permits, an arbitrarily low fee is unlikely to allocate the permits to those who value them most.

We recommend that municipalities use a SALSA mechanism — open to residents and non-residents alike — to improve allocative efficiency. It's easy to imagine, for instance, that non-residents who work in a given municipality may value a parking space more than a resident who already has one car and has just purchased a second one.

Policymakers may have social equity concerns. Many low- and middle-income families rely on affordable parking to support themselves economically, so policymakers may worry that a SALSA will simply allocate parking permits to a city's wealthiest residents. To address this, policymakers could set geographic quotas for the permits: i.e., permits allow the holder to park within a certain two-block area of the city, ensuring that households in the area will be most likely to bid. And, insofar as people of similar income levels tend to live near each other, low- and middle-income households will largely be

11 Boston Considers Charging for Residential Parking Permits, NECN (Jun. 29, 2018), *https://www.necn.com/news/new-england/Boston-Considers-Charging-for-Residential-Parking-Permits-486985971.html*.

12 Request a Residential Parking Permit, City of Cambridge MA, *https://www.cambridgema.gov/iwantto/requestresidentparkingpermit*.

bidding against similarly-situated households for permits. In addition, policymakers should keep in mind that revenue generated from the SALSA's yearly fee is likely to be spent in a progressive manner.

If municipalities want to get extra creative, they could allow the space to be used for non-parking activities too. Some municipalities do this on an infrequent, temporary basis,[13] but there could potentially be large gains both for individual space-users who would value the space and the public who would take in extra revenue from the yearly fee.

2) Micromobility: Bikes and e-scooters

Cities across the world are facing regulatory challenges related to micromobility (i.e., bikes and scooters that provide "last mile" mobility solutions). Implementing a fixed cap on the number of vehicles allowed would resurface the undersupply problem of taxi medallions that we discussed above (i.e., how can a municipality know exactly how many scooters its citizens demand?). However, because micromobility companies are often well-funded and pursuing network effects, cities that do not regulate supply risk becoming flooded with unused vehicles taking up valuable public space and making urban life unpleasant.[14] Some cities are considering"dynamic caps," whereby the number of vehicles each company can deploy expands and contracts according to the "usage rate" of the vehicles.[15] We think that a SALSA mechanism could further enhance the effectiveness of a dynamic

13 PARKing Day, City of Cambridge MA, *https://www.cambridgema.gov/CDD/Projects/Transportation/parkingday*.

14 For a rather extreme example, see, e.g., Alan Taylor, The Bike-Share Oversupply in China: Huge Piles of Abandoned and Broken Bicycles, The Atlantic (Mar. 22, 2018), *https://www.theatlantic.com/photo/2018/03/bike-share-oversupply-in-china-huge-piles-of-abandoned-and-broken-bicycles/556268/*.

15 Polina Marinova, Lime Investor Sarah Smith: It's 'Inevitable' That E-Scooters Are Coming to Every Major Market, Fortune (Feb. 7, 2019), *https://fortune.com/2019/02/07/lime-funding-sarah-smith-bain-capital-ventures/*.

cap. Under our proposed solution, companies would purchase vehicle licenses at auction from the city and then would engage in the self-assessment and exchange process that we have described in detail above — the firms could reallocate vehicle licenses among themselves in an online marketplace and would pay a yearly holding fee based on their self-assessed value. The dynamic cap would be based on the city's overall usage rate, rather than the usage rate of any one particular company.[16] Finally, citizen welfare could be further enhanced with interoperability, whereby users could view the location of and pay for a ride on any company's vehicle in the same app/platform. This way, rather than competing for network effects (and flooding cities with duplicate vehicles in the same areas), companies would compete on price and experience quality.

More Examples

Below is a list of potential further applications of SALSA that we have come up with. This is by no means comprehensive — we encourage you to experiment with others, and let us know what you come up with!

→ ***Temporary vending opportunities:*** Food truck space licenses, really any sort of vendor stall, especially things in the "pop up" vein, because transaction/re-allocation costs would be minimal.

→ ***Road space/transportation units:*** Cap on number of "vehicle licenses" (i.e., vehicles allowed to drive in a city), as a more efficient alternative to cordon or congestion pricing.[7]

16 When the dynamic cap needs to shrink (e.g., because of a decrease in demand, population decline, etc.), the city would randomly purchase back the required number of licenses at self-assessed value from their holders.

→ ***Public facility use:*** Reserving public fields / tennis / basketball courts. With this application, it is probably important to have "windows" of time in which people can buy out your reservation, so that people aren't, e.g., getting bought off a field in the middle of a soccer game.

→ ***Permanent vending spaces limited for other reasons:*** Marijuana stores/liquor licenses (things that cities may have "moral" reasons to cap) .

→ ***Natural resources:*** Grazing rights, mineral, fishery/hunting, farming rights, which are frequently sold off at arbitrary prices.

→ ***Electronic resources:*** Domain names (e.g., NYC has its own domain, ".nyc"[17]).

→ ***Public attention resources:*** Citywide public wifi supported by advertisements, where advertisement slots are maintained via SALSA (i.e., rather than funded by tax dollars).

→ ***Public Facilities Management:*** In 2008, Mayor Daley of Chicago awarded a 75-year lease[18] to a private consortium, allowing them to manage the city's parking meters. The deal has turned out to be a terrible albatross for the city and its residents. A SALSA system asking the lessee to periodically self-assess its franchise, and pay a fee against that (or surrender it to another operator), would have protected the public interest.

17 Ash Milton, COST as Cure for Car Dependency, RadicalXChange Blog, (June 7, 2019), *https://radicalxchange.org/blog/posts/2019-06-07-z6cxo7/.*

18 Chris Lentino, Chicago to Pay $20 Million to Parking Meter Company in 2018, Illinois Policy (Nov. 2, 2017), *https://www.illinoispolicy.org/chicago-to-pay-20-million-to-parking-meter-company-in-2018/*.

THE RATIONALE BEHIND SALSA

Problems that SALSA solves

Black markets: A flat license fee for a limited number of licenses (i.e.,first-come,first-served) runs the risk of corruption and the creation of black markets.[19] For instance, a 2011 Wall Street Journal article explains that New York City charged $200 for a two-year food-cart permit license.[20] But the permits fetched tens of thousands of dollars on the black market — revenue that could have gone to the city.

Holdout problems: Even a well-run public auction will run into the following types of "holdout" problem, rooted in the fact that people's values change over time and new people, with higher values, may enter a city after the auction.

→ ***Assembly cost holdout:*** Sometimes, a large-scale project requires assembling several assets together in a package (think multiple parcels of land needed for a railroad right-of-way). However, once any single asset-holder realizes that a buyer needs to assemble several assets, she can raise the price of her own asset extract some of the gains from the potential projects — and, if all asset holders behave this way, projects that would be productive may not get done. SALSA solves this problem by allowing instantaneous purchase at self-assessed values.

→ ***Endowment effect:*** People frequently exhibit a cognitive bias called the endowment effect, whereby

19 See generally Chapter 2 in Susan Rose-Ackerman & Bonnie J. Paflika, Corruption and Government: Causes, Consequences, and Reform (2016).
20 Prices for Food-Cart Prices Skyrocket, Wall Street Journal (Mar. 9, 2011), *https://www.wsj.com/articles/SB10001424052748704754.*

they value an asset more simply because it's theirs. Though SALSA does not "solve" the endowment effect, it does make asset-holders put their money where their mouths are by paying the annual fee on their self-assessed value.

→ ***Lazy monopolist:*** Sometimes, an asset-holder just doesn't want to sell because to someone who values the asset more because they don't feel like it, even though they themselves aren't putting it to productive use. Imagine a stall license holder who just never checks her email, and so fails to see that many potential vendors are making high offers to her. SALSA solves this problem by requiring asset-holders to transfer the asset to someone who values it more.

When an asset-holder is unwilling to sell the asset to someone who would value it more, the public good can be harmed in at least two ways: (1) the higher-valuer, who would have created more economic value, is not able to do so, and (2) the government loses out on the potentially higher tax revenue it would have gained, both from any sales transactions related to the asset, and from any sort of "property tax" paid on the value of the asset.

In general, SALSA addresses the above problems because it disincentivizes excessively high valuations. Asset owners will have to pay a tax based on their self-assessed valuation, so they are disincentivized from declaring a valuation that is too high.

What is the right annual license fee rate?
Some simple arithmetic shows that setting the tax rate equal to the turnover rate (i.e., the percent chance that someone who values the asset higher will come along within any given time period) will incentivize owners to

self-assess honestly, at their actual subjective valuation.[21] In addition, the government can reduce the rate slightly to incentivize appropriate investments in the asset. The chart below walks through a sample SALSA rate calculation. As a side effect, as values decrease, low-income people or otherwise credit-constrained people may be able to participate more, relative to situations where with artificially high valuations and holdout problems.

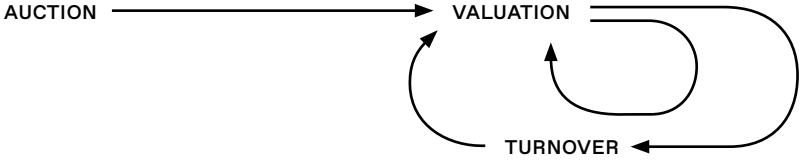
Base rate	20%	Suppose that the turnover rate for farmers' market stall is 20% per year. This means that, for each stall, there is a 20% probability that a farmer who values the stall more will come along in any given year.
↓	↓	↓
Adjusted (final) Rate	5-15%	In settings where there is potential for investment or improvement in the asset, the government will want to set the fee somewhere below this turnover rate. For instance, even in his farmers' market example, a license itself will become more valuable if all the current license holders work hard to appeal to consumers (thus increasing foot traffic) and maybe even make the area around look nicer.

Progressivity: To make the license fee progressive, policymakers can set a small exemption. For instance, the 5-15% rate in the above example might apply to the declared value of the asset minus $1,000.

21 Imagine that there is a 30% chance that a higher-value purchases comes along in any given year. If the asset holder sets her self-assessed value above her actual value by ΔP, then she will benefit by $0.3\Delta P$ (this is the 30% probability that a higher-valuing buyer comes along and buys the asset at the new higher price), but she will also have to pay a higher annual fee on the asset. And if the government sets the fee rate equal to the turnover rate, this will penalize the asset-holder by exactly $0.3\Delta P$, cancelling out the gain to her from setting her valuation above her true valuation. See pages 57-58 in Eric A. Posner & E. Glen Weyl, Radical Markets (2018).

IMPLEMENTATION TIPS

A step-by-step example



Step 1: Auction a set number of licenses to the highest bidders. We recommend using a Dutch auction (i.e., descending price) or a Channel auction. In a Channel auction, there is a lower bound price, which gradually rises, and an upper bound price, which gradually descends. Buyers are committed to buy, for at least the lower bound price, but may purchase directly at the upper bound price at any time.[22]

Step 2: Holders maintain their valuations in an online platform and pay annual fees on their self-assessed valuation (e.g., a 20% fee). As mentioned above, the right annual fee rate will be somewhere between zero and the turnover rate (i.e., the probability that a higher-value purchaser comes along within a year).

Notes:

→ **Bundling/packaging units:** For some assets, there are such strong complementarities across assets that it would represent a market failure for owners to part with one, but not all, of the assets (e.g., a physical structure and the land upon which the structure stands). In such cases, asset-holders should get to determine what bundle of items con-

22 Eduardo M. Azevedo et al., Channel Auctions (August 5, 2019) (unpublished manuscript), *https://ssrn.com/abstract=3241744*.

stitutes the single “asset” for which they will enter a valuation in the online marketplace. This concern is unlikely to affect operating licenses, like our farmers' market example, but policymakers should keep this concern in mind.

Net asset value: To avoid double taxation, possessors can deduct the value of any mortgages or liabilities related to the asset from their self-assessment for the purposes of paying the self-assessed fee. Thus, possessors are taxed on the net value of the asset to them, but they must stand ready to sell at their listed valuation.[23]

Step 3: Purchasers who value the asset higher opt to buy in the online marketplace.

Notes:

→ **Valuation difficulties:** For goods that require inspection by the buyer, the purchaser could freeze the listed price and pay a small percentage to the seller in order to inspect it, before deciding whether to proceed.

→ **Turnover time:** A reasonable amount of time to turn the asset over will depend on the asset type.

→ **Asset maintenance:** To the extent that maintenance is required, it would be good to have an automated way to monitor maintenance and even subsidize (via reduced tax rate) positive investments made in the condition of the asset.

23 See page 65 in Eric A. Posner & E. Glen Weyl, Radical Markets (2018).

Pitfalls to avoid

Deciding how many units to allocate: Far and away, the most important risk with a SALSA is generating an artificial undersupply of a given service. Many kinds of services do not need to be restricted in supply — any entrepreneur who wants to provide them can try, and the public at large will benefit from the lower prices and innovation that come with robust competition. When supply is restricted artificially, license holders can earn higher profits by charging higher prices to customers for the scarce good or service. In urban settings, the effects of undersupply due to industry influence frequently hurt the poorest citizens.[24] It is therefore important to ensure that SALSA licensure does not become influenced by industry resulting in artificial undersupply.

Social equity reasons to allocate assets on a non-financial basis: There are many reasons why local governments may not want to allocate resources to those who value them most, related to cultural traditions and notions of fairness apart from willingness-to-pay. For instance, Washington, D.C. has a cultural tradition of go-go music, frequently performed and enjoyed by its lower-income, Black population. If the District decided to allocate a certain number of "street corner music performance" licenses via SALSA, this tradition might not be able to survive.[25] In fact, a situation like go-go music in D.C. may be better suited for quadratic voting (see chapter above), in which groups can democratically express their preference intensity.

24 For one example, see the following OECD report on the taxi industry, Taxi Services: Competition and Regulation, OECD (2007), *http://www.oecd.org/regreform/sectors/41472612.pdf.*

25 For a similar discussion, see, e.g., 'Don't Mute D.C.': Bill Aims To Protect Go-Go As District's Official Music, WBUR (NPR local station) (Jul. 1, 2019), *https://www.wbur.org/hereandnow/2019/07/01/go-go-music-washington-dc-gentrification.*

Legal issues: This document does not, and cannot, provide legal advice. State and local laws for auctioning public licenses vary widely by jurisdiction. In general, however, local governments are less likely to encounter obstacles to using SALSA for licenses to use government property (such as licenses to operate on city land). Moreover, local governments will often be on strong footing to use SALSA for licenses that have already been cleared for auction by a state legislature, and/or where the local government enjoys the unilateral power to increase license fees. However, local governments must ensure that particular applications of SALSA do not overstep limitations on their power to impose new taxes. This issue is most likely to arise when local governments sell licenses at high prices unrelated to the cost of providing the regulatory scheme, and/or when the revenues from a regulatory licensing scheme go into an unrestricted general fund, rather than being used on services related to the regulation scheme. You should always have your plans reviewed by qualified counsel.

Conclusion

Quadratic voting, quadratic finance, and SALSA are more than just clever, efficient mechanisms. We think they represent a step forward in our ability to manage common resources fairly, and to make complex decisions in groups. There is still a lot of tweaking and experimentation to be done — good governance is always a work in progress. But we hope you will take up the challenge to apply these ideas and help advance them.

We also want to help! The RadicalxChange Foundation is a willing resource to anyone looking to pilot these or related ideas. Similarly, the RadicalxChange movement has chapters and discussion groups all around the world — so there are likely people in your community interested in helping out. Visit us at *RadicalxChange.org* or reach out at *info@radicalxchange.org* to get connected.

THE HANDBOOK FOR RADICAL LOCAL DEMOCRACY

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