Casual vacancies and the Meek method

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1 Introduction

If a casual vacancy occurs in a body that has been elected by STV, caused, for example, by an elected member resigning, there is a difficulty because to hold a by-election for just the one vacant seat would, usually, result in the dominant party (or other interest group) gaining the seat, whereas the vacancy may have arisen by the resignation of a candidate from a minority group. The ideal solution, in many ways, would be that of Thomas Wright Hill's 1819 version of STV [1, 2] in which a substitute would be elected only by those electors who had, in the first place, elected the resigning candidate – but that solution is not possible in these days of secret voting.

A possible solution is for the remaining members to co-opt a suitable replacement and that may be perfectly satisfactory in some cases, but in most cases it would not be thought a good plan.

A properly representative result would be attained if all seats were declared vacant and a full new STV election held, but it would not be at all satisfactory to put other people's seats at risk because one had resigned. Those correctly elected in the first place, for a given term, must be allowed to continue and to complete their term.

A solution that is sometimes advocated is not to have either co-option or a new election, but to recount the original votes, treating the resigned candidate (and any other candidate who no longer wishes to be considered) as withdrawn, and the remaining elected members as "guarded", meaning that they cannot be excluded. Thus the exclusion rule changes, from excluding the candidate who currently has fewest votes, to excluding the non-guarded candidate who currently has fewest votes.

It should be noted that any such recounting is likely to break the rule that later preferences should not upset a voter's earlier preferences because adherence to that rule requires that later preferences are not looked at until the fates of earlier preferences have been definitely determined. When recounting, later preferences will have been looked at, and acted upon, in making the initial count and that cannot be undone. Provided that voters can be assured that it cannot happen on the initial count, the thought that a casual vacancy could occur later and need to be dealt with, is rather unlikely to worry anyone much.

There remain some problems: (1) if the voting pattern has been published, as I believe it should be, it is possible to determine with certainty who a replacement will be and, in a party situation, that could lead to pressure on someone to resign; (2) in a party situation, there may be no spare candidate of the same party. This could be an advantage, though, in that it might persuade parties to offer more candidates in the first place in case of such an eventuality, thus improving the choice for voters; (3) if the count were made in the ordinary way, except for observing the guarding criterion, it could result in too many candidates exceeding the quota simultaneously, typically two candidates doing so where there is only one vacant seat.

If the first two of those problems are not regarded as too serious, and such a method is to be adopted, how should the third problem be dealt with? Whatever is done must be compatible with the particular STV rules in use. Here I am concerned with the situation under the Meek rules.

2 Artificial examples of the problem

Example 1. Like many artificial examples this is intended merely to illustrate a point, and so the fact that something so extreme is unlikely in practice need not disturb us. Suppose three seats are occupied by A, B and Z, and Z resigns. After redistributing Z's votes appropriately, the votes are

10	A	
10	B	
100	CA	(See Appendix 1 for
60	DB	a detailed explanation)
30	EDA	
20	EDB	

The normal quota is 230/4 = 57.5 and C and D have both passed it, while A and B are guarded. Is it right to take a "first-past-the-post" type of solution and say C has more votes than D and should take the seat, or is it right to take an STV type of solution and say that E's votes must be redistributed first giving D 110 to C's 100? I strongly believe that the second of those approaches is preferable.

Example 2. If that is accepted, we need to note that a similar situation can arise even though too many candidates have not passed the quota. Consider the following: again three seats are occupied by A, B and Z, and Z resigns. After redistributing Z's votes appropriately, the votes are

10	A	
10	B	
100	CA	(See Appendix 1 for
50	DB	a detailed explanation)
19	EDA	
20	EDB	
20	FDA	
21	FDB	

The normal quota is 250/4 = 62.5; C has passed it, while A and B are guarded. Is it right to elect C, even though D, E and F between them have 130 votes to C's 100? I do not think that it is. The trouble arises because the normal quota is really irrelevant – the logic of its calculation depends upon no candidate being guarded.

These examples are highly artificial, and it might be thought that such a problem would hardly ever happen in practice, but experience suggests that it happens more frequently than would be guessed as likely. The possibility must be allowed for.

3 A suggested solution

A solution that seems to meet the requirements admirably has been suggested to me by Douglas Woodall. It works by treating any non-guarded candidate who exceeds the quota as "checked". In ordinary English, "checked" can have more than one meaning, and it is used here in two senses. First it means that the candidate's name has been marked for special treatment; secondly it means that the candidate's progress has been held up. A checked candidate is not yet elected, but is otherwise treated exactly as if elected, in having a reduced keep value to redistribute surplus votes.

The count proceeds exactly as normal (except that exclusions are of the lowest non-guarded candidate in each case) until no candidate remains who is not either guarded or checked. After that, each counting of the votes must be taken to convergence, not using any short cut of excluding a candidate before convergence. In my own implementation, convergence is taken as having been reached when the total surplus is no more than 1/10000 of a vote.

When convergence is reached, to the degree of accuracy defined in the rules, if there are too many guarded and checked candidates to fill all seats, a candidate must be excluded. All checked candidates will then have a quota of votes and the one with the highest keep value is excluded.

The counting continues until the number of remaining candidates equals the number of seats to be filled, when all those remaining are elected.

Trying this on Example 1 above, C is not elected but checked. When an exclusion becomes necessary, E is excluded as having the fewest votes of C, D and E. D now has more than a quota and is checked. When an exclusion next becomes necessary the keep values of C and D are 0.521 and 0.474 respectively. C is therefore excluded leaving A, B and D to be elected.

Trying it on Example 2 above in a similar way, E and F are the first to be excluded as having fewest votes. When an exclusion next becomes necessary the keep values of C and D are 0.594 and 0.457 respectively. C is therefore excluded leaving A, B and D to be elected.

So in both these cases, the correct result, in my opinion, is attained.

It should be noted that such a solution is not available for those versions of STV that do not redistribute votes (when appropriate) to already-elected candidates. In those versions there is no equivalent of the keep value of a candidate nor, so far as I can see, anything else that could usefully be employed to give a similar effect.

4 Example of a real non-party election

The test, though, must be how it behaves with real elections. It has been tried on 17 elections where political parties were not involved, each election being used several times as each sitting candidate in

turn was taken as having resigned. The results seem to me to be satisfactory. As an example, an election with 11 candidates (A, B, ..., K) for 3 seats, and 58 votes, has been chosen. The votes are set out in Appendix 2.

Those elected were GHJ. If G were to resign and the votes were recounted without any guarding, those elected would be AHK, showing that J had been thrown out because somebody else had resigned, which would not be a sensible outcome. Using the proposed system, those elected would be AHJ, bringing in A to replace G, but not throwing anyone out.

Satisfactory results have also been found if two or more sitting candidates resign simultaneously.

5 A party-based election

Where an election is conducted on political party lines, and there are some non-elected candidates of the various parties, it might be expected that, if someone resigns, the vacancy would probably be someone else of the same party. The complete voting patterns of the Glasgow City Council 2007 elections have been published and these are a valuable resource of real party-based STV elections. The actual counting was not by the Meek method, but a Meek count can be carried out on them nevertheless.

It is a pity that, in general, the Scottish parties did not make the best use of STV in that, except for Labour, they usually put up only 1 candidate per ward. However the Hillhead Ward is an exception. Here those elected, both in fact and by Meek counting, were one each of the Labour, Liberal Democrat, Scottish National and Green parties, while there was also an unelected Labour candidate, and an unelected Liberal Democrat candidate.

Using the proposed method, if the Labour councillor were to resign, the other Labour candidate would be the replacement, but if the Liberal Democrat councillor were to do so, the other Liberal Democrat candidate would be the replacement.

It is not suggested that, if a councillor resigns, someone of the same party ought necessarily to be the replacement. The correct replacement is what the voters want, even if of a different party. However, in a party-based election, it would be a little odd if the correct replacement were not of the same party, where such a person is available. The observed result, using the proposed system, does follow the expected pattern.

As it happens, the other Labour candidate would be the replacement if the Scottish National or Green candidate were to resign, but it is not claimed that this indicates anything special.

6 Comparison with a plain recount

In the party-based election discussed above, it is found that if it were merely rerun normally, without guarding, the sitting members would be elected anyway, and the same pattern of filling the vacancies occurs. That is good – the aim is to get the right solution in difficult cases, not to change the solution in easier cases. It is one of the virtues of the proposed system that if a plain recount would elect all the sitting candidates, then the result always agrees with that of such a plain recount.

7 Acknowledgements

I thank Brian Wichmann and Nicolaus Tideman for much helpful discussion and comments on an earlier proposal of mine, and Jonathan Lundell for helpful discussion on this proposal. However the main acknowledgement must go to Douglas Woodall for suggesting the current proposal and for agreeing so selflessly to let me put it forward in this paper. My own earlier proposal was both more complicated and less effective and I have abandoned it.

8 References

[1] Hill I.D. (1988) Some aspects of elections — to fill one seat or many. Journal of the Royal Statistical Society, A, 151, 243-275.

[2] Birmingham Public Library references 60360 and 62702.

Appendix 1: Examples 1 and 2

Artificial examples can be very useful as illustrations of a problem, but they should not be so unrealistic as to be impossible in practice. It might be thought impossible for A and B to have had enough support to have been elected originally, yet have so little at the recount, yet it is possible.

For Example 1, let there be 22 candidates for 3 seats and votes

10	A
10	B
2	FZDB
18	GZDB
3	HZDB
17	IZDB
4	JZDB
16	KZDB
5	LZCA
15	MZCA
6	NZCA
14	OZCA
7	PZCA
13	QZCA
8	RZCA
12	SZCA
9	TZCA
11	UZCA
30	ZEDA
20	ZEDB

On an initial count ABZ are elected. If Z resigns, and all candidates except ABCDE are then unwilling to stand, we get

10	A
10	B
100	CA
60	DB
30	EDA
20	EDB

with A and B as sitting members, as in Example 1.

For Example 2, similarly, let there be 22 candidates for 3 seats and votes

10	A
10	B
2	GZDB
26	HZDB
3	IZDB
15	JZDB
4	KZDB
19	LZCA
1	MZCA
14	NZCA
6	OZCA
13	PZCA
7	QZCA
12	RZCA
8	SZCA
11	TZCA
9	UZCA
19	ZEDA
20	ZEDB
20	ZFDA
21	ZFDB

On an initial count ABZ are elected. If Z resigns, and all candidates except ABCDEF are then unwilling to stand, we get

10	A
10	B
100	CA
50	DB
19	EDA
20	EDB
20	FDA
21	FDB

with A and B as sitting members, as in Example 2.

9 Appendix 2: A real example

These are the votes in the real non-party election discussed above.

ACBHJIKFDE
ACH
ACIFHJEK
AHDCGFEBJI
AHICDFEBGJ
BCK
BFGHKAECDJ
CBEJIHKFGAD
CGEHAJBDIK
CKABHGDJ
EGKH
EGKHF
GAHE
GEBFA
GEHFCBJIDA
GEKCB
GFECBADHKJ
GFEHACBKJI
GHFCBAEI
GKEHCJDBAF
GKIH
HABCEFGIKD
HABCJ
HACFGBKIJE
HAGKCJIBEFD
HAJFEBCGKID
HBACFK
HBCEFJAIKG
HCA
HCA
HCBGFEKAJI
HDFCEGABJI
HGCKBFEAJD
HGKCBFAJDE
HIBCDG
HIJEGFBACKD
HIKGCABJEFD
HJA
HJACBEFGIKD
HJAIEGCDBKF
HJCABIGEKFD
HJCFGEDBAI
HJIGAB
HJIGKABCFE
HJKABCDEFG
HKB
HKBCEGJAFI
HKCBGAJEFI
HKJ
HKJABC
J
JCBK
JHICBGEFDA
JHICGFBAED
JHKACGIBFE
JICHKBAFGE
KABCFG
KHACJIGBED