Submission to the Victorian Parliament's Electoral Matters Committee

Antony Green
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The 2010 Victorian state election was the second to be held since the introduction of proportional representation for Legislative Council elections.

In general the new system has been effective in electing a Legislative Council where representation by party is broadly in proportion to the level of vote received by each party.

However, I believe there are two ways in which the method of counting could be improved. The first concerns the treatment of ballot papers with exhausted preferences. The second involves a correction to the formula used to determine the distribution of preferences from candidates elected with more than a quota of votes.

Defining the Relationship Between Ballot Papers and Votes

Understanding the Legislative Council’s electoral system requires recognising that there is a difference between a ballot paper and a vote.

This is a distinction that does not apply to single member electorates in the lower house where the number of ballot papers a candidate holds at any stage of the count always equals the number of votes. Whenever a candidate is excluded in a single member electorate, preferences are distributed at full value, with one ballot paper equalling one vote.

However, in the Legislative Council, preferences can also be distributed from candidates elected with votes in excess of the quota required for election. In distributing surplus-to-quota votes, all ballot papers are distributed, but their value is discounted. The number of votes is equal to the number of ballot papers times their discount rate, this rate known as a Transfer Value.

The formula defining the relationship between votes and ballot papers is

\[ \text{Votes} = (\text{Ballot Papers}) \times (\text{Transfer Value}) \]

In a lower house election, the transfer value is always equal to one, which is why the number of votes equals the number of ballot papers.

In the Legislative Council, ballot papers are 'bundled' together by transfer value, with each bundle corresponding to ballot papers with the same Transfer Value. The Transfer Value converts this number of ballot papers into a number of votes.
Changing the Transfer Value to Exclude Ballot Papers with Exhausted Preferences

The introduction of Group Ticket or 'above the line' voting for the Senate in 1984 provided a simpler method for voters to complete their Senate ballot paper. However, the old rules on full preferential voting were retained for voters who wanted to select candidates 'below the line' on the new ballot paper.

This created the situation where voters were given two choices, to select a single party box 'above the line', or to laboriously fill in every square below the line with a sequence of numbers, a task that can require more than 50 preferences.

It is to the credit of Victoria that the state's Legislative Council system offers a simpler 'below the line' method of voting, electors simply required to number as many preferences as there are vacancies, from 1 to 5 in the current Legislative Council. This means the final Victorian Legislative Council result is not entirely pre-determined by complex preference deals between political parties.

Only a minority of voters use the five-preference option, but this creates a pool of ballot papers that exhaust their preferences during the count. These exhausted ballots have created several cases where the final vacancy in a region has been filled by a candidates with less than a full quota of votes.

Nothing can be done to diminish the impact of ballot papers that exhaust their preferences at the point where a candidate is excluded. However, the current Victorian system allows the creation of exhausted ballot papers at the point where an elected candidate has their surplus to quota votes distributed.

In contrast, two jurisdictions with far higher rates of exhausted ballot papers, New South Wales and the Australian Capital Territory, calculate a Transfer Value that excludes exhausted ballots from the distribution, leaving exhausted ballots with the elected candidate.

This is achieved by a simple change to the formula for calculating Transfer Value. The current formula is:

\[
\text{Transfer Value} = \frac{\text{Surplus Votes}}{(\text{Total ballot papers})}
\]

where \(\text{Surplus Votes} = (\text{Total Votes}) - \text{Quota}\)

In NSW and the ACT the formula is

\[
\text{Transfer Value} = \frac{\text{Surplus Votes}}{[(\text{Total Ballot papers}) - \text{Exhausted Ballots}]}
\]

(Note: I will return to whether the divisor should be total ballots or total votes later in this submission.)

This second formula ensures that all the ballot papers with exhausted preferences will stay with the elected candidate, and only ballot papers with further preferences will be included in the elected candidate's surplus.
To explain how these formulas work, let me refer to the final distribution of preferences in Western Metropolitan Region at the 2010 election. Liberal candidate Andrew Elsbury became the fourth elected candidate on the partial distribution of Family First preferences. Only two candidates remained in the count, Labor’s Bob Smith and the Green’s Colleen Hartland.

Table 1 shows the distribution of Elsbury’s preferences at this point (Count 94). The second column shows the tally of preferences to remaining candidates from his 152,106 ballot papers. The column headed ‘Existing T.V.’ shows how many votes these ballot papers became applying the existing Transfer Value formula, while the column headed ‘Proposed T.V.’ column shows the number of votes that would be distributed under my proposed change excluding exhausted ballot papers.

<table>
<thead>
<tr>
<th>Preferences to</th>
<th>Ballot Papers</th>
<th>Existing T.V.</th>
<th>Proposed T.V.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Labor</td>
<td>149,157</td>
<td>11,135</td>
<td>11,311</td>
</tr>
<tr>
<td>Greens</td>
<td>591</td>
<td>44</td>
<td>44</td>
</tr>
<tr>
<td>Exhausted</td>
<td>2,358</td>
<td>176</td>
<td>0</td>
</tr>
<tr>
<td>Total</td>
<td>152,106</td>
<td>11,355</td>
<td>11,355</td>
</tr>
</tbody>
</table>

The quota for election was 70,452 votes, and Elsbury’s 152,106 ballot papers corresponded to 81,808 votes, producing a surplus to quota vote of 11,356.

The Existing Transfer Value is calculated as follows:

Existing T.V. = \((81808 – 70452) / 152106\)  
\[= 0.074658\]

The Proposed Transfer Value is:

Proposed T.V. = \((81808 – 70452) / (152106 – 2358)\)  
\[= 0.075834\]

Where the existing formula would result in the transfer of 2,358 exhausted ballot papers (corresponding to 176 votes), the second formula would leave all 2,358 ballot papers with Andrew Elsbury and distribute only ballot papers with continuing preferences. In this case an extra 176 votes were distributed to the Labor candidate. Had Elsbury’s preferences not flown so strongly to Labor, the Green candidate would also have received additional preferences.

Provision must be made to deal with the situation where the surplus is smaller than the number ballot papers with continuing preferences. If this were the case the formula would produce a Transfer Value greater than 1. This formula must be capped to provide a maximum Transfer Value of 1, corresponding to the situation where all ballot papers with preferences are distributed, the balance being a number of exhausted preferences.

My proposed transfer formula would not prevent exhausted ballot papers from excluded candidates, but it would remove most instances of exhausted preferences entering the count on the election of a candidate.
Correctly Weighting Preferences on the Distribution of an Elected Candidate’s Surplus

(The discussion that follows does not take account of the proposal set out above to exclude exhausted ballot papers in calculating Transfer Values. However, it would be relatively easy to adapt the formulas discussed below to also exclude exhausted ballot papers from the calculation.)

In the academic literature the current Transfer Value calculation is known as the Inclusive Gregory Method. As outlined above, the formula is

\[ \text{Transfer Value} = \frac{(\text{Surplus Votes})}{(\text{Total ballot papers})} \]

Once calculated, this transfer value is applied to the total of all ballot papers transferred to another candidate, the Transfer Value turning ballot papers into a given number of votes.

The problem with this method is that if a candidate's surplus includes a large number of ballot papers at very small Transfer value, these ballot papers are given much greater weight in the distribution of preferences. This is illustrated by the result of the 2010 Queensland Senate election. Queensland Green candidate Larissa Waters was declared elected during the count on reaching a quota, and Table 2 shows the composition of the Green total at this point, showing total ballot papers, total votes and transfer values.

<table>
<thead>
<tr>
<th>Vote source</th>
<th>Ballot Papers</th>
<th>Transfer Value</th>
<th>Votes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Green Ticket Votes</td>
<td>291,043</td>
<td>1</td>
<td>291,043</td>
</tr>
<tr>
<td>Waters First Preferences</td>
<td>20,036</td>
<td>1</td>
<td>20,036</td>
</tr>
<tr>
<td>Labor Ticket Votes</td>
<td>710,366</td>
<td>0.025593</td>
<td>18,180</td>
</tr>
<tr>
<td>Australian Democrat Ticket Votes</td>
<td>17,334</td>
<td>1</td>
<td>17,334</td>
</tr>
<tr>
<td>Socialist Alliance Ticket Votes</td>
<td>3,325</td>
<td>1</td>
<td>3,325</td>
</tr>
<tr>
<td>Group C Ticket Votes</td>
<td>1,015</td>
<td>1</td>
<td>1,015</td>
</tr>
<tr>
<td>Group F Ticket Votes</td>
<td>641</td>
<td>1</td>
<td>641</td>
</tr>
<tr>
<td>Various below the line votes</td>
<td>n.a.</td>
<td>n.a.</td>
<td>5,006</td>
</tr>
<tr>
<td>Total Votes on election</td>
<td></td>
<td></td>
<td>356,580</td>
</tr>
</tbody>
</table>

n.a. – not available. Published counts do not provide complete detail of the source of all below the line votes.

In this example there were only a small number of Labor votes, but these were derived from 710,366 ballot papers at a very small transfer value. Of Waters' total vote, 81.6% were Green ticket votes and only 5.1% were originally Labor votes. However, Labor's ballot papers made up 67% of the Waters’ total ballot papers, meaning that when the Green surplus was distributed, 67% went according to the Labor ticket. The Transfer Value formula based on ballot papers had totally distorted the composition of the Green surplus and gave greater weight to a small number of Labor votes.

The Transfer Value formula as applied to Senate and Victorian Legislative Council elections is like pouring water on to dry peat moss. What looks like a small dry mound of votes can suddenly reflate...
into a huge number of ballot papers, as the Queensland example shows. Despite only 5.1% of the
total Green vote being sourced from Labor, Labor preferences made up 67% of the votes distributed
as part of the Green surplus. The flow of preferences was distorted by the formula.

Rarer though even more perverse, the current formula can cause ballot papers to increase in value
when distributed as part of the surplus from an excluded candidate. This did happen in the 2001
Western Australian Legislative Council election and has resulted in Western Australia adopting what
is known as the Weighted Inclusive Gregory Method.

The Weighted Inclusive Gregory Method uses Total Votes rather than Total Ballot Papers as the
divisor. It calculates a New Transfer Value with the following formula:

\[
\text{New Transfer Value} = \frac{\text{Surplus Votes}}{(\text{Total Votes})}
\]

This New Transfer Value is then applied to all votes rather than ballot papers of the elected
candidate. So using the Queensland example above, the Transfer Value would be applied to the
18,180 Labor votes rather than the 710,366 Labor ballot papers.

The formula for calculating the votes to be distributed in the surplus is:

\[
\text{Votes} = (\text{New Transfer Value}) \times \text{Votes}
\]

Which is the same as

\[
\text{Votes} = (\text{New Transfer Value}) \times (\text{Old Transfer Value}) \times (\text{Ballot Papers})
\]

To explain how the two methods differ in how they work, let me again refer to the example in
Western Metropolitan Region at the 2010 election following the election of Andrew Elsbury. Table 3
breaks down Elsbury’s tally by source and shows total ballot papers, total votes and transfer values.

<table>
<thead>
<tr>
<th>Source</th>
<th>Ballot Papers</th>
<th>Transfer Value</th>
<th>Votes</th>
<th>% of Ballots</th>
<th>% of Votes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Finn (LIB) preferences</td>
<td>123343</td>
<td>0.430460</td>
<td>53088</td>
<td>81.1%</td>
<td>64.9%</td>
</tr>
<tr>
<td>Family First ticket votes</td>
<td>14505</td>
<td>1.000000</td>
<td>14505</td>
<td>9.5%</td>
<td>17.7%</td>
</tr>
<tr>
<td>D.L.P. ticket votes</td>
<td>12108</td>
<td>1.000000</td>
<td>12108</td>
<td>8.0%</td>
<td>14.8%</td>
</tr>
<tr>
<td>Elsbury first preferences</td>
<td>386</td>
<td>1.000000</td>
<td>386</td>
<td>0.3%</td>
<td>0.5%</td>
</tr>
<tr>
<td>Other full preferences received</td>
<td>1707</td>
<td>1.000000</td>
<td>1707</td>
<td>1.1%</td>
<td>2.1%</td>
</tr>
<tr>
<td>Pakula (ALP) preferences</td>
<td>23</td>
<td>0.639611</td>
<td>10</td>
<td>0.0%</td>
<td>0.0%</td>
</tr>
<tr>
<td>Eideh (ALP) preferences</td>
<td>34</td>
<td>0.279701</td>
<td>4</td>
<td>0.0%</td>
<td>0.0%</td>
</tr>
</tbody>
</table>

On his election, 64.9% of Elsbury’s votes came from lead Liberal candidate Bernie Finn and 32.5%
were ticket votes from Family First and DLP. However, the Transfer Value formula reverted to ballot
papers at this point, and 81.1% of Elsbury’s ballot papers came from Finn and only 17.5% from
Family First and the DLP. This meant that when Elsbury’s surplus was distributed, a greater
proportion of his preferences were sourced from Liberal ticket ballot papers compared to Family
First and the DLP ballot papers than if the preference distribution had been based on votes.
Using the vote tallies in Table 3, Tables 4 constructs how many votes from each source would be included in Elsbury's surplus using the current Inclusive Gregory Method. Table 5 estimates how many votes by source would be included in the surplus using the proposed Weighted Inclusive Gregory Method.

### Table 4: Elsbury Surplus using current Inclusive Gregory Formula

<table>
<thead>
<tr>
<th>Source</th>
<th>Ballot Papers</th>
<th>Old Transfer Value</th>
<th>New Transfer Value</th>
<th>Votes Transferred</th>
</tr>
</thead>
<tbody>
<tr>
<td>Finn (LIB) preferences</td>
<td>123343</td>
<td>0.430460</td>
<td>0.074658</td>
<td>9208</td>
</tr>
<tr>
<td>Family First ticket votes</td>
<td>14505</td>
<td>1.000000</td>
<td>0.074658</td>
<td>1082</td>
</tr>
<tr>
<td>D.L.P. ticket votes</td>
<td>12108</td>
<td>1.000000</td>
<td>0.074658</td>
<td>903</td>
</tr>
<tr>
<td>Elsbury first preferences</td>
<td>386</td>
<td>1.000000</td>
<td>0.074658</td>
<td>28</td>
</tr>
<tr>
<td>Other full preferences received</td>
<td>1707</td>
<td>1.000000</td>
<td>0.074658</td>
<td>127</td>
</tr>
<tr>
<td>Pakula (ALP) preferences</td>
<td>23</td>
<td>0.639611</td>
<td>0.074658</td>
<td>1</td>
</tr>
<tr>
<td>Eideh (ALP) preferences</td>
<td>34</td>
<td>0.279701</td>
<td>0.074658</td>
<td>2</td>
</tr>
</tbody>
</table>

### Table 5: Elsbury Surplus using proposed Weighted Inclusive Gregory Formula

<table>
<thead>
<tr>
<th>Source</th>
<th>Ballot Papers</th>
<th>Old Transfer Value</th>
<th>New Transfer Value</th>
<th>Votes Transferred</th>
</tr>
</thead>
<tbody>
<tr>
<td>Finn (LIB) preferences</td>
<td>123343</td>
<td>0.430460</td>
<td>0.059753</td>
<td>7370</td>
</tr>
<tr>
<td>Family First ticket votes</td>
<td>14505</td>
<td>1.000000</td>
<td>0.138813</td>
<td>2013</td>
</tr>
<tr>
<td>D.L.P. ticket votes</td>
<td>12108</td>
<td>1.000000</td>
<td>0.138813</td>
<td>1680</td>
</tr>
<tr>
<td>Elsbury first preferences</td>
<td>386</td>
<td>1.000000</td>
<td>0.138813</td>
<td>53</td>
</tr>
<tr>
<td>Other full preferences received</td>
<td>1707</td>
<td>1.000000</td>
<td>0.138813</td>
<td>236</td>
</tr>
<tr>
<td>Pakula (ALP) preferences</td>
<td>23</td>
<td>0.639611</td>
<td>0.088786</td>
<td>2</td>
</tr>
<tr>
<td>Eideh (ALP) preferences</td>
<td>34</td>
<td>0.279701</td>
<td>0.038826</td>
<td>1</td>
</tr>
</tbody>
</table>

Using the current Inclusive Gregory Method based on ballot papers (Table 4), 9208 preference votes were from Finn compared to only 7370 by the proposed Weighted Inclusive Gregory Method (Table 5). Similarly 1985 Family First and DLP preferences would be included under the current method, but 3693 under the proposed method.

Neither method would have made any difference to the Western Metropolitan Region result in 2010 as the Liberal, Family First and DLP preference tickets all flowed to the Labor Party ahead of the Greens. However, if the three parties had made different preference decisions, the two methods would have produced different preference flows by changing the composition of the surplus.

If Elsbury had been excluded rather than elected, then his preferences would have been distributed according to the value of the vote. However, using the current Inclusive Gregory Method, preferences are treated differently when a candidate is elected by being distributed according to the number of ballot papers.
Under the proposed Weighted Inclusive Gregory Method, there would be no difference between the distribution of preferences by exclusion or by election. In both cases preferences would be distributed according the value of the vote. There would be no surprise re-emergence of ballot papers at their original value when a candidate was declared elected.

'Unbundling' of the Count

Currently in the Legislative Council, when a candidate is excluded, the votes of the candidate are excluded in a series of counts. The counts correspond to separate 'bundles', with the exclusion of each 'bundle' treated as a distinct count.

The 'bundles' are distributed in the following order
(1) All first preference votes for the candidate
(2) All votes bundled by Transfer value, with bundles distributed in order of decreasing Transfer Value

In the case of the Western Metropolitan Region count, the exclusion of each candidate corresponded to five separate counts. The first count was a candidate's first preference votes. The second bundle was all preferences received at full value (TV = 1.0), followed by all preferences received with a first preference for Pakula (TV = 0.639611), then votes with a first preference for Finn (TV = 0.43046) then votes with a first preference for Eideh (TV = 0.279701).

This bundling makes a manual count easier, and also limits the distortion created by the current Transfer Value formula by checking at each count to see if a candidate has achieved a quota. Again using the Western Metropolitan Region count, the following counts took place on the exclusion of the lead Family First candidate Daniel Mumby,

Count 89 distributed 15140 first preference votes for Mumby including 14505 Family First ticket votes
Count 90 distributed 13023 full value (T.V. = 1.0) preferences for Mumby, including 12108 DLP ticket votes. Note that Elsbury was declared elected at this point and could receive no further preferences, the distribution of his surplus deferred until after Mumby was completely excluded.
Count 91 excluded 139 Mumby votes (231 ballot papers at T.V. = 0.639611) with a first preference for Pakula (ALP)
Count 92 distributed Mumby 61 votes (154 ballot papers at T.V. = 0.43046) with a first preference for Finn (LIB)
Count 93 distributed Mumby 14 votes (67 ballot papers at T.V. = 0.279701) with a first preference for Eideh (ALP)

Victoria is the only jurisdiction that draws a distinction between first preferences and preferences received at full value. In the Senate, South Australia and Western Australia, the bundles distributed at Counts 89 and 90 would have been distributed together.
Using the current Inclusive Gregory Method transfer value formula, distributing all these bundles at once would have the potential to further distort the preferences from the surplus of an elected candidate. This problem would not occur if the Weighted Inclusive Gregory Method transfer value formula was adopted.

However, distributing all bundles at once would increase the size of the surplus of an elected candidate. In the case shown above, had all bundles been distributed together, the votes distributed at counts 91-93 would have formed part of Elsbury's surplus rather than been passed straight on to the next preference under the current method.

There is no correct answer on whether all bundles should be distributed at once on the exclusion of a candidate. Using one or several bundles creates slightly different distributions of preferences but neither is the correct method.

The advantage of the existing method is it is easier to duplicate if a manual count was required. Using computer counts it makes little difference which method is used, but distributing all bundles at once on the exclusion of a candidate would be more difficult if required in a manual count.

More Complex Counting Methods

Some people advocate more complex counting methods, such as the Meeks method. However, methods such as Meeks are iterative, processes that repeat the count with the exclusion of each candidate to overcome theoretical difficulties with the current Senate-style voting system.

Methods such as Meeks can only be conducted using a computerised count. The current Legislative Council count could be conducted by hand, even with the inclusion of the Weighted Inclusive Gregory Method, though conducting the count by hand would be time consuming.

Further References

I would refer the Committee to the following references related to the matters raised in this submission.

Dr Narelle Miragliotta, "Determining the Result: Transferring Surplus Votes in the Western Australian Legislative Council", Western Australian Electoral Commission, July 2002.