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Ref: EC22-000082

Mr Tom Rogers
Australian Electoral Commissioner
Australian Electoral Commission
10-12 Mort Street
Canberra ACT 2600

Tom

Dear Mr Rogers

Non-Parliamentary political party membership testing methodology

Thank you for your letter of 23 August concerning the deregistration of the political party Flux and the political party membership testing methodology used by the AEC.

Before responding to the six questions you posed, it is worth summarising some of the relevant detail. In requesting a review of the decision to deregister Flux, Mr Max Kaye constructs a hypothetical example in which:

  (i)   a political party has more than 1,500 legitimate members, but
  (ii) the membership testing methodology used by the AEC rejects the hypothesis that the party has 1,500 or more members.

Mr Kaye's hypothetical example relies on the argument that a political party can "have members that cannot be validated against the electoral roll."

This is the crux of his argument. If a political party has members who are legitimate electors but:

  (i)   cannot be validated against the electoral role, or
  (ii) who deny membership when asked (despite being valid members of the political party)

then the membership testing methodology used by the AEC (and recommended by the ABS) cannot work. That testing methodology relies on being able to accurately identify legitimate electors who are members of the political party. If it is not possible to accurately identify such electors, then the methodology cannot work and should not be used.

Therefore, a key question in assessing whether Mr Kaye's objections have merit is this:

> Is it reasonable to require a political party to provide a list of between 1,500 and 1,650 legitimate electors who are members of the political party and are willing and able to confirm their membership when asked?

If it is considered reasonable to require a political party to provide such a list, then the testing methodology used by the AEC is appropriate and can be used as recommended by the ABS.

If the AEC had unlimited resources, it could allow a political party to provide a members' list of arbitrary length – potentially many multiples of 1,500. For every person on that list, the AEC could then determine if they were a legitimate elector and, if so, contact them to confirm that they were a member of the political party. From there, it would be straightforward to determine whether the political party had at least 1,500 legitimate members or not.

The key reason for using the membership testing methodology recommended by the ABS is to limit the resource burden on the AEC of testing for political party membership.

Having summarised the relevant detail, I now provide answers to the six questions you posed.

1. *The AEC understands that if the Commission writes back to the party requesting a smaller list (between 1500-1650 members), then this can be tested in accordance with the extant testing methodology. Is this correct?*

   Yes

2. *What statistical options are available to conduct further testing in relation to the Party's list of 4680 members to establish whether the party has 1500 members?*

   (a) You could randomly select a sample from the entire list of 4680. You can set the chosen probabilities with the tool provided. To achieve a probability of <.02 to falsely accept a list and <.06 to falsely reject a list would require a sample size of approximately 564. With a sample size of 564, the maximum number of denials allowed would be 399.

   (b) Alternatively, you could check all the names on the entire list until you identify 1500 eligible members, or until you exhaust the list having identified less than 1500 eligible members.

3. *For each of these options what is the probability of falsely accepting a list? What is the probability of falsely rejecting a list?*

   For option 2a), the probabilities are as specified, namely <.02 to falsely accept a list and <.06 to falsely reject a list.

   For option 2b), provided the checking is done accurately, the probabilities of falsely accepting a list or falsely rejecting a list are both zero.

4. *s47F (Personal Priv)claims that it is not possible for the AEC to accurately test parties with more than 1650 members using the current testing methodology (VoteFlux Attachments, pp 13, 21). Is this correct?*

   The AEC is testing whether a political party has at least 1,500 members. Provided a political party has at least 1,500 members, whether it has more than 1,650 is not relevant. The testing methodology can be applied appropriately once a political party provides a list of between 1,500 and 1,650 members.

5. *Mr Kaye claims that there is a mistake in the AEC's membership testing list -- in one column of the table, it says there can be 3 denials, where it should be 4 denials according to Mr Kaye (VoteFlux Attachments, pp 20, 43). Is this correct? If so, does this error have any other consequences for the table?*

    Yes. Mr Kaye's specific criticism about the entry in the relevant column of the table is correct. That error has no other consequences for the table.

6. *Is there anything in Mr Kaye's statistical material that would lead the ABS to change or modify their advice to date?*

    No. As discussed in detail earlier in this letter, the testing methodology requires a political party to provide to the AEC a list of between 1,500 and 1,650 legitimate electors who are members of the political party and are willing and able to confirm their membership when asked. That in turn requires a political party to have a list of people who are actually members of the party.

I hope this is helpful.

Yours sincerely

s 47F (Personal Privacy)

Dr David Gruen AO
Australian Statistician

2 September 2022

The table below shows the desired sample size and maximum number of denials for each list size from 1500 up to 3000

The error probabilities for these have been set to:

  - Probability of rejecting a valid list = 6%
  - Probability of accepting an invalid list = 2%

NOTE: the error probabilities have been adhered to as strict constraints. There are some combinations that can achieve close to the desired error rates with smaller sample size. For example, with 1523 members, a sample size of 27 and max denials of 1 will give a Probability of rejecting a valid list of 6.09%. As this is above the constraint value it is not included

Members Lodged	Random Sample Size	Maximum denials to pass	Accepting 1200 - risk	Rejecting 1500 - risk
1500	18	0	1.8%	0.0%
1501	18	0	1.7%	1.2%
1502	18	0	1.7%	2.4%
1503	18	0	1.7%	3.6%
1504	18	0	1.7%	4.7%
1505	18	0	1.7%	5.8%
1506	27	1	1.6%	0.4%
1507	27	1	1.6%	0.6%
1508	27	1	1.6%	0.8%
1509	27	1	1.6%	1.0%
1510	27	1	1.5%	1.3%
1511	27	1	1.5%	1.5%
1512	27	1	1.5%	1.8%
1513	27	1	1.5%	2.1%
1514	27	1	1.5%	2.4%
1515	27	1	1.4%	2.8%
1516	27	1	1.4%	3.1%
1517	27	1	1.4%	3.5%
1518	27	1	1.4%	3.9%
1519	27	1	1.3%	4.3%
1520	27	1	1.3%	4.7%
1521	27	1	1.3%	5.2%
1522	27	1	1.3%	5.6%
1523	33	2	1.8%	1.2%
1524	33	2	1.7%	1.4%
1525	33	2	1.7%	1.5%
1526	33	2	1.7%	1.7%
1527	33	2	1.6%	1.9%
1528	33	2	1.6%	2.1%
1529	33	2	1.6%	2.3%
1530	33	2	1.6%	2.5%
1531	33	2	1.5%	2.7%
1532	33	2	1.5%	3.0%
1533	33	2	1.5%	3.2%
1534	33	2	1.5%	3.4%
1535	33	2	1.4%	3.7%
1536	33	2	1.4%	4.0%
1537	33	2	1.4%	4.3%

1538	33	2	1.4%	4.6%
1539	33	2	1.4%	4.9%
1540	33	2	1.3%	5.2%
1541	33	2	1.3%	5.5%
1542	33	2	1.3%	5.8%
1543	38	3	1.8%	1.9%
1544	38	3	1.8%	2.1%
1545	38	3	1.7%	2.2%
1546	38	3	1.7%	2.4%
1547	38	3	1.7%	2.6%
1548	38	3	1.6%	2.8%
1549	38	3	1.6%	3.0%
1550	38	3	1.6%	3.2%
1551	38	3	1.6%	3.4%
1552	38	3	1.5%	3.6%
1553	38	3	1.5%	3.8%
1554	38	3	1.5%	4.0%
1555	38	3	1.5%	4.2%
1556	38	3	1.4%	4.5%
1557	38	3	1.4%	4.7%
1558	38	3	1.4%	5.0%
1559	38	3	1.4%	5.2%
1560	38	3	1.3%	5.5%
1561	38	3	1.3%	5.8%
1562	42	4	1.9%	2.3%
1563	42	4	1.9%	2.4%
1564	42	4	1.9%	2.6%
1565	42	4	1.8%	2.7%
1566	42	4	1.8%	2.9%
1567	42	4	1.8%	3.1%
1568	42	4	1.8%	3.2%
1569	42	4	1.7%	3.4%
1570	42	4	1.7%	3.6%
1571	42	4	1.7%	3.8%
1572	42	4	1.6%	4.0%
1573	42	4	1.6%	4.2%
1574	42	4	1.6%	4.4%
1575	42	4	1.6%	4.6%
1576	42	4	1.5%	4.8%
1577	42	4	1.5%	5.0%
1578	42	4	1.5%	5.3%
1579	42	4	1.5%	5.5%
1580	42	4	1.4%	5.7%
1581	42	4	1.4%	6.0%
1582	46	5	1.9%	2.9%
1583	46	5	1.9%	3.0%
1584	46	5	1.8%	3.2%
1585	46	5	1.8%	3.3%
1586	46	5	1.8%	3.5%
1587	46	5	1.7%	3.6%

1588	46	5	1.7%	3.8%
1589	46	5	1.7%	4.0%
1590	46	5	1.7%	4.2%
1591	46	5	1.6%	4.4%
1592	46	5	1.6%	4.6%
1593	46	5	1.6%	4.7%
1594	46	5	1.5%	5.0%
1595	46	5	1.5%	5.2%
1596	46	5	1.5%	5.4%
1597	46	5	1.5%	5.6%
1598	46	5	1.4%	5.8%
1599	50	6	1.8%	3.1%
1600	50	6	1.8%	3.3%
1601	50	6	1.8%	3.4%
1602	50	6	1.7%	3.6%
1603	50	6	1.7%	3.7%
1604	50	6	1.7%	3.9%
1605	50	6	1.6%	4.1%
1606	50	6	1.6%	4.2%
1607	50	6	1.6%	4.4%
1608	50	6	1.6%	4.6%
1609	50	6	1.5%	4.8%
1610	50	6	1.5%	5.0%
1611	50	6	1.5%	5.2%
1612	50	6	1.5%	5.4%
1613	50	6	1.4%	5.6%
1614	50	6	1.4%	5.8%
1615	50	6	1.4%	6.0%
1616	53	7	2.0%	3.2%
1617	53	7	2.0%	3.3%
1618	53	7	1.9%	3.5%
1619	53	7	1.9%	3.6%
1620	53	7	1.9%	3.8%
1621	53	7	1.8%	3.9%
1622	53	7	1.8%	4.1%
1623	53	7	1.8%	4.2%
1624	53	7	1.7%	4.4%
1625	53	7	1.7%	4.6%
1626	53	7	1.7%	4.7%
1627	53	7	1.6%	4.9%
1628	53	7	1.6%	5.1%
1629	53	7	1.6%	5.3%
1630	53	7	1.6%	5.5%
1631	53	7	1.5%	5.7%
1632	53	7	1.5%	5.9%
1633	57	8	1.7%	3.7%
1634	57	8	1.7%	3.9%
1635	57	8	1.7%	4.0%
1636	57	8	1.6%	4.2%
1637	57	8	1.6%	4.3%

1638	57	8	1.6%	4.5%
1639	57	8	1.6%	4.7%
1640	57	8	1.5%	4.8%
1641	57	8	1.5%	5.0%
1642	57	8	1.5%	5.2%
1643	57	8	1.4%	5.4%
1644	57	8	1.4%	5.5%
1645	57	8	1.4%	5.7%
1646	57	8	1.4%	5.9%
1647	60	9	1.8%	3.6%
1648	60	9	1.8%	3.7%
1649	60	9	1.8%	3.9%
1650	60	9	1.7%	4.0%
1651	60	9	1.7%	4.2%
1652	60	9	1.7%	4.3%
1653	60	9	1.6%	4.5%
1654	60	9	1.6%	4.6%
1655	60	9	1.6%	4.8%
1656	60	9	1.6%	4.9%
1657	60	9	1.5%	5.1%
1658	60	9	1.5%	5.3%
1659	60	9	1.5%	5.5%
1660	60	9	1.4%	5.6%
1661	60	9	1.4%	5.8%
1662	63	10	1.8%	3.7%
1663	63	10	1.8%	3.8%
1664	63	10	1.8%	4.0%
1665	63	10	1.7%	4.1%
1666	63	10	1.7%	4.3%
1667	63	10	1.7%	4.4%
1668	63	10	1.6%	4.6%
1669	63	10	1.6%	4.7%
1670	63	10	1.6%	4.9%
1671	63	10	1.6%	5.0%
1672	63	10	1.5%	5.2%
1673	63	10	1.5%	5.4%
1674	63	10	1.5%	5.5%
1675	63	10	1.4%	5.7%
1676	63	10	1.4%	5.9%
1677	66	11	1.8%	3.9%
1678	66	11	1.8%	4.0%
1679	66	11	1.7%	4.2%
1680	66	11	1.7%	4.3%
1681	66	11	1.7%	4.5%
1682	66	11	1.6%	4.6%
1683	66	11	1.6%	4.7%
1684	66	11	1.6%	4.9%
1685	66	11	1.5%	5.1%
1686	66	11	1.5%	5.2%
1687	66	11	1.5%	5.4%

1688	66	11	1.5%	5.6%
1689	66	11	1.4%	5.7%
1690	66	11	1.4%	5.9%
1691	69	12	1.7%	4.0%
1692	69	12	1.7%	4.2%
1693	69	12	1.7%	4.3%
1694	69	12	1.6%	4.5%
1695	69	12	1.6%	4.6%
1696	69	12	1.6%	4.7%
1697	69	12	1.6%	4.9%
1698	69	12	1.5%	5.0%
1699	69	12	1.5%	5.2%
1700	69	12	1.5%	5.4%
1701	69	12	1.4%	5.5%
1702	69	12	1.4%	5.7%
1703	69	12	1.4%	5.9%
1704	71	13	2.0%	3.7%
1705	71	13	2.0%	3.8%
1706	71	13	1.9%	4.0%
1707	71	13	1.9%	4.1%
1708	71	13	1.9%	4.2%
1709	71	13	1.8%	4.4%
1710	71	13	1.8%	4.5%
1711	71	13	1.8%	4.6%
1712	71	13	1.7%	4.8%
1713	71	13	1.7%	4.9%
1714	71	13	1.7%	5.1%
1715	71	13	1.6%	5.2%
1716	71	13	1.6%	5.4%
1717	71	13	1.6%	5.5%
1718	71	13	1.5%	5.7%
1719	71	13	1.5%	5.9%
1720	74	14	1.8%	4.3%
1721	74	14	1.8%	4.4%
1722	74	14	1.7%	4.5%
1723	74	14	1.7%	4.7%
1724	74	14	1.7%	4.8%
1725	74	14	1.6%	4.9%
1726	74	14	1.6%	5.1%
1727	74	14	1.6%	5.2%
1728	74	14	1.5%	5.4%
1729	74	14	1.5%	5.5%
1730	74	14	1.5%	5.7%
1731	74	14	1.5%	5.9%
1732	77	15	1.7%	4.4%
1733	77	15	1.7%	4.5%
1734	77	15	1.6%	4.6%
1735	77	15	1.6%	4.8%
1736	77	15	1.6%	4.9%
1737	77	15	1.5%	5.0%

1738	77	15	1.5%	5.2%
1739	77	15	1.5%	5.3%
1740	77	15	1.5%	5.5%
1741	77	15	1.4%	5.6%
1742	77	15	1.4%	5.8%
1743	77	15	1.4%	6.0%
1744	79	16	1.9%	4.1%
1745	79	16	1.8%	4.2%
1746	79	16	1.8%	4.3%
1747	79	16	1.8%	4.4%
1748	79	16	1.7%	4.6%
1749	79	16	1.7%	4.7%
1750	79	16	1.7%	4.8%
1751	79	16	1.7%	5.0%
1752	79	16	1.6%	5.1%
1753	79	16	1.6%	5.3%
1754	79	16	1.6%	5.4%
1755	79	16	1.5%	5.6%
1756	79	16	1.5%	5.7%
1757	79	16	1.5%	5.9%
1758	81	17	2.0%	4.1%
1759	81	17	1.9%	4.2%
1760	81	17	1.9%	4.3%
1761	81	17	1.9%	4.4%
1762	81	17	1.8%	4.6%
1763	81	17	1.8%	4.7%
1764	81	17	1.8%	4.8%
1765	81	17	1.7%	5.0%
1766	81	17	1.7%	5.1%
1767	81	17	1.7%	5.2%
1768	81	17	1.7%	5.4%
1769	81	17	1.6%	5.5%
1770	81	17	1.6%	5.7%
1771	81	17	1.6%	5.8%
1772	81	17	1.5%	6.0%
1773	84	18	1.7%	4.7%
1774	84	18	1.7%	4.9%
1775	84	18	1.6%	5.0%
1776	84	18	1.6%	5.1%
1777	84	18	1.6%	5.3%
1778	84	18	1.6%	5.4%
1779	84	18	1.5%	5.5%
1780	84	18	1.5%	5.7%
1781	84	18	1.5%	5.8%
1782	84	18	1.4%	6.0%
1783	86	19	1.9%	4.3%
1784	86	19	1.8%	4.4%
1785	86	19	1.8%	4.6%
1786	86	19	1.8%	4.7%
1787	86	19	1.7%	4.8%

1788	86	19	1.7%	4.9%
1789	86	19	1.7%	5.1%
1790	86	19	1.7%	5.2%
1791	86	19	1.6%	5.3%
1792	86	19	1.6%	5.5%
1793	86	19	1.6%	5.6%
1794	86	19	1.5%	5.8%
1795	86	19	1.5%	5.9%
1796	88	20	1.9%	4.3%
1797	88	20	1.9%	4.4%
1798	88	20	1.9%	4.6%
1799	88	20	1.8%	4.7%
1800	88	20	1.8%	4.8%
1801	88	20	1.8%	4.9%
1802	88	20	1.7%	5.1%
1803	88	20	1.7%	5.2%
1804	88	20	1.7%	5.3%
1805	88	20	1.7%	5.5%
1806	88	20	1.6%	5.6%
1807	88	20	1.6%	5.7%
1808	88	20	1.6%	5.9%
1809	90	21	2.0%	4.3%
1810	90	21	2.0%	4.5%
1811	90	21	1.9%	4.6%
1812	90	21	1.9%	4.7%
1813	90	21	1.9%	4.8%
1814	90	21	1.8%	5.0%
1815	90	21	1.8%	5.1%
1816	90	21	1.8%	5.2%
1817	90	21	1.7%	5.3%
1818	90	21	1.7%	5.5%
1819	90	21	1.7%	5.6%
1820	90	21	1.6%	5.8%
1821	90	21	1.6%	5.9%
1822	93	22	1.7%	4.9%
1823	93	22	1.7%	5.1%
1824	93	22	1.6%	5.2%
1825	93	22	1.6%	5.3%
1826	93	22	1.6%	5.5%
1827	93	22	1.5%	5.6%
1828	93	22	1.5%	5.7%
1829	93	22	1.5%	5.9%
1830	95	23	1.9%	4.4%
1831	95	23	1.8%	4.6%
1832	95	23	1.8%	4.7%
1833	95	23	1.8%	4.8%
1834	95	23	1.7%	4.9%
1835	95	23	1.7%	5.0%
1836	95	23	1.7%	5.2%
1837	95	23	1.6%	5.3%

1838	95	23	1.6%	5.4%
1839	95	23	1.6%	5.6%
1840	95	23	1.6%	5.7%
1841	95	23	1.5%	5.8%
1842	95	23	1.5%	6.0%
1843	97	24	1.9%	4.6%
1844	97	24	1.8%	4.7%
1845	97	24	1.8%	4.8%
1846	97	24	1.8%	4.9%
1847	97	24	1.7%	5.1%
1848	97	24	1.7%	5.2%
1849	97	24	1.7%	5.3%
1850	97	24	1.6%	5.4%
1851	97	24	1.6%	5.6%
1852	97	24	1.6%	5.7%
1853	97	24	1.6%	5.9%
1854	97	24	1.5%	6.0%
1855	99	25	1.9%	4.6%
1856	99	25	1.8%	4.7%
1857	99	25	1.8%	4.9%
1858	99	25	1.8%	5.0%
1859	99	25	1.7%	5.1%
1860	99	25	1.7%	5.2%
1861	99	25	1.7%	5.4%
1862	99	25	1.6%	5.5%
1863	99	25	1.6%	5.6%
1864	99	25	1.6%	5.8%
1865	99	25	1.6%	5.9%
1866	101	26	1.9%	4.6%
1867	101	26	1.9%	4.7%
1868	101	26	1.8%	4.8%
1869	101	26	1.8%	4.9%
1870	101	26	1.8%	5.1%
1871	101	26	1.7%	5.2%
1872	101	26	1.7%	5.3%
1873	101	26	1.7%	5.4%
1874	101	26	1.6%	5.6%
1875	101	26	1.6%	5.7%
1876	101	26	1.6%	5.8%
1877	101	26	1.6%	6.0%
1878	103	27	1.9%	4.7%
1879	103	27	1.9%	4.8%
1880	103	27	1.8%	4.9%
1881	103	27	1.8%	5.1%
1882	103	27	1.8%	5.2%
1883	103	27	1.7%	5.3%
1884	103	27	1.7%	5.4%
1885	103	27	1.7%	5.5%
1886	103	27	1.6%	5.7%
1887	103	27	1.6%	5.8%

1888	103	27	1.6%	5.9%
1889	105	28	1.9%	4.7%
1890	105	28	1.9%	4.8%
1891	105	28	1.8%	4.9%
1892	105	28	1.8%	5.1%
1893	105	28	1.8%	5.2%
1894	105	28	1.7%	5.3%
1895	105	28	1.7%	5.4%
1896	105	28	1.7%	5.6%
1897	105	28	1.6%	5.7%
1898	105	28	1.6%	5.8%
1899	105	28	1.6%	5.9%
1900	107	29	1.9%	4.8%
1901	107	29	1.8%	4.9%
1902	107	29	1.8%	5.0%
1903	107	29	1.8%	5.1%
1904	107	29	1.8%	5.2%
1905	107	29	1.7%	5.3%
1906	107	29	1.7%	5.5%
1907	107	29	1.7%	5.6%
1908	107	29	1.6%	5.7%
1909	107	29	1.6%	5.8%
1910	107	29	1.6%	6.0%
1911	109	30	1.9%	4.8%
1912	109	30	1.8%	4.9%
1913	109	30	1.8%	5.1%
1914	109	30	1.8%	5.2%
1915	109	30	1.7%	5.3%
1916	109	30	1.7%	5.4%
1917	109	30	1.7%	5.5%
1918	109	30	1.6%	5.7%
1919	109	30	1.6%	5.8%
1920	109	30	1.6%	5.9%
1921	111	31	1.9%	4.8%
1922	111	31	1.8%	4.9%
1923	111	31	1.8%	5.0%
1924	111	31	1.8%	5.1%
1925	111	31	1.7%	5.3%
1926	111	31	1.7%	5.4%
1927	111	31	1.7%	5.5%
1928	111	31	1.7%	5.6%
1929	111	31	1.6%	5.7%
1930	111	31	1.6%	5.9%
1931	113	32	1.9%	4.8%
1932	113	32	1.8%	4.9%
1933	113	32	1.8%	5.0%
1934	113	32	1.8%	5.1%
1935	113	32	1.7%	5.3%
1936	113	32	1.7%	5.4%
1937	113	32	1.7%	5.5%

1938	113	32	1.6%	5.6%
1939	113	32	1.6%	5.7%
1940	113	32	1.6%	5.9%
1941	113	32	1.6%	6.0%
1942	115	33	1.8%	4.9%
1943	115	33	1.8%	5.0%
1944	115	33	1.8%	5.2%
1945	115	33	1.7%	5.3%
1946	115	33	1.7%	5.4%
1947	115	33	1.7%	5.5%
1948	115	33	1.6%	5.6%
1949	115	33	1.6%	5.8%
1950	115	33	1.6%	5.9%
1951	117	34	1.8%	4.9%
1952	117	34	1.8%	5.0%
1953	117	34	1.8%	5.1%
1954	117	34	1.7%	5.2%
1955	117	34	1.7%	5.3%
1956	117	34	1.7%	5.4%
1957	117	34	1.6%	5.6%
1958	117	34	1.6%	5.7%
1959	117	34	1.6%	5.8%
1960	117	34	1.6%	5.9%
1961	119	35	1.8%	4.9%
1962	119	35	1.8%	5.0%
1963	119	35	1.7%	5.2%
1964	119	35	1.7%	5.3%
1965	119	35	1.7%	5.4%
1966	119	35	1.6%	5.5%
1967	119	35	1.6%	5.6%
1968	119	35	1.6%	5.7%
1969	119	35	1.6%	5.9%
1970	119	35	1.5%	6.0%
1971	121	36	1.7%	5.0%
1972	121	36	1.7%	5.1%
1973	121	36	1.7%	5.2%
1974	121	36	1.7%	5.4%
1975	121	36	1.6%	5.5%
1976	121	36	1.6%	5.6%
1977	121	36	1.6%	5.7%
1978	121	36	1.5%	5.8%
1979	121	36	1.5%	6.0%
1980	123	37	1.7%	5.0%
1981	123	37	1.7%	5.1%
1982	123	37	1.7%	5.2%
1983	123	37	1.6%	5.3%
1984	123	37	1.6%	5.5%
1985	123	37	1.6%	5.6%
1986	123	37	1.6%	5.7%
1987	123	37	1.5%	5.8%

1988	123	37	1.5%	5.9%
1989	125	38	1.7%	5.0%
1990	125	38	1.7%	5.1%
1991	125	38	1.6%	5.2%
1992	125	38	1.6%	5.4%
1993	125	38	1.6%	5.5%
1994	125	38	1.6%	5.6%
1995	125	38	1.5%	5.7%
1996	125	38	1.5%	5.8%
1997	125	38	1.5%	6.0%
1998	126	39	2.0%	4.5%
1999	126	39	2.0%	4.6%
2000	126	39	1.9%	4.7%
2001	126	39	1.9%	4.8%
2002	126	39	1.9%	4.9%
2003	126	39	1.8%	5.0%
2004	126	39	1.8%	5.1%
2005	126	39	1.8%	5.2%
2006	126	39	1.7%	5.3%
2007	126	39	1.7%	5.4%
2008	126	39	1.7%	5.6%
2009	126	39	1.6%	5.7%
2010	126	39	1.6%	5.8%
2011	126	39	1.6%	5.9%
2012	128	40	1.8%	5.1%
2013	128	40	1.8%	5.2%
2014	128	40	1.7%	5.3%
2015	128	40	1.7%	5.4%
2016	128	40	1.7%	5.5%
2017	128	40	1.6%	5.6%
2018	128	40	1.6%	5.7%
2019	128	40	1.6%	5.8%
2020	128	40	1.6%	6.0%
2021	130	41	1.7%	5.1%
2022	130	41	1.7%	5.2%
2023	130	41	1.7%	5.3%
2024	130	41	1.7%	5.4%
2025	130	41	1.6%	5.6%
2026	130	41	1.6%	5.7%
2027	130	41	1.6%	5.8%
2028	130	41	1.5%	5.9%
2029	132	42	1.7%	5.1%
2030	132	42	1.7%	5.2%
2031	132	42	1.7%	5.3%
2032	132	42	1.6%	5.4%
2033	132	42	1.6%	5.5%
2034	132	42	1.6%	5.6%
2035	132	42	1.6%	5.8%
2036	132	42	1.5%	5.9%
2037	132	42	1.5%	6.0%

2038	133	43	2.0%	4.6%
2039	133	43	1.9%	4.7%
2040	133	43	1.9%	4.8%
2041	133	43	1.9%	4.9%
2042	133	43	1.8%	5.0%
2043	133	43	1.8%	5.1%
2044	133	43	1.8%	5.2%
2045	133	43	1.8%	5.3%
2046	133	43	1.7%	5.4%
2047	133	43	1.7%	5.5%
2048	133	43	1.7%	5.7%
2049	133	43	1.6%	5.8%
2050	133	43	1.6%	5.9%
2051	135	44	1.8%	5.1%
2052	135	44	1.8%	5.2%
2053	135	44	1.7%	5.3%
2054	135	44	1.7%	5.4%
2055	135	44	1.7%	5.5%
2056	135	44	1.6%	5.7%
2057	135	44	1.6%	5.8%
2058	135	44	1.6%	5.9%
2059	137	45	1.7%	5.1%
2060	137	45	1.7%	5.2%
2061	137	45	1.7%	5.3%
2062	137	45	1.7%	5.5%
2063	137	45	1.6%	5.6%
2064	137	45	1.6%	5.7%
2065	137	45	1.6%	5.8%
2066	137	45	1.6%	5.9%
2067	139	46	1.7%	5.2%
2068	139	46	1.7%	5.3%
2069	139	46	1.6%	5.4%
2070	139	46	1.6%	5.5%
2071	139	46	1.6%	5.6%
2072	139	46	1.6%	5.7%
2073	139	46	1.5%	5.8%
2074	139	46	1.5%	5.9%
2075	140	47	2.0%	4.6%
2076	140	47	1.9%	4.7%
2077	140	47	1.9%	4.8%
2078	140	47	1.9%	4.9%
2079	140	47	1.8%	5.0%
2080	140	47	1.8%	5.1%
2081	140	47	1.8%	5.2%
2082	140	47	1.7%	5.3%
2083	140	47	1.7%	5.4%
2084	140	47	1.7%	5.5%
2085	140	47	1.7%	5.7%
2086	140	47	1.6%	5.8%
2087	140	47	1.6%	5.9%

2088	140	47	1.6%	6.0%
2089	142	48	1.7%	5.3%
2090	142	48	1.7%	5.4%
2091	142	48	1.7%	5.5%
2092	142	48	1.6%	5.6%
2093	142	48	1.6%	5.7%
2094	142	48	1.6%	5.8%
2095	142	48	1.6%	5.9%
2096	144	49	1.7%	5.3%
2097	144	49	1.7%	5.4%
2098	144	49	1.6%	5.5%
2099	144	49	1.6%	5.6%
2100	144	49	1.6%	5.7%
2101	144	49	1.6%	5.8%
2102	144	49	1.5%	5.9%
2103	145	50	2.0%	4.7%
2104	145	50	1.9%	4.8%
2105	145	50	1.9%	4.8%
2106	145	50	1.9%	4.9%
2107	145	50	1.8%	5.0%
2108	145	50	1.8%	5.1%
2109	145	50	1.8%	5.2%
2110	145	50	1.8%	5.3%
2111	145	50	1.7%	5.5%
2112	145	50	1.7%	5.6%
2113	145	50	1.7%	5.7%
2114	145	50	1.6%	5.8%
2115	145	50	1.6%	5.9%
2116	145	50	1.6%	6.0%
2117	147	51	1.7%	5.3%
2118	147	51	1.7%	5.4%
2119	147	51	1.7%	5.6%
2120	147	51	1.6%	5.7%
2121	147	51	1.6%	5.8%
2122	147	51	1.6%	5.9%
2123	147	51	1.6%	6.0%
2124	148	52	2.0%	4.7%
2125	148	52	2.0%	4.8%
2126	148	52	1.9%	4.9%
2127	148	52	1.9%	5.0%
2128	148	52	1.9%	5.1%
2129	148	52	1.8%	5.2%
2130	148	52	1.8%	5.3%
2131	148	52	1.8%	5.4%
2132	148	52	1.7%	5.5%
2133	148	52	1.7%	5.6%
2134	148	52	1.7%	5.8%
2135	148	52	1.7%	5.9%
2136	148	52	1.6%	6.0%
2137	150	53	1.8%	5.4%

2138	150	53	1.7%	5.5%
2139	150	53	1.7%	5.6%
2140	150	53	1.7%	5.7%
2141	150	53	1.6%	5.8%
2142	150	53	1.6%	5.9%
2143	150	53	1.6%	6.0%
2144	152	54	1.7%	5.4%
2145	152	54	1.7%	5.5%
2146	152	54	1.6%	5.6%
2147	152	54	1.6%	5.7%
2148	152	54	1.6%	5.8%
2149	152	54	1.6%	5.9%
2150	153	55	2.0%	4.7%
2151	153	55	2.0%	4.8%
2152	153	55	1.9%	4.9%
2153	153	55	1.9%	5.0%
2154	153	55	1.9%	5.1%
2155	153	55	1.8%	5.2%
2156	153	55	1.8%	5.3%
2157	153	55	1.8%	5.4%
2158	153	55	1.7%	5.5%
2159	153	55	1.7%	5.6%
2160	153	55	1.7%	5.7%
2161	153	55	1.7%	5.8%
2162	153	55	1.6%	5.9%
2163	155	56	1.7%	5.4%
2164	155	56	1.7%	5.5%
2165	155	56	1.7%	5.6%
2166	155	56	1.7%	5.7%
2167	155	56	1.6%	5.8%
2168	155	56	1.6%	5.9%
2169	155	56	1.6%	6.0%
2170	156	57	2.0%	4.8%
2171	156	57	2.0%	4.9%
2172	156	57	1.9%	5.0%
2173	156	57	1.9%	5.1%
2174	156	57	1.9%	5.2%
2175	156	57	1.8%	5.3%
2176	156	57	1.8%	5.4%
2177	156	57	1.8%	5.5%
2178	156	57	1.7%	5.6%
2179	156	57	1.7%	5.7%
2180	156	57	1.7%	5.8%
2181	156	57	1.7%	5.9%
2182	158	58	1.8%	5.4%
2183	158	58	1.7%	5.5%
2184	158	58	1.7%	5.6%
2185	158	58	1.7%	5.7%
2186	158	58	1.7%	5.8%
2187	158	58	1.6%	5.9%

2188	158	58	1.6%	6.0%
2189	160	59	1.7%	5.4%
2190	160	59	1.7%	5.6%
2191	160	59	1.6%	5.7%
2192	160	59	1.6%	5.8%
2193	160	59	1.6%	5.9%
2194	160	59	1.6%	6.0%
2195	161	60	2.0%	4.8%
2196	161	60	1.9%	4.9%
2197	161	60	1.9%	5.0%
2198	161	60	1.9%	5.1%
2199	161	60	1.8%	5.2%
2200	161	60	1.8%	5.3%
2201	161	60	1.8%	5.4%
2202	161	60	1.7%	5.5%
2203	161	60	1.7%	5.6%
2204	161	60	1.7%	5.7%
2205	161	60	1.7%	5.8%
2206	161	60	1.6%	5.9%
2207	163	61	1.7%	5.4%
2208	163	61	1.7%	5.5%
2209	163	61	1.7%	5.6%
2210	163	61	1.6%	5.7%
2211	163	61	1.6%	5.8%
2212	163	61	1.6%	5.9%
2213	164	62	2.0%	4.8%
2214	164	62	2.0%	4.9%
2215	164	62	1.9%	5.0%
2216	164	62	1.9%	5.1%
2217	164	62	1.9%	5.2%
2218	164	62	1.8%	5.3%
2219	164	62	1.8%	5.4%
2220	164	62	1.8%	5.5%
2221	164	62	1.7%	5.6%
2222	164	62	1.7%	5.7%
2223	164	62	1.7%	5.8%
2224	164	62	1.7%	5.9%
2225	164	62	1.6%	6.0%
2226	166	63	1.7%	5.5%
2227	166	63	1.7%	5.6%
2228	166	63	1.7%	5.7%
2229	166	63	1.6%	5.8%
2230	166	63	1.6%	5.9%
2231	166	63	1.6%	6.0%
2232	167	64	2.0%	4.9%
2233	167	64	1.9%	5.0%
2234	167	64	1.9%	5.1%
2235	167	64	1.9%	5.2%
2236	167	64	1.8%	5.3%
2237	167	64	1.8%	5.4%

2238	167	64	1.8%	5.5%
2239	167	64	1.8%	5.6%
2240	167	64	1.7%	5.7%
2241	167	64	1.7%	5.8%
2242	167	64	1.7%	5.9%
2243	167	64	1.7%	6.0%
2244	169	65	1.7%	5.5%
2245	169	65	1.7%	5.6%
2246	169	65	1.7%	5.7%
2247	169	65	1.6%	5.8%
2248	169	65	1.6%	5.9%
2249	171	66	1.7%	5.5%
2250	171	66	1.7%	5.6%
2251	171	66	1.6%	5.7%
2252	171	66	1.6%	5.8%
2253	171	66	1.6%	5.9%
2254	171	66	1.6%	6.0%
2255	172	67	1.9%	4.9%
2256	172	67	1.9%	5.0%
2257	172	67	1.9%	5.1%
2258	172	67	1.8%	5.2%
2259	172	67	1.8%	5.3%
2260	172	67	1.8%	5.4%
2261	172	67	1.8%	5.5%
2262	172	67	1.7%	5.6%
2263	172	67	1.7%	5.6%
2264	172	67	1.7%	5.7%
2265	172	67	1.6%	5.8%
2266	172	67	1.6%	5.9%
2267	173	68	2.0%	4.9%
2268	173	68	2.0%	5.0%
2269	173	68	1.9%	5.1%
2270	173	68	1.9%	5.2%
2271	173	68	1.9%	5.3%
2272	173	68	1.8%	5.3%
2273	173	68	1.8%	5.4%
2274	173	68	1.8%	5.5%
2275	173	68	1.8%	5.6%
2276	173	68	1.7%	5.7%
2277	173	68	1.7%	5.8%
2278	173	68	1.7%	5.9%
2279	175	69	1.7%	5.5%
2280	175	69	1.7%	5.6%
2281	175	69	1.7%	5.7%
2282	175	69	1.7%	5.8%
2283	175	69	1.6%	5.9%
2284	176	70	2.0%	4.9%
2285	176	70	2.0%	5.0%
2286	176	70	1.9%	5.1%
2287	176	70	1.9%	5.2%

2288	176	70	1.9%	5.2%
2289	176	70	1.9%	5.3%
2290	176	70	1.8%	5.4%
2291	176	70	1.8%	5.5%
2292	176	70	1.8%	5.6%
2293	176	70	1.7%	5.7%
2294	176	70	1.7%	5.8%
2295	176	70	1.7%	5.9%
2296	178	71	1.7%	5.5%
2297	178	71	1.7%	5.6%
2298	178	71	1.7%	5.7%
2299	178	71	1.7%	5.8%
2300	178	71	1.6%	5.9%
2301	179	72	2.0%	4.9%
2302	179	72	2.0%	5.0%
2303	179	72	1.9%	5.1%
2304	179	72	1.9%	5.2%
2305	179	72	1.9%	5.3%
2306	179	72	1.9%	5.4%
2307	179	72	1.8%	5.4%
2308	179	72	1.8%	5.5%
2309	179	72	1.8%	5.6%
2310	179	72	1.7%	5.7%
2311	179	72	1.7%	5.8%
2312	179	72	1.7%	5.9%
2313	181	73	1.7%	5.6%
2314	181	73	1.7%	5.7%
2315	181	73	1.7%	5.7%
2316	181	73	1.7%	5.8%
2317	181	73	1.6%	5.9%
2318	182	74	2.0%	4.9%
2319	182	74	2.0%	5.0%
2320	182	74	1.9%	5.1%
2321	182	74	1.9%	5.2%
2322	182	74	1.9%	5.3%
2323	182	74	1.8%	5.4%
2324	182	74	1.8%	5.5%
2325	182	74	1.8%	5.6%
2326	182	74	1.8%	5.7%
2327	182	74	1.7%	5.8%
2328	182	74	1.7%	5.9%
2329	182	74	1.7%	6.0%
2330	184	75	1.7%	5.6%
2331	184	75	1.7%	5.7%
2332	184	75	1.7%	5.8%
2333	184	75	1.6%	5.9%
2334	184	75	1.6%	6.0%
2335	185	76	2.0%	5.0%
2336	185	76	1.9%	5.1%
2337	185	76	1.9%	5.2%

2338	185	76	1.9%	5.3%
2339	185	76	1.8%	5.4%
2340	185	76	1.8%	5.5%
2341	185	76	1.8%	5.5%
2342	185	76	1.8%	5.6%
2343	185	76	1.7%	5.7%
2344	185	76	1.7%	5.8%
2345	185	76	1.7%	5.9%
2346	187	77	1.7%	5.6%
2347	187	77	1.7%	5.7%
2348	187	77	1.7%	5.8%
2349	187	77	1.6%	5.9%
2350	187	77	1.6%	6.0%
2351	188	78	2.0%	5.0%
2352	188	78	1.9%	5.1%
2353	188	78	1.9%	5.2%
2354	188	78	1.9%	5.3%
2355	188	78	1.8%	5.4%
2356	188	78	1.8%	5.4%
2357	188	78	1.8%	5.5%
2358	188	78	1.8%	5.6%
2359	188	78	1.7%	5.7%
2360	188	78	1.7%	5.8%
2361	188	78	1.7%	5.9%
2362	190	79	1.7%	5.6%
2363	190	79	1.7%	5.7%
2364	190	79	1.7%	5.8%
2365	190	79	1.6%	5.9%
2366	190	79	1.6%	6.0%
2367	191	80	1.9%	5.0%
2368	191	80	1.9%	5.1%
2369	191	80	1.9%	5.2%
2370	191	80	1.9%	5.3%
2371	191	80	1.8%	5.4%
2372	191	80	1.8%	5.5%
2373	191	80	1.8%	5.6%
2374	191	80	1.7%	5.6%
2375	191	80	1.7%	5.7%
2376	191	80	1.7%	5.8%
2377	191	80	1.7%	5.9%
2378	193	81	1.7%	5.6%
2379	193	81	1.7%	5.7%
2380	193	81	1.6%	5.8%
2381	193	81	1.6%	5.9%
2382	194	82	1.9%	5.0%
2383	194	82	1.9%	5.1%
2384	194	82	1.9%	5.2%
2385	194	82	1.9%	5.2%
2386	194	82	1.8%	5.3%
2387	194	82	1.8%	5.4%

2388	194	82	1.8%	5.5%
2389	194	82	1.8%	5.6%
2390	194	82	1.7%	5.7%
2391	194	82	1.7%	5.8%
2392	194	82	1.7%	5.9%
2393	194	82	1.6%	6.0%
2394	195	83	2.0%	5.0%
2395	195	83	1.9%	5.1%
2396	195	83	1.9%	5.2%
2397	195	83	1.9%	5.3%
2398	195	83	1.9%	5.4%
2399	195	83	1.8%	5.5%
2400	195	83	1.8%	5.5%
2401	195	83	1.8%	5.6%
2402	195	83	1.8%	5.7%
2403	195	83	1.7%	5.8%
2404	195	83	1.7%	5.9%
2405	197	84	1.7%	5.7%
2406	197	84	1.7%	5.7%
2407	197	84	1.7%	5.8%
2408	197	84	1.6%	5.9%
2409	198	85	2.0%	5.0%
2410	198	85	1.9%	5.1%
2411	198	85	1.9%	5.2%
2412	198	85	1.9%	5.3%
2413	198	85	1.9%	5.4%
2414	198	85	1.8%	5.4%
2415	198	85	1.8%	5.5%
2416	198	85	1.8%	5.6%
2417	198	85	1.8%	5.7%
2418	198	85	1.7%	5.8%
2419	198	85	1.7%	5.9%
2420	198	85	1.7%	6.0%
2421	200	86	1.7%	5.7%
2422	200	86	1.7%	5.8%
2423	200	86	1.6%	5.9%
2424	201	87	2.0%	5.0%
2425	201	87	1.9%	5.1%
2426	201	87	1.9%	5.2%
2427	201	87	1.9%	5.3%
2428	201	87	1.8%	5.4%
2429	201	87	1.8%	5.4%
2430	201	87	1.8%	5.5%
2431	201	87	1.8%	5.6%
2432	201	87	1.7%	5.7%
2433	201	87	1.7%	5.8%
2434	201	87	1.7%	5.9%
2435	201	87	1.7%	6.0%
2436	202	88	2.0%	5.1%
2437	202	88	2.0%	5.2%

2438	202	88	1.9%	5.2%
2439	202	88	1.9%	5.3%
2440	202	88	1.9%	5.4%
2441	202	88	1.8%	5.5%
2442	202	88	1.8%	5.6%
2443	202	88	1.8%	5.7%
2444	202	88	1.8%	5.8%
2445	202	88	1.7%	5.9%
2446	202	88	1.7%	5.9%
2447	204	89	1.7%	5.7%
2448	204	89	1.7%	5.8%
2449	204	89	1.7%	5.9%
2450	205	90	2.0%	5.0%
2451	205	90	2.0%	5.1%
2452	205	90	1.9%	5.2%
2453	205	90	1.9%	5.3%
2454	205	90	1.9%	5.4%
2455	205	90	1.8%	5.4%
2456	205	90	1.8%	5.5%
2457	205	90	1.8%	5.6%
2458	205	90	1.8%	5.7%
2459	205	90	1.7%	5.8%
2460	205	90	1.7%	5.9%
2461	205	90	1.7%	6.0%
2462	207	91	1.7%	5.8%
2463	207	91	1.7%	5.9%
2464	207	91	1.6%	5.9%
2465	208	92	1.9%	5.1%
2466	208	92	1.9%	5.2%
2467	208	92	1.9%	5.2%
2468	208	92	1.9%	5.3%
2469	208	92	1.8%	5.4%
2470	208	92	1.8%	5.5%
2471	208	92	1.8%	5.6%
2472	208	92	1.8%	5.7%
2473	208	92	1.7%	5.8%
2474	208	92	1.7%	5.8%
2475	208	92	1.7%	5.9%
2476	209	93	2.0%	5.1%
2477	209	93	2.0%	5.2%
2478	209	93	1.9%	5.2%
2479	209	93	1.9%	5.3%
2480	209	93	1.9%	5.4%
2481	209	93	1.9%	5.5%
2482	209	93	1.8%	5.6%
2483	209	93	1.8%	5.7%
2484	209	93	1.8%	5.7%
2485	209	93	1.8%	5.8%
2486	209	93	1.7%	5.9%
2487	211	94	1.7%	5.7%

2488	211	94	1.7%	5.8%
2489	211	94	1.7%	5.9%
2490	212	95	2.0%	5.1%
2491	212	95	1.9%	5.1%
2492	212	95	1.9%	5.2%
2493	212	95	1.9%	5.3%
2494	212	95	1.9%	5.4%
2495	212	95	1.8%	5.5%
2496	212	95	1.8%	5.6%
2497	212	95	1.8%	5.6%
2498	212	95	1.8%	5.7%
2499	212	95	1.7%	5.8%
2500	212	95	1.7%	5.9%
2501	212	95	1.7%	6.0%
2502	213	96	2.0%	5.1%
2503	213	96	2.0%	5.2%
2504	213	96	1.9%	5.3%
2505	213	96	1.9%	5.4%
2506	213	96	1.9%	5.5%
2507	213	96	1.9%	5.6%
2508	213	96	1.8%	5.6%
2509	213	96	1.8%	5.7%
2510	213	96	1.8%	5.8%
2511	213	96	1.8%	5.9%
2512	213	96	1.7%	6.0%
2513	215	97	1.7%	5.8%
2514	215	97	1.7%	5.9%
2515	215	97	1.7%	6.0%
2516	216	98	2.0%	5.2%
2517	216	98	1.9%	5.2%
2518	216	98	1.9%	5.3%
2519	216	98	1.9%	5.4%
2520	216	98	1.9%	5.5%
2521	216	98	1.8%	5.6%
2522	216	98	1.8%	5.6%
2523	216	98	1.8%	5.7%
2524	216	98	1.7%	5.8%
2525	216	98	1.7%	5.9%
2526	216	98	1.7%	6.0%
2527	217	99	2.0%	5.2%
2528	217	99	2.0%	5.2%
2529	217	99	1.9%	5.3%
2530	217	99	1.9%	5.4%
2531	217	99	1.9%	5.5%
2532	217	99	1.9%	5.6%
2533	217	99	1.8%	5.6%
2534	217	99	1.8%	5.7%
2535	217	99	1.8%	5.8%
2536	217	99	1.8%	5.9%
2537	217	99	1.7%	6.0%

2538	219	100	1.7%	5.9%
2539	219	100	1.7%	5.9%
2540	220	101	2.0%	5.1%
2541	220	101	2.0%	5.2%
2542	220	101	1.9%	5.3%
2543	220	101	1.9%	5.4%
2544	220	101	1.9%	5.4%
2545	220	101	1.9%	5.5%
2546	220	101	1.8%	5.6%
2547	220	101	1.8%	5.7%
2548	220	101	1.8%	5.8%
2549	220	101	1.8%	5.9%
2550	220	101	1.7%	5.9%
2551	222	102	1.7%	5.8%
2552	222	102	1.7%	5.9%
2553	222	102	1.7%	6.0%
2554	223	103	1.9%	5.2%
2555	223	103	1.9%	5.3%
2556	223	103	1.9%	5.3%
2557	223	103	1.9%	5.4%
2558	223	103	1.8%	5.5%
2559	223	103	1.8%	5.6%
2560	223	103	1.8%	5.7%
2561	223	103	1.8%	5.7%
2562	223	103	1.7%	5.8%
2563	223	103	1.7%	5.9%
2564	223	103	1.7%	6.0%
2565	224	104	2.0%	5.2%
2566	224	104	1.9%	5.3%
2567	224	104	1.9%	5.3%
2568	224	104	1.9%	5.4%
2569	224	104	1.9%	5.5%
2570	224	104	1.8%	5.6%
2571	224	104	1.8%	5.7%
2572	224	104	1.8%	5.8%
2573	224	104	1.8%	5.8%
2574	224	104	1.7%	5.9%
2575	226	105	1.7%	5.8%
2576	226	105	1.7%	5.9%
2577	226	105	1.7%	6.0%
2578	227	106	1.9%	5.2%
2579	227	106	1.9%	5.3%
2580	227	106	1.9%	5.3%
2581	227	106	1.9%	5.4%
2582	227	106	1.8%	5.5%
2583	227	106	1.8%	5.6%
2584	227	106	1.8%	5.7%
2585	227	106	1.8%	5.7%
2586	227	106	1.7%	5.8%
2587	227	106	1.7%	5.9%

2588	229	107	1.7%	5.8%
2589	229	107	1.7%	5.9%
2590	229	107	1.6%	6.0%
2591	230	108	1.9%	5.2%
2592	230	108	1.9%	5.3%
2593	230	108	1.9%	5.4%
2594	230	108	1.8%	5.4%
2595	230	108	1.8%	5.5%
2596	230	108	1.8%	5.6%
2597	230	108	1.8%	5.7%
2598	230	108	1.7%	5.8%
2599	230	108	1.7%	5.8%
2600	230	108	1.7%	5.9%
2601	231	109	2.0%	5.1%
2602	231	109	1.9%	5.2%
2603	231	109	1.9%	5.3%
2604	231	109	1.9%	5.4%
2605	231	109	1.9%	5.5%
2606	231	109	1.8%	5.5%
2607	231	109	1.8%	5.6%
2608	231	109	1.8%	5.7%
2609	231	109	1.8%	5.8%
2610	231	109	1.7%	5.9%
2611	231	109	1.7%	6.0%
2612	232	110	2.0%	5.2%
2613	232	110	2.0%	5.3%
2614	232	110	1.9%	5.3%
2615	232	110	1.9%	5.4%
2616	232	110	1.9%	5.5%
2617	232	110	1.9%	5.6%
2618	232	110	1.8%	5.6%
2619	232	110	1.8%	5.7%
2620	232	110	1.8%	5.8%
2621	232	110	1.8%	5.9%
2622	232	110	1.7%	6.0%
2623	234	111	1.7%	5.9%
2624	234	111	1.7%	6.0%
2625	235	112	1.9%	5.2%
2626	235	112	1.9%	5.3%
2627	235	112	1.9%	5.4%
2628	235	112	1.9%	5.4%
2629	235	112	1.8%	5.5%
2630	235	112	1.8%	5.6%
2631	235	112	1.8%	5.7%
2632	235	112	1.8%	5.8%
2633	235	112	1.7%	5.8%
2634	235	112	1.7%	5.9%
2635	236	113	2.0%	5.2%
2636	236	113	2.0%	5.2%
2637	236	113	1.9%	5.3%

2638	236	113	1.9%	5.4%
2639	236	113	1.9%	5.5%
2640	236	113	1.9%	5.6%
2641	236	113	1.8%	5.6%
2642	236	113	1.8%	5.7%
2643	236	113	1.8%	5.8%
2644	236	113	1.8%	5.9%
2645	236	113	1.7%	6.0%
2646	238	114	1.7%	5.9%
2647	238	114	1.7%	6.0%
2648	239	115	1.9%	5.2%
2649	239	115	1.9%	5.3%
2650	239	115	1.9%	5.4%
2651	239	115	1.9%	5.5%
2652	239	115	1.8%	5.5%
2653	239	115	1.8%	5.6%
2654	239	115	1.8%	5.7%
2655	239	115	1.8%	5.8%
2656	239	115	1.7%	5.9%
2657	239	115	1.7%	5.9%
2658	240	116	2.0%	5.2%
2659	240	116	2.0%	5.3%
2660	240	116	1.9%	5.3%
2661	240	116	1.9%	5.4%
2662	240	116	1.9%	5.5%
2663	240	116	1.9%	5.6%
2664	240	116	1.8%	5.7%
2665	240	116	1.8%	5.7%
2666	240	116	1.8%	5.8%
2667	240	116	1.8%	5.9%
2668	240	116	1.7%	6.0%
2669	242	117	1.7%	5.9%
2670	243	118	2.0%	5.2%
2671	243	118	1.9%	5.3%
2672	243	118	1.9%	5.3%
2673	243	118	1.9%	5.4%
2674	243	118	1.9%	5.5%
2675	243	118	1.8%	5.6%
2676	243	118	1.8%	5.7%
2677	243	118	1.8%	5.7%
2678	243	118	1.8%	5.8%
2679	243	118	1.7%	5.9%
2680	243	118	1.7%	6.0%
2681	244	119	2.0%	5.2%
2682	244	119	1.9%	5.3%
2683	244	119	1.9%	5.4%
2684	244	119	1.9%	5.5%
2685	244	119	1.9%	5.5%
2686	244	119	1.8%	5.6%
2687	244	119	1.8%	5.7%

2688	244	119	1.8%	5.8%
2689	244	119	1.8%	5.9%
2690	244	119	1.7%	5.9%
2691	246	120	1.7%	5.9%
2692	246	120	1.7%	6.0%
2693	247	121	1.9%	5.3%
2694	247	121	1.9%	5.3%
2695	247	121	1.9%	5.4%
2696	247	121	1.9%	5.5%
2697	247	121	1.8%	5.6%
2698	247	121	1.8%	5.6%
2699	247	121	1.8%	5.7%
2700	247	121	1.8%	5.8%
2701	247	121	1.7%	5.9%
2702	247	121	1.7%	6.0%
2703	248	122	2.0%	5.2%
2704	248	122	1.9%	5.3%
2705	248	122	1.9%	5.4%
2706	248	122	1.9%	5.5%
2707	248	122	1.9%	5.5%
2708	248	122	1.8%	5.6%
2709	248	122	1.8%	5.7%
2710	248	122	1.8%	5.8%
2711	248	122	1.8%	5.8%
2712	248	122	1.7%	5.9%
2713	250	123	1.7%	5.9%
2714	250	123	1.7%	6.0%
2715	251	124	1.9%	5.3%
2716	251	124	1.9%	5.3%
2717	251	124	1.9%	5.4%
2718	251	124	1.8%	5.5%
2719	251	124	1.8%	5.6%
2720	251	124	1.8%	5.6%
2721	251	124	1.8%	5.7%
2722	251	124	1.7%	5.8%
2723	251	124	1.7%	5.9%
2724	251	124	1.7%	6.0%
2725	252	125	2.0%	5.2%
2726	252	125	1.9%	5.3%
2727	252	125	1.9%	5.4%
2728	252	125	1.9%	5.5%
2729	252	125	1.9%	5.5%
2730	252	125	1.8%	5.6%
2731	252	125	1.8%	5.7%
2732	252	125	1.8%	5.8%
2733	252	125	1.8%	5.9%
2734	252	125	1.7%	5.9%
2735	253	126	2.0%	5.2%
2736	253	126	2.0%	5.3%
2737	253	126	1.9%	5.4%

2738	253	126	1.9%	5.4%
2739	253	126	1.9%	5.5%
2740	253	126	1.9%	5.6%
2741	253	126	1.8%	5.7%
2742	253	126	1.8%	5.8%
2743	253	126	1.8%	5.8%
2744	253	126	1.8%	5.9%
2745	253	126	1.7%	6.0%
2746	255	127	1.7%	6.0%
2747	256	128	1.9%	5.3%
2748	256	128	1.9%	5.4%
2749	256	128	1.9%	5.4%
2750	256	128	1.9%	5.5%
2751	256	128	1.8%	5.6%
2752	256	128	1.8%	5.7%
2753	256	128	1.8%	5.7%
2754	256	128	1.8%	5.8%
2755	256	128	1.7%	5.9%
2756	256	128	1.7%	6.0%
2757	257	129	2.0%	5.3%
2758	257	129	1.9%	5.3%
2759	257	129	1.9%	5.4%
2760	257	129	1.9%	5.5%
2761	257	129	1.9%	5.6%
2762	257	129	1.8%	5.6%
2763	257	129	1.8%	5.7%
2764	257	129	1.8%	5.8%
2765	257	129	1.8%	5.9%
2766	257	129	1.7%	5.9%
2767	259	130	1.7%	6.0%
2768	260	131	1.9%	5.3%
2769	260	131	1.9%	5.3%
2770	260	131	1.9%	5.4%
2771	260	131	1.9%	5.5%
2772	260	131	1.8%	5.6%
2773	260	131	1.8%	5.6%
2774	260	131	1.8%	5.7%
2775	260	131	1.8%	5.8%
2776	260	131	1.7%	5.9%
2777	260	131	1.7%	5.9%
2778	261	132	2.0%	5.3%
2779	261	132	1.9%	5.3%
2780	261	132	1.9%	5.4%
2781	261	132	1.9%	5.5%
2782	261	132	1.9%	5.6%
2783	261	132	1.8%	5.6%
2784	261	132	1.8%	5.7%
2785	261	132	1.8%	5.8%
2786	261	132	1.8%	5.9%
2787	261	132	1.7%	5.9%

2788	262	133	2.0%	5.3%
2789	262	133	2.0%	5.3%
2790	262	133	1.9%	5.4%
2791	262	133	1.9%	5.5%
2792	262	133	1.9%	5.5%
2793	262	133	1.9%	5.6%
2794	262	133	1.8%	5.7%
2795	262	133	1.8%	5.8%
2796	262	133	1.8%	5.8%
2797	262	133	1.8%	5.9%
2798	264	134	1.7%	6.0%
2799	265	135	1.9%	5.3%
2800	265	135	1.9%	5.3%
2801	265	135	1.9%	5.4%
2802	265	135	1.9%	5.5%
2803	265	135	1.8%	5.6%
2804	265	135	1.8%	5.6%
2805	265	135	1.8%	5.7%
2806	265	135	1.8%	5.8%
2807	265	135	1.7%	5.9%
2808	265	135	1.7%	5.9%
2809	266	136	2.0%	5.3%
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2811	266	136	1.9%	5.4%
2812	266	136	1.9%	5.5%
2813	266	136	1.9%	5.6%
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2819	267	137	2.0%	5.3%
2820	267	137	2.0%	5.3%
2821	267	137	1.9%	5.4%
2822	267	137	1.9%	5.5%
2823	267	137	1.9%	5.6%
2824	267	137	1.9%	5.6%
2825	267	137	1.9%	5.7%
2826	267	137	1.8%	5.8%
2827	267	137	1.8%	5.9%
2828	267	137	1.8%	5.9%
2829	269	138	1.7%	6.0%
2830	270	139	1.9%	5.3%
2831	270	139	1.9%	5.4%
2832	270	139	1.9%	5.5%
2833	270	139	1.9%	5.5%
2834	270	139	1.8%	5.6%
2835	270	139	1.8%	5.7%
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2838	270	139	1.8%	5.9%
2839	270	139	1.7%	6.0%
2840	271	140	2.0%	5.3%
2841	271	140	1.9%	5.4%
2842	271	140	1.9%	5.5%
2843	271	140	1.9%	5.5%
2844	271	140	1.9%	5.6%
2845	271	140	1.8%	5.7%
2846	271	140	1.8%	5.7%
2847	271	140	1.8%	5.8%
2848	271	140	1.8%	5.9%
2849	271	140	1.8%	6.0%
2850	272	141	2.0%	5.3%
2851	272	141	2.0%	5.4%
2852	272	141	1.9%	5.5%
2853	272	141	1.9%	5.5%
2854	272	141	1.9%	5.6%
2855	272	141	1.9%	5.7%
2856	272	141	1.8%	5.7%
2857	272	141	1.8%	5.8%
2858	272	141	1.8%	5.9%
2859	272	141	1.8%	6.0%
2860	275	143	2.0%	5.3%
2861	275	143	1.9%	5.4%
2862	275	143	1.9%	5.4%
2863	275	143	1.9%	5.5%
2864	275	143	1.9%	5.6%
2865	275	143	1.8%	5.7%
2866	275	143	1.8%	5.7%
2867	275	143	1.8%	5.8%
2868	275	143	1.8%	5.9%
2869	275	143	1.7%	6.0%
2870	276	144	2.0%	5.3%
2871	276	144	1.9%	5.4%
2872	276	144	1.9%	5.4%
2873	276	144	1.9%	5.5%
2874	276	144	1.9%	5.6%
2875	276	144	1.9%	5.7%
2876	276	144	1.8%	5.7%
2877	276	144	1.8%	5.8%
2878	276	144	1.8%	5.9%
2879	276	144	1.8%	6.0%
2880	277	145	2.0%	5.3%
2881	277	145	2.0%	5.4%
2882	277	145	1.9%	5.5%
2883	277	145	1.9%	5.5%
2884	277	145	1.9%	5.6%
2885	277	145	1.9%	5.7%
2886	277	145	1.9%	5.7%
2887	277	145	1.8%	5.8%

2888	277	145	1.8%	5.9%
2889	277	145	1.8%	6.0%
2890	280	147	1.9%	5.3%
2891	280	147	1.9%	5.4%
2892	280	147	1.9%	5.5%
2893	280	147	1.9%	5.5%
2894	280	147	1.9%	5.6%
2895	280	147	1.8%	5.7%
2896	280	147	1.8%	5.7%
2897	280	147	1.8%	5.8%
2898	280	147	1.8%	5.9%
2899	280	147	1.7%	6.0%
2900	281	148	2.0%	5.3%
2901	281	148	1.9%	5.4%
2902	281	148	1.9%	5.5%
2903	281	148	1.9%	5.5%
2904	281	148	1.9%	5.6%
2905	281	148	1.9%	5.7%
2906	281	148	1.8%	5.8%
2907	281	148	1.8%	5.8%
2908	281	148	1.8%	5.9%
2909	281	148	1.8%	6.0%
2910	282	149	2.0%	5.3%
2911	282	149	2.0%	5.4%
2912	282	149	1.9%	5.5%
2913	282	149	1.9%	5.6%
2914	282	149	1.9%	5.6%
2915	282	149	1.9%	5.7%
2916	282	149	1.8%	5.8%
2917	282	149	1.8%	5.8%
2918	282	149	1.8%	5.9%
2919	282	149	1.8%	6.0%
2920	285	151	1.9%	5.4%
2921	285	151	1.9%	5.4%
2922	285	151	1.9%	5.5%
2923	285	151	1.9%	5.6%
2924	285	151	1.8%	5.7%
2925	285	151	1.8%	5.7%
2926	285	151	1.8%	5.8%
2927	285	151	1.8%	5.9%
2928	285	151	1.8%	5.9%
2929	286	152	2.0%	5.3%
2930	286	152	2.0%	5.4%
2931	286	152	1.9%	5.5%
2932	286	152	1.9%	5.5%
2933	286	152	1.9%	5.6%
2934	286	152	1.9%	5.7%
2935	286	152	1.8%	5.7%
2936	286	152	1.8%	5.8%
2937	286	152	1.8%	5.9%

2938	286	152	1.8%	6.0%
2939	287	153	2.0%	5.3%
2940	287	153	2.0%	5.4%
2941	287	153	1.9%	5.5%
2942	287	153	1.9%	5.5%
2943	287	153	1.9%	5.6%
2944	287	153	1.9%	5.7%
2945	287	153	1.9%	5.8%
2946	287	153	1.8%	5.8%
2947	287	153	1.8%	5.9%
2948	287	153	1.8%	6.0%
2949	290	155	1.9%	5.4%
2950	290	155	1.9%	5.4%
2951	290	155	1.9%	5.5%
2952	290	155	1.9%	5.6%
2953	290	155	1.8%	5.7%
2954	290	155	1.8%	5.7%
2955	290	155	1.8%	5.8%
2956	290	155	1.8%	5.9%
2957	290	155	1.8%	5.9%
2958	291	156	2.0%	5.3%
2959	291	156	1.9%	5.4%
2960	291	156	1.9%	5.5%
2961	291	156	1.9%	5.5%
2962	291	156	1.9%	5.6%
2963	291	156	1.9%	5.7%
2964	291	156	1.8%	5.7%
2965	291	156	1.8%	5.8%
2966	291	156	1.8%	5.9%
2967	291	156	1.8%	6.0%
2968	292	157	2.0%	5.3%
2969	292	157	2.0%	5.4%
2970	292	157	1.9%	5.5%
2971	292	157	1.9%	5.6%
2972	292	157	1.9%	5.6%
2973	292	157	1.9%	5.7%
2974	292	157	1.8%	5.8%
2975	292	157	1.8%	5.8%
2976	292	157	1.8%	5.9%
2977	292	157	1.8%	6.0%
2978	295	159	1.9%	5.4%
2979	295	159	1.9%	5.5%
2980	295	159	1.9%	5.5%
2981	295	159	1.9%	5.6%
2982	295	159	1.8%	5.7%
2983	295	159	1.8%	5.8%
2984	295	159	1.8%	5.8%
2985	295	159	1.8%	5.9%
2986	295	159	1.7%	6.0%
2987	296	160	2.0%	5.4%

2988	296	160	1.9%	5.4%
2989	296	160	1.9%	5.5%
2990	296	160	1.9%	5.6%
2991	296	160	1.9%	5.6%
2992	296	160	1.8%	5.7%
2993	296	160	1.8%	5.8%
2994	296	160	1.8%	5.8%
2995	296	160	1.8%	5.9%
2996	296	160	1.8%	6.0%
2997	297	161	2.0%	5.4%
2998	297	161	1.9%	5.5%
2999	297	161	1.9%	5.5%
3000	297	161	1.9%	5.6%

Good afternoon s 47F (P

Responses to your questions in red at your initial email.

Can you also please provide the document *VoteFlux Attachments, pp 20, 43*? If this is a public document we will need to make the appropriate updates to fix the error.

Please advise if you require anything further

s 47F (P

s 47F (Personal Privacy) **| Assistant Director**
Party Registration and Redistribution Section | Disclosure, Party Registration and Redistribution Branch
Australian Electoral Commission
s 47F (Personal Privacy)

Dear s 47F (P

Further to my email of 30 August, please see attached a letter from the ABS to the Electoral Commissioner, which provides context for our request for advice below. I've slightly updated our question 3 below in light of ABS response at 2(a) of their letter. As you'll see the ABS considers that the current testing methodology continues to be appropriate, provided that the Commission is satisfied that it is reasonable to require a political party to provide a list of between 1,500 to 1,650 members. As we noted below, the Commission has orally advised the Commission Secretariat that they would also like to seek advice from the AEC, and to the extent necessary, Services Australia in relation to the likely cost of various options for membership testing.

Kind regards

s 47F (Personal Privacy) **| Senior Government Lawyer**
Legal Services Section | Legal & Procurement Branch
Australian Electoral Commission
s 47F (Personal Privacy)

Subject: voteflux.org - Request for advice from Party Registration Team/Services Australia (LEX1991) [SEC=OFFICIAL]

Dear s 47F (P)

On 23 August 2022 the Electoral Commissioner wrote to Dr Gruen AO at the ABS to ask a number of questions about the testing methodology currently employed by the AEC. Please see attached a copy of that correspondence.

As you will see, in that letter the Electoral Commission requested formal ABS advice in relation to options for testing party membership. ABS have not yet responded to the letter, but the Commission has orally advised the Commission Secretariat that they would also like to seek advice from the AEC, and to the extent necessary, Services Australia in relation to the likely cost of various options for membership testing.

We understand that the AEC has an agreement with Services Australia for Services Australia to undertake membership testing. However, the AEC Party Registration Team also has capacity to undertake some membership testing 'in-house'.

Whilst that advice may depend on the response from ABS, and whilst the Commission may write with further questions, we would be grateful at this stage if you could prepare initial advice responding to the following questions.

1. On the basis of the current methodology (noting the sample size would be less than 60 members for a list of between 1500-1650 members), what is the average amount of time that performing a membership test takes?
    a. How long does it usually take from the AEC providing instructions to undertake testing until a result is provided?
        i. Approximately 2 weeks.
    b. Roughly how many hours of Commonwealth employees' time does testing take?
        i. Contacting members takes approximately 6 hours.
        ii. Data cleaning of the membership list and matching the list to the Commonwealth Electoral Roll takes approximately 15 hours.
2. What is the average cost of performing a membership test with the current methodology when testing undertaken by Services Australia or by the AEC?
        i. Current inhouse staffing arrangements would have an APS5 undertake membership testing. An APS 5's hourly rate is $51.54 (incl Leave, Long Service Leave and Superannuation). Using the assumption that it requires 21 hours for end-to-end testing of the membership list, it would costs the Commonwealth $1,082 of a Commonwealth Employee's time.
        ii. In regards to Services Australia, my understanding is that the AEC has paid for Services Australia's services for a one year period in which any number of membership lists can be tested.
3. Noting that the current methodology requires a sample size of less than 60 members, can you provide an estimate of how long it would take and how much it would cost to test a list assuming a sample size of **564** members?
        i. Using the same set of assumptions above, and noting to do this this in a timely manner, 5 to 10 staff members would need to work on the list concurrently, it would take:

1. Approximately 2 to 3 weeks for end-end-testing: 56 hours to contact members; and 141 hours to undertake data cleaning and matching of the list to the Commonwealth Electoral Roll (using 9.4 multiplier, which is the multiplier I used to calculate time of testing a list of 60 vs 564). Using the APS5 multiplier of $51.54 it would cost $10,153 of a Commonwealth Employee's time.

   ii. There are a number of considerations and risks should the agency choose to increase the size of testing to (for example) a list of 564 members. This includes:

   1. A list of 564 members would not be possible for the current Party Registration Team staffing arrangement to undertake without substantial changes to the team's structure – the list is simply too large for it to be manageable.

   2. The most efficient way to manage a list this size would be to split it amongst 5 to 10 staff. This poses a number of risks including:
      a. Mis-managing member responses
      b. Duplications
      c. Ensuring accuracy in the membership results.

   3. Under current arrangements, splitting a list between 5 to 10 staff would involve further engagement with Services Australia and a possible split of work between AEC and Services Australia staff. In theory, by splitting the list between 5 to 10 people, the membership testing could be completed within 2-3 weeks.

   4. The size of such a membership list however would be a substantial increase in work at the first part of the process in which members are matched to electors on the Commonwealth Electoral Roll (which is done by the AEC), it is probable that the Party Registration Team would need to increase staffing numbers, or engage other areas of the AEC to assist.

   5. Further concerns testing a size this large could create a precedent in which the AEC (or the Electoral Commission) will test membership lists of any size, despite there being an endorsed methodology. Should the Electoral Commission wish to test a list of that size, we may need to consider an entirely new membership testing methodology and ensure that the process is fair, robust and not providing an opportunity for deregistered parties to challenge established processes. Furthermore, if the AEC tests a list of over 4,000 members, what's to stop a party submitting a list of 10,000 or more members? Lists of this size would put an unnecessary strain on resources and is not consistent with the endorsed methodology.

You will note that the third question proceeds from the assumption of testing a list of over 4,000 members based on the sample size suggested by the ABS calculator using the existing parameters for risk of false acceptance and rejection.

Thank you for your assistance.

s 47F (Personal Privacy) | **Commission Secretariat**
Australian Electoral Commission
s 47F (Personal Privacy)