**Data Analysis - Chi-square Test/Post-Hoc Comparison**

|  |  |
| --- | --- |
| Chi-square test | results |
| Pearson Chi-square ( 20.0) = | 118.2966 |
| p-value = | 0.0000 |
| Cramer's V = | 0.2241 |

Post-Hoc Comparison: Bonferroni-adjusted method

Bonferroni-adjusted method adjusts the p-value by how many planned pairwise comparisons are being conducted. The formula is p/N, where “p”= the original tests p-value and “N”= the number of planned pairwise comparisons.

To conduct all possible pairwise comparisons then the formula would be 0.05/32 = 0.0016666666666666668. So our planned pairwise comparisons to be significant, the p-value must be less than 0.0017.

To conduct multiple 2×2 Chi-square tests, one needs to regroup the variables for each test to where it is one category against the rest. For us, it will be

To conduct multiple 2×2 Chi-square tests, one needs to regroup the variables for each test to where it is one category against the rest.

For Geopolitical zones

North-Central vs all geo-political zones

North-East vs all geo-political zones

North-West vs all geo-political zones

South-South vs all geo-political zones

South-East vs all geo-political zones

South-West vs all geo-political zones

For 5 Years period of Study

2012 vs the rest

2013 vs the rest

2014 vs the rest

2015 vs the rest

2016 vs the rest

|  |  |  |
| --- | --- | --- |
| **2012** | **0** | **1** |
| North-Central |  |  |
| 0 | 6572 | 1384 |
| 1 | 1392 | 327 |
|  |  |  |
| Chi2 value= 2.459971829937674 | | |
| p-value= 0.11678087646789201 | | |
| Degrees of freedom= 1 | | |
| p-value is not statistically significant | | |
| (Sig.@0.0016666666666666668) | | |
|  |  |  |
| **2013** | **0** | **1** |
| North-Central |  |  |
| 0 | 6291 | 1665 |
| 1 | 1390 | 329 |
|  |  |  |
| Chi2 value= 2.655460031212265 | | |
| p-value= 0.10319489813599414 | | |
| Degrees of freedom= 1 | | |
| p-value is not statistically significant | | |
| (Sig.@0.0016666666666666668) | | |
|  |  |  |
| **2014** | **0** | **1** |
| North-Central |  |  |
| 0 | 6271 | 1685 |
| 1 | 1347 | 372 |
|  |  |  |
| Chi2 value= 0.15333337565588154 | | |
| p-value= 0.6953700028196306 | | |
| Degrees of freedom= 1 | | |
| p-value is not statistically significant | | |
| (Sig.@0.0016666666666666668) | | |
|  |  |  |
| **2015** | **0** | **1** |
| North-Central |  |  |
| 0 | 6611 | 1345 |
| 1 | 1399 | 320 |
|  |  |  |
| Chi2 value= 2.7823312498930353 | | |
| p-value= 0.09530934498869155 | | |
| Degrees of freedom= 1 | | |
| p-value is not statistically significant | | |
| (Sig.@0.0016666666666666668) | | |
|  |  |  |
| **2016** | **0** | **1** |
| North-Central |  |  |
| 0 | 6079 | 1877 |
| 1 | 1348 | 371 |
|  |  |  |
| Chi2 value= 3.0899919411960375 | | |
| p-value= 0.07877519827939963 | | |
| Degrees of freedom= 1 | | |
| p-value is not statistically significant | | |
| (Sig.@0.0016666666666666668) | | |
| Dddddddddddddddd |  |  |
| **2012** | **0** | **1** |
| North-East |  |  |
| 0 | 6779 | 1513 |
| 1 | 1185 | 198 |
|  |  |  |
| Chi2 value= 12.306032278135476 | | |
| p-value= 0.00045149672328017275 | | |
| Degrees of freedom= 1 | | |
| p-value is statistically significant | | |
| (Sig.@0.0016666666666666668) | | |
|  |  |  |
| **2013** | **0** | **1** |
| North-East |  |  |
| 0 | 6618 | 1674 |
| 1 | 1063 | 320 |
|  |  |  |
| Chi2 value= 6.125130909880909 | | |
| p-value= 0.013327341851472236 | | |
| Degrees of freedom= 1 | | |
| p-value is not statistically significant | | |
| (Sig.@0.0016666666666666668) | | |
|  |  |  |
|  |  |  |
| **2014** | **0** | **1** |
| North-East |  |  |
| 0 | 6527 | 1765 |
| 1 | 1091 | 292 |
|  |  |  |
| Chi2 value= 0.011942294578462862 | | |
| p-value= 0.9129797699364218 | | |
| Degrees of freedom= 1 | | |
| p-value is not statistically significant | | |
| (Sig.@0.0016666666666666668) | | |
| **2015** | **0** | **1** |
| North-East |  |  |
| 0 | 6898 | 1394 |
| 1 | 1112 | 271 |
|  |  |  |
| Chi2 value= 6.252692923942683 | | |
| p-value= 0.012400464436598037 | | |
| Degrees of freedom= 1 | | |
| p-value is not statistically significant | | |
| (Sig.@0.0016666666666666668) | | |
|  |  |  |
| **2016** | **0** | **1** |
| North-East |  |  |
| 0 | 6346 | 1946 |
| 1 | 1081 | 302 |
|  |  |  |
| Chi2 value= 1.6792541503556073 | | |
| p-value= 0.19502358786324747 | | |
| Degrees of freedom= 1 | | |
| p-value is not statistically significant | | |
| (Sig.@0.0016666666666666668) | | |
|  |  |  |
| **2012** | **0** | **1** |
| North-West |  |  |
| 0 | 5761 | 1177 |
| 1 | 2203 | 534 |
|  |  |  |
| Chi2 value= 8.564775625278276 | | |
| p-value= 0.0034272921069252713 | | |
| Degrees of freedom= 1 | | |
| p-value is not statistically significant | | |
| (Sig.@0.0016666666666666668) | | |
|  |  |  |
| **2013** | **0** | **1** |
| North-West |  |  |
| 0 | 5540 | 1398 |
| 1 | 2141 | 596 |
|  |  |  |
| Chi2 value= 3.071963558587891 | | |
| p-value= 0.0796532086041233 | | |
| Degrees of freedom= 1 | | |
| p-value is not statistically significant | | |
| (Sig.@0.0016666666666666668) | | |
|  |  |  |
| **2014** | **0** | **1** |
| North-West |  |  |
| 0 | 5497 | 1441 |
| 1 | 2121 | 616 |
|  |  |  |
| Chi2 value= 3.433278696982911 | | |
| p-value= 0.0638951346507607 | | |
| Degrees of freedom= 1 | | |
| p-value is not statistically significant | | |
| (Sig.@0.0016666666666666668) | | |
|  |  |  |
| **2015** | **0** | **1** |
| North-West |  |  |
| 0 | 5634 | 1304 |
| 1 | 2376 | 361 |
|  |  |  |
| Chi2 value= 42.89166230906925 | | |
| p-value= 5.7856715798390783e-11 | | |
| Degrees of freedom= 1 | | |
| p-value is statistically significant | | |
| (Sig.@0.0016666666666666668) | | |
|  |  |  |
| **2016** | **0** | **1** |
| North-West |  |  |
| 0 | 5320 | 1618 |
| 1 | 2107 | 630 |
|  |  |  |
| Chi2 value= 0.08471568355223699 | | |
| p-value= 0.7710057468683481 | | |
| Degrees of freedom= 1 | | |
| p-value is not statistically significant | | |
| (Sig.@0.0016666666666666668) | | |
|  |  |  |
| **2012** | **0** | **1** |
| South-East |  |  |
| 0 | 7394 | 1632 |
| 1 | 570 | 79 |
|  |  |  |
| Chi2 value= 14.117001314524785 | | |
| p-value= 0.0001717841159755566 | | |
| Degrees of freedom= 1 | | |
| p-value is statistically significant | | |
| (Sig.@0.0016666666666666668) | | |
|  |  |  |
| **2013** | **0** | **1** |
| South-East |  |  |
| 0 | 7125 | 1901 |
| 1 | 556 | 93 |
|  |  |  |
| Chi2 value= 16.359440911396465 | | |
| p-value= 5.239451259580669e-05 | | |
| Degrees of freedom= 1 | | |
| p-value is statistically significant | | |
| (Sig.@0.0016666666666666668) | | |
|  |  |  |
| **2014** | **0** | **1** |
| South-East |  |  |
| 0 | 7121 | 1905 |
| 1 | 497 | 152 |
|  |  |  |
| Chi2 value= 1.8023893564127498 | | |
| p-value= 0.1794239015427768 | | |
| Degrees of freedom= 1 | | |
| p-value is not statistically significant | | |
| (Sig.@0.0016666666666666668) | | |
|  |  |  |
| **2015** | **0** | **1** |
| South-East |  |  |
| 0 | 7497 | 1529 |
| 1 | 513 | 136 |
|  |  |  |
| Chi2 value= 6.572707656675667 | | |
| p-value= 0.010355428959945843 | | |
| Degrees of freedom= 1 | | |
| p-value is not statistically significant | | |
| (Sig.@0.0016666666666666668) | | |
|  |  |  |
| **2016** | **0** | **1** |
| South-East |  |  |
| 0 | 6967 | 2059 |
| 1 | 460 | 189 |
|  |  |  |
| Chi2 value= 13.16365074019756 | | |
| p-value= 0.0002854322389819314 | | |
| Degrees of freedom= 1 | | |
| p-value is statistically significant | | |
| (Sig.@0.0016666666666666668) | | |
|  |  |  |
| **2012** | **0** | **1** |
| South-South |  |  |
| 0 | 7145 | 1570 |
| 1 | 819 | 141 |
|  |  |  |
| Chi2 value= 6.350334299516409 | | |
| p-value= 0.011735918055470262 | | |
| Degrees of freedom= 1 | | |
| p-value is not statistically significant | | |
| (Sig.@0.0016666666666666668) | | |
|  |  |  |
| **2013** | **0** | **1** |
| South-South |  |  |
| 0 | 6926 | 1789 |
| 1 | 755 | 205 |
|  |  |  |
| Chi2 value= 0.3121458780483638 | | |
| p-value= 0.5763663644693188 | | |
| Degrees of freedom= 1 | | |
| p-value is not statistically significant | | |
| (Sig.@0.0016666666666666668) | | |
|  |  |  |
| **2014** | **0** | **1** |
| South-South |  |  |
| 0 | 6864 | 1851 |
| 1 | 754 | 206 |
|  |  |  |
| Chi2 value= 0.013434513456130512 | | |
| p-value= 0.9077259716248726 | | |
| Degrees of freedom= 1 | | |
| p-value is not statistically significant | | |
| (Sig.@0.0016666666666666668) | | |
|  |  |  |
| **2015** | **0** | **1** |
| South-South |  |  |
| 0 | 7228 | 1487 |
| 1 | 782 | 178 |
|  |  |  |
| Chi2 value= 1.226085100251448 | | |
| p-value= 0.2681697460195277 | | |
| Degrees of freedom= 1 | | |
| p-value is not statistically significant | | |
| (Sig.@0.0016666666666666668) | | |
|  |  |  |
| **2016** | **0** | **1** |
| South-South |  |  |
| 0 | 6697 | 2018 |
| 1 | 730 | 230 |
|  |  |  |
| Chi2 value= 0.2691111609491475 | | |
| p-value= 0.6039286370767619 | | |
| Degrees of freedom= 1 | | |
| p-value is not statistically significant | | |
| (Sig.@0.0016666666666666668) | | |
|  |  |  |
| **2012** | **0** | **1** |
| South-West |  |  |
| 0 | 6376 | 1328 |
| 1 | 1588 | 383 |
|  |  |  |
| Chi2 value= 5.039944765046827 | | |
| p-value= 0.02476927976703991 | | |
| Degrees of freedom= 1 | | |
| p-value is not statistically significant | | |
| (Sig.@0.0016666666666666668) | | |
|  |  |  |
| **2013** | **0** | **1** |
| South-West |  |  |
| 0 | 6114 | 1590 |
| 1 | 1567 | 404 |
|  |  |  |
| Chi2 value= 0.011514075818801478 | | |
| p-value= 0.9145480796835833 | | |
| Degrees of freedom= 1 | | |
| p-value is not statistically significant | | |
| (Sig.@0.0016666666666666668) | | |
|  |  |  |
| **2014** | **0** | **1** |
| South-West |  |  |
| 0 | 6014 | 1690 |
| 1 | 1604 | 367 |
|  |  |  |
| Chi2 value= 10.115764575301922 | | |
| p-value= 0.0014700643618787332 | | |
| Degrees of freedom= 1 | | |
| p-value is statistically significant | | |
| (Sig.@0.0016666666666666668) | | |
|  |  |  |
| **2015** | **0** | **1** |
| South-West |  |  |
| 0 | 6380 | 1324 |
| 1 | 1630 | 341 |
|  |  |  |
| Chi2 value= 0.007611882576707177 | | |
| p-value= 0.9304758937464694 | | |
| Degrees of freedom= 1 | | |
| p-value is not statistically significant | | |
| (Sig.@0.0016666666666666668) | | |
|  |  |  |
| **2016** | **0** | **1** |
| South-West |  |  |
| 0 | 5932 | 1772 |
| 1 | 1495 | 476 |
|  |  |  |
| Chi2 value= 1.098421719132599 | | |
| p-value= 0.29461273203801575 | | |
| Degrees of freedom= 1 | | |
| p-value is not statistically significant | | |
| (Sig.@0.0016666666666666668) | | |

Using the Bonferroni-adjusted p-value of 0.0017

For North central, no single year out of the 6 planned pairwise comparisons was found significant.

For North central, 1 out of 6 years planned pairwise comparisons is significant. The year is 2012.

For North west, 1 out of 6 years planned pairwise comparisons is found significant. That year is 2015

For South east, 1 out of 6 years planned pairwise comparisons is found significant. Those years are 2012, 2013 and 2016.

For South south, no single year out of the 6 planned pairwise comparisons was found significant.

For South west, 1 out of 6 years planned pairwise comparisons is found significant. That year is 2014