**PEP (Personal Equity Plan)Report**

**Introduction**

The purpose of this report is to examine the demographic and banking data of a bank’s dataset to determine if they should be offered the bank’s new PEP (Personal Equity Plan) product. Per the information received with the data, the bank uses the following process and data collection to test market products:

The marketing department of a financial firm keeps records on customers, including demographic information and, number of type of accounts. When launching a new product, such as a "Personal Equity Plan" (PEP), a direct mail piece, advertising the product, is sent to existing customers, and a record kept as to whether that customer responded and bought the product. Based on this store of prior experience, the managers decide to use data mining techniques to build customer profile models.

The process has for the new product described above has been followed and has generated to data we will use in the analysis. We will use Weka and associate rule mining to determine the five most interesting rules found in the data to predict if a customer should be offered the new PEP product.

The result of the report will assist the bank in understanding the product’s customers and prospects by identifying unrealized associations that can be used to target untapped segments for the new product offering.

**Analysis and Models**

**About the Data**

The data consists of 600 records that contain the following 11 fields:

|  |  |
| --- | --- |
| **Attribute** | **Description** |
| id | a unique identification number |
| age | age of customer in years |
| sex | MALE / FEMALE |
| region | inner\_city/rural/suburban/town |
| income | income of customer |
| married | Is the customer married (YES/NO) |
| children | number of children |
| car | Does the customer own a car (YES/NO) |
| save\_acct | Does the customer have a saving account (YES/NO) |
| current\_acct | Does the customer have a current account (YES/NO) |
| mortgage | Does the customer have a mortgage (YES/NO) |
| pep | Did the customer buy a PEP after the last mailing (YES/NO) |

*Reading in the data*

The data is received as a csv file from bankdata file obtained from DePaul University data mining course materials, and is upload directly to Weka without issue.

*Data Cleaning*

The data is a very simple and clean data set. There is a mix of nominal and numeric fields. The numeric fields are converted to nominal for this analysis although it may be more appropriate to use them as numeric for other types of analysis and modeling.

In Weka, the unsupervised attribute NumericToNominal filter is applied to the following fields:

* age
* income
* children

Attributes removed for not necessary to the analysis:

* id

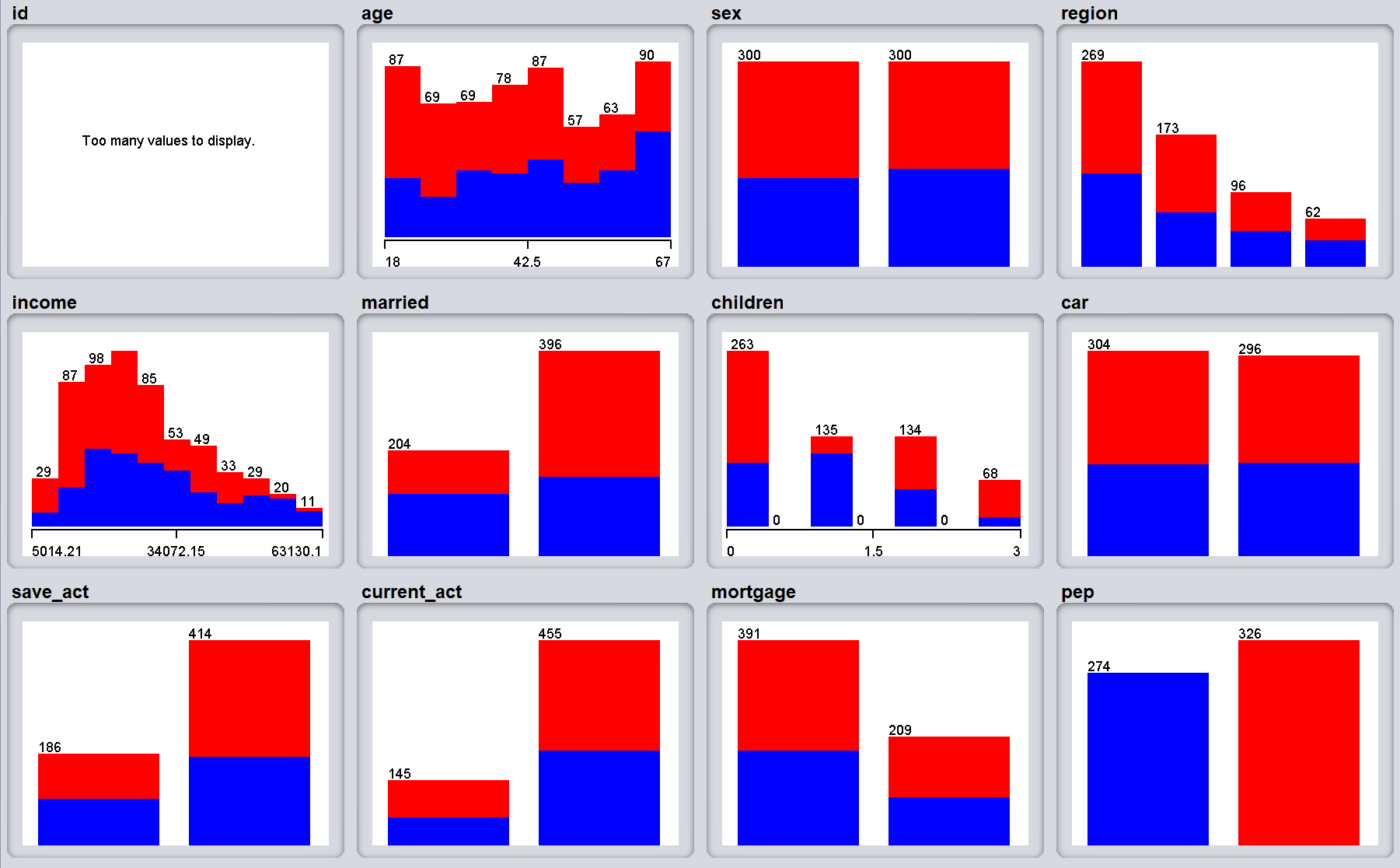
*Organizing the Data Structure*

The data structure is in a user friendly order and doesn’t require any updates.

*Missing Data*

There are no missing data values or place holders in this dataset.

*Exploritory Data Analysis on Each Attribute*



**Models**

Apriori rule association algorithm is selected for the analysis. If we choose the last field, did the customer bought the product or not, after receiving the direct mail piece, as the classification to which the rules will be generated against we wouldn’t be able to see lift. Instead the analysis was not restricted to this to do a more investigative research on rule associations that could be used for further marketing efforts.

In order to find the most interesting rules, many experiments were run adjusting the parameters to create different rule sets. Below are the three finally selected for the analysis. Details and results of the models are presented followed by an analysis of the results and conclusions. The three parameter updates selected to generate the three models for comparison are:

Model #1: Confidence Level minimum of .9

Model#2: Confidence Level minimum of .8

Model #3: Lift minimum of 1.7

They were all run on the full record count (600) and used all of the (11) attributes except id.

Relation: bankdata\_csv\_all-weka.filters.unsupervised.attribute.NumericToNominal-Rfirst-last-weka.filters.unsupervised.attribute.Remove-R1

Instances: 600

Attributes: 11

* age
* sex
* region
* income
* married
* children
* car
* save\_act
* current\_act
* mortgage
* pep

**Model #1:**

=== Run information ===

Scheme: weka.associations.Apriori -N 100 -T 0 -C 0.9 -D 0.05 -U 1.0 -M 0.1 -S -1.0 -V -c -1

=== Associator model (full training set) ===

Apriori

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Minimum support: 0.1 (60 instances)

Minimum metric <confidence>: 0.9

Number of cycles performed: 18

Best rules found:

1. children=0 save\_act=YES mortgage=NO pep=NO 74 ==> married=YES 73 <conf:(0.99)> lift:(1.49) lev:(0.04) [24] conv:(12.58)

2. sex=FEMALE children=0 mortgage=NO pep=NO 64 ==> married=YES 63 <conf:(0.98)> lift:(1.49) lev:(0.03) [20] conv:(10.88)

3. children=0 current\_act=YES mortgage=NO pep=NO 82 ==> married=YES 80 <conf:(0.98)> lift:(1.48) lev:(0.04) [25] conv:(9.29)

4. children=0 mortgage=NO pep=NO 107 ==> married=YES 104 <conf:(0.97)> lift:(1.47) lev:(0.06) [33] conv:(9.1)

5. children=0 car=NO mortgage=NO pep=NO 62 ==> married=YES 60 <conf:(0.97)> lift:(1.47) lev:(0.03) [19] conv:(7.03)

6. married=YES children=0 save\_act=YES current\_act=YES 87 ==> pep=NO 80 <conf:(0.92)> lift:(1.69) lev:(0.05) [32] conv:(4.97)

7. married=YES children=0 save\_act=YES mortgage=NO 80 ==> pep=NO 73 <conf:(0.91)> lift:(1.68) lev:(0.05) [29] conv:(4.57)

8. married=YES children=0 current\_act=YES mortgage=NO 88 ==> pep=NO 80 <conf:(0.91)> lift:(1.67) lev:(0.05) [32] conv:(4.47)

9. sex=FEMALE married=YES children=0 mortgage=NO 70 ==> pep=NO 63 <conf:(0.9)> lift:(1.66) lev:(0.04) [24] conv:(4)

**Model #2:**

Minimum support: 0.1 (60 instances)

Minimum metric <confidence>: 0.8

Number of cycles performed: 18

Best rules found:

1. children=0 save\_act=YES mortgage=NO pep=NO 74 ==> married=YES 73 <conf:(0.99)> lift:(1.49) lev:(0.04) [24] conv:(12.58)

2. sex=FEMALE children=0 mortgage=NO pep=NO 64 ==> married=YES 63 <conf:(0.98)> lift:(1.49) lev:(0.03) [20] conv:(10.88)

3. children=0 current\_act=YES mortgage=NO pep=NO 82 ==> married=YES 80 <conf:(0.98)> lift:(1.48) lev:(0.04) [25] conv:(9.29)

4. children=0 mortgage=NO pep=NO 107 ==> married=YES 104 <conf:(0.97)> lift:(1.47) lev:(0.06) [33] conv:(9.1)

5. children=0 car=NO mortgage=NO pep=NO 62 ==> married=YES 60 <conf:(0.97)> lift:(1.47) lev:(0.03) [19] conv:(7.03)

6. married=YES children=0 save\_act=YES current\_act=YES 87 ==> pep=NO 80 <conf:(0.92)> lift:(1.69) lev:(0.05) [32] conv:(4.97)

7. married=YES children=0 save\_act=YES mortgage=NO 80 ==> pep=NO 73 <conf:(0.91)> lift:(1.68) lev:(0.05) [29] conv:(4.57)

8. married=YES children=0 current\_act=YES mortgage=NO 88 ==> pep=NO 80 <conf:(0.91)> lift:(1.67) lev:(0.05) [32] conv:(4.47)

9. sex=FEMALE married=YES children=0 mortgage=NO 70 ==> pep=NO 63 <conf:(0.9)> lift:(1.66) lev:(0.04) [24] conv:(4)

10. married=YES children=0 save\_act=YES 119 ==> pep=NO 107 <conf:(0.9)> lift:(1.65) lev:(0.07) [42] conv:(4.18)

11. married=YES children=0 mortgage=NO 116 ==> pep=NO 104 <conf:(0.9)> lift:(1.65) lev:(0.07) [40] conv:(4.07)

12. married=YES children=0 car=NO mortgage=NO 67 ==> pep=NO 60 <conf:(0.9)> lift:(1.65) lev:(0.04) [23] conv:(3.82)

13. children=0 car=NO pep=NO 91 ==> married=YES 80 <conf:(0.88)> lift:(1.33) lev:(0.03) [19] conv:(2.58)

14. region=INNER\_CITY children=0 pep=NO 73 ==> married=YES 64 <conf:(0.88)> lift:(1.33) lev:(0.03) [15] conv:(2.48)

15. children=0 car=NO current\_act=YES pep=NO 69 ==> married=YES 60 <conf:(0.87)> lift:(1.32) lev:(0.02) [14] conv:(2.35)

16. sex=FEMALE children=0 pep=NO 90 ==> married=YES 78 <conf:(0.87)> lift:(1.31) lev:(0.03) [18] conv:(2.35)

17. car=NO mortgage=NO pep=YES 89 ==> current\_act=YES 77 <conf:(0.87)> lift:(1.14) lev:(0.02) [9] conv:(1.65)

18. children=1 save\_act=YES current\_act=YES 73 ==> pep=YES 63 <conf:(0.86)> lift:(1.89) lev:(0.05) [29] conv:(3.61)

19. sex=FEMALE children=0 current\_act=YES pep=NO 70 ==> married=YES 60 <conf:(0.86)> lift:(1.3) lev:(0.02) [13] conv:(2.16)

20. car=YES save\_act=YES mortgage=NO pep=NO 74 ==> married=YES 63 <conf:(0.85)> lift:(1.29) lev:(0.02) [14] conv:(2.1)

21. region=INNER\_CITY current\_act=YES mortgage=NO pep=NO 78 ==> married=YES 66 <conf:(0.85)> lift:(1.28) lev:(0.02) [14] conv:(2.04)

22. children=1 mortgage=NO 84 ==> pep=YES 71 <conf:(0.85)> lift:(1.85) lev:(0.05) [32] conv:(3.26)

23. save\_act=YES mortgage=NO pep=NO 142 ==> married=YES 120 <conf:(0.85)> lift:(1.28) lev:(0.04) [26] conv:(2.1)

24. sex=FEMALE married=YES children=0 current\_act=YES 71 ==> pep=NO 60 <conf:(0.85)> lift:(1.56) lev:(0.04) [21] conv:(2.7)

25. children=0 pep=NO 167 ==> married=YES 141 <conf:(0.84)> lift:(1.28) lev:(0.05) [30] conv:(2.1)

26. save\_act=YES current\_act=YES mortgage=NO pep=NO 108 ==> married=YES 91 <conf:(0.84)> lift:(1.28) lev:(0.03) [19] conv:(2.04)

27. children=1 save\_act=YES 95 ==> pep=YES 80 <conf:(0.84)> lift:(1.84) lev:(0.06) [36] conv:(3.23)

28. children=0 car=YES pep=NO 76 ==> save\_act=YES 64 <conf:(0.84)> lift:(1.22) lev:(0.02) [11] conv:(1.81)

29. region=INNER\_CITY children=0 pep=NO 73 ==> current\_act=YES 61 <conf:(0.84)> lift:(1.1) lev:(0.01) [5] conv:(1.36)

30. region=INNER\_CITY mortgage=NO pep=NO 96 ==> married=YES 80 <conf:(0.83)> lift:(1.26) lev:(0.03) [16] conv:(1.92)

31. married=NO car=NO save\_act=YES 72 ==> current\_act=YES 60 <conf:(0.83)> lift:(1.1) lev:(0.01) [5] conv:(1.34)

32. children=1 current\_act=YES 101 ==> pep=YES 84 <conf:(0.83)> lift:(1.82) lev:(0.06) [37] conv:(3.05)

33. married=YES children=1 89 ==> pep=YES 74 <conf:(0.83)> lift:(1.82) lev:(0.06) [33] conv:(3.02)

34. sex=FEMALE region=INNER\_CITY pep=NO 77 ==> current\_act=YES 64 <conf:(0.83)> lift:(1.1) lev:(0.01) [5] conv:(1.33)

35. married=NO save\_act=YES pep=YES 77 ==> current\_act=YES 64 <conf:(0.83)> lift:(1.1) lev:(0.01) [5] conv:(1.33)

36. married=NO save\_act=YES pep=YES 77 ==> mortgage=NO 64 <conf:(0.83)> lift:(1.28) lev:(0.02) [13] conv:(1.92)

37. sex=FEMALE save\_act=YES mortgage=NO pep=NO 77 ==> married=YES 64 <conf:(0.83)> lift:(1.26) lev:(0.02) [13] conv:(1.87)

38. sex=FEMALE married=YES children=0 94 ==> pep=NO 78 <conf:(0.83)> lift:(1.53) lev:(0.04) [26] conv:(2.53)

39. sex=MALE mortgage=NO pep=NO 94 ==> married=YES 78 <conf:(0.83)> lift:(1.26) lev:(0.03) [15] conv:(1.88)

40. children=0 current\_act=YES pep=NO 127 ==> married=YES 105 <conf:(0.83)> lift:(1.25) lev:(0.04) [21] conv:(1.88)

41. sex=FEMALE region=INNER\_CITY save\_act=YES 86 ==> current\_act=YES 71 <conf:(0.83)> lift:(1.09) lev:(0.01) [5] conv:(1.3)

42. current\_act=YES mortgage=YES pep=NO 86 ==> save\_act=YES 71 <conf:(0.83)> lift:(1.2) lev:(0.02) [11] conv:(1.67)

43. region=INNER\_CITY married=YES mortgage=NO pep=NO 80 ==> current\_act=YES 66 <conf:(0.82)> lift:(1.09) lev:(0.01) [5] conv:(1.29)

44. married=NO save\_act=YES 137 ==> current\_act=YES 113 <conf:(0.82)> lift:(1.09) lev:(0.02) [9] conv:(1.32)

45. region=INNER\_CITY children=0 save\_act=YES 74 ==> current\_act=YES 61 <conf:(0.82)> lift:(1.09) lev:(0.01) [4] conv:(1.28)

46. car=NO mortgage=NO pep=NO 108 ==> married=YES 89 <conf:(0.82)> lift:(1.25) lev:(0.03) [17] conv:(1.84)

47. married=NO car=NO 102 ==> current\_act=YES 84 <conf:(0.82)> lift:(1.09) lev:(0.01) [6] conv:(1.3)

48. sex=FEMALE region=INNER\_CITY married=YES 84 ==> current\_act=YES 69 <conf:(0.82)> lift:(1.08) lev:(0.01) [5] conv:(1.27)

49. mortgage=NO pep=NO 209 ==> married=YES 171 <conf:(0.82)> lift:(1.24) lev:(0.06) [33] conv:(1.82)

50. car=NO save\_act=YES pep=YES 88 ==> current\_act=YES 72 <conf:(0.82)> lift:(1.08) lev:(0.01) [5] conv:(1.25)

51. sex=MALE children=0 pep=NO 77 ==> married=YES 63 <conf:(0.82)> lift:(1.24) lev:(0.02) [12] conv:(1.75)

52. car=YES current\_act=YES mortgage=NO pep=NO 77 ==> married=YES 63 <conf:(0.82)> lift:(1.24) lev:(0.02) [12] conv:(1.75)

53. children=0 save\_act=YES pep=NO 131 ==> married=YES 107 <conf:(0.82)> lift:(1.24) lev:(0.03) [20] conv:(1.78)

54. current\_act=YES mortgage=NO pep=NO 158 ==> married=YES 129 <conf:(0.82)> lift:(1.24) lev:(0.04) [24] conv:(1.79)

55. sex=MALE car=NO mortgage=NO 87 ==> current\_act=YES 71 <conf:(0.82)> lift:(1.08) lev:(0.01) [5] conv:(1.24)

56. children=1 135 ==> pep=YES 110 <conf:(0.81)> lift:(1.78) lev:(0.08) [48] conv:(2.82)

57. car=NO current\_act=YES mortgage=NO pep=NO 81 ==> married=YES 66 <conf:(0.81)> lift:(1.23) lev:(0.02) [12] conv:(1.72)

58. married=NO save\_act=YES mortgage=NO 86 ==> current\_act=YES 70 <conf:(0.81)> lift:(1.07) lev:(0.01) [4] conv:(1.22)

59. sex=FEMALE current\_act=YES mortgage=NO pep=NO 86 ==> married=YES 70 <conf:(0.81)> lift:(1.23) lev:(0.02) [13] conv:(1.72)

60. save\_act=YES mortgage=NO pep=YES 128 ==> current\_act=YES 104 <conf:(0.81)> lift:(1.07) lev:(0.01) [6] conv:(1.24)

61. region=INNER\_CITY mortgage=NO pep=NO 96 ==> current\_act=YES 78 <conf:(0.81)> lift:(1.07) lev:(0.01) [5] conv:(1.22)

62. region=INNER\_CITY save\_act=YES current\_act=YES pep=NO 80 ==> married=YES 65 <conf:(0.81)> lift:(1.23) lev:(0.02) [12] conv:(1.7)

63. region=INNER\_CITY married=YES save\_act=YES pep=NO 80 ==> current\_act=YES 65 <conf:(0.81)> lift:(1.07) lev:(0.01) [4] conv:(1.21)

64. car=YES mortgage=NO pep=NO 101 ==> married=YES 82 <conf:(0.81)> lift:(1.23) lev:(0.03) [15] conv:(1.72)

65. sex=FEMALE mortgage=NO pep=YES 90 ==> current\_act=YES 73 <conf:(0.81)> lift:(1.07) lev:(0.01) [4] conv:(1.21)

66. married=NO mortgage=YES 74 ==> current\_act=YES 60 <conf:(0.81)> lift:(1.07) lev:(0.01) [3] conv:(1.19)

67. sex=MALE car=YES pep=NO 74 ==> save\_act=YES 60 <conf:(0.81)> lift:(1.18) lev:(0.01) [8] conv:(1.53)

68. married=YES children=0 car=NO current\_act=YES 74 ==> pep=NO 60 <conf:(0.81)> lift:(1.49) lev:(0.03) [19] conv:(2.25)

69. children=1 mortgage=NO 84 ==> current\_act=YES 68 <conf:(0.81)> lift:(1.07) lev:(0.01) [4] conv:(1.19)

70. sex=FEMALE save\_act=YES pep=YES 84 ==> current\_act=YES 68 <conf:(0.81)> lift:(1.07) lev:(0.01) [4] conv:(1.19)

71. car=NO pep=YES 136 ==> current\_act=YES 110 <conf:(0.81)> lift:(1.07) lev:(0.01) [6] conv:(1.22)

72. sex=FEMALE mortgage=NO pep=NO 115 ==> married=YES 93 <conf:(0.81)> lift:(1.23) lev:(0.03) [17] conv:(1.7)

73. sex=FEMALE married=YES children=0 pep=NO 78 ==> mortgage=NO 63 <conf:(0.81)> lift:(1.24) lev:(0.02) [12] conv:(1.7)

74. region=INNER\_CITY married=YES save\_act=YES mortgage=NO 78 ==> current\_act=YES 63 <conf:(0.81)> lift:(1.07) lev:(0.01) [3] conv:(1.18)

75. sex=FEMALE region=INNER\_CITY mortgage=NO 88 ==> current\_act=YES 71 <conf:(0.81)> lift:(1.06) lev:(0.01) [4] conv:(1.18)

76. car=NO save\_act=YES mortgage=NO 129 ==> current\_act=YES 104 <conf:(0.81)> lift:(1.06) lev:(0.01) [6] conv:(1.2)

77. sex=MALE children=0 pep=NO 77 ==> save\_act=YES 62 <conf:(0.81)> lift:(1.17) lev:(0.01) [8] conv:(1.49)

78. region=INNER\_CITY save\_act=YES mortgage=NO 112 ==> current\_act=YES 90 <conf:(0.8)> lift:(1.06) lev:(0.01) [5] conv:(1.18)

79. children=0 car=YES pep=NO 76 ==> married=YES 61 <conf:(0.8)> lift:(1.22) lev:(0.02) [10] conv:(1.61)

80. sex=MALE region=TOWN 81 ==> current\_act=YES 65 <conf:(0.8)> lift:(1.06) lev:(0.01) [3] conv:(1.15)

81. sex=FEMALE children=0 mortgage=NO 91 ==> current\_act=YES 73 <conf:(0.8)> lift:(1.06) lev:(0.01) [3] conv:(1.16)

82. region=INNER\_CITY car=NO mortgage=NO 91 ==> current\_act=YES 73 <conf:(0.8)> lift:(1.06) lev:(0.01) [3] conv:(1.16)

83. car=NO mortgage=NO 197 ==> current\_act=YES 158 <conf:(0.8)> lift:(1.06) lev:(0.01) [8] conv:(1.19)

84. sex=FEMALE region=INNER\_CITY 131 ==> current\_act=YES 105 <conf:(0.8)> lift:(1.06) lev:(0.01) [5] conv:(1.17)

85. sex=FEMALE married=NO 105 ==> current\_act=YES 84 <conf:(0.8)> lift:(1.05) lev:(0.01) [4] conv:(1.15)

86. region=INNER\_CITY save\_act=YES pep=NO 100 ==> married=YES 80 <conf:(0.8)> lift:(1.21) lev:(0.02) [13] conv:(1.62)

87. region=INNER\_CITY save\_act=YES pep=NO 100 ==> current\_act=YES 80 <conf:(0.8)> lift:(1.05) lev:(0.01) [4] conv:(1.15)

88. married=YES children=0 car=NO 100 ==> pep=NO 80 <conf:(0.8)> lift:(1.47) lev:(0.04) [25] conv:(2.17)

89. married=YES car=YES current\_act=YES mortgage=NO 95 ==> save\_act=YES 76 <conf:(0.8)> lift:(1.16) lev:(0.02) [10] conv:(1.47)

90. region=INNER\_CITY married=YES children=0 85 ==> current\_act=YES 68 <conf:(0.8)> lift:(1.05) lev:(0.01) [3] conv:(1.14)

**Model #3:**

=== Run information ===

Scheme: weka.associations.Apriori -N 100 -T 1 -C 1.7 -D 0.05 -U 1.0 -M 0.1 -S -1.0 -V -c -1

Minimum support: 0.1 (60 instances)

Minimum metric <lift>: 1.7

Number of cycles performed: 18

Best rules found:

1. children=1 135 ==> married=YES pep=YES 74 conf:(0.55) < lift:(2.14)> lev:(0.07) [39] conv:(1.62)

2. married=YES pep=YES 154 ==> children=1 74 conf:(0.48) < lift:(2.14)> lev:(0.07) [39] conv:(1.47)

3. children=1 current\_act=YES 101 ==> save\_act=YES pep=YES 63 conf:(0.62) < lift:(2.09)> lev:(0.05) [32] conv:(1.82)

4. save\_act=YES pep=YES 179 ==> children=1 current\_act=YES 63 conf:(0.35) < lift:(2.09)> lev:(0.05) [32] conv:(1.27)

5. children=1 135 ==> save\_act=YES current\_act=YES pep=YES 63 conf:(0.47) < lift:(2)> lev:(0.05) [31] conv:(1.42)

6. save\_act=YES current\_act=YES pep=YES 140 ==> children=1 63 conf:(0.45) < lift:(2)> lev:(0.05) [31] conv:(1.39)

7. children=1 135 ==> save\_act=YES pep=YES 80 conf:(0.59) < lift:(1.99)> lev:(0.07) [39] conv:(1.69)

8. save\_act=YES pep=YES 179 ==> children=1 80 conf:(0.45) < lift:(1.99)> lev:(0.07) [39] conv:(1.39)

9. sex=FEMALE married=YES children=0 94 ==> mortgage=NO pep=NO 63 conf:(0.67) < lift:(1.92)> lev:(0.05) [30] conv:(1.91)

10. mortgage=NO pep=NO 209 ==> sex=FEMALE married=YES children=0 63 conf:(0.3) < lift:(1.92)> lev:(0.05) [30] conv:(1.2)

11. married=YES children=0 mortgage=NO 116 ==> sex=FEMALE pep=NO 63 conf:(0.54) < lift:(1.92)> lev:(0.05) [30] conv:(1.54)

12. sex=FEMALE pep=NO 170 ==> married=YES children=0 mortgage=NO 63 conf:(0.37) < lift:(1.92)> lev:(0.05) [30] conv:(1.27)

13. children=1 save\_act=YES current\_act=YES 73 ==> pep=YES 63 conf:(0.86) < lift:(1.89)> lev:(0.05) [29] conv:(3.61)

14. pep=YES 274 ==> children=1 save\_act=YES current\_act=YES 63 conf:(0.23) < lift:(1.89)> lev:(0.05) [29] conv:(1.14)

15. current\_act=YES pep=YES 211 ==> children=1 save\_act=YES 63 conf:(0.3) < lift:(1.89)> lev:(0.05) [29] conv:(1.19)

16. children=1 save\_act=YES 95 ==> current\_act=YES pep=YES 63 conf:(0.66) < lift:(1.89)> lev:(0.05) [29] conv:(1.87)

17. car=NO mortgage=NO pep=NO 108 ==> married=YES children=0 60 conf:(0.56) < lift:(1.85)> lev:(0.05) [27] conv:(1.54)

18. married=YES children=0 180 ==> car=NO mortgage=NO pep=NO 60 conf:(0.33) < lift:(1.85)> lev:(0.05) [27] conv:(1.22)

19. children=1 mortgage=NO 84 ==> pep=YES 71 conf:(0.85) < lift:(1.85)> lev:(0.05) [32] conv:(3.26)

20. pep=YES 274 ==> children=1 mortgage=NO 71 conf:(0.26) < lift:(1.85)> lev:(0.05) [32] conv:(1.16)

21. car=NO pep=NO 168 ==> married=YES children=0 mortgage=NO 60 conf:(0.36) < lift:(1.85)> lev:(0.05) [27] conv:(1.24)

22. married=YES children=0 mortgage=NO 116 ==> car=NO pep=NO 60 conf:(0.52) < lift:(1.85)> lev:(0.05) [27] conv:(1.47)

23. children=1 save\_act=YES 95 ==> pep=YES 80 conf:(0.84) < lift:(1.84)> lev:(0.06) [36] conv:(3.23)

24. pep=YES 274 ==> children=1 save\_act=YES 80 conf:(0.29) < lift:(1.84)> lev:(0.06) [36] conv:(1.18)

25. sex=FEMALE mortgage=NO pep=NO 115 ==> married=YES children=0 63 conf:(0.55) < lift:(1.83)> lev:(0.05) [28] conv:(1.52)

26. married=YES children=0 180 ==> sex=FEMALE mortgage=NO pep=NO 63 conf:(0.35) < lift:(1.83)> lev:(0.05) [28] conv:(1.23)

27. children=1 current\_act=YES 101 ==> pep=YES 84 conf:(0.83) < lift:(1.82)> lev:(0.06) [37] conv:(3.05)

28. pep=YES 274 ==> children=1 current\_act=YES 84 conf:(0.31) < lift:(1.82)> lev:(0.06) [37] conv:(1.19)

29. married=YES children=1 89 ==> pep=YES 74 conf:(0.83) < lift:(1.82)> lev:(0.06) [33] conv:(3.02)

30. pep=YES 274 ==> married=YES children=1 74 conf:(0.27) < lift:(1.82)> lev:(0.06) [33] conv:(1.16)

31. sex=FEMALE married=YES pep=NO 127 ==> children=0 mortgage=NO 63 conf:(0.5) < lift:(1.81)> lev:(0.05) [28] conv:(1.42)

32. children=0 mortgage=NO 164 ==> sex=FEMALE married=YES pep=NO 63 conf:(0.38) < lift:(1.81)> lev:(0.05) [28] conv:(1.27)

33. sex=FEMALE married=YES 195 ==> children=0 mortgage=NO pep=NO 63 conf:(0.32) < lift:(1.81)> lev:(0.05) [28] conv:(1.2)

34. children=0 mortgage=NO pep=NO 107 ==> sex=FEMALE married=YES 63 conf:(0.59) < lift:(1.81)> lev:(0.05) [28] conv:(1.6)

35. children=1 135 ==> pep=YES 110 conf:(0.81) < lift:(1.78)> lev:(0.08) [48] conv:(2.82)

36. pep=YES 274 ==> children=1 110 conf:(0.4) < lift:(1.78)> lev:(0.08) [48] conv:(1.29)

37. children=1 135 ==> current\_act=YES pep=YES 84 conf:(0.62) < lift:(1.77)> lev:(0.06) [36] conv:(1.68)

38. current\_act=YES pep=YES 211 ==> children=1 84 conf:(0.4) < lift:(1.77)> lev:(0.06) [36] conv:(1.28)

39. married=YES children=0 save\_act=YES 119 ==> mortgage=NO pep=NO 73 conf:(0.61) < lift:(1.76)> lev:(0.05) [31] conv:(1.65)

40. mortgage=NO pep=NO 209 ==> married=YES children=0 save\_act=YES 73 conf:(0.35) < lift:(1.76)> lev:(0.05) [31] conv:(1.22)

41. children=0 mortgage=NO 164 ==> married=YES car=NO pep=NO 60 conf:(0.37) < lift:(1.74)> lev:(0.04) [25] conv:(1.23)

42. married=YES car=NO pep=NO 126 ==> children=0 mortgage=NO 60 conf:(0.48) < lift:(1.74)> lev:(0.04) [25] conv:(1.37)

43. mortgage=NO pep=YES 182 ==> children=1 71 conf:(0.39) < lift:(1.73)> lev:(0.05) [30] conv:(1.26)

44. children=1 135 ==> mortgage=NO pep=YES 71 conf:(0.53) < lift:(1.73)> lev:(0.05) [30] conv:(1.45)

45. married=YES children=0 current\_act=YES 133 ==> mortgage=NO pep=NO 80 conf:(0.6) < lift:(1.73)> lev:(0.06) [33] conv:(1.61)

46. mortgage=NO pep=NO 209 ==> married=YES children=0 current\_act=YES 80 conf:(0.38) < lift:(1.73)> lev:(0.06) [33] conv:(1.25)

47. mortgage=NO pep=NO 209 ==> married=YES children=0 car=NO 60 conf:(0.29) < lift:(1.72)> lev:(0.04) [25] conv:(1.16)

48. married=YES children=0 car=NO 100 ==> mortgage=NO pep=NO 60 conf:(0.6) < lift:(1.72)> lev:(0.04) [25] conv:(1.59)

49. sex=FEMALE children=0 mortgage=NO 91 ==> married=YES pep=NO 63 conf:(0.69) < lift:(1.72)> lev:(0.04) [26] conv:(1.87)

50. married=YES pep=NO 242 ==> sex=FEMALE children=0 mortgage=NO 63 conf:(0.26) < lift:(1.72)> lev:(0.04) [26] conv:(1.14)

51. married=YES children=0 180 ==> save\_act=YES mortgage=NO pep=NO 73 conf:(0.41) < lift:(1.71)> lev:(0.05) [30] conv:(1.27)

52. save\_act=YES mortgage=NO pep=NO 142 ==> married=YES children=0 73 conf:(0.51) < lift:(1.71)> lev:(0.05) [30] conv:(1.42)

**Results**

Analysing the resulting rule sets for the most interesting rules that included factoring in the PEP attribute to be Yes came from the model #3, which focused on lift.

1. children=1 135 ==> married=YES pep=YES 74 conf:(0.55) < lift:(2.14)> lev:(0.07) [39] conv:(1.62)

2. married=YES pep=YES 154 ==> children=1 74 conf:(0.48) < lift:(2.14)> lev:(0.07) [39] conv:(1.47)

3. children=1 current\_act=YES 101 ==> save\_act=YES pep=YES 63 conf:(0.62) < lift:(2.09)> lev:(0.05) [32] conv:(1.82)

4. save\_act=YES pep=YES 179 ==> children=1 current\_act=YES 63 conf:(0.35) < lift:(2.09)> lev:(0.05) [32] conv:(1.27)

5. children=1 135 ==> save\_act=YES current\_act=YES pep=YES 63 conf:(0.47) < lift:(2)> lev:(0.05) [31] conv:(1.42)

The top rule above indicates a relatively low confidence level of .55 for the rule that married couples with 1 child will purchase the PEP product. Confidence of .55 means that 55% of the Yes to PEP responses will be married couples with 1 child. And lift for this rule is a very significant 2.14 which means that there is a very strong correlation between the metrics being related to each other and not any one of the metrics being the driving force behind the results.

**Conclusion**

In conclusion, the three top models chosen for overall analysis and recommendation for this report, it becomes clear that the number of children metric can be used as a strong indicator of a top prospect for the new PEP product. The models #1 & #2 show a high confidence level that 0 children will correspond with no response to the PEP product offering. Model # 3 shows a high degree of lift can be achieved by targeting those with 1 child.

The recommendation would be to segment and target the remaining contact base in the following order until the counts needed for the marketing efforts goal ROI is achieved:

1. Married and 1 child
2. Married and 2+ child
3. 1 child
4. 2+ child