Author Metrics

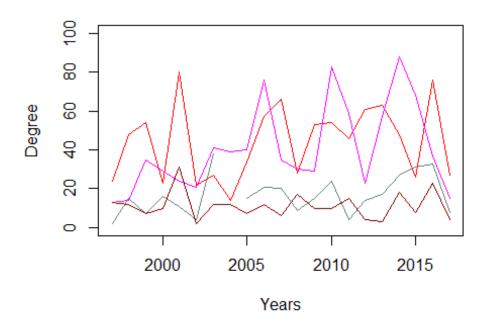
AMIT

April 17, 2020

Degree

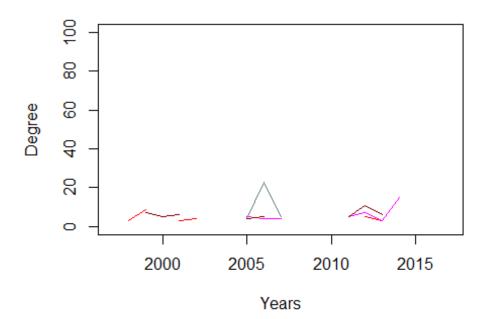
```
df= read.csv("C:/Users/amitd/Desktop/FA/MasterDegree.csv")
dflth = subset(df,df$LowToHigh=="LTH")
dfhtl = subset(df,df$HighToLow=="HTL")
dfclp = subset(df,df$ConsistentlyLowPerf=="CLP")
dfchp = subset(df,df$ConsistentlyHighPerf =="CHP")
##ConsistentHighPerformers
dfchp[,4:24]
      X1997 X1998 X1999 X2000 X2001 X2002 X2003 X2004 X2005 X2006 X2007 X2008
##
## 2
          24
                48
                       54
                              23
                                    80
                                           22
                                                 27
                                                        14
                                                               34
                                                                     57
                                                                            66
                                                                                   28
## 7
          13
                14
                       35
                              29
                                    24
                                           21
                                                 41
                                                        39
                                                               40
                                                                     76
                                                                            35
                                                                                   30
## 13
           2
                15
                        7
                              16
                                    11
                                            4
                                                 38
                                                        NA
                                                               15
                                                                     21
                                                                            20
                                                                                    9
                                            2
                                                                                   17
## 15
          13
                12
                        7
                              10
                                    31
                                                 12
                                                        12
                                                                7
                                                                     12
                                                                             6
      X2009 X2010 X2011 X2012 X2013 X2014 X2015 X2016 X2017
##
## 2
          53
                54
                       46
                              61
                                    63
                                           48
                                                 26
                                                        76
                                                               27
## 7
          29
                83
                       59
                              23
                                    57
                                           88
                                                 68
                                                        37
                                                               15
## 13
                              14
                                    17
                                           27
          15
                24
                        4
                                                  31
                                                        33
                                                                8
## 15
          10
                10
                       15
                              4
                                     3
                                           18
                                                   8
                                                        23
                                                                4
M <- as.matrix(dfchp[,4:24])</pre>
Μ
      X1997 X1998 X1999 X2000 X2001 X2002 X2003 X2004 X2005 X2006 X2007 X2008
##
## 2
          24
                48
                                    80
                                                               34
                                                                     57
                                                                            66
                       54
                              23
                                           22
                                                 27
                                                        14
                                                                                   28
## 7
          13
                14
                       35
                              29
                                    24
                                           21
                                                 41
                                                        39
                                                               40
                                                                     76
                                                                            35
                                                                                   30
                                                                                    9
## 13
           2
                15
                        7
                              16
                                            4
                                                 38
                                                               15
                                                                     21
                                                                            20
                                    11
                                                        NA
## 15
          13
                12
                        7
                              10
                                    31
                                            2
                                                 12
                                                        12
                                                                7
                                                                     12
                                                                             6
                                                                                   17
##
      X2009 X2010 X2011 X2012 X2013 X2014 X2015 X2016 X2017
## 2
          53
                54
                       46
                              61
                                    63
                                           48
                                                 26
                                                        76
                                                               27
## 7
          29
                83
                       59
                              23
                                    57
                                           88
                                                 68
                                                        37
                                                               15
## 13
          15
                24
                        4
                              14
                                    17
                                           27
                                                  31
                                                        33
                                                                8
                              4
                                                        23
## 15
          10
                10
                       15
                                     3
                                           18
                                                  8
                                                                4
x <-
c(1997,1998,1999,2000,2001,2002,2003,2004,2005,2006,2007,2008,2009,2010,2011,
2012,2013,2014,2015,2016,2017)
length(x)
## [1] 21
```

```
dim(M)
## [1] 4 21
```



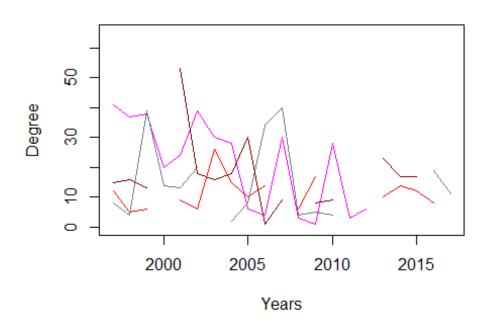
```
###ConsistentLowPerformers
dfclp[,4:24]
        X1997 X1998 X1999 X2000 X2001 X2002 X2003 X2004 X2005 X2006 X2007
##
## 90
            NA
                    3
                           9
                                 NA
                                         3
                                                4
                                                      NA
                                                               4
                                                                     NA
                                                                             3
                                                                                   NA
                    4
                                         8
                                                                      5
## 93
            NA
                                 NA
                                                                             4
                                                                                    4
                          NA
                                               NA
                                                       NA
                                                              NA
## 94
             9
                                  4
                                        NA
                                                2
                                                      NA
                                                              NA
                                                                      4
                                                                            23
                                                                                    5
                   NΑ
                          NA
                                  5
## 95
                           7
                                                                      4
                                                                             5
            NA
                   NA
                                         6
                                               NA
                                                       NA
                                                              NA
                                                                                   NA
                                                                             2
## 96
                           2
                                         2
                                                                                   NA
            NA
                   NA
                                 NA
                                               NA
                                                        2
                                                              NA
                                                                     NA
## 97
            NA
                   NA
                           6
                                 NA
                                        NA
                                               14
                                                       8
                                                                     NA
                                                                            NA
                                                                                   NA
                                                              NA
                           3
                                  3
                                                        5
                                                                                   12
## 98
            NA
                   NA
                                         6
                                               NA
                                                              NA
                                                                     NA
                                                                            NA
## 99
             7
                   NA
                          NA
                                  7
                                         5
                                                 3
                                                      NA
                                                              NA
                                                                      5
                                                                                   NA
                                                                            NA
             5
## 100
                   NA
                          NA
                                 NA
                                        NA
                                                 3
                                                       10
                                                              NA
                                                                     NA
                                                                             7
                                                                                   12
##
        X2008 X2009 X2010 X2011 X2012 X2013 X2014 X2015 X2016 X2017
                           5
                                         5
## 90
             8
                   NA
                                 NA
                                                 3
                                                       NA
                                                              NA
                                                                     NA
                                                                             6
## 93
            NA
                   NA
                          NA
                                  5
                                         7
                                                 3
                                                       15
                                                              NA
                                                                     NA
                                                                             4
                                                                            19
## 94
            NA
                   NA
                          12
                                         8
                                                                     NA
                                 NA
                                               NA
                                                      NA
                                                              NA
## 95
                                  5
                                                6
                                                      NA
                                                                     NA
            NA
                   NA
                          NA
                                        11
                                                              13
                                                                            NA
## 96
            NA
                   NA
                           7
                                 NA
                                        18
                                               NA
                                                      NA
                                                              NA
                                                                     18
                                                                            NA
## 97
                           9
                                         5
                                                 9
             6
                   NA
                                 13
                                                       NA
                                                              12
                                                                     NA
                                                                            NA
## 98
            NA
                    6
                          NA
                                  3
                                        NA
                                               NA
                                                       11
                                                              NA
                                                                      6
                                                                            NA
## 99
             3
                   NA
                          NA
                                  5
                                        NA
                                               NA
                                                       5
                                                              NA
                                                                      3
                                                                            NA
## 100
            NA
                    5
                          NA
                                 NA
                                         8
                                               NA
                                                      NA
                                                              NA
                                                                      8
                                                                            NA
```

```
M <- as.matrix(dfclp[,4:24])</pre>
Μ
        X1997 X1998 X1999 X2000 X2001 X2002 X2003 X2004 X2005 X2006 X2007
##
## 90
            NA
                    3
                           9
                                 NA
                                         3
                                                4
                                                      NA
                                                              4
                                                                     NA
                                                                             3
                                                                                   NA
                                                                      5
## 93
            NA
                    4
                                         8
                                                      NA
                                                                             4
                          NA
                                 NA
                                               NA
                                                             NA
                                                                                    4
                                                                                    5
             9
                                                2
                                                                            23
## 94
                   NA
                          NA
                                  4
                                        NA
                                                      NA
                                                             NA
                                                                      4
## 95
                           7
                                  5
                                                                      4
                                                                             5
            NA
                   NA
                                         6
                                                      NA
                                                             NA
                                                                                   NA
                                               NA
                                         2
                                                       2
                                                                             2
                                                                                   NA
## 96
            NA
                   NA
                           2
                                               NA
                                 NA
                                                             NA
                                                                     NA
## 97
            NA
                   NA
                           6
                                 NA
                                        NA
                                               14
                                                       8
                                                             NA
                                                                     NA
                                                                            NA
                                                                                   NA
                           3
                                                       5
## 98
            NA
                   NA
                                  3
                                         6
                                               NA
                                                             NA
                                                                     NA
                                                                            NA
                                                                                   12
                                  7
## 99
             7
                   NA
                          NA
                                         5
                                                3
                                                      NA
                                                             NA
                                                                      5
                                                                            NA
                                                                                   NA
## 100
             5
                   NA
                          NA
                                 NA
                                        NA
                                                3
                                                      10
                                                             NA
                                                                     NA
                                                                             7
                                                                                   12
        X2008 X2009 X2010 X2011 X2012 X2013 X2014 X2015 X2016 X2017
##
## 90
                           5
                                 NA
                                         5
             8
                   NA
                                                3
                                                      NA
                                                             NA
                                                                     NA
                                                                             6
## 93
            NA
                   NA
                          NA
                                  5
                                         7
                                                3
                                                      15
                                                             NA
                                                                     NA
                                                                             4
## 94
            NA
                          12
                                         8
                                                                     NA
                                                                            19
                   NA
                                 NA
                                               NA
                                                      NA
                                                             NA
## 95
                                  5
                                                6
            NA
                   NA
                          NA
                                        11
                                                      NA
                                                             13
                                                                     NA
                                                                            NA
## 96
            NA
                   NA
                           7
                                 NA
                                        18
                                               NA
                                                      NA
                                                             NA
                                                                     18
                                                                            NA
## 97
                   NA
                           9
                                         5
                                                9
             6
                                 13
                                                      NA
                                                             12
                                                                     NA
                                                                            NA
## 98
            NA
                    6
                          NA
                                  3
                                        NA
                                               NA
                                                      11
                                                             NA
                                                                      6
                                                                            NA
## 99
             3
                   NA
                          NA
                                  5
                                        NA
                                               NA
                                                       5
                                                             NA
                                                                      3
                                                                            NA
## 100
                    5
                                                                      8
                                                                            NA
            NA
                          NA
                                 NA
                                         8
                                               NA
                                                      NA
                                                             NA
dim(M)
## [1]
         9 21
```



```
###HighToLowPerformers
dfht1[,4:24]
##
       X1997 X1998 X1999 X2000 X2001 X2002 X2003 X2004 X2005 X2006 X2007 X2008
## 2
           24
                  48
                          54
                                 23
                                         80
                                                22
                                                       27
                                                               14
                                                                      34
                                                                              57
                                                                                     66
                                                                                             28
## 27
                                                                      15
           15
                  17
                          12
                                 19
                                          8
                                                28
                                                       15
                                                                6
                                                                              23
                                                                                     25
                                                                                             12
   28
                                                                                              3
##
           41
                  37
                          38
                                 20
                                         24
                                                39
                                                        30
                                                               28
                                                                        6
                                                                               4
                                                                                     30
## 39
            8
                          39
                                         13
                                                                2
                                                                        8
                                                                                              4
                   4
                                 14
                                                20
                                                       NA
                                                                              34
                                                                                     40
                                                                                      9
## 46
           15
                  16
                          13
                                         53
                                                18
                                                                               1
                                                                                             NA
                                 NA
                                                       16
                                                               18
                                                                      30
##
   54
           12
                    5
                           6
                                 NA
                                          9
                                                 6
                                                        26
                                                               15
                                                                      10
                                                                              14
                                                                                     NA
                                                                                              6
## 55
            9
                    5
                           4
                                 10
                                          4
                                                 4
                                                         5
                                                                6
                                                                        3
                                                                               2
                                                                                     11
                                                                                              2
## 66
           NA
                    5
                          NA
                                219
                                       273
                                                NA
                                                       16
                                                                7
                                                                        6
                                                                              NA
                                                                                      3
                                                                                             NA
## 69
           NA
                    3
                          NA
                                 NA
                                         12
                                                 3
                                                         8
                                                               16
                                                                      12
                                                                              13
                                                                                     NA
                                                                                              9
                    5
                                                 5
            9
                                                                                      5
                                                                                              8
##
   75
                           6
                                 NA
                                         12
                                                       NA
                                                                4
                                                                      NA
                                                                              NA
## 83
                   4
                          19
                                  6
                                                       NA
                                                                        9
                                                                               3
           NA
                                          6
                                                NA
                                                               NA
                                                                                     NA
                                                                                             NA
## 90
           NA
                    3
                           9
                                 NA
                                          3
                                                 4
                                                       NA
                                                                4
                                                                      NA
                                                                               3
                                                                                              8
                                                                                     NA
## 98
                           3
                                  3
                                          6
                                                         5
                                                                      NA
           NA
                  NA
                                                NA
                                                               NA
                                                                              NA
                                                                                     12
                                                                                             NA
              X2010 X2011 X2012 X2013 X2014 X2015 X2016 X2017
##
       X2009
## 2
           53
                  54
                          46
                                 61
                                         63
                                                48
                                                       26
                                                               76
                                                                      27
## 27
                                                                9
           46
                   3
                          18
                                  8
                                         11
                                                62
                                                       11
                                                                      15
                                                                5
## 28
            1
                  28
                           3
                                  6
                                         NA
                                                 4
                                                       NA
                                                                      NA
##
   39
            5
                   4
                          NA
                                 12
                                         NA
                                                       NA
                                                               19
                                                                      11
                                                10
   46
            8
                   9
                                                                        2
##
                          NA
                                 NA
                                         23
                                                17
                                                       17
                                                               NA
## 54
           17
                          11
                                 NA
                                         10
                                                                8
                                                                      NA
                  NA
                                                14
                                                       12
            7
                           3
                                  9
                                                                        5
##
   55
                  NA
                                         NA
                                                NA
                                                       NA
                                                               NA
##
   66
           NA
                  13
                          NA
                                  6
                                          5
                                                NA
                                                       NA
                                                               NA
                                                                        4
##
   69
            3
                  NA
                          NA
                                                 9
                                                       NA
                                                                6
                                                                      37
                                 NA
                                         NA
##
   75
           NΑ
                  11
                          NA
                                  1
                                          6
                                                NA
                                                         7
                                                               NA
                                                                      NA
## 83
                                  4
           NA
                  10
                          NA
                                          6
                                                 6
                                                       NA
                                                               NA
                                                                      20
## 90
           NA
                    5
                          NA
                                  5
                                          3
                                                NA
                                                       NA
                                                               NA
                                                                        6
## 98
            6
                  NA
                           3
                                 NA
                                         NA
                                                11
                                                       NA
                                                                6
                                                                      NA
M <- as.matrix(dfhtl[,4:24])</pre>
Μ
##
       X1997 X1998 X1999 X2000 X2001 X2002 X2003 X2004 X2005 X2006 X2007 X2008
## 2
           24
                  48
                          54
                                 23
                                         80
                                                22
                                                       27
                                                               14
                                                                      34
                                                                              57
                                                                                     66
                                                                                             28
   27
                                                28
                                                                      15
                                                                                     25
                                                                                             12
##
           15
                  17
                          12
                                 19
                                          8
                                                       15
                                                                6
                                                                              23
   28
                                                                                              3
##
           41
                  37
                          38
                                 20
                                         24
                                                39
                                                       30
                                                               28
                                                                        6
                                                                               4
                                                                                     30
   39
            8
                          39
                                         13
                                                                2
                                                                        8
                                                                              34
                                                                                              4
##
                   4
                                 14
                                                20
                                                       NA
                                                                                     40
                  16
## 46
           15
                          13
                                 NA
                                         53
                                                18
                                                       16
                                                               18
                                                                      30
                                                                               1
                                                                                      9
                                                                                             NA
##
   54
           12
                    5
                           6
                                 NA
                                          9
                                                 6
                                                       26
                                                               15
                                                                      10
                                                                              14
                                                                                     NA
                                                                                              6
## 55
            9
                   5
                           4
                                 10
                                          4
                                                 4
                                                         5
                                                                6
                                                                        3
                                                                               2
                                                                                     11
                                                                                              2
   66
                    5
                                219
                                                       16
                                                                7
                                                                        6
                                                                                      3
##
           NA
                          NA
                                       273
                                                NA
                                                                              NA
                                                                                             NA
## 69
           NA
                    3
                          NA
                                 NA
                                         12
                                                 3
                                                         8
                                                               16
                                                                      12
                                                                              13
                                                                                     NA
                                                                                              9
            9
                    5
                                                 5
                                                                                              8
##
   75
                           6
                                 NA
                                         12
                                                       NA
                                                                4
                                                                      NA
                                                                              NA
                                                                                       5
                                                                        9
## 83
                   4
                          19
                                                                               3
                                                                                             NA
           NA
                                  6
                                          6
                                                NA
                                                       NA
                                                               NA
                                                                                     NA
## 90
                    3
                           9
                                 NA
                                          3
                                                 4
                                                                4
                                                                               3
                                                                                              8
           NA
                                                       NA
                                                                      NA
                                                                                     NA
## 98
                                          6
           NA
                  NA
                           3
                                  3
                                                NA
                                                         5
                                                               NA
                                                                      NA
                                                                              NA
                                                                                     12
                                                                                             NA
##
       X2009 X2010 X2011 X2012 X2013 X2014 X2015 X2016 X2017
```

```
## 2
           53
                  54
                                61
                                       63
                                               48
                                                      26
                                                             76
                                                                    27
                         46
## 27
                   3
                                                              9
           46
                         18
                                 8
                                       11
                                               62
                                                      11
                                                                    15
## 28
            1
                  28
                          3
                                 6
                                       NA
                                               4
                                                      NA
                                                              5
                                                                    NA
## 39
            5
                   4
                         NA
                                12
                                       NA
                                               10
                                                      NA
                                                             19
                                                                    11
                   9
## 46
            8
                         NA
                                NA
                                       23
                                               17
                                                      17
                                                             NA
                                                                     2
## 54
           17
                  NA
                         11
                                NΑ
                                       10
                                               14
                                                      12
                                                              8
                                                                    NA
## 55
                                 9
                                                                     5
                  NA
                          3
                                       NA
                                              NA
           7
                                                      NA
                                                             NA
                                 6
                                                                     4
## 66
           NA
                  13
                         NA
                                         5
                                               NA
                                                      NA
                                                             NA
## 69
            3
                                                9
                  NA
                         NA
                                                      NA
                                                              6
                                                                    37
                                NA
                                       NA
## 75
           NA
                  11
                         NA
                                 1
                                         6
                                              NA
                                                       7
                                                             NA
                                                                    NA
## 83
                                 4
                                                      NA
                                                                    20
           NA
                  10
                         NA
                                         6
                                                6
                                                             NA
## 90
                   5
                                 5
                                         3
                                                                     6
           NA
                         NA
                                               NA
                                                      NA
                                                             NA
## 98
            6
                  NA
                          3
                                NA
                                       NA
                                               11
                                                      NA
                                                              6
                                                                    NA
dim(M)
## [1] 13 21
```

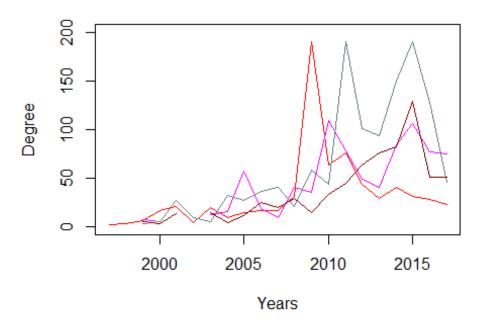


```
###LowToHighPerformers
dflth[,4:24]
##
      X1997 X1998 X1999 X2000 X2001 X2002 X2003 X2004 X2005 X2006 X2007 X2008
## 1
          NA
                 10
                        NA
                               12
                                     NA
                                             4
                                                   13
                                                          37
                                                                 24
                                                                        53
                                                                               49
                                                                                      43
## 3
           2
                  3
                         6
                               17
                                     21
                                             4
                                                   20
                                                           9
                                                                 14
                                                                        17
                                                                               17
                                                                                      31
## 4
                                5
                                     NA
                                                   12
                                                          15
                                                                 57
                                                                        19
                                                                                9
                                                                                      40
          NA
                 NA
                         7
                                            NA
                         3
                                5
## 5
                                     27
                                             9
                                                                                      21
           5
                 NA
                                                    5
                                                          32
                                                                 27
                                                                        36
                                                                               41
## 8
           2
                         5
                                3
                                     13
                                                   14
                                                           4
                                                                        25
                                                                               20
                                                                                      29
                 NA
                                            NA
                                                                 11
```

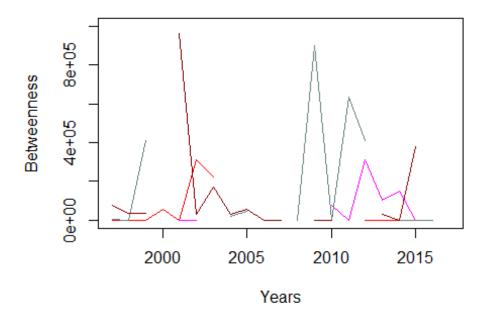
щи	0	7	NIA	17	12	4	22	1.1	0.4	24	1.1	26	10
##		7	NA	17	13	4	32	14	94	31	14	26	19
##		NA	6	2	7	2	3	25	11	25	12	39	22
	11	12	NA	NA	194	5	21	NA	NA	291	259	15	25
	12	8	NA	11	1	10	5	6	7	4	9	45	4
##		NA	3	10	NA	22	4	NA	12	NA	2	7	19
##		1	12	3	4	5	9	14	3	11	20	17	25
##		3	3	12	NA	NA	4	4	7	30	26	5	11
##		NA	NA	4	5	29	10	12	4	4	13	10	17
##		13	NA	5	NA	25	22	7	14	NA	7	38	51
##		6	NA	23	14	21	24	18	22	3	34	30	39
##		8	6	3	3	4	11	NA	8	12	14	24	15
##		NA	NA	8	2	NA	NA	NA	NA	4	8	5	2
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##		NA	6	NA	NA	3	NA	4	NA	3	1	NA	NA
			U	רעו	11/		INA	4	IVA	,		11/	INA
##	02	X2009									_	IVA	IVA
		X2009	X2010	X2011	X2012	X2013	X2014	X2015	X2016	X2017	_	IVA	NA
##	1		X2010 80					X2015 47	X2016 56		_	IVA	IVA
## ##	1	X2009 54 191	X2010 80 63	X2011 84 76	X2012 102 44	X2013 66 29	X2014 90 40	X2015 47 31	X2016 56 28	X2017 55 23	1	IVA	NA
## ## ## ##	1 3 4	X2009 54 191 35	X2010 80 63 109	X2011 84 76 78	X2012 102 44 49	X2013 66 29 40	X2014 90 40 84	X2015 47 31 106	X2016 56 28 77	X2017 55 23 75	1	IVA	NA
## ## ## ##	1 3 4 5	X2009 54 191 35 58	X2010 80 63 109 44	X2011 84 76 78 190	X2012 102 44 49 101	X2013 66 29 40 94	X2014 90 40 84 150	X2015 47 31 106 191	X2016 56 28 77 128	X2017 55 23 75 46	1	IVA	NA
## ## ## ## ##	1 3 4 5 8	X2009 54 191 35 58 14	X2010 80 63 109 44 33	X2011 84 76 78 190 45	X2012 102 44 49 101 63	X2013 66 29 40 94 76	X2014 90 40 84 150 82	X2015 47 31 106 191 129	X2016 56 28 77 128 51	X2017 55 23 75 46 51	•	IVA	IVA
## ## ## ## ## ##	1 3 4 5 8 9	X2009 54 191 35 58 14 27	X2010 80 63 109 44 33 23	X2011 84 76 78 190 45 15	X2012 102 44 49 101 63 43	X2013 66 29 40 94 76 93	X2014 90 40 84 150 82 42	X2015 47 31 106 191 129 47	X2016 56 28 77 128 51 41	X2017 55 23 75 46 51 56	-	IVA	IVA
## ## ## ## ## ##	1 3 4 5 8 9 10	X2009 54 191 35 58 14 27 26	X2010 80 63 109 44 33 23 20	X2011 84 76 78 190 45 15 31	X2012 102 44 49 101 63 43 54	X2013 66 29 40 94 76 93 73	X2014 90 40 84 150 82 42 162	X2015 47 31 106 191 129 47 132	X2016 56 28 77 128 51 41 61	X2017 55 23 75 46 51 56 42	-	IVA	IVA
## ## ## ## ## ##	1 3 4 5 8 9 10 11	X2009 54 191 35 58 14 27 26 24	X2010 80 63 109 44 33 23 20 24	X2011 84 76 78 190 45 15 31 30	X2012 102 44 49 101 63 43 54 95	X2013 66 29 40 94 76 93 73 111	X2014 90 40 84 150 82 42 162 33	X2015 47 31 106 191 129 47 132 49	X2016 56 28 77 128 51 41 61 13	X2017 55 23 75 46 51 56 42 33	-	IVA	IVA
## ## ## ## ## ## ##	1 3 4 5 8 9 10 11 12	X2009 54 191 35 58 14 27 26 24 19	X2010 80 63 109 44 33 23 20 24 26	X2011 84 76 78 190 45 15 31 30 29	X2012 102 44 49 101 63 43 54 95 10	X2013 66 29 40 94 76 93 73 111 43	X2014 90 40 84 150 82 42 162 33 23	X2015 47 31 106 191 129 47 132 49 18	X2016 56 28 77 128 51 41 61 13	X2017 55 23 75 46 51 56 42 33 20	-	IVA	IVA
## ## ## ## ## ## ##	1 3 4 5 8 9 10 11 12 16	X2009 54 191 35 58 14 27 26 24 19 37	X2010 80 63 109 44 33 23 20 24 26 29	X2011 84 76 78 190 45 15 31 30 29 54	X2012 102 44 49 101 63 43 54 95 10	X2013 66 29 40 94 76 93 73 111 43 63	X2014 90 40 84 150 82 42 162 33 23 134	X2015 47 31 106 191 129 47 132 49 18 51	X2016 56 28 77 128 51 41 61 13 15 49	X2017 55 23 75 46 51 56 42 33 20 14	-	IVA	IVA
## ## ## ## ## ## ## ##	1 3 4 5 8 9 10 11 12 16 17	X2009 54 191 35 58 14 27 26 24 19 37 24	X2010 80 63 109 44 33 23 20 24 26 29 43	X2011 84 76 78 190 45 15 31 30 29 54 29	X2012 102 44 49 101 63 43 54 95 10 110 80	X2013 66 29 40 94 76 93 73 111 43 63 46	X2014 90 40 84 150 82 42 162 33 23 134 97	X2015 47 31 106 191 129 47 132 49 18 51	X2016 56 28 77 128 51 41 61 13 15 49 23	X2017 55 23 75 46 51 56 42 33 20 14 NA	-	IVA	IVA
## ## ## ## ## ## ## ##	1 3 4 5 8 9 10 11 12 16 17 18	X2009 54 191 35 58 14 27 26 24 19 37 24 15	X2010 80 63 109 44 33 23 20 24 26 29 43 30	X2011 84 76 78 190 45 15 31 30 29 54 29 17	X2012 102 44 49 101 63 43 54 95 10 110 80 64	X2013 66 29 40 94 76 93 73 111 43 63 46 55	X2014 90 40 84 150 82 42 162 33 23 134 97 19	X2015 47 31 106 191 129 47 132 49 18 51 51 65	X2016 56 28 77 128 51 41 61 13 15 49 23 55	X2017 55 23 75 46 51 56 42 33 20 14 NA 40	-	IVA	IVA
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######################################	1 3 4 5 8 9 10 11 12 16 17 18 20 23 24 25 34	X2009 54 191 35 58 14 27 26 24 19 37 24 15 19 51 59 18 4	X2010 80 63 109 44 33 20 24 26 29 43 30 23 18 100 14 12	X2011 84 76 78 190 45 15 31 30 29 54 29 17 20 45 19 13	X2012 102 44 49 101 63 43 54 95 10 110 80 64 27 29 46 16 28	X2013 66 29 40 94 76 93 73 111 43 63 46 55 17 25 16 32 49	X2014 90 40 84 150 82 42 162 33 23 134 97 19 17 68 37 32 15	X2015 47 31 106 191 129 47 132 49 18 51 51 65 29 52 32 11 19	X2016 56 28 77 128 51 41 61 13 15 49 23 55 7 35 31 27 30	X2017 55 23 75 46 51 56 42 33 20 14 NA 40 14 44 NA 22 10			IVA
######################################	1 3 4 5 8 9 10 11 12 16 17 18 20 23 24 25 34 37	X2009 54 191 35 58 14 27 26 24 19 37 24 15 19 51 59 18 4 1	X2010 80 63 109 44 33 20 24 26 29 43 30 23 18 100 14 12 5	X2011 84 76 78 190 45 15 31 30 29 54 29 17 20 45 19 13	X2012 102 44 49 101 63 43 54 95 10 110 80 64 27 29 46 16 28 17	X2013 66 29 40 94 76 93 73 111 43 63 46 55 17 25 16 32 49 8	X2014 90 40 84 150 82 42 162 33 23 134 97 19 17 68 37 32 15 3	X2015 47 31 106 191 129 47 132 49 18 51 51 65 29 52 32 11 19 15	X2016 56 28 77 128 51 41 61 13 15 49 23 55 7 35 31 27 30 6	X2017 55 23 75 46 51 56 42 33 20 14 NA 40 14 44 NA 22 10 7			IVA
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######################################	1 3 4 5 8 9 10 11 12 16 17 18 20 23 24 25 34 45 48	X2009 54 191 35 58 14 27 26 24 19 37 24 15 59 18 4 1 8 156 3 9	X2010 80 63 109 44 33 20 24 26 29 43 30 23 18 100 14 12 5 32 10 11 39	X2011 84 76 78 190 45 15 31 30 29 54 29 17 20 45 19 13 12 13 9 122 NA NA	X2012 102 44 49 101 63 43 54 95 10 110 80 64 27 29 46 16 28 17 18 96 4 14	X2013 66 29 40 94 76 93 73 111 43 63 46 55 17 25 16 32 49 8 24 NA 10 17	X2014 90 40 84 150 82 42 162 33 23 134 97 19 17 68 37 32 15 3 14 16 17 NA	X2015 47 31 106 191 129 47 132 49 18 51 51 65 29 52 32 11 19 15 50 12 41 NA	X2016 56 28 77 128 51 41 61 13 15 49 23 55 7 35 31 27 30 6 26 7 4 17	X2017 55 23 75 46 51 56 42 33 20 14 NA 40 14 44 NA 22 10 7 6 NA 2 2 33			IVA
#############################	1 3 4 5 8 9 10 11 12 16 17 18 20 23 24 25 34 44 45	X2009 54 191 35 58 14 27 26 24 19 37 24 15 59 18 4 1 8 156 3	X2010 80 63 109 44 33 20 24 26 29 43 30 23 18 100 14 12 5 32 10 11	X2011 84 76 78 190 45 15 31 30 29 54 29 17 20 45 19 13 12 13 9	X2012 102 44 49 101 63 43 54 95 10 110 80 64 27 29 46 16 28 17 18 96 4	X2013 66 29 40 94 76 93 73 111 43 63 46 55 17 25 16 32 49 8 24 NA 10	X2014 90 40 84 150 82 42 162 33 23 134 97 19 17 68 37 32 15 3 14 16 17	X2015 47 31 106 191 129 47 132 49 18 51 51 65 29 52 32 11 19 15 50 12 41	X2016 56 28 77 128 51 41 61 13 15 49 23 55 7 35 31 27 30 6 26 7	X2017 55 23 75 46 51 56 42 33 20 14 NA 40 14 44 NA 22 10 7 6 NA 2			IVA

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9
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## 58
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                                                          8
## 62
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                                                 18
                                                                11
                                                                        NA
## 73
            3
                  NA
                           5
                                   3
                                                  1
                                                        NA
                                                                15
                                                                         6
                                         NA
## 74
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                          20
                                   7
                                                  7
                                                                        NA
                   NA
                                          NΑ
                                                        17
                                                                NΑ
## 82
            7
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                                           6
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                                                                11
                                                                        NΑ
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M <- as.matrix(dflth[,4:24])</pre>
##
       X1997 X1998 X1999 X2000 X2001 X2002 X2003 X2004 X2005 X2006 X2007 X2008
## 1
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                                                  4
                                                                37
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                                                                                       49
                                                                                              43
           NA
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                                  12
                                         NA
                                                        13
                                                                               53
            2
## 3
                    3
                           6
                                  17
                                          21
                                                  4
                                                         20
                                                                 9
                                                                        14
                                                                               17
                                                                                       17
                                                                                               31
## 4
                            7
                                   5
                                                                                        9
                                                                                              40
           NA
                  NA
                                         NA
                                                 NΑ
                                                         12
                                                                15
                                                                        57
                                                                               19
                                   5
##
   5
            5
                           3
                                          27
                                                  9
                                                          5
                                                                32
                                                                                               21
                   NA
                                                                        27
                                                                               36
                                                                                       41
## 8
            2
                  NA
                            5
                                   3
                                          13
                                                         14
                                                                 4
                                                                        11
                                                                               25
                                                                                       20
                                                                                              29
                                                 NA
            7
                          17
                                                                94
## 9
                   NA
                                  13
                                           4
                                                 32
                                                         14
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                                                                               14
                                                                                       26
                                                                                               19
                           2
                                   7
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                                                         25
                                                                        25
                                                                               12
                                                                                              22
## 10
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                                                                                       39
## 11
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                                           5
                                                 21
                                                                NA
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                                                                                       15
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                                                        NA
## 12
                                          10
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                                                                                       45
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                  NA
                          11
                                   1
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## 16
                    3
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           NA
                                          22
## 17
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                                                                                               25
## 18
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##
                           4
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                                                                               13
                                                                                       10
           NA
                   NA
## 23
           13
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                           5
                                  NA
                                          25
                                                 22
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                                                                                       38
                                                                                               51
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## 25
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       X2009 X2010 X2011 X2012 X2013 X2014 X2015 X2016 X2017
##
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## 3
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## 4
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## 8
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                                                 82
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## 10
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## 11
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                                                                    NA
dim(M)
## [1] 30 21
```



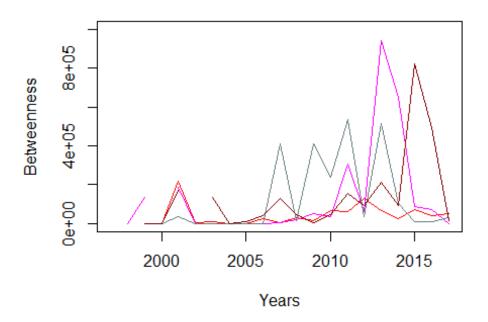
```
##Betweenness
dfbt= read.csv("C:/Users/amitd/Desktop/FA/MasterBetweenness.csv")
dflthbt = subset(dfbt,dfbt$LowToHigh=="LTH")
dfhtlbt = subset(dfbt,dfbt$HighToLow=="HTL")
dfclpbt = subset(dfbt,dfbt$ConsistentlyLowPerf=="CLP")
dfchpbt = subset(dfbt,dfbt$ConsistentlyHighPerf =="CHP")
###ConsistentHighPerformers
dfchpbt[,4:24]
##
        X1997
                 X1998
                           X1999 X2000
                                           X2001
                                                     X2002
                                                               X2003
                                                                         X2004
## 2
          0.0
                   0.00
                             1.5 57396
                                             0.0 309778.67 225964.6
                                                                            NA
## 7
                   0.00
           NA
                              NA
                                     NA
                                             0.0
                                                       0.00
                                                                  NΑ
                                                                          0.00
## 13 4891.6
                   0.00 411774.6
                                     NA
                                              NA
                                                       0.00
                                                                  NA 20740.66
## 15 77220.0 35880.21
                                     NA 962746.3
                                                  32731.99 173942.9 28859.80
                         34074.0
##
         X2005 X2006 X2007 X2008
                                       X2009
                                                 X2010
                                                           X2011
                                                                    X2012
## 2
                     0
                           0
                                NA
                                        30.0
                                                     NA
                                                              NA
                                                                       0.0
            NA
## 7
            NA 123546
                          NA
                                NA
                                          NA 76970.667
                                                             0.0 312702.2
## 13 47166.50
                          NA
                                 0 902454.6
                                                 0.000 635810.3 413529.1
                    NA
## 15 58963.92
                     0
                           0
                                NA
                                         0.0 1275.863
                                                                        NA
                                                              NA
##
          X2013
                X2014
                           X2015 X2016 X2017
## 2
           0.00
                     48
                             0.0
                                      0
                                           NA
## 7
      102489.82 149718
                             0.0
                                      0
                                           NA
## 13
             NA
                                      0
                                           NA
                      0
                             0.0
      32972.97
## 15
                      0 380899.2
                                     NA
                                            0
M <- as.matrix(dfchpbt[,4:24])</pre>
Μ
##
                                                                         X2004
        X1997
                 X1998
                           X1999 X2000
                                           X2001
                                                     X2002
                                                               X2003
## 2
          0.0
                   0.00
                             1.5 57396
                                             0.0 309778.67 225964.6
                                                                            NA
## 7
           NA
                   0.00
                                                       0.00
                              NA
                                     NA
                                             0.0
                                                                  NA
                                                                          0.00
## 13
      4891.6
                   0.00 411774.6
                                     NA
                                              NA
                                                       0.00
                                                                  NA 20740.66
## 15 77220.0 35880.21
                         34074.0
                                     NA 962746.3 32731.99 173942.9 28859.80
##
         X2005 X2006 X2007 X2008
                                      X2009
                                                 X2010
                                                           X2011
                                                                    X2012
## 2
            NA
                     0
                           0
                                NA
                                        30.0
                                                     NA
                                                              NA
                                                                       0.0
## 7
            NA 123546
                          NA
                                NA
                                          NA 76970.667
                                                             0.0 312702.2
## 13 47166.50
                                 0 902454.6
                                                 0.000 635810.3 413529.1
                    NA
                          NA
## 15 58963.92
                     0
                           0
                                NA
                                         0.0
                                              1275.863
                                                              NA
                                                                        NA
##
          X2013 X2014
                           X2015 X2016 X2017
## 2
           0.00
                     48
                             0.0
                                      0
                                           NA
## 7
      102489.82 149718
                             0.0
                                      0
                                           NA
## 13
             NA
                      0
                             0.0
                                      0
                                           NA
## 15
       32972.97
                      0 380899.2
                                     NA
                                            0
dim(M)
## [1] 4 21
```



```
###ConsistentLowPerformers
dfclpbt[,4:24]
                        X1998
                                  X1999
##
             X1997
                                             X2000
                                                       X2001
                                                                X2002
                                                                            X2003
## 90
       143124.432
                    280324.55 344303.3
                                          53040.66 282155.7 67428.35
                                                                        85566.178
## 93
                                    0.0
                NA
                            NΑ
                                              0.00
                                                          NA
                                                                    NA
                                                                        31696.043
             0.000
                                    0.0
## 94
                            NA
                                              0.00 189229.2
                                                                  0.00
                                                                         1702.240
                NA
                     58890.74
                                     NA
                                        103845.39
                                                          NA
                                                                  0.00 165441.012
## 95
## 96
             0.000
                            NA
                                    0.0
                                              0.00 169141.1
                                                                    NA 132351.960
             0.000
                                                    37816.0
## 97
                            NA
                                    0.0
                                              0.00
                                                                  0.00
                                                                            0.000
## 98
         7259.222 1066205.99 265088.7
                                          99854.78 140844.3 11004.28
                                                                        26280,912
##
  99
                NA
                          0.00 136248.0
                                                NA 189024.5
                                                                  0.00
                                                                                NA
## 100
                NA
                            NA
                                     0.0
                                              0.00 218341.6
                                                              6146.53
                                                                         8781.766
                          X2005
##
               X2004
                                     X2006
                                                  X2007
                                                             X2008
                                                                         X2009
                                              53854.535 117877.91
   90
       7.860909e+04 193392.955
                                  36646.58
                                                                    40363.542
##
       8.321105e+05 361708.119 341765.02
                                             169137.783 344786.58 270890.277
##
   93
   94
       5.083784e+05 357471.601 218782.47 1084737.922 140876.12
                                                                     86014.621
       8.823074e+04 333327.657 452244.15
                                             451261.004 450714.35 492801.369
##
   95
   96
       3.33333e-01
                       7374.407
                                  40102.00
                                             127924.544
                                                          47463.00
##
                                                                      4560.086
##
   97
       0.000000e+00
                           0.000
                                      22.00
                                             412175.850
                                                          13628.50 409060.000
##
   98
       1.451539e+04
                           0.000
                                 114552.94
                                                      NA
                                                              0.00
                                                                         0.000
##
   99
       1.483987e+04
                              NA
                                       0.00
                                               2735.046
                                                          19023.49
                                                                     51021.679
   100 0.000000e+00
                           0.000
                                               3432.454
                                                          32880.57
##
                                  23129.16
                                                                     16259.451
                                   X2012
                                              X2013
##
            X2010
                        X2011
                                                          X2014
                                                                       X2015
       170769.51
                   188113.248
                                       NA
                                               0.00
                                                       5478.974
                                                                      0.0000
##
   90
##
   93
       285928.82
                   186980.353
                                75214.80 235598.24 131534.739 310860.4596
       167307.59 3575594.326 364061.89 297407.41 478250.335 866515.6082
```

```
## 95
      986158.33 499941.433 821150.14 443803.15 807662.487 637823.1159
## 96
       44836.71 156622.985 92186.50 214751.49 91109.406 823969.8747
      237585.43 533916.766 34563.99 514027.71 102924.533
## 97
                                                           8778.3751
## 98
           0.00
                 8606.558 372600.23 293000.69 87795.000
                                                            121.0749
## 99
       36193.37 304716.874 59873.88 942285.93 652523.975 88624.2326
## 100
       69098.99 61109.007 128983.40 64586.13 23089.071 73023.4165
##
           X2016
                     X2017
            0.00
                      0.000
## 90
## 93
       599267.59
                 53252.102
## 94
      1045305.16
                 45361.599
       534703.86 193657.689
## 95
       493429.79 14420.146
## 96
## 97
        11370.83 30935.348
## 98
            0.00 171152.606
## 99
        74758.90
                 1195.928
## 100
      40604.56 52672.899
M <- as.matrix(dfclpbt[,4:24])</pre>
##
           X1997
                 X1998
                              X1999 X2000
                                                 X2001
                                                         X2002
## 90
      143124.432
                  280324.55 344303.3 53040.66 282155.7 67428.35 85566.178
## 93
              NA
                         NA
                                 0.0
                                         0.00
                                                    NA
                                                            NA 31696.043
           0.000
## 94
                                 0.0
                                         0.00 189229.2
                                                           0.00
                                                                1702.240
                         NA
                   58890.74
                                 NA 103845.39
## 95
              NA
                                                    NA
                                                           0.00 165441.012
## 96
           0.000
                         NA
                                 0.0
                                         0.00 169141.1
                                                             NA 132351.960
## 97
           0.000
                                         0.00 37816.0
                                                           0.00
                         NA
                                 0.0
                                                                     0.000
        7259.222 1066205.99 265088.7 99854.78 140844.3 11004.28 26280.912
## 98
                       0.00 136248.0 NA 189024.5
## 99
              NA
                                                           0.00
                                 0.0
## 100
              NA
                        NA
                                         0.00 218341.6 6146.53
                                                                 8781.766
                                 X2006
                                            X2007
##
             X2004
                        X2005
                                                       X2008
                                                                 X2009
## 90
      7.860909e+04 193392.955 36646.58 53854.535 117877.91 40363.542
      8.321105e+05 361708.119 341765.02 169137.783 344786.58 270890.277
## 93
## 94
      5.083784e+05 357471.601 218782.47 1084737.922 140876.12 86014.621
      8.823074e+04 333327.657 452244.15 451261.004 450714.35 492801.369
## 95
## 96
      3.33333e-01
                     7374.407 40102.00 127924.544 47463.00
                                                               4560.086
      0.000000e+00
                        0.000
                                 22.00 412175.850
                                                   13628.50 409060.000
## 97
## 98
      1.451539e+04
                        0.000 114552.94
                                                NA
                                                        0.00
                                                                  0.000
## 99
      1.483987e+04
                         NA
                                 0.00
                                          2735.046
                                                   19023.49
                                                              51021.679
                      0.000 23129.16
## 100 0.000000e+00
                                         3432.454 32880.57
                                                              16259.451
##
          X2010
                     X2011
                               X2012
                                         X2013
                                                   X2014
                                                               X2015
      170769.51 188113.248
                                                 5478.974
                                  NA
                                          0.00
                                                               0.0000
## 90
      285928.82 186980.353 75214.80 235598.24 131534.739 310860.4596
## 93
      167307.59 3575594.326 364061.89 297407.41 478250.335 866515.6082
## 94
      986158.33 499941.433 821150.14 443803.15 807662.487 637823.1159
## 95
       44836.71 156622.985 92186.50 214751.49 91109.406 823969.8747
## 96
                 533916.766 34563.99 514027.71 102924.533
## 97
      237585.43
                                                          8778.3751
## 98
           0.00
                 8606.558 372600.23 293000.69 87795.000
                                                           121.0749
       36193.37 304716.874 59873.88 942285.93 652523.975 88624.2326
## 99
## 100 69098.99 61109.007 128983.40 64586.13 23089.071 73023.4165
```

```
##
            X2016
                        X2017
             0.00
                        0.000
## 90
## 93
        599267.59
                    53252.102
       1045305.16
## 94
                    45361.599
## 95
        534703.86 193657.689
## 96
        493429.79
                    14420.146
## 97
         11370.83
                    30935.348
## 98
             0.00 171152.606
## 99
         74758.90
                     1195.928
## 100
         40604.56
                    52672.899
dim(M)
## [1] 9 21
```

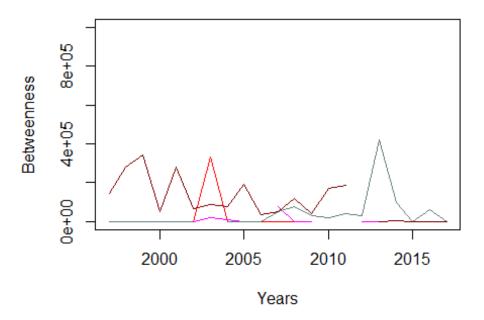


```
###HighToLowPerformers
dfht1bt[,4:24]
                                   X1999
##
            X1997
                          X1998
                                             X2000
                                                        X2001
                                                                    X2002
## 2
            0.000 0.000000e+00
                                      1.5 57396.00
                                                         0.00 309778.667
## 27
           36.000 0.000000e+00
                                      0.0
                                              0.00
                                                           NA
                                                                       NA
## 28
       47572.000 0.000000e+00
                                      0.0
                                                NA
                                                     10524.66
                                                                 6775.916
## 39 543518.649
                                                         0.00 116226.000
                             NA
                                       NA
                                                NA
## 46
               NA
                             NA
                                 14191.1
                                              0.00
                                                           NA
                                                                       NA
## 54
               NA 0.000000e+00
                                       NA
                                                NA
                                                         0.00
                                                                       NA
## 55
               NA 3.425804e+00
                                       NA
                                                           NA
                                              0.00
                                                                       NA
## 66
          12.500
                                       NA
                                                NA
                                                           NA
                                                                       NA
                             NA
```

```
## 69
              NA 0.000000e+00
                                            0.00
                                                                 0.000
                                     NA
                                                         NA
              NA
                                              NA
## 75
                            NA
                                    0.0
                                                         NA
                                                                 0.000
           0.000 0.000000e+00
                                    0.0
                                            0.00
                                                       0.00
                                                                 0.000
## 90 143124.432 2.803246e+05 344303.3 53040.66 282155.67
                                                             67428.350
        7259.222 1.066206e+06 265088.7 99854.78 140844.28
                                                             11004.284
                   X2004
                              X2005
                                         X2006
                                                 X2007
                                                             X2008
##
          X2003
## 2
      225964.64
                      NA
                                  NA
                                         0.00
                                                   0.00
                                                                NA 3.000000e+01
                    0.00
                                  NA 86482.50
                                                    0.00 136270.25 1.500000e+01
## 27
           0.00
## 28 173534.88 60376.26
                              0.000
                                      25337.10
                                                      NA
                                                              0.00 1.283662e+05
## 39
             NA
                    0.00
                          2269.241
                                            NA
                                                    0.00 334164.59 2.193288e+03
             NA
                              0.000
                                      49422.00 53006.00
## 46
                      NA
                                                              0.00 0.000000e+00
           0.00
                               0.000
                                          0.00
                                                      NA
                                                              NA 2.150000e+01
## 54
                      NA
## 55
           0.00
                    0.00
                                  NA
                                          0.00
                                                      NA
                                                                NA 3.33333e-01
## 66
           0.00
                    8.00
                              0.000
                                          0.00
                                                    0.00
                                                              0.00
## 69 335072.00
                    0.00
                              0.000
                                          0.00
                                                    0.50
                                                              0.00 0.000000e+00
       20053.90 10912.01
                              0.000
                                          NA 75931.91
                                                              0.00 0.000000e+00
## 75
## 83
             NA
                    0.00
                              0.000
                                        0.00 53920.04 75114.35 3.096087e+04
       85566.18 78609.09 193392.955 36646.58 53854.53 117877.91 4.036354e+04
## 90
       26280.91 14515.39
                               0.000 114552.94
## 98
                                                      NA
                                                              0.00 0.000000e+00
##
            X2010
                       X2011
                                   X2012
                                              X2013
                                                          X2014
                                                                      X2015
                                   0.0000
                                               0.00
                                                       48.0000
## 2
                          NA
                                                                     0.0000
               NA
## 27
               NA 103468.454
                                       NA 160575.00 72588.9487
                                                                     0.0000
## 28
               NA
                       0.000
                                       NA 192684.00
                                                        0.0000
                                                                     0.0000
## 39
         9142.011
                    1294.967
                               211.6014
                                          14398.43
                                                     132.9228 140948.5467
## 46 2712782.744 193518.000
                               67728.0235
                                                     1293.6380
                                                                 14806.3870
                                          36139.39
## 54
            0.000
                          NA
                                  0.0000
                                          64236.33
                                                             NA
                                                                         NA
## 55
            0.000
                        0.000
                                                 NA
                                                             NA
                                                                         NA
                                   0.0000
            0.000
                                 914.3210
                                               0.00
                                                         0.0000
                                                                     0.0000
## 66
                           NA
## 69
               NA
                           NA
                                   0.0000
                                                             NA
                                                                     0.0000
                                                 NA
## 75
               NA
                           NA
                                   0.0000
                                               0.00
                                                             NA
                                                                     0.0000
## 83
        20680.371
                  39647.099
                               29579.6370 420211.19 98463.8068
                                                                    12.0000
       170769.513 188113.248
## 90
                                      NA
                                               0.00
                                                      5478.9744
                                                                    0.0000
                    8606.558 372600.2304 293000.69 87795.0000
## 98
           0.000
                                                                 121.0749
##
           X2016
                     X2017
## 2
           0.000
                          NA
                          NA
## 27
              NA
## 28
           0.000
                          NA
        5694.504
## 39
                      0.000
## 46
       17704.979
                   6030.233
## 54
          10.500
                          NA
## 55 699053.632
                          NA
## 66
           0.000
                          NA
## 69
              NA
                          NA
## 75
              NA
                          NA
       62349.274
## 83
                      0.000
## 90
           0.000
                      0.000
           0.000 171152.606
M <- as.matrix(dfhtlbt[,4:24])</pre>
```

```
## X1997 X1998 X1999 X2000
                                          X2001 X2002
        0.000 0.000000e+00
                           1.5 57396.00
                                              0.00 309778.667
## 2
       36.000 0.000000e+00
                             0.0 0.00
                                               NA
## 28 47572.000 0.000000e+00
                             0.0
                                      NA
                                           10524.66
                                                     6775.916
## 39 543518.649 NA
                                              0.00 116226.000
                             NA
                                      NA
                                  0.00
## 46
                       NA
                          14191.1
            NA
                                                NA
## 54
            NA 0.000000e+00
                            NA
                                      NA
                                              0.00
                                                          NA
                                  0.00
NA
           NA 3.425804e+00
                               NA
## 55
                                               NA
                                                          NA
       12.500
                               NA
## 66
                       NA
                                               NA
                                                          NA
## 69
            NA 0.000000e+00
                               NA
                                    0.00
                                               NA
                                                       0.000
## 75
            NA
                       NA
                              0.0
                                     NA
                                               NA
                                                      0.000
        0.000 0.000000e+00
                             0.0 0.00
                                             0.00
                                                      0.000
## 83
## 90 143124.432 2.803246e+05 344303.3 53040.66 282155.67 67428.350
      7259.222 1.066206e+06 265088.7 99854.78 140844.28 11004.284
##
        X2003
               X2004
                      X2005
                                   X2006 X2007
                                                    X2008
                                                               X2009
## 2 225964.64
                NA
                                   0.00
                                           0.00
                                                      NA 3.000000e+01
                      NA 86482.50
0.000 25337.10
## 27
     0.00
                0.00
                                            0.00 136270.25 1.500000e+01
## 28 173534.88 60376.26
                                            NA
                                                     0.00 1.283662e+05
                                NA
                0.00
                       2269.241
                                            0.00 334164.59 2.193288e+03
## 39
         NA
## 46
          NA
                 NA
                         0.000 49422.00 53006.00
                                                    0.00 0.000000e+00
                          0.000
## 54
         0.00
                  NA
                                0.00
                                         NA
                                                     NA 2.150000e+01
         0.00
                 0.00
                          NA
                                   0.00
                                                      NA 3.333333e-01
## 55
                                             NA
        0.00
                 8.00
                         0.000
                                   0.00
                                           0.00
                                                     0.00
## 66
              0.00
                                         0.50
## 69 335072.00
                         0.000
                                    0.00
                                                    0.00 0.000000e+00
                                   NA 75931.91
## 75
      20053.90 10912.01
                          0.000
                                                   0.00 0.000000e+00
                                 0.00 53920.04 75114.35 3.096087e+04
## 83
         NA
                0.00
                          0.000
## 90 85566.18 78609.09 193392.955 36646.58 53854.53 117877.91 4.036354e+04
## 98 26280.91 14515.39 0.000 114552.94 NA 0.00 0.000000e+00
##
          X2010
                X2011 X2012 X2013
                                             X2014
                                                           X2015
         NA
                   NA
                             0.0000
                                       0.00
                                            48.0000
## 2
                                                           0.0000
## 27
             NA 103468.454
                             NA 160575.00 72588.9487
                                                           0.0000
             NA
                                NA 192684.00
                0.000
                                             0.0000
                          211.6014 14398.43 132.9228 140948.5467
      9142.011
## 39
                 1294.967
## 46 2712782.744 193518.000
                          67728.0235
                                    36139.39 1293.6380
                                                      14806.3870
                            0.0000 64236.33
                                                              NA
## 54
         0.000
                  NA
                                                    NA
## 55
          0.000
                    0.000
                             0.0000
                                                    NA
                                                              NA
                                     NA
## 66
          0.000
                      NA
                           914.3210
                                        0.00
                                                0.0000
                                                           0.0000
## 69
          NA
                      NA
                             0.0000
                                        NA
                                                  NA
                                                           0.0000
                     NA
## 75
            NA
                             0.0000
                                        0.00
                                                   NA
                                                          0.0000
                                                         12.0000
## 83
      20680.371 39647.099
                          29579.6370 420211.19 98463.8068
      170769.513 188113.248 NA 0.00 5478.9744
## 90
                                                         0.0000
                 8606.558 372600.2304 293000.69 87795.0000 121.0749
## 98
         0.000
##
                  X2017
         X2016
         0.000
## 2
                      NA
                      NA
## 27
         NA
       0.000
## 28
                      NA
## 39
       5694.504
                   0.000
## 46
      17704.979
                6030,233
## 54
      10.500
                      NA
## 55 699053.632
```

```
## 66
            0.000
                           NA
## 69
               NA
                           NA
## 75
               NA
                           NA
## 83
       62349.274
                        0.000
## 90
            0.000
                        0.000
## 98
            0.000 171152.606
dim(M)
## [1] 13 21
```



```
###LowToHighPerformers
dflthbt[,4:24]
##
          X1997
                      X1998
                                X1999
                                             X2000
                                                           X2001
                                                                       X2002
## 1
              NA
                      0.000
                                  0.0
                                                 NA 0.000000e+00
                                                                   57274.615
                                            0.0000 0.000000e+00
## 3
              NA
                          NA
                                  1.0
                                                                           NA
## 4
              NA
                      0.000
                                    NA 655457.4155 0.000000e+00
## 5
            0.60
                                  0.0
                                                 NA 5.866667e+00
                                                                    6110.859
                          NA
## 8
            0.00
                      0.000
                             299072.9
                                        24860.9263 0.000000e+00
                                                                   22832.847
                                  6.0
                                            0.0000
                                                                        0.000
## 9
              NA
                          NA
                                                               NA
## 10
              NA
                          NA
                                  0.0
                                            0.0000
                                                               NA
                                                                           NA
                                                 NA 0.000000e+00
## 11
              NA
                          NA
                                  0.0
                                                                           NA
## 12 106996.00
                      0.000
                                  4.0
                                                 NA 0.000000e+00
                                                                           NA
## 16
              NA
                          NA 153270.0 511634.4293 0.000000e+00 177672.003
## 17
       76008.22
                                  0.0 146646.6958
                                                               NA
                                                                        0.000
                     24.000
## 18
              NA
                      0.000
                                   NA
                                                 NA 0.000000e+00
                                                                           NA
```

```
NA NA 0.0 0.0000 NA
18647.42 0.000 0.0 324.6591 0.000000e+00
                                                    NA
0.000
## 20
## 23
## 24 140100.67 24319.289 85170.0 180641.7688 1.922791e+05
                                                     0.000
                                                     0.000
## 25
       0.00
              3967.933
                      NA
                                0.0000 9.452500e+04
                       0.0
## 34
                1.000
                                0.0000 NA
        NA
                                                       NA
## 37
        0.00
                 0.000
                         NA
                               9817.5590 9.657982e+03
## 38
     23790.00
                 0.000
                         NA NA 0.000000e+00 61973.979
                 NA
                          NA
                                    NA NA 0.000
## 44
        0.00
## 45
        0.00
                 0.000
                          0.0 36592.8512 9.965544e+04
                                                   3246.076
                             0.0000 NA
        NA
## 48
                 0.000
                          0.0
                                                     0.000
## 49
       0.00
             38242.060 145501.3 19134.0000
                                               NA
                                                       NA
               NA
## 56
        0.00
                        0.0 0.0000 0.000000e+00
                                                       NA
                  NA
## 57
        NA
                          0.0
                                    NA 0.000000e+00
                                                      0.000
## 58
         NA
                 0.000
                         NA
                                    NA NA
        NA
## 62
                 0.000
                         0.0
                                    NA 0.000000e+00
                                                     0.000
## 73
        0.00
                 NA
                         NA
                                    NA 0.000000e+00
                         0.0
## 74
        NA
               0.000
                                   NA 0.000000e+00
## 82
         NA 277512.072 136248.0 499080.5792 6.363633e+05 305064.204
       X2003
               X2004
                        X2005
NA
                                 X2006
##
                                            X2007
                                                     X2008
## 1 180273.7296
              54901.194
                                   NA
                                             5.500
                                                  40882.500
                                     0.00
## 3
      NA
                0.000 24960.000
                                             NA
                                                    NA
## 4
       0.0000
                  0.000 0.000
                                    NA
                                             0.000
                                                       NA
## 5
      4983.3769
                  0.000
                        4987.000
                                    0.00
                                            0.000
                                                      0.000
                        0.000 567752.13 143757.957
## 8
      NA
                  0.000
                                                      0.000
## 9
     69836.6667
                          0.000
                                         0.000
                  0.000
                                  6.00
     0.0000
                                            0.000 20435.250
## 10
                  0.000
                          NA
                                    18.00
## 11
     1892.9985 80230.915 291075.559
                                    NA
                                            0.000
                                                  NA
## 12
     27932.0000 206543.441 109681.665
                                    0.00 291675.793
                                                     0.000
## 16
          NA
                 NA
                        0.000
                                   0.00 29676.546
                                                     NA
                                                    0.000
## 17
       0.0000
                  0.000
                          6.000
                                   0.00 NA
                                    0.00 3227.474 8396.606
## 18
        0.0000
                  0.000
                         2865.849
## 20
                  NA
                                    0.00 NA
        NA
                          0.000
                                                    0.000
     740.1487 0.000
                                 0.00 35106.410
                        0.000
## 23
                                                     0.000
                                        0.000
## 24
      0.0000
               81005.370 117600.507 53442.05
                                                     0.000
## 25
        0.0000
               69287.000
                        0.000 740634.00 238464.000
                                                     0.000
        NA
                           0.000
                                   4.00
## 34
               NA
                                           27.000
                                                     8.000
       0.0000
## 37
                7824.609
                        49918.000
                                     NA
                                         4635.695 10664.246
## 38
        0.0000 122000.504
                        0.000
                                    0.00 283915.041
        NA 92368.000 64059.501 401326.48 NA
## 45 109656.8501
               74460.970
                        67542.355
                                 NA
                                           0.000 19286.078
     NA NA 0.000
## 48
                                 30417.96 6218.190
                                                  17984.237
## 49
           NA
                  0.000
                        84027.619
                                    0.00
                                          0.000
                                                     0.000
                        NA
                                    NA
                                            0.000
## 56
                 0.000
                                                      0.000
        0.0000
                 NA
## 57
        0.0000
                             NA
                                    1.00
                                             NA
                                                      NA
## 58
        0.0000
               18038.667 160857.760
                                    0.00
                                               NA
                                                      0.000
                                             NA
        NA
## 62
               0.000
                          NA
                                    0.00
                                                      3.000
## 73
        0.0000
               23097.778
                           0.000
                                    NA
                                             0.000
                                                      0.000
## 74
        0.0000
               NA
                           NA
                                    0.00 132500.000
## 82
         0.0000 162155.172
                             NA
                                    0.00
                                         NA 817614.213
        X2009 X2010 X2011 X2012
                                           X2013 X2014
```

```
NA NA 0.000 0.00 NA NA NA NA NA NA NA 0.000 1.000 0.00 0.000 15.500 NA 158825.4117 NA 32078.00 32117.0000 NA 276735.0673 330.5784 0.000 NA 0.0000 NA 0.0000 NA 0.0000 NA 0.0000 NA 0.000 NA 0.000 NA 0.000 NA 0.000 NA 0.000 NA 0.000 NA NA 0.000 NA 0.000 NA NA 0.000 NA NA 0.000 0.0000 NA NA NA 0.0000 0.0000 448989.00 0.00000 NA NA 0.000 NA 0.0000 NA NA 0.0000 NA 0.0000 NA NA 0.0000 0.0000 NA NA 0.0000 NA 0.
## 1
## 3
## 4
## 5
## 8
## 9
## 10
                                   NA NA 141137.557 0.00
                                                                                                                                                                     NA
## 11
                                                                                                                                          0.0000
                                                                                                                                                                    0.000
## 12
                24770.6286 14248.3313 5640.029
                                                                                                             0.00
                                                                                                                                       0.0000
                3226.9435 0.0000 4059.727 1739.40 1211931.8640 8914.054
## 16
                    NA
                                                      0.0000 23911.284 39199.88 183.9211 15932.291
## 17
                                                      0.0000 NA 0.00 NA
199.9065 NA 1796.45 4156.2026
                                                                                                                                    NA 32344.915
## 18
                                   NA
               6843.4890 74199.9065 NA 1796.45 4156.2026 NA 0.0000 NA 0.000 0.00 NA NA 64091.1895 118408.0507 2821.400 0.00 53798.0243 164375.473
## 20
## 23
## 24
## 25 137147.8788 NA 154344.566 32080.00 163242.8283 NA
                                                     0.0000 0.000 NA NA 0.000
0.0000 121469.654 135525.85 137851.2853 142542.431
                18.5000
## 34
## 37 26219.0233
               NA NA 33.700 0.00 89374.1103 0.000

NA 0.0000 NA 0.00 0.000 235418.529

26463.5835 0.0000 0.000 0.00 19297.9248 161382.188

364.1333 1953.0412 0.000 0.00 NA 9415.133

0.0000 NA NA 0.00 0.0000 13274.927

0.0000 NA NA 0.00 NA 0.000

NA 0.0000 NA NA 0.000 NA 0.000
## 38
## 44
## 45
## 48
                                                                                                             0.00
0.00
346.86
0.00
0.00
## 49
## 56
                                                                                                                                              NA
NA
## 57
NA
                                                                                                                                       0.0000
                                                                                                                                                                           NA
                                                                                                                                         NA
                                                                                                                                                                   0.000
                                                                                                                                               NA
NA
                                                                                                                                                                     0.000
                                                                                                                                                                     0.000
                  X2015 X2016 X2017
##
                                                NA
## 1 256806.00
             55.50 NA 0.000000e+00
NA NA 0.000000e+00
## 3
                    NA NA 0.000000e+00
NA 63790.000 NA
NA 102072.000 0.0000000e+00
## 4
## 5
## 8
## 9
                       0.00 0.000 1.500000e+02
## 10
                       6.00
                                             10.500 NA
                       0.00
                                              NA
## 12 256783.97
                                              0.000 0.000000e+00
## 16 0.00 77142.406 0.000000e+00
                0.00 98998.104 NA
## 17
                1005.39 NA
## 18
## 20
                NA 3745.961 5.440803e+03
                     NA NA 0.000000e+00
## 23
## 24 82344.09 71604.775 1.132470e+05
## 25
                  0.00
                                       NA 1.709440e+05
                                               0.000
## 34
                      17.00
                                                                                       NΑ
                                                 NA
## 37 313852.00
                                                                                         NA
## 38 0.00 0.000
```

```
## 44 259074.45 266444.580 5.281419e+03
       21076.29 182445.266 8.680547e+04
## 45
## 48
          0.00
                       NA
                       NA 3.073578e+04
## 49
            NA
## 56
          0.00
                80427.543 1.428571e-01
## 57
                    0.000
            NA
                    0.000 0.000000e+00
## 58
            NA
## 62
            NA
                       NA 9.000000e+00
            NA
                       NA 0.000000e+00
## 73
## 74
            NA
                       NA 0.000000e+00
## 82 360336.88
                 136.000 0.000000e+00
M <- as.matrix(dflthbt[,4:24])</pre>
##
         X1997
                   X1998
                            X1999
                                        X2000
                                                  X2001
                                                                X2002
                                            NA 0.000000e+00 57274.615
## 1
            NA
                    0.000
                               0.0
            NA
                                        0.0000 0.000000e+00
## 3
                       NA
                               1.0
## 4
            NA
                    0.000
                                NA 655457.4155 0.000000e+00
                                                                   NA
                                            NA 5.866667e+00
## 5
          0.60
                       NA
                               0.0
                                                             6110.859
## 8
          0.00
                    0.000 299072.9
                                    24860.9263 0.000000e+00
                                                            22832.847
                     NA
## 9
            NA
                               6.0
                                        0.0000
                                                         NA
                                                                 0.000
## 10
            NA
                      NA
                               0.0
                                        0.0000
                                                         NA
                                                                    NA
                      NA
## 11
            NA
                               0.0
                                            NA 0.000000e+00
                                                                    NA
                    0.000
## 12 106996.00
                               4.0
                                            NA 0.000000e+00
## 16
            NA
                       NA 153270.0 511634.4293 0.000000e+00 177672.003
## 17
       76008.22
                  24.000
                               0.0 146646.6958
                                                         NA
                                                                 0.000
                   0.000
                                       NA 0.000000e+00
## 18
            NA
                               NA
                                                                    NA
## 20
            NA
                     NA
                               0.0
                                       0.0000
                                                                    NA
## 23
      18647.42
                  0.000
                               0.0
                                    324.6591 0.000000e+00
                                                                 0.000
                          85170.0 180641.7688 1.922791e+05
## 24 140100.67
                 24319.289
                                                                 0.000
## 25
          0.00
                 3967.933
                              NA
                                    0.0000 9.452500e+04
                                                                 0.000
## 34
                                       0.0000
            NA
                    1.000
                               0.0
                                                         NA
                                                                    NA
                                     9817.5590 9.657982e+03
## 37
          0.00
                    0.000
                               NA
                                                                    NA
## 38
       23790.00
                    0.000
                               NA
                                            NA 0.000000e+00 61973.979
## 44
          0.00
                       NA
                               NA
                                            NA
                                                         NA
                                                                 0.000
## 45
          0.00
                    0.000
                               0.0 36592.8512 9.965544e+04
                                                              3246.076
## 48
           NA
                    0.000
                               0.0
                                     0.0000
                                                         NA
                                                                 0.000
## 49
          0.00
                 38242.060 145501.3
                                    19134.0000
## 56
          0.00
                               0.0
                                       0.0000 0.000000e+00
                       NA
                                                                    NA
## 57
                       NA
                               0.0
                                            NA 0.000000e+00
           NA
                                                                    NA
## 58
            NA
                    0.000
                               NA
                                            NA
                                                         NA
                                                                 0.000
## 62
            NA
                    0.000
                               0.0
                                            NA 0.000000e+00
                                                                 0.000
## 73
          0.00
                       NA
                                NA
                                            NA 0.000000e+00
                                                                 0.000
## 74
                    0.000
                                            NA 0.000000e+00
           NA
                               0.0
           NA 277512.072 136248.0 499080.5792 6.363633e+05 305064.204
## 82
          X2003
                   X2004
                               X2005
                                        X2006
                                                      X2007
                                                                 X2008
## 1
                               NA
      180273.7296
                  54901.194
                                              NA
                                                      5.500
                                                             40882.500
## 3
                                            0.00
              NA
                      0.000
                             24960.000
                                                         NA
                                                                    NA
                      0.000
                             0.000
## 4
          0.0000
                                              NA
                                                      0.000
                                                                    NA
```

```
## 5 4983.3769 0.000 4987.000 0.00 0.000 0.000
        NA
## 8
                         0.000 0.000 567752.13 143757.957
                                                                        0.000
                                0.000
NA
        69836.6667
                         0.000
                                    0.000 6.00 0.000
## 9
                                                                       NA
                                                           0.000 20435.250
## 10
        0.0000
                         0.000
                                               18.00
                                               NA 0.000 NA
## 11
       1892.9985 80230.915 291075.559
                                                 0.00 291675.793
## 12 27932.0000 206543.441 109681.665
                                                                      0.000
       NA NA 0.000
                                                                       NA
                                                0.00 29676.546
## 16
       0.0000 0.000 6.000
0.0000 0.000 2865.849
NA NA 0.000
740.1487 0.000 0.000
                       0.000 6.000 0.00 NA 0.000
0.000 2865.849 0.00 3227.474 8396.606
## 17
## 18
                                            0.00 NA 0.000
0.00 35106.410 0.000
## 20
## 23
                                    0.000
         0.0000 81005.370 117600.507 53442.05 0.000
## 24
                                                                       0.000
          0.0000 69287.000 0.000 740634.00 238464.000
                                                                       0.000
## 25
          NA NA 0.000 4.00 27.000 8.000
## 34
         0.0000 7824.609 49918.000
0.0000 122000.504 0.000
                                                NA 4635.695 10664.246
## 37
                                               0.00 283915.041 NA
## 38
## 44 NA 92368.000 64059.501 401326.48 NA
                                                                          NA
## 45 109656.8501 74460.970 67542.355 NA 0.000 19286.078
       NA NA 0.000 30417.96 6218.190 17984.237
NA 0.000 84027.619 0.00 0.000 0.000
## 48
                                                       0.000
## 49
          0.0000 0.000 NA
0.0000 NA NA
## 56
         0.0000
                                                 NA
                                                           0.000
                                                                       0.000
                                               1.00
## 57
                                                            NA
                                                                        NA
       0.0000 NA NA
0.0000 18038.667 160857.760
NA 0.000 NA
0.0000 23097.778 0.000
0.0000 NA NA
## 58
                                                              NA
                                                                       0.000
         NA

0.0000 23097.778

0.0000 NA NA

0.0000 162155.172 NA 0.00

X2009 X2010 X2011 X2012 X2013

NA NA 0.000 0.00 NA NA

0.0000 1.000 0.00 0.0000 15.500

NA 32078.00 32117.0000 NA

NA 0.0000

NA
                                              0.00 NA
NA 0.000
## 62
## 73
## 74
## 82
       X2009 X2010

NA NA 0.000 0.00 0.00

NA 158825.4117 NA 32078.00 32117.0000

276735.0673 330.5784 0.000 NA 0.0000

0.0000 0.0000 NA 60955.42 NA

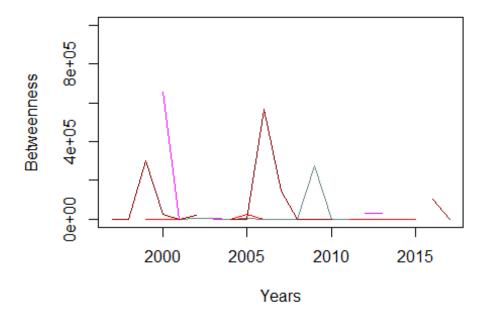
NA 6.2500 NA 0.00 0.0000

2000 448989.00 0.0000
##
## 1
## 3
## 4
## 5
## 8
                                                                           NA
## 9
       NA 0.0000 0.000 448989.00
NA NA 141137.557 0.00
       NA 0.0000 0.000 448989.00 0.0000 42.000
NA NA 141137.557 0.00 0.0000 NA
24770.6286 14248.3313 5640.029 0.00 0.0000 0.000
## 10
## 11
## 12
## 16 3226.9435 0.0000 4059.727 1739.40 1211931.8640 8914.054
## 17
         NA
                        0.0000 23911.284 39199.88 183.9211 15932.291
          NA 0.0000 NA 0.00 NA 6843.4890 74199.9065 NA 1796.45 4156.2026
                                                            NA 32344.915
## 18
        6843.4890 74199.9065
## 20
       6843.4890 74199.9065 NA 1796.45 4156.2026 NA 0.0000 NA 0.000 0.00 NA NA 04091.1895 118408.0507 2821.400 0.00 53798.0243 164375.473
## 23
## 24
       137147.8788 NA 154344.566 32080.00 163242.8283 NA
## 25
         18.5000 0.0000 0.000 NA NA 0.000
26219.0233 0.0000 121469.654 135525.85 137851.2853 142542.431
## 34
        18.5000
## 37
       NA NA 33.700 0.00 0.33/4.1103

NA 0.0000 NA 0.00 0.0000 235418.529

26463.5835 0.0000 0.000 0.00 19297.9248 161382.188
## 38
## 44
## 45
## 48 364.1333 1953.0412 0.000 0.00 NA 9415.133
```

```
## 49
            0.0000
                            NA
                                        NA
                                                0.00
                                                           0.0000
                                                                   13274.927
## 56
            0.0000
                            NA
                                        NA
                                                0.00
                                                                        0.000
                                                                NA
                                        NA 768346.86
## 57
              NA
                        0.0000
                                                               NA
                                                                           NA
                            NA 302976.248
## 58
            0.0000
                                                0.00
                                                               NA
                                                                           NA
## 62
                        0.0000
                                                0.00
                                                           0.0000
                                                                           NA
              NA
                                        NA
## 73
            0.0000
                                        NA
                                                0.00
                                                               NA
                                                                        0.000
                            NA
## 74 2633075.9640
                            NA
                                        NA
                                                  NA
                                                               NA
                                                                        0.000
## 82 233079.9315
                        0.0000 453351.016 652103.42
                                                               NA
                                                                        0.000
##
                     X2016
          X2015
                                  X2017
## 1
      256806.00
                        NA
                                      NA
## 3
          55.50
                        NA 0.000000e+00
## 4
             NA
                        NA 0.000000e+00
## 5
                63790.000
             NA
## 8
            NA 102072.000 0.000000e+00
## 9
          0.00
                   0.000 1.500000e+02
## 10
                   10.500
          6.00
## 11
           0.00
                        NA
                                      NA
## 12 256783.97
                    0.000 0.000000e+00
                 77142.406 0.000000e+00
## 16
          0.00
                 98998.104
## 17
           0.00
        1005.39
## 18
                        NA
                                      NA
## 20
             NA
                  3745.961 5.440803e+03
## 23
             NA
                        NA 0.000000e+00
## 24
       82344.09
                 71604.775 1.132470e+05
## 25
          0.00
                        NA 1.709440e+05
## 34
          17.00
                     0.000
                                      NA
                                      NA
## 37 313852.00
                        NA
## 38
                     0.000
           0.00
                                      NA
## 44 259074.45 266444.580 5.281419e+03
       21076.29 182445.266 8.680547e+04
## 45
## 48
           0.00
                        NA
## 49
                        NA 3.073578e+04
           NA
## 56
           0.00
                 80427.543 1.428571e-01
## 57
                     0.000
           NA
                     0.000 0.000000e+00
## 58
             NA
## 62
             NA
                        NA 9.000000e+00
## 73
             NA
                        NA 0.000000e+00
## 74
             NA
                        NA 0.000000e+00
## 82 360336.88
                 136.000 0.000000e+00
dim(M)
## [1] 30 21
```

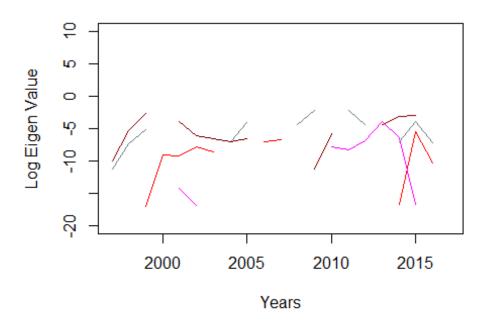


Eigen Value

```
dfev= read.csv("C:/Users/amitd/Desktop/FA/MasterEigenVector.csv")
dflthev = subset(dfev,dfev$LowToHigh=="LTH")
dfhtlev = subset(dfev,dfev$HighToLow=="HTL")
dfclpev = subset(dfev,dfev$ConsistentlyLowPerf=="CLP")
dfchpev = subset(dfev,dfev$ConsistentlyHighPerf =="CHP")
###ConsistentHighPerformers
dfchpev[,4:24]
         X1997
                  X1998
                                X1999
                                         X2000
                                                     X2001
                                                               X2002
##
                                                                        X2003
## 2
      0.00e+00 0.00e+00 9.010000e-18 7.98e-10 5.59000e-10 1.42e-08 2.69e-09
            NA 2.49e-17
                                            NA 5.91000e-15 1.31e-17
                                   NA
                                                                           NA
## 13 5.92e-12 4.57e-08 7.940000e-06
                                            NA
                                                         NA 2.73e-17
                                                                           NA
## 15 1.12e-10 4.12e-06 1.879383e-03
                                            NA 1.37109e-04 7.18e-07 2.51e-07
##
         X2004
                  X2005
                           X2006
                                     X2007
                                              X2008
                                                            X2009
                                                                     X2010
## 2
            NA
                     NA 7.57e-08 1.67e-07
                                                 NA 0.000000e+00
                                                                        NA
## 7
      5.17e-10
                     NA 3.93e-06
                                        NA
                                                 NA
                                                               NA 1.56e-08
## 13 9.51e-08 8.66e-05
                               NA
                                        NA 4.62e-05 7.293617e-03 0.00e+00
## 15 9.45e-08 2.64e-07 0.00e+00 5.16e-05
                                                 NA 5.840000e-12 1.65e-06
##
             X2011
                      X2012
                                   X2013
                                               X2014
                                                            X2015
                                                                     X2016
## 2
                NA 2.93e-09 0.000000000 1.83000e-17 2.76000e-06 4.56e-11
      5.320000e-09 1.35e-07 0.000124735 4.41000e-07 1.54000e-17 0.00e+00
## 13 6.053506e-03 4.33e-05
                                      NA 9.18000e-08 1.06460e-04 6.92e-08
## 15
                NA
                         NA 0.000046600 7.68065e-04 9.07124e-04
                                                                        NA
##
         X2017
```

```
## 2
         NA
## 7
         NA
## 13
         NA
## 15 1.33e-17
M <- as.matrix(dfchpev[,4:24])</pre>
      X1997 X1998 X1999 X2000 X2001 X2002 X2003
##
## 2 0.00e+00 0.00e+00 9.010000e-18 7.98e-10 5.59000e-10 1.42e-08 2.69e-09
X2004 X2005 X2006 X2007 X2008
                                             X2009 X2010
                NA 7.57e-08 1.67e-07 NA 0.000000e+00 NA NA 3.93e-06 NA NA NA 1.56e-08
## 2
         NA
## 7 5.17e-10
## 13 9.51e-08 8.66e-05 NA NA 4.62e-05 7.293617e-03 0.00e+00
## 15 9.45e-08 2.64e-07 0.00e+00 5.16e-05 NA 5.840000e-12 1.65e-06
                                    X2014 X2015 X2016
         X2011 X2012 X2013
            NA 2.93e-09 0.000000000 1.83000e-17 2.76000e-06 4.56e-11
## 2
## 7 5.320000e-09 1.35e-07 0.000124735 4.41000e-07 1.54000e-17 0.00e+00
## 13 6.053506e-03 4.33e-05 NA 9.18000e-08 1.06460e-04 6.92e-08
## 15
               NA 0.000046600 7.68065e-04 9.07124e-04 NA
##
       X2017
## 2
         NA
## 7
         NA
## 13
         NA
## 15 1.33e-17
dim(M)
## [1] 4 21
```

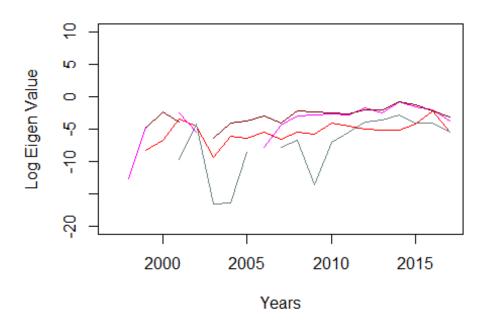
Since Eigen Value vary from order 0 to 10^-18 I chose to plot Log of Eigen Value



```
###ConsistentLowPerformers
dfclpev[,4:24]
                   X1998
##
          X1997
                                X1999
                                              X2000
                                                           X2001
                                                                        X2002
## 90
       4.71e-05 2.85e-06 7.220000e-05 6.021390e-04 1.990000e-06 0.000006930
## 93
             NA
                      NA 2.750000e-11 3.710000e-18
                                                              NA
                                                                           NA
## 94
       0.00e+00
                      NA 2.050000e-09 1.061450e-04 1.123094e-02 0.002591453
## 95
             NA 2.93e-06
                                    NA 3.610000e-05
                                                              NA 0.000000172
## 96
       1.00e-17
                      NA 1.630000e-05 4.726345e-03 1.380520e-04
                                                                           NA
##
  97
       1.00e-16
                      NA 1.220000e-05 0.000000e+00 1.890000e-10 0.000051600
## 98
       3.27e-06 5.11e-07 1.848713e-03 9.990000e-07 3.070000e-05 0.000053100
## 99
             NA 2.28e-13 2.370000e-05
                                                 NA 3.629636e-03 0.000002860
## 100
             NA
                      NA 4.310000e-09 2.050000e-07 4.135380e-04 0.000026100
##
          X2003
                       X2004
                                    X2005
                                                 X2006
                                                              X2007
## 90
       1.11e-08 8.000000e-07 1.53044e-04 0.0000223000 0.0000002360
       1.40e-08 6.250000e-05 7.97819e-04 0.0022139440 0.0001007360
## 93
       4.24e-07 4.041337e-03 5.21081e-04 0.0103278850 0.0050411610
##
  94
       2.42e-07 9.190000e-05 4.97670e-04 0.0001007870 0.0000224000
## 95
  96
       4.25e-07 7.770000e-05 1.98242e-04 0.0011930830 0.0000971000
       3.04e-17 4.460000e-17 2.60000e-09 0.0000000000 0.0000000148
## 97
## 98
       1.46e-08 2.240000e-07 2.73000e-19 0.0000037200
             NA 4.187902e-03
                                       NA 0.0000000162 0.0000462000
## 100 3.63e-10 8.010000e-07 3.20000e-07 0.0000037800 0.0000002820
```

```
X2009 X2010
             X2008
                                                   X2011
                                                                X2012
                                                                   NA
       0.000001480 3.210000e-07 0.0000067100 0.000030800
## 90
## 93
       0.002530413 1.367817e-03 0.0163831320 0.004128106 0.004930620
## 94
       0.006142006 1.862004e-02 0.0029013230 0.008152054 0.010090880
       0.000287638 1.503490e-04 0.0006349740 0.000258225 0.000143923
       0.006654584 3.912405e-03 0.0030405480 0.002360698 0.008782712
## 96
       0.000000183 2.280000e-14 0.0000000754 0.000003120 0.000139157
## 98
       0.000000778 7.680000e-08 0.0000038600 0.000004890 0.000011900
       0.001045793 1.388158e-03 0.0018415410 0.001395194 0.017167510
## 100 0.000003500 1.400000e-06 0.0000909000 0.000032300 0.000008800
##
              X2013
                          X2014
                                     X2015
                                                  X2016
       5.610000e-11 0.000003390 0.00000139 8.430000e-09 3.380000e-17
## 90
## 93
       2.153597e-03 0.144868616 0.04167163 9.070804e-03 1.424755e-03
      6.808426e-03 0.238866445 0.13797383 4.485846e-02 5.702400e-04
       5.810000e-05 0.001232782 0.00905797 4.088990e-04 7.280000e-06
## 95
      7.938940e-03 0.145135326 0.05432568 7.220248e-03 7.973560e-04
## 97
       2.194190e-04 0.001678535 0.00007930 7.090000e-05 3.590000e-06
      7.985980e-04 0.000000191 0.02018366 5.240000e-06 3.790000e-06
## 99 2.630199e-03 0.181051794 0.02792774 9.397069e-03 1.792370e-04
## 100 6.050000e-06 0.000007140 0.00006060 6.242962e-03 2.740000e-06
M <- as.matrix(dfclpev[,4:24])</pre>
          X1997
                   X1998
                                X1999
                                             X2000
                                                           X2001
                                                                       X2002
       4.71e-05 2.85e-06 7.220000e-05 6.021390e-04 1.990000e-06 0.000006930
## 90
                      NA 2.750000e-11 3.710000e-18
## 93
             NA
                                                              NA
## 94
                      NA 2.050000e-09 1.061450e-04 1.123094e-02 0.002591453
       0.00e+00
             NA 2.93e-06
## 95
                                   NA 3.610000e-05
                                                             NA 0.000000172
## 96
                      NA 1.630000e-05 4.726345e-03 1.380520e-04
       1.00e-17
## 97
       1.00e-16
                      NA 1.220000e-05 0.000000e+00 1.890000e-10 0.000051600
## 98
       3.27e-06 5.11e-07 1.848713e-03 9.990000e-07 3.070000e-05 0.000053100
## 99
             NA 2.28e-13 2.370000e-05
                                                NA 3.629636e-03 0.000002860
                      NA 4.310000e-09 2.050000e-07 4.135380e-04 0.000026100
## 100
             NA
##
                                   X2005
                                                X2006
          X2003
                       X2004
                                                             X2007
       1.11e-08 8.000000e-07 1.53044e-04 0.0000223000 0.0000002360
## 90
       1.40e-08 6.250000e-05 7.97819e-04 0.0022139440 0.0001007360
      4.24e-07 4.041337e-03 5.21081e-04 0.0103278850 0.0050411610
## 94
       2.42e-07 9.190000e-05 4.97670e-04 0.0001007870 0.0000224000
      4.25e-07 7.770000e-05 1.98242e-04 0.0011930830 0.0000971000
## 96
## 97
       3.04e-17 4.460000e-17 2.60000e-09 0.0000000000 0.0000000148
       1.46e-08 2.240000e-07 2.73000e-19 0.0000037200
## 98
## 99
             NA 4.187902e-03
                                      NA 0.0000000162 0.0000462000
## 100 3.63e-10 8.010000e-07 3.20000e-07 0.0000037800 0.0000002820
##
             X2008
                          X2009
                                       X2010
                                                   X2011
                                                                X2012
       0.000001480 3.210000e-07 0.0000067100 0.000030800
## 90
       0.002530413 1.367817e-03 0.0163831320 0.004128106 0.004930620
## 93
      0.006142006 1.862004e-02 0.0029013230 0.008152054 0.010090880
## 95
       0.000287638 1.503490e-04 0.0006349740 0.000258225 0.000143923
## 96  0.006654584  3.912405e-03  0.0030405480  0.002360698  0.008782712
```

```
## 97
       0.000000183 2.280000e-14 0.0000000754 0.000003120 0.000139157
       0.000000778 7.680000e-08 0.0000038600 0.000004890 0.000011900
## 98
       0.001045793 1.388158e-03 0.0018415410 0.001395194 0.017167510
## 99
  100 0.000003500 1.400000e-06 0.0000909000 0.000032300 0.000008800
##
              X2013
                          X2014
                                     X2015
                                                  X2016
                                                                X2017
       5.610000e-11 0.000003390 0.00000139 8.430000e-09 3.380000e-17
## 90
       2.153597e-03 0.144868616 0.04167163 9.070804e-03 1.424755e-03
       6.808426e-03 0.238866445 0.13797383 4.485846e-02 5.702400e-04
## 95
       5.810000e-05 0.001232782 0.00905797 4.088990e-04 7.280000e-06
       7.938940e-03 0.145135326 0.05432568 7.220248e-03 7.973560e-04
## 96
       2.194190e-04 0.001678535 0.00007930 7.090000e-05 3.590000e-06
## 97
       7.985980e-04 0.000000191 0.02018366 5.240000e-06 3.790000e-06
## 98
       2.630199e-03 0.181051794 0.02792774 9.397069e-03 1.792370e-04
## 100 6.050000e-06 0.000007140 0.00006060 6.242962e-03 2.740000e-06
dim(M)
## [1] 9 21
```

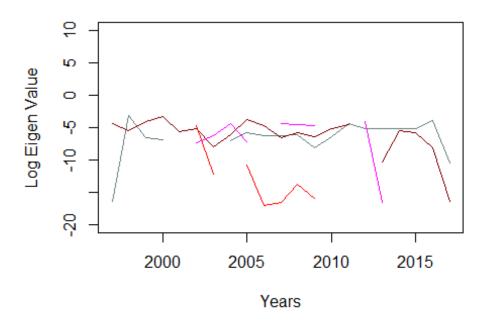


```
###HighToLowPerformers
dfhtlev[,4:24]
##
         X1997
                     X1998
                                  X1999
                                               X2000
                                                        X2001
                                                                    X2002
      0.00e+00 0.00000e+00 9.010000e-18 7.98000e-10 5.59e-10 1.42000e-08
## 2
## 27 1.51e-16 0.00000e+00 0.000000e+00 4.26000e-18
                                                           NA
                                                                       NA
## 28 9.57e-07 4.77000e-08 2.550000e-07
                                                  NA 5.62e-08 1.85872e-04
## 39 3.90e-05
                        NA
                                      NA
                                                NA 3.13e-05 7.03000e-05
```

```
NA NA 1.830933e-03 5.62000e-05 NA
## 46
                                                               NA
          NA 6.00000e-17 NA
## 54
                                            NA 3.76e-17
                                                               NA
                                 NA 1.47000e-07
## 55
          NA 4.14000e-08
                                                    NA
                                                               NA
## 66 5.02e-17
                     NA
                                 NA
                                           NA
                                                    NA
                                                               NA
                           NA 1.60000e-17
## 69
          NA 2.75000e-18
                                                    NA 2.06000e-05
          NA
                     NA 0.000000e+00 NA
## 75
                                                    NA 5.03000e-08
## 83 4.52e-17 7.75873e-04 2.460000e-07 1.29000e-07 0.00e+00 9.65000e-07
## 90 4.71e-05 2.85000e-06 7.220000e-05 6.02139e-04 1.99e-06 6.93000e-06
## 98 3.27e-06 5.11000e-07 1.848713e-03 9.99000e-07 3.07e-05 5.31000e-05
##
        X2003
                X2004 X2005
                                     X2006
                                                  X2007
                                                              X2008
                             NA 7.570000e-08 1.670000e-07
## 2 2.69e-09
                   NA
## 27 9.13e-12 2.82e-08
                            NA 6.120000e-09 1.590000e-07 9.960000e-10
## 28 5.70e-09 1.95e-07 1.88000e-09 5.340000e-08 NA 3.040000e-08
          NA 8.74e-17 3.34262e-04 NA 2.595622e-03 1.319576e-03
## 46
          NA NA 2.25091e-04 2.070155e-03 2.010000e-05 7.780000e-08
                 NA 3.50000e-09 1.430000e-18
## 54 5.84e-17
## 55 3.30e-17 9.66e-08 NA 0.000000e+00
                                                    NA
                                                                 NA
## 66 0.00e+00 0.00e+00 2.18000e-17 8.540000e-15 7.220000e-16 4.810000e-17
## 69 5.79e-13 0.00e+00 1.78000e-11 9.190000e-18 2.630000e-17 1.530000e-14
## 75 5.08e-07 4.61e-05 5.34000e-08 NA 3.500000e-05 3.040000e-05
## 83 NA 9.29e-08 1.69000e-06 5.730000e-07 5.160000e-07 8.400000e-07
## 90 1.11e-08 8.00e-07 1.53044e-04 2.230000e-05 2.360000e-07 1.480000e-06
## 98 1.46e-08 2.24e-07 2.73000e-19 3.720000e-06 NA 7.780000e-07
          X2009 X2010
                                 X2011 X2012
                                    NA 2.930000e-09 0.000000e+00
## 2 0.00000e+00
                         NA
                                      NA 3.120000e-07
## 27 2.98000e-17
                         NA 0.000157266
## 28 1.05090e-04
                        NA 0.000338222
                                              NA 7.060000e-05
## 39 1.91047e-04 9.872992e-03 0.000399609 1.613517e-03 8.001754e-03
## 46 2.89788e-04 2.315170e-04 0.000001340 2.635840e-03 4.528166e-03
## 54 7.45000e-18 0.000000e+00 NA 0.000000e+00 6.580000e-10
## 55 5.85000e-09 2.540000e-15 0.000000000 5.061920e-04
       NA 3.270000e-17 NA 3.010000e-07 0.000000e+00
                NA
NA
## 69 1.01000e-16
                                   NA 0.000000e+00
                        NA
## 75 2.32000e-05
                                   NA 7.740000e-05 2.630000e-17
## 83 8.65000e-09 3.790000e-07 0.000034000 6.830000e-06 7.230000e-06
## 90 3.21000e-07 6.710000e-06 0.000030800 NA 5.610000e-11
## 98 7.68000e-08 3.860000e-06 0.000004890 1.190000e-05 7.985980e-04
##
           X2014
                      X2015
                                            X2017
                                  X2016
## 2 1.830000e-17 0.000002760 4.560000e-11
                                                NA
## 27 2.864810e-04 0.000123214
                                                NA
## 28 7.110000e-05 0.006005438 2.400000e-08
## 39 3.716832e-02 0.020153285 5.831398e-03 2.39442e-04
## 46 3.714767e-02 0.020432117 9.285463e-03 8.45000e-05
## 54
              NA
                        NA 0.000000e+00
## 55
              NA
                         NA 1.930000e-05
                                                NA
## 66 1.840000e-05 0.000013600 5.840000e-08
                                                NA
## 69
     NA 0.000000279
                                     NA
                                                NA
## 75
             NA 0.000002770
                                   NΑ
## 83 5.640000e-06 0.000007070 1.042550e-04 2.91000e-11
```

```
## 90 3.390000e-06 0.000001390 8.430000e-09 3.38000e-17
## 98 1.910000e-07 0.020183661 5.240000e-06 3.79000e-06
M <- as.matrix(dfhtlev[,4:24])</pre>
                              X1999 X2000 X2001
        X1997
                   X1998
## 2 0.00e+00 0.00000e+00 9.010000e-18 7.98000e-10 5.59e-10 1.42000e-08
## 27 1.51e-16 0.00000e+00 0.000000e+00 4.26000e-18 NA
## 28 9.57e-07 4.77000e-08 2.550000e-07
                                     NA 5.62e-08 1.85872e-04
## 39 3.90e-05 NA NA
                                          NA 3.13e-05 7.03000e-05
                      NA 1.830933e-03 5.62000e-05
## 46
          NA
                                                     NA
                                                                NA
## 54
           NA 6.00000e-17
                                 NA
                                             NA 3.76e-17
                                                                NA
         NA 4.14000e-08
                                 NA 1.47000e-07
                                                                NA
                                  NA
## 66 5.02e-17
                      NA
                                                     NA
                                             NA
## 69 NA 2.75000e-18
                                 NA 1.60000e-17
                                                     NA 2.06000e-05
                      NA 0.000000e+00
          NA
## 75
                                             NA
                                                     NA 5.03000e-08
## 83 4.52e-17 7.75873e-04 2.460000e-07 1.29000e-07 0.00e+00 9.65000e-07
## 90 4.71e-05 2.85000e-06 7.220000e-05 6.02139e-04 1.99e-06 6.93000e-06
## 98 3.27e-06 5.11000e-07 1.848713e-03 9.99000e-07 3.07e-05 5.31000e-05
              X2004 X2005 X2006 X2007
        X2003
## 27 9.13e-12 2.82e-08
                              NA 7.570000e-08 1.670000e-07
                                                                  NA
                             NA 6.120000e-09 1.590000e-07 9.960000e-10
## 28 5.70e-09 1.95e-07 1.88000e-09 5.340000e-08 NA 3.040000e-08
          NA 8.74e-17 3.34262e-04 NA 2.595622e-03 1.319576e-03
## 39
## 46
         NA
                 NA 2.25091e-04 2.070155e-03 2.010000e-05 7.780000e-08
## 54 5.84e-17
                  NA 3.50000e-09 1.430000e-18
## 55 3.30e-17 9.66e-08 NA 0.000000e+00
                                                     NA
## 66 0.00e+00 0.00e+00 2.18000e-17 8.540000e-15 7.220000e-16 4.810000e-17
## 69 5.79e-13 0.00e+00 1.78000e-11 9.190000e-18 2.630000e-17 1.530000e-14
## 75 5.08e-07 4.61e-05 5.34000e-08 NA 3.500000e-05 3.040000e-05
          NA 9.29e-08 1.69000e-06 5.730000e-07 5.160000e-07 8.400000e-07
## 90 1.11e-08 8.00e-07 1.53044e-04 2.230000e-05 2.360000e-07 1.480000e-06
## 98 1.46e-08 2.24e-07 2.73000e-19 3.720000e-06 NA 7.780000e-07
##
                      X2010
                                X2011
           X2009
                                       X2012
                                                         X2013
## 2 0.00000e+00
                                    NA 2.930000e-09 0.000000e+00
                        NA
                        NA 0.000157266 NA 3.120000e-07
## 27 2.98000e-17
## 28 1.05090e-04
                        NA 0.000338222
                                               NA 7.060000e-05
## 39 1.91047e-04 9.872992e-03 0.000399609 1.613517e-03 8.001754e-03
## 46 2.89788e-04 2.315170e-04 0.000001340 2.635840e-03 4.528166e-03
## 54 7.45000e-18 0.000000e+00
                                    NA 0.000000e+00 6.580000e-10
## 55 5.85000e-09 2.540000e-15 0.000000000 5.061920e-04
                                    NA 3.010000e-07 0.000000e+00
             NA 3.270000e-17
## 66
## 69 1.01000e-16
## 75 2.32000e-05
                        NA
                                    NA 0.000000e+00
                        NA
                                    NA 7.740000e-05 2.630000e-17
## 83 8.65000e-09 3.790000e-07 0.000034000 6.830000e-06 7.230000e-06
## 90 3.21000e-07 6.710000e-06 0.000030800 NA 5.610000e-11
## 98 7.68000e-08 3.860000e-06 0.000004890 1.190000e-05 7.985980e-04
            X2014 X2015 X2016
                                             X2017
## 2 1.830000e-17 0.000002760 4.560000e-11
                                                NA
```

```
## 27 2.864810e-04 0.000123214
                                                      NA
## 28 7.110000e-05 0.006005438 2.400000e-08
                                                      NA
## 39 3.716832e-02 0.020153285 5.831398e-03 2.39442e-04
## 46 3.714767e-02 0.020432117 9.285463e-03 8.45000e-05
## 54
                            NA 0.000000e+00
                NA
## 55
                NA
                            NA 1.930000e-05
                                                      NA
## 66 1.840000e-05 0.000013600 5.840000e-08
                                                      NA
                NA 0.000000279
## 69
                                          NA
                                                      NA
## 75
                NA 0.000002770
                                          NA
                                                      NA
## 83 5.640000e-06 0.000007070 1.042550e-04 2.91000e-11
## 90 3.390000e-06 0.000001390 8.430000e-09 3.38000e-17
## 98 1.910000e-07 0.020183661 5.240000e-06 3.79000e-06
dim(M)
## [1] 13 21
```



```
###LowToHighPerformers
dflthev[,4:24]
             X1997
                         X1998
                                                X2000
##
                                   X1999
                                                              X2001
## 1
                NA 5.63000e-18 3.35e-17
                                                    NA 5.210000e-08
## 3
                NA
                             NA 1.93e-17 0.000000e+00 0.000000e+00
## 4
                NA 4.37000e-08
                                      NA 9.103858e-01 9.495265e-01
## 5
      0.000000e+00
                             NA 1.03e-17
                                                    NA 0.000000e+00
## 8
      4.150000e-05 1.83000e-07 2.04e-06 1.187725e-03 5.210000e-06
                             NA 0.00e+00 0.000000e+00
## 9
```

```
## 10 NA NA 0.00e+00 1.131710e-04 NA ## 11 NA NA 8.13e-06 NA 1.880000e-08 ## 13 1 850000e 00 1 040000 17 3 600 17
## 12 1.850000e-09 1.04000e-17 3.60e-17
                                            NA 3.675483e-03
## 16 NA NA 8.01e-06 6.131059e-03 1.710000e-09
## 17 8.605440e-04 0.00000e+00 2.15e-05 5.816745e-03
              NA 3.89000e-17
## 18
                                 NA
                                             NA 0.000000e+00
## 20
              NA NA 0.00e+00 0.000000e+00
## 23 1.720000e-06 7.56259e-04 1.39e-07 7.290000e-07 3.440000e-05
## 24 4.020000e-05 1.59000e-07 1.10e-07 3.500000e-05 2.480000e-07
## 25 3.760000e-17 8.24000e-08 NA 5.570000e-18 3.340000e-07
             NA 1.57000e-17 0.00e+00 2.210000e-17
## 37 5.920806e-03 7.41000e-07 NA 1.980000e-05 2.410000e-06
## 38 4.080000e-10 0.00000e+00
                                 NA
                                             NA 1.890000e-05
## 44 6.540000e-08 NA NA
                                            NA
## 45 8.340000e-07 4.90000e-08 5.38e-07 5.020000e-06 2.190000e-07
       NA 8.56000e-09 7.78e-06 2.610000e-05
## 49 4.220000e-05 2.21000e-06 6.03e-05 1.319020e-04
## 56 7.930000e-14
                 NA 5.95e-15 1.060000e-11 0.000000e+00
                   NA 9.65e-18
## 57
              NΑ
                                             NA 4.270000e-18
## 58
              NA 3.61000e-08
                                 NA
                                             NA
             NA 0.00000e+00 1.20e-07
                                            NA 1.620000e-17
## 73 0.000000e+00 NA NA
                                             NA 2.820000e-17
                                       NA 3.130000e-05
     NA 3.13000e-06 1.54e-17
## 74
## 82
              NA 3.27000e-06 7.51e-08 2.060000e-07 5.208719e-02
                  X2003 X2004 X2005
           X2002
## 1 1.270000e-10 4.82e-11 1.670000e-11
                                              NA
              NA NA 2.340000e-07 1.900000e-05 2.010000e-18
## 3
              NA 2.97e-06 0.000000e+00 0.000000e+00
## 4
## 5 1.790000e-11 2.77e-08 1.540000e-18 2.120000e-10 6.460000e-09
## 8 2.730000e-06 NA 9.780000e-08 3.030000e-06 3.570000e-06
## 9 2.060000e-18 4.33e-08 3.280000e-17 3.100000e-07 1.700000e-17
             NA 1.42e-17 5.330000e-16 NA 3.700000e-17
## 11
              NA 1.18e-08 3.110000e-07 1.530000e-05
             NA 9.66e-14 1.240000e-08 6.520000e-07 1.370000e-06
## 16 3.427006e-02 NA NA 6.900000e-05 2.890000e-05
## 17 0.000000e+00 2.06e-07 6.310000e-17 0.000000e+00 3.510000e-05
              NA 2.05e-07 4.636568e-03 1.840000e-05 2.342950e-04
## 18
## 20
              NA
                       NA
                                  NA 5.310000e-05 3.950000e-05
## 23 5.450000e-05 4.36e-11 6.110000e-05 2.780000e-05 3.362700e-04
## 24 2.070000e-17 1.30e-17 3.860000e-07 9.835460e-04 2.730000e-05
## 25 6.780000e-08 8.81e-09 8.770000e-10 2.310000e-08 4.900000e-07
                                  NA 1.350000e-17 0.000000e+00
## 34
              NA
                      NA
## 37
              NA 0.00e+00 4.850000e-07 2.790000e-07
## 38 3.410000e-05 0.00e+00 2.230000e-05 1.950000e-09 1.330000e-17
## 44 5.690000e-07 NA 5.480000e-07 1.560000e-07 1.888267e-03
## 45 5.990000e-06 7.94e-09 2.920000e-06 1.563410e-04
## 48 0.000000e+00
                    NA
                            NA 2.330000e-06 2.210000e-05
## 49
       NA
                     NA 1.420000e-08 5.163177e-03 6.660000e-07
## 56
             NA 0.00e+00 1.300000e-17
                                      NA
                                                          NA
         NA 0.00e+00 NA NA 1.490000e-17
```

```
## 58 1.820000e-07 4.91e-11 3.740000e-06 3.687769e-03 2.060000e-06
## 62 0.000000e+00 NA 0.000000e+00
                                              NA 0.000000e+00
## 73 1.300000e-17 1.21e-17 9.360000e-08 9.680000e-17
      NA 8.72e-18
                           NA
                                       NA 2.200000e-07
## 82 3.630000e-05 8.78e-06 2.163650e-04
                                             NA 1.620000e-06
                       X2008 X2009
           X2007
                                              X2010
                                                           X2011
     0.000000e+00 1.450000e-06
                                      NA
## 1
                                                  NA 2.480000e-17
## 3
              NA
                          NA
                                      NA 0.000000e+00 1.450000e-18
## 4 7.920000e-10
                          NA
                                      NA 6.680000e-07
## 5 1.100000e-17 1.480000e-11 7.000000e-10 1.110000e-07 5.200000e-17
## 8 3.040000e-05 2.020000e-07 7.680000e-07 8.680000e-08
## 9 1.320000e-17 NA
                                      NA 0.000000e+00
                                                              NA
## 10 5.390000e-10 8.450000e-14
                                      NA 1.940000e-13 1.310000e-11
## 11 2.428952e-03 NA
                                      NA
                                            NA 2.780000e-09
## 12 2.626534e-03 5.060000e-06 1.340000e-06 8.190000e-06 1.010000e-06
## 16 9.870000e-05 NA 2.585870e-04 1.528480e-04 1.853989e-03
      NA 5.306623e-03
                                      NA 1.041277e-03 1.251203e-03
## 18 6.400000e-06 3.669020e-04
                                NA 4.297070e-04
                                                              NA
              NA 7.070000e-17 4.302800e-04 3.212408e-03
                                                              NA
## 23 7.210000e-06 5.070000e-05 8.090000e-05 NA 4.970000e-05
## 24 1.020000e-07 1.100000e-06 1.860000e-06 4.960000e-05 1.560000e-06
## 25 2.423173e-03 1.138120e-04 7.430000e-09 NA 4.300000e-09
## 34 1.320000e-17 0.000000e+00 1.380000e-16 1.770000e-17 4.980000e-17
## 37 9.200000e-08 8.050000e-07 4.200000e-08 1.110000e-05 8.130000e-05
                             NA
## 38 2.852035e-03
                          NA
                                           NA 0.000000e+00
                          NA
                                      NA 1.390000e-10
## 45 2.190000e-17 1.990000e-06 9.600000e-08 6.670000e-07 3.580000e-09
## 48 6.630000e-07 6.350000e-05 7.230000e-07 1.160000e-05 1.049680e-04
## 49 2.438813e-03 6.470000e-07 6.160000e-07
## 56 5.980000e-06 8.330000e-18 3.920000e-05
                                                  NA
                                                              NA
                          NA NA 0.000000e+00
## 57
              NA
              NA 3.820000e-06 8.480000e-09
                                                  NA 4.500000e-09
              NA 7.690000e-17
                                      NA 1.340000e-08
## 73 3.260000e-05 4.960000e-18 0.000000e+00
## 74 8.330000e-10 1.920000e-17 7.282287e-03
                                                 NA
                                                              NA
              NA 7.572960e-03 1.290000e-07 1.970000e-16 6.998490e-04
## 82
                       X2013
##
           X2012
                                   X2014
                                              X2015
                                                           X2016
## 1 1.740000e-05
                          NA
                                      NA 6.850000e-09
                                                              NA
## 3 6.490000e-18 7.340000e-17 2.740000e-17 0.0000000e+00
                                                              NA
## 4 5.200000e-10 2.300000e-06
                                      NA
                                                  NΔ
                                                              NA
                             NA
              NA 2.420000e-07
                                                  NA 7.250000e-05
## 8 3.620000e-06
                          NA 2.080000e-05
                                                  NA 4.860000e-05
## 9 3.120000e-12 1.010000e-16 NA 0.000000e+00 8.040000e-17
## 10 3.850000e-08 4.210000e-17 0.0000000e+00 0.000000e+00 0.000000e+00
## 11 1.230000e-06 2.690000e-07 NA 2.290000e-07
## 12 6.840000e-08 2.580000e-15 3.570440e-04 6.851800e-04 5.010000e-08
## 16 2.951827e-03 3.417713e-03 8.631178e-02 1.642712e-03 2.673480e-03
## 17 3.413459e-03 9.979670e-04 1.752098e-02 7.680000e-05 1.299382e-02
                 NA 6.320386e-03 2.332028e-03
## 18 3.107177e-03
## 20 1.052664e-03 1.110522e-03 NA NA 1.096499e-02
```

```
## 23 1.760630e-04 NA NA NA
## 24 4.850000e-06 3.720000e-05 5.603460e-04 2.682460e-04 1.519170e-04
## 25 5.910000e-10 1.290000e-07
                                         NA 4.620000e-17
## 34
              NA
                            NA 9.780000e-19 0.000000e+00 1.100000e-08
## 37 2.250000e-05 3.860000e-06 2.512660e-04 2.990000e-07
                                                                   NA
## 38 2.760000e-07 4.189670e-04 3.390000e-04 0.000000e+00 3.180000e-06
## 44 6.590000e-07 3.020000e-17 8.552825e-03 5.275170e-04 5.110000e-07
## 45 6.570000e-09 3.710000e-06 4.926960e-04 4.619910e-04 2.420000e-06
## 48 1.100000e-05
                            NA 3.059730e-04 9.880000e-05
## 49 2.100000e-08 1.570000e-06 6.118220e-04
                                                                   NA
                            NA 1.840000e-17 9.780000e-16 2.020000e-06
## 56 0.000000e+00
                                                      NA 1.940000e-09
## 57 4.645290e-04
                            NA
                                         NA
## 58 8.080000e-08
                                                      NA 4.650000e-05
                                         NA
                            NA
## 62 8.820000e-09 1.160000e-08
                                         NA
                                                      NA
                                                                  NA
## 73 1.410000e-12
                            NA 0.000000e+00
                                                      NA
                                                                  NA
## 74
                            NA 1.630000e-17
                                                      NA
                                                                  NA
## 82 1.880000e-07
                            NA 1.005753e-03 2.841872e-03 1.590000e-16
##
            X2017
## 1
               NA
## 3 0.000000e+00
## 4 6.220000e-09
## 5
               NΑ
## 8 1.280000e-06
## 9 1.430000e-16
## 10
               NA
## 11
               NA
## 12 4.950000e-08
## 16 5.250000e-05
## 17
               NA
## 18
               NA
## 20 1.860980e-04
## 23 9.270000e-06
## 24 3.230000e-07
## 25 3.770000e-05
## 34
               NA
## 37
               NA
## 38
               NA
## 44 5.600000e-05
## 45 7.020000e-07
## 48
## 49 6.010000e-06
## 56 0.000000e+00
## 57
## 58 3.290000e-05
## 62 1.720000e-17
## 73 6.880000e-17
## 74 3.064614e-03
## 82 8.490000e-09
```

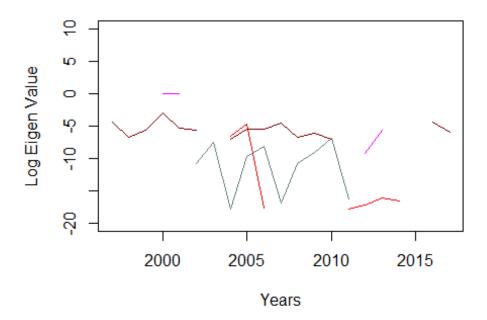
```
M <- as.matrix(dflthev[,4:24])</pre>
                               X1999
           X1997
                      X1998
                                           X2000
                                                       X2001
## 1
               NA 5.63000e-18 3.35e-17
                                               NA 5.210000e-08
                         NA 1.93e-17 0.000000e+00 0.000000e+00
## 4
               NA 4.37000e-08
                                  NA 9.103858e-01 9.495265e-01
## 5 0.000000e+00
                         NA 1.03e-17
                                         NA 0.000000e+00
## 8 4.150000e-05 1.83000e-07 2.04e-06 1.187725e-03 5.210000e-06
               NA
                         NA 0.00e+00 0.000000e+00
## 9
                          NA 0.00e+00 1.131710e-04
## 10
               NA
                                                            NA
## 11
                          NA 8.13e-06
               NA
                                               NA 1.880000e-08
## 12 1.850000e-09 1.04000e-17 3.60e-17
                                               NA 3.675483e-03
               NA NA 8.01e-06 6.131059e-03 1.710000e-09
## 17 8.605440e-04 0.00000e+00 2.15e-05 5.816745e-03
               NA 3.89000e-17
                                   NA
                                               NA 0.000000e+00
## 20
                          NA 0.00e+00 0.000000e+00
## 23 1.720000e-06 7.56259e-04 1.39e-07 7.290000e-07 3.440000e-05
## 24 4.020000e-05 1.59000e-07 1.10e-07 3.500000e-05 2.480000e-07
## 25 3.760000e-17 8.24000e-08
                                  NA 5.570000e-18 3.340000e-07
              NA 1.57000e-17 0.00e+00 2.210000e-17
## 37 5.920806e-03 7.41000e-07 NA 1.980000e-05 2.410000e-06
## 38 4.080000e-10 0.00000e+00
                                   NA
                                               NA 1.890000e-05
## 44 6.540000e-08 NA
                                  NA
## 45 8.340000e-07 4.90000e-08 5.38e-07 5.020000e-06 2.190000e-07
             NA 8.56000e-09 7.78e-06 2.610000e-05
## 49 4.220000e-05 2.21000e-06 6.03e-05 1.319020e-04
## 56 7.930000e-14
                  NA 5.95e-15 1.060000e-11 0.000000e+00
## 57
               NA
                         NA 9.65e-18
                                               NA 4.270000e-18
## 58
               NA 3.61000e-08
                                   NA
                                               NA
              NA 0.00000e+00 1.20e-07
                                               NA 1.620000e-17
## 73 0.000000e+00
                  NA
                                  NA
                                               NA 2.820000e-17
## 74
               NA 3.13000e-06 1.54e-17
                                               NA 3.130000e-05
               NA 3.27000e-06 7.51e-08 2.060000e-07 5.208719e-02
## 82
                    X2003
                                       X2005
            X2002
                                 X2004
## 1 1.270000e-10 4.82e-11 1.670000e-11
                                                NA
               NA
                       NA 2.340000e-07 1.900000e-05 2.010000e-18
                                                   NA
               NA 2.97e-06 0.000000e+00 0.000000e+00
## 5 1.790000e-11 2.77e-08 1.540000e-18 2.120000e-10 6.460000e-09
## 8 2.730000e-06 NA 9.780000e-08 3.030000e-06 3.570000e-06
## 9 2.060000e-18 4.33e-08 3.280000e-17 3.100000e-07 1.700000e-17
## 10
               NA 1.42e-17 5.330000e-16 NA 3.700000e-17
               NA 1.18e-08 3.110000e-07 1.530000e-05
## 11
## 12
              NA 9.66e-14 1.240000e-08 6.520000e-07 1.370000e-06
                   NA NA 6.900000e-05 2.890000e-05
## 16 3.427006e-02
## 17 0.000000e+00 2.06e-07 6.310000e-17 0.000000e+00 3.510000e-05
               NA 2.05e-07 4.636568e-03 1.840000e-05 2.342950e-04
## 18
## 20
               NA
                       NA
                                    NA 5.310000e-05 3.950000e-05
## 23 5.450000e-05 4.36e-11 6.110000e-05 2.780000e-05 3.362700e-04
## 24 2.070000e-17 1.30e-17 3.860000e-07 9.835460e-04 2.730000e-05
```

```
## 25 6.780000e-08 8.81e-09 8.770000e-10 2.310000e-08 4.900000e-07
       NA
                                    NA 1.350000e-17 0.000000e+00
## 34
                       NA
               NA 0.00e+00 4.850000e-07 2.790000e-07
## 38 3.410000e-05 0.00e+00 2.230000e-05 1.950000e-09 1.330000e-17
## 44 5.690000e-07 NA 5.480000e-07 1.560000e-07 1.888267e-03
## 45 5.990000e-06 7.94e-09 2.920000e-06 1.563410e-04
## 48 0.000000e+00
                  NA
                              NA 2.330000e-06 2.210000e-05
                       NA 1.420000e-08 5.163177e-03 6.660000e-07
## 56
               NA 0.00e+00 1.300000e-17
                                                NA
               NA 0.00e+00
                                    NA
                                                NA 1.490000e-17
## 58 1.820000e-07 4.91e-11 3.740000e-06 3.687769e-03 2.060000e-06
## 62 0.000000e+00 NA 0.000000e+00
                                               NA 0.000000e+00
## 73 1.300000e-17 1.21e-17 9.360000e-08 9.680000e-17
               NA 8.72e-18 NA
                                         NA 2.200000e-07
## 82 3.630000e-05 8.78e-06 2.163650e-04
                                               NA 1.620000e-06
            X2007
                        X2008 X2009
                                                X2010
## 1 0.000000e+00 1.450000e-06
                                        NA
                                                    NA 2.480000e-17
## 3
                                        NA 0.000000e+00 1.450000e-18
               NA
                           NA
## 4 7.920000e-10
                           NA
                                        NA 6.680000e-07
## 5 1.100000e-17 1.480000e-11 7.000000e-10 1.110000e-07 5.200000e-17
## 8 3.040000e-05 2.020000e-07 7.680000e-07 8.680000e-08
                                                                 NA
## 9 1.320000e-17
                           NΑ
                                        NA 0.000000e+00
                                                                 NA
## 10 5.390000e-10 8.450000e-14
                                        NA 1.940000e-13 1.310000e-11
## 11 2.428952e-03
                                        NA
                           NA
                                                    NA 2.780000e-09
## 12 2.626534e-03 5.060000e-06 1.340000e-06 8.190000e-06 1.010000e-06
                   NA 2.585870e-04 1.528480e-04 1.853989e-03
## 16 9.870000e-05
         NA 5.306623e-03
                                      NA 1.041277e-03 1.251203e-03
## 18 6.400000e-06 3.669020e-04
                                        NA 4.297070e-04
                                                                 NA
              NA 7.070000e-17 4.302800e-04 3.212408e-03
## 23 7.210000e-06 5.070000e-05 8.090000e-05 NA 4.970000e-05
## 24 1.020000e-07 1.100000e-06 1.860000e-06 4.960000e-05 1.560000e-06
## 25 2.423173e-03 1.138120e-04 7.430000e-09 NA 4.300000e-09
## 34 1.320000e-17 0.000000e+00 1.380000e-16 1.770000e-17 4.980000e-17
## 37 9.200000e-08 8.050000e-07 4.200000e-08 1.110000e-05 8.130000e-05
## 38 2.852035e-03
                           NA
                                        NA
                                                    NA 0.000000e+00
                           NA
                                        NA 1.390000e-10
               NA
## 45 2.190000e-17 1.990000e-06 9.600000e-08 6.670000e-07 3.580000e-09
## 48 6.630000e-07 6.350000e-05 7.230000e-07 1.160000e-05 1.049680e-04
## 49 2.438813e-03 6.470000e-07 6.160000e-07
                                                    NA
                                                                 NA
## 56 5.980000e-06 8.330000e-18 3.920000e-05
                                                    NA
                                                                 NA
## 57
               NA
                           NA
                                        NA 0.000000e+00
## 58
               NA 3.820000e-06 8.480000e-09
                                                    NA 4.500000e-09
                                        NA 1.340000e-08
               NA 7.690000e-17
## 73 3.260000e-05 4.960000e-18 0.000000e+00
                                                    NA
                                                                 NA
## 74 8.330000e-10 1.920000e-17 7.282287e-03
                                                    NA
                                                                 NA
## 82
               NA 7.572960e-03 1.290000e-07 1.970000e-16 6.998490e-04
##
            X2012
                        X2013
                                     X2014
                                                              X2016
                                                 X2015
## 1 1.74000e-05
                           NΑ
                                        NA 6.850000e-09
                                                                 NA
## 3 6.490000e-18 7.340000e-17 2.740000e-17 0.0000000e+00
                                                                 NA
## 4 5.200000e-10 2.300000e-06 NA
```

```
## 5 NA 2.420000e-07
                                        NA
                                                     NA 7.250000e-05
## 8 3.620000e-06
                            NA 2.080000e-05
                                                     NA 4.860000e-05
## 9 3.120000e-12 1.010000e-16
                                        NA 0.000000e+00 8.040000e-17
## 10 3.850000e-08 4.210000e-17 0.000000e+00 0.000000e+00 0.000000e+00
## 11 1.230000e-06 2.690000e-07
                                        NA 2.290000e-07
                                                                  NΔ
## 12 6.840000e-08 2.580000e-15 3.570440e-04 6.851800e-04 5.010000e-08
## 16 2.951827e-03 3.417713e-03 8.631178e-02 1.642712e-03 2.673480e-03
## 17 3.413459e-03 9.979670e-04 1.752098e-02 7.680000e-05 1.299382e-02
## 18 3.107177e-03 NA 6.320386e-03 2.332028e-03
## 20 1.052664e-03 1.110522e-03
                                        NA
                                                     NA 1.096499e-02
## 23 1.760630e-04
                            NA
                                        NA
                                                     NA
## 24 4.850000e-06 3.720000e-05 5.603460e-04 2.682460e-04 1.519170e-04
## 25 5.910000e-10 1.290000e-07
                                        NA 4.620000e-17
         NA
                            NA 9.780000e-19 0.000000e+00 1.100000e-08
## 37 2.250000e-05 3.860000e-06 2.512660e-04 2.990000e-07
## 38 2.760000e-07 4.189670e-04 3.390000e-04 0.000000e+00 3.180000e-06
## 44 6.590000e-07 3.020000e-17 8.552825e-03 5.275170e-04 5.110000e-07
## 45 6.570000e-09 3.710000e-06 4.926960e-04 4.619910e-04 2.420000e-06
## 48 1.100000e-05
                            NA 3.059730e-04 9.880000e-05
## 49 2.100000e-08 1.570000e-06 6.118220e-04
                                                                  NA
## 56 0.000000e+00
                            NA 1.840000e-17 9.780000e-16 2.020000e-06
## 57 4.645290e-04
                            NA
                                        NΑ
                                                     NA 1.940000e-09
## 58 8.080000e-08
                            NA
                                        NA
                                                     NA 4.650000e-05
## 62 8.820000e-09 1.160000e-08
                                        NA
                                                     NA
                                                                  NA
## 73 1.410000e-12
                            NA 0.000000e+00
                                                     NA
                                                                  NA
## 74
                            NA 1.630000e-17
                                                     NA
                                                                  NA
                            NA 1.005753e-03 2.841872e-03 1.590000e-16
## 82 1.880000e-07
##
            X2017
## 1
               NA
## 3 0.000000e+00
## 4 6.220000e-09
## 5
               NΔ
## 8 1.280000e-06
## 9 1.430000e-16
## 10
               NA
## 11
               NA
## 12 4.950000e-08
## 16 5.250000e-05
## 17
               NA
## 18
               NA
## 20 1.860980e-04
## 23 9.270000e-06
## 24 3.230000e-07
## 25 3.770000e-05
## 34
               NA
## 37
               NA
## 38
               NΑ
## 44 5.600000e-05
## 45 7.020000e-07
## 48
```

```
## 49 6.010000e-06
## 56 0.000000e+00
## 57 NA
## 58 3.290000e-05
## 62 1.720000e-17
## 73 6.880000e-17
## 74 3.064614e-03
## 82 8.490000e-09

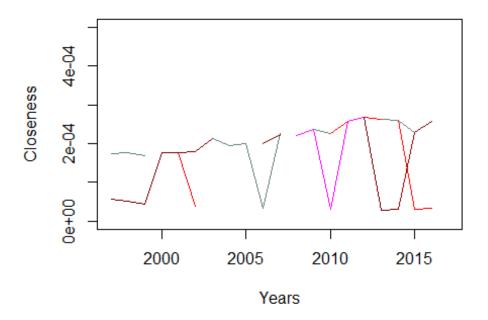
dim(M)
## [1] 30 21
```



Closeness

```
dfcl= read.csv("C:/Users/amitd/Desktop/FA/MasterCloseness.csv")
dflthcl = subset(dfcl,dfcl$LowToHigh=="LTH")
dfhtlcl = subset(dfcl,dfcl$HighToLow=="HTL")
dfclpcl = subset(dfcl,dfcl$ConsistentlyLowPerf=="CLP")
dfchpcl = subset(dfcl,dfcl$ConsistentlyHighPerf =="CHP")
###ConsistentHighPerformers
dfchpc1[,4:24]
##
                        X1998
                                                X2000
                                                             X2001
            X1997
                                    X1999
                                                                         X2002
## 2
      0.000056700 0.000050800 0.000043500 0.000177008 0.000177694 0.000178939
## 7
               NA 0.000050700
                                       NA
                                                    NA 0.000177646 0.000040100
## 13 0.000173018 0.000176763 0.000168081
                                                   NA
                                                                NA 0.000040100
```

```
## 15 0.000173021 0.000176797 0.000168093 NA 0.000177755 0.000178960
## X2003 X2004 X2005 X2006 X2007 X2008
       .000214499 NA
NA 0.000194157
## 2 0.000214499
                                 NA 0.000201323 0.000224978
                                                                        NA
                                    NA 0.000201344 NA
## 13 NA 0.000194210 0.000199992 NA NA 0.000220255
## 15 0.000214532 0.000194200 0.000199963 0.000033700 0.000225031 NA
## X2009 X2010 X2011 X2012 X2013
## 2 0.000029900
                      NA
                                  NA 0.000267231 0.000027800 0.000030200
## 7 NA 0.000226519 0.000258295 0.000267305 0.000261782 0.000260929
## 13 0.000237107 0.000030100 0.000258400 0.000267377 NA 0.000260902
## 15 0.000236944 0.000226560
                                     NA NA 0.000261753 0.000261008
## X2015 X2016 X2017
## 2 0.000229937 0.000257757
                               NA
## 7 0.000030400 0.000034000
                                 NA
## 13 0.000229958 0.000257828 NA
## 15 0.000229996 NA 3.88e-05
M <- as.matrix(dfchpcl[,4:24])</pre>
     X1997 X1998 X1999 X2000 X2001 X2002
## 2 0.000056700 0.000050800 0.000043500 0.000177008 0.000177694 0.000178939
## 7 NA 0.00050700 NA NA 0.000177646 0.000040100
## 13 0.000173018 0.000176763 0.000168081 NA NA 0.000177755 0.000178960
## 15 0.000173021 0.000176797 0.000168093 NA 0.000177755 0.000178960
## 2 0.000214499 NA NA 0.000201323 0.000224978 NA
## 7 NA 0.000194157 NA 0.000201344 NA NA
## 13
            NA 0.000194210 0.000199992 NA
                                                           NA 0.000220255
## 15 0.000214532 0.000194200 0.000199963 0.000033700 0.000225031 NA
## X2009 X2010 X2011 X2012 X2013
## 2 0.000029900 NA NA 0.000267231 0.000027800 0.0000
                                  NA 0.000267231 0.000027800 0.000030200
## 7 NA 0.000226519 0.000258295 0.000267305 0.000261782 0.000260929
## 13 0.000237107 0.000030100 0.000258400 0.000267377 NA 0.000260902
## 15 0.000236944 0.000226560 NA NA 0.000261753 0.000261008
           X2015 X2016 X2017
                               NA
## 2 0.000229937 0.000257757
## 7 0.000030400 0.000034000
                                  NA
## 13 0.000229958 0.000257828 NA
## 15 0.000229996 NA 3.88e-05
dim(M)
## [1] 4 21
```

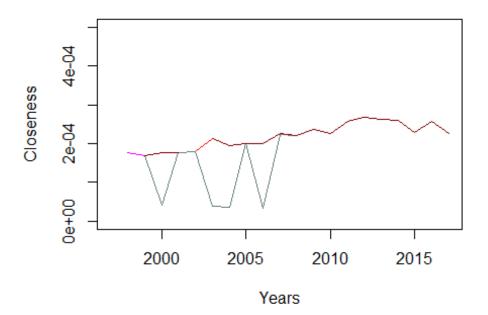


```
###ConsistentLowPerformers
dfclpcl[,4:24]
```

```
X1997
                         X1998
                                      X1999
                                                  X2000
##
                                                               X2001
##
  90
       0.000173078 0.000176808 0.000168106 0.000177063 0.000177749
## 93
                NA
                            NA 0.000168037 0.000040400
                                                                  NA
## 94
       0.000056600
                             NA 0.000168074 0.000177033 0.000177761
                NA 0.000176786
                                         NA 0.000177050
##
  95
                                                                  NA
  96
       0.000056600
                            NA 0.000168095 0.000177049 0.000177753
##
##
  97
       0.000056600
                            NA 0.000168069 0.000040400 0.000177690
## 98
       0.000173063 0.000176806 0.000168105 0.000177051 0.000177752
## 99
                NA 0.000176715 0.000168072
                                                     NA 0.000177749
## 100
                             NA 0.000168078 0.000177039 0.000177759
                NA
##
             X2002
                         X2003
                                      X2004
                                                  X2005
       0.000178989 0.000214534 0.000194240 0.000200009 0.000201357
##
  90
                NA 0.000214521 0.000194249 0.000200020 0.000201379
##
  93
##
   94
       0.000178996 0.000214544 0.000194263 0.000200017 0.000201386
       0.000178965 0.000214533 0.000194250 0.000200015 0.000201373
## 95
                NA 0.000214543 0.000194249 0.000200013 0.000201384
##
  96
##
  97
       0.000178972 0.000039000 0.000035400 0.000199939 0.000033700
   98
       0.000178991 0.000214528 0.000194238 0.000033400 0.000201362
##
                            NA 0.000194260
  99
       0.000178972
                                                     NA 0.000201317
  100 0.000178983 0.000214518 0.000194242 0.000199979 0.000201361
##
             X2007
                         X2008
                                      X2009
                                                  X2010
                                                               X2011
       0.000225001 0.000220237 0.000237043 0.000226582 0.000258385
##
  90
   93
       0.000225031 0.000220288 0.000237107 0.000226639 0.000258442
      0.000225046 0.000220278 0.000237113 0.000226629 0.000258446
```

```
0.000225020 0.000220268 0.000237081 0.000226614 0.000258410
## 96 0.000225024 0.000220279 0.000237102 0.000226629 0.000258432
      0.000224951 0.000220183 0.000236892 0.000226541 0.000258354
## 97
## 98
               NA 0.000220230 0.000237016 0.000226586 0.000258379
## 99 0.000225021 0.000220273 0.000237103 0.000226623 0.000258430
## 100 0.000225002 0.000220246 0.000237058 0.000226588 0.000258372
            X2012
                        X2013
                                    X2014
                                                X2015
## 90
               NA 0.000261625 0.000260968 0.000229944 0.000257787
## 93 0.000267421 0.000261814 0.000261078 0.000230028 0.000257975
## 94 0.000267433 0.000261831 0.000261085 0.000230041 0.000257983
      0.000267395 0.000261781 0.000261034 0.000230018 0.000257930
## 95
## 96  0.000267429  0.000261827  0.000261076  0.000230032  0.000257970
## 97
      0.000267344 0.000261793 0.000261025 0.000229972 0.000257914
      0.000267367 0.000261806 0.000260926 0.000229987 0.000257900
       0.000267432 0.000261816 0.000261074 0.000230024 0.000257964
## 99
## 100 0.000267356 0.000261757 0.000260978 0.000229980 0.000257920
            X2017
## 90
      0.000038800
## 93
      0.000226491
## 94
      0.000226484
## 95
      0.000226451
## 96
      0.000226489
## 97
      0.000226441
## 98
      0.000226445
## 99 0.000226476
## 100 0.000226443
M <- as.matrix(dfclpcl[,4:24])</pre>
М
            X1997 X1998
                                    X1999
##
                                                X2000
## 90 0.000173078 0.000176808 0.000168106 0.000177063 0.000177749
                           NA 0.000168037 0.000040400
## 93
               NA
## 94
      0.000056600
                           NA 0.000168074 0.000177033 0.000177761
## 95
               NA 0.000176786
                                       NA 0.000177050
## 96
      0.000056600
                   NA 0.000168095 0.000177049 0.000177753
## 97
      0.000056600
                          NA 0.000168069 0.000040400 0.000177690
## 98
      0.000173063 0.000176806 0.000168105 0.000177051 0.000177752
## 99
               NA 0.000176715 0.000168072
                                                   NA 0.000177749
                           NA 0.000168078 0.000177039 0.000177759
## 100
               NA
##
            X2002
                        X2003
                                    X2004
                                                X2005
       0.000178989 0.000214534 0.000194240 0.000200009 0.000201357
## 90
               NA 0.000214521 0.000194249 0.000200020 0.000201379
## 93
      0.000178996 0.000214544 0.000194263 0.000200017 0.000201386
## 94
## 95
       0.000178965 0.000214533 0.000194250 0.000200015 0.000201373
               NA 0.000214543 0.000194249 0.000200013 0.000201384
## 96
## 97
      0.000178972 0.000039000 0.000035400 0.000199939 0.000033700
      0.000178991 0.000214528 0.000194238 0.000033400 0.000201362
## 99 0.000178972
                          NA 0.000194260
                                                   NA 0.000201317
## 100 0.000178983 0.000214518 0.000194242 0.000199979 0.000201361
```

```
X2007 X2008
                                    X2009
##
                                                 X2010
## 90
       0.000225001 0.000220237 0.000237043 0.000226582 0.000258385
## 93
       0.000225031 0.000220288 0.000237107 0.000226639 0.000258442
## 94
       0.000225046 0.000220278 0.000237113 0.000226629 0.000258446
## 95
       0.000225020 0.000220268 0.000237081 0.000226614 0.000258410
       0.000225024 0.000220279 0.000237102 0.000226629 0.000258432
## 96
## 97
       0.000224951 0.000220183 0.000236892 0.000226541 0.000258354
## 98
                NA 0.000220230 0.000237016 0.000226586 0.000258379
## 99
       0.000225021 0.000220273 0.000237103 0.000226623 0.000258430
## 100 0.000225002 0.000220246 0.000237058 0.000226588 0.000258372
##
             X2012
                         X2013
                                     X2014
                                                 X2015
                                                             X2016
## 90
                NA 0.000261625 0.000260968 0.000229944 0.000257787
## 93
       0.000267421 0.000261814 0.000261078 0.000230028 0.000257975
## 94
       0.000267433 0.000261831 0.000261085 0.000230041 0.000257983
## 95
       0.000267395 0.000261781 0.000261034 0.000230018 0.000257930
      0.000267429 0.000261827 0.000261076 0.000230032 0.000257970
## 97
       0.000267344 0.000261793 0.000261025 0.000229972 0.000257914
      0.000267367 0.000261806 0.000260926 0.000229987 0.000257900
## 98
       0.000267432 0.000261816 0.000261074 0.000230024 0.000257964
## 99
## 100 0.000267356 0.000261757 0.000260978 0.000229980 0.000257920
##
            X2017
## 90
       0.000038800
## 93
       0.000226491
## 94
       0.000226484
## 95
       0.000226451
## 96
      0.000226489
## 97
       0.000226441
## 98
       0.000226445
## 99
      0.000226476
## 100 0.000226443
dim(M)
## [1] 9 21
```



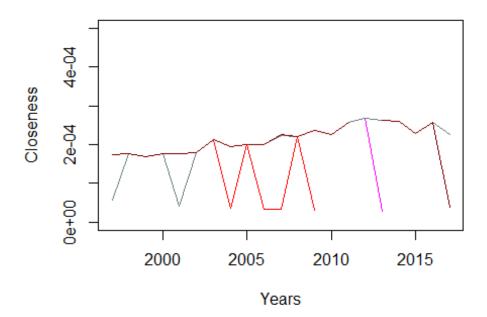
###HighToLowPerformers

```
dfhtlcl[,4:24]
            X1997
                        X1998
                                     X1999
                                                  X2000
                                                              X2001
##
                                                                           X2002
      0.000056700 0.000050800 0.000043500 0.000177008 0.000177694 0.000178939
   27 0.000056600 0.000050800 0.000043500 0.000040400
                                                                 NA
   28 0.000173068 0.000176784 0.000168086
                                                     NA 0.000177726 0.000178988
  39 0.000173067
                                                        0.000177740 0.000178981
                            NA
                                        NA
## 46
                            NA 0.000168094 0.000177042
                                                                 NA
               NA
                                                                              NA
## 54
               NA 0.000050800
                                        NA
                                                     NA 0.000040800
                                                                              NA
               NA 0.000176787
## 55
                                        NA 0.000177019
                                                                 NA
                                                                              NA
  66 0.000056600
                            NA
                                        NA
                                                     NA
                                                                 NA
                                                                              NA
##
               NA 0.000050700
                                        NA 0.000040400
## 69
                                                                 NA 0.000178959
##
  75
               NA
                            NA 0.000167988
                                                     NA
                                                                 NA 0.000178949
   83 0.000056600 0.000176786 0.000168083 0.000177014 0.000040800 0.000178966
   90 0.000173078 0.000176808 0.000168106 0.000177063 0.000177749 0.000178989
   98 0.000173063 0.000176806 0.000168105 0.000177051 0.000177752 0.000178991
##
            X2003
                         X2004
                                                  X2006
                                                              X2007
                                     X2005
                                                                           X2008
      0.000214499
                                        NA 0.000201323 0.000224978
##
  2
                            NA
                                        NA 0.000201307 0.000224975 0.000220165
   27 0.000214432 0.000194209
   28 0.000214531 0.000194224 0.000199942 0.000201327
                                                                 NA 0.000220208
               NA 0.000035400 0.000200010
##
  39
                                                     NA 0.000225037 0.000220282
                            NA 0.000200009 0.000201375 0.000225009 0.000220204
## 46
               NA
   54 0.000039000
                            NA 0.000199946 0.000033700
                                                                 NA
                                                                              NA
  55 0.000039000 0.000194189
                                        NA 0.000033700
                                                                              NA
                                                                 NA
  66 0.000039000 0.000035400 0.000033400 0.000201213 0.000224846 0.000031500
```

69 0.000214446 0.000035400 0.000199910 0.000033700 0.000032300 0.000220082

```
## 75 0.000214531 0.000194236 0.000199950 NA 0.000225028 0.000220233
              NA 0.000194206 0.000199983 0.000201335 0.000224997 0.000220226
## 90 0.000214534 0.000194240 0.000200009 0.000201357 0.000225001 0.000220237
## 98 0.000214528 0.000194238 0.000033400 0.000201362
                                                               NA 0.000220230
##
           X2009
                      X2010
                                    X2011
                                                X2012
                                                            X2013
## 2
      0.000029900
                           NA
                                       NA 0.000267231 0.000027800 0.000030200
## 27 0.000029900
                           NA 0.000258399
                                                   NA 0.000261721 0.000261003
## 28 0.000237084
                          NA 0.000258415
                                                  NA 0.000261776 0.000261002
## 39 0.000237089 0.000226629 0.000258415 0.000267402 0.000261814 0.000261061
## 46 0.000237093 0.000226609 0.000258343 0.000267413 0.000261824 0.000261060
## 54 0.000029900 0.000030000
                                       NA 0.000027900 0.000261664
## 55 0.000237004 0.000226393 0.000027700 0.000267397
                                                               NA
                                                                           NA
## 66
              NA 0.000030000
                                       NA 0.000267306 0.000027800 0.000260970
## 69 0.000029900
                           NA
                                       NA 0.000027900
                                                               NA
## 75 0.000237058
                                       NA 0.000267382 0.000027800
                           NA
                                                                           NA
## 83 0.000237021 0.000226551 0.000258353 0.000267356 0.000261768 0.000260963
## 90 0.000237043 0.000226582 0.000258385 NA 0.000261625 0.000260968
## 98 0.000237016 0.000226586 0.000258379 0.000267367 0.000261806 0.000260926
           X2015
##
                       X2016
                                    X2017
## 2 0.000229937 0.000257757
                                       NA
## 27 0.000229973
                                       NA
                           NA
## 28 0.000230012 0.000257836
                                       NA
## 39 0.000230022 0.000257967 0.000226472
## 46 0.000230019 0.000257968 0.000226469
## 54
              NA 0.000034000
## 55
              NA 0.000257892
## 66 0.000229956 0.000257837
                                       NΑ
## 69 0.000229890
                           NA
                                       NA
## 75 0.000229936
                           NA
## 83 0.000229949 0.000257936 0.000226333
## 90 0.000229944 0.000257787 0.000038800
## 98 0.000229987 0.000257900 0.000226445
M <- as.matrix(dfhtlcl[,4:24])</pre>
                                    X1999
                       X1998
                                               X2000
           X1997
                                                            X2001
                                                                        X2002
## 2 0.000056700 0.000050800 0.000043500 0.000177008 0.000177694 0.000178939
## 27 0.000056600 0.000050800 0.000043500 0.000040400
                                                               NA
## 28 0.000173068 0.000176784 0.000168086
                                                   NA 0.000177726 0.000178988
## 39 0.000173067
                           NA
                                       NA
                                                   NA 0.000177740 0.000178981
## 46
                           NA 0.000168094 0.000177042
               NA
                                                               NA
                                                                           NA
## 54
               NA 0.000050800
                                       NA
                                                   NA 0.000040800
                                                                           NA
               NA 0.000176787
                                       NA 0.000177019
                                                                           NA
                                                               NA
## 66 0.000056600
                                       NA
                                                               NA
                           NA
                                                   NA
                                       NA 0.000040400
## 69
               NA 0.000050700
                                                               NA 0.000178959
                           NA 0.000167988
## 75
                                                   NA
                                                               NA 0.000178949
## 83 0.000056600 0.000176786 0.000168083 0.000177014 0.000040800 0.000178966
## 90 0.000173078 0.000176808 0.000168106 0.000177063 0.000177749 0.000178989
## 98 0.000173063 0.000176806 0.000168105 0.000177051 0.000177752 0.000178991
```

```
## X2003 X2004 X2005 X2006 X2007
## 2 0.000214499 NA NA 0.000201323 0.000224978
## 2 0.000214499 NA NA 0.000201323 0.000224978
## 27 0.000214432 0.000194209 NA 0.000201307 0.000224075
                                   NA 0.000201307 0.000224975 0.000220165
## 28 0.000214531 0.000194224 0.000199942 0.000201327 NA 0.000220208
            NA 0.000035400 0.000200010 NA 0.000225037 0.000220282
## 46
                        NA 0.000200009 0.000201375 0.000225009 0.000220204
              NA
## 54 0.000039000
                        NA 0.000199946 0.000033700
## 55 0.000039000 0.000194189 NA 0.000033700
## 66 0.000039000 0.000035400 0.000033400 0.000201213 0.000224846 0.000031500
## 69 0.000214446 0.000035400 0.000199910 0.000033700 0.000032300 0.000220082
## 75 0.000214531 0.000194236 0.000199950
                                               NA 0.000225028 0.000220233
## 83 NA 0.000194206 0.000199983 0.000201335 0.000224997 0.000220226
## 90 0.000214534 0.000194240 0.000200009 0.000201357 0.000225001 0.000220237
## 98 0.000214528 0.000194238 0.000033400 0.000201362 NA 0.000220230
                                             X2012 X2013
##
           X2009 X2010
                            X2011
                                                                    X2014
                      NA
                                    NA 0.000267231 0.000027800 0.000030200
## 2 0.000029900
## 27 0.000029900
                         NA 0.000258399 NA 0.000261721 0.000261003
## 28 0.000237084
                        NA 0.000258415
                                               NA 0.000261776 0.000261002
## 39 0.000237089 0.000226629 0.000258415 0.000267402 0.000261814 0.000261061
## 46 0.000237093 0.000226609 0.000258343 0.000267413 0.000261824 0.000261060
## 54 0.000029900 0.000030000 NA 0.000027900 0.000261664
                                                                       NA
## 55 0.000237004 0.000226393 0.000027700 0.000267397
                                                            NΑ
                                                                       NΑ
              NA 0.000030000 NA 0.000267306 0.000027800 0.000260970
## 69 0.000029900
## 75 0.000237058
                        NA NA 0.000027900 NA NA NA 0.000267382 0.000027800
                                                    NA
## 83 0.000237021 0.000226551 0.000258353 0.000267356 0.000261768 0.000260963
## 90 0.000237043 0.000226582 0.000258385 NA 0.000261625 0.000260968
## 98 0.000237016 0.000226586 0.000258379 0.000267367 0.000261806 0.000260926
           X2015
                      X2016
                                  X2017
## 2 0.000229937 0.000257757
                                     NA
## 27 0.000229973
                 NA
                                     NA
## 28 0.000230012 0.000257836
## 39 0.000230022 0.000257967 0.000226472
## 46 0.000230019 0.000257968 0.000226469
## 54
      NA 0.000034000
## 55
             NA 0.000257892
                                     NA
## 66 0.000229956 0.000257837
                                     NA
## 69 0.000229890 NA
                                     NA
## 75 0.000229936
                        NA
## 83 0.000229949 0.000257936 0.000226333
## 90 0.000229944 0.000257787 0.000038800
## 98 0.000229987 0.000257900 0.000226445
dim(M)
## [1] 13 21
```



###LowToHighPerformers

dflthc1[,4:24]

48

```
X1997
                        X1998
                                                 X2000
                                                              X2001
                                                                          X2002
##
                                     X1999
## 1
               NA 0.000050700 0.000043500
                                                    NA 0.000177707 0.000178931
                            NA 0.000043500 0.000040400 0.000040800
##
## 4
               NA 0.000176783
                                        NA 0.000177073 0.000177769
                                                                             NA
                                                    NA 0.000040800 0.000178902
                           NA 0.000043500
  5
      0.000056700
      0.000173072 0.000176787 0.000168101 0.000177059 0.000177750 0.000178986
##
  8
##
  9
                           NA 0.000043500 0.000040400
                                                                 NA 0.000040100
## 10
               NA
                           NA 0.000043500 0.000177055
                                                                             NA
## 11
               NA
                           NA 0.000168080
                                                    NA 0.000177721
                                                                             NA
  12 0.000173026 0.000050700 0.000043500
                                                    NA 0.000177749
               NA
                           NA 0.000168072 0.000177067 0.000177710 0.000179011
  17 0.000173073 0.000050800 0.000168093 0.000177062
                                                                 NA 0.000040100
## 18
               NA 0.000050700
                                        NA
                                                    NA 0.000040800
                                                                             NA
##
  20
                           NA 0.000043500 0.000040400
                                                                 NA
                                                                             NA
   23 0.000173072 0.000176797 0.000168085 0.000177045 0.000177751 0.000178980
   24 0.000173067 0.000176792 0.000168081 0.000177050 0.000177741 0.000040100
   25 0.000056600 0.000176767
                                        NA 0.000040400 0.000177734 0.000178945
##
  34
               NA 0.000050800 0.000043500 0.000040400
                                                                 NA
                                                                             NA
   37 0.000173073 0.000176796
                                        NA 0.000177049 0.000177747
   38 0.000173040 0.000050800
                                                    NA 0.000177741 0.000178974
                                        NA
  44 0.000173043
                           NA
                                        NA
                                                    NA
                                                                 NA 0.000178978
  45 0.000173061 0.000176794 0.000168095 0.000177050 0.000177746 0.000178984
```

NA 0.000176774 0.000168081 0.000177041

49 0.000173068 0.000176801 0.000168104 0.000177063

NA 0.000040100

NA

```
## 56 0.000172986 NA 0.000168000 0.000176991 0.000040800 NA ## 57 NA NA 0.000043500 NA 0.000040800 NA ## 58 NA 0.000176789 NA NA NA NA 0.000178937  ## 62 NA 0.000050700 0.000168075 NA 0.000040800 0.000040100
## 73 0.000056600 NA NA
                                             NA 0.000040800 0.000040100
      NA 0.000176791 0.000043500
                                             NA 0.000177740
## 82
            NA 0.000176792 0.000168067 0.000177032 0.000177771 0.000178976
          X2003 X2004 X2005 X2006 X2007 X2008
## 1 0.000214465 0.000194169
                           NA NA 0.000032300 0.000220207
             NA 0.000194221 0.000199991 0.000033700 NA
## 4 0.000214522 0.000035400 0.000033400
                                             NA 0.000224936
## 5 0.000214478 0.000035400 0.000199929 0.000201323 0.000032400 0.000220127
      NA 0.000194221 0.000199991 0.000201369 0.000225029 0.000220218
## 9 0.000214513 0.000035400 0.000199959 0.000033700 0.000032300 NA
## 10 0.000039000 0.000194081 NA 0.000033700 0.000224937 0.000220057
## 11 0.000214499 0.000194223 0.000199992 NA 0.000225011 NA
## 12 0.000214449 0.000194211 0.000199962 0.000201341 0.000225012 0.000220239
             NA NA 0.000200002 0.000201355 0.000225028 NA
## 17 0.000214532 0.000035400 0.000033400 0.000201351 NA 0.000220254
## 18 0.000214537 0.000194260 0.000199990 0.000201370 0.000224999 0.000220265
      NA NA 0.000200000 0.000201363 NA 0.000031500
## 23 0.000214497 0.000194254 0.000199994 0.000201368 0.000225018 0.000220258
## 24 0.000039000 0.000194229 0.000200020 0.000201360 0.000224995 0.000220232
## 25 0.000214524 0.000194185 0.000199959 0.000201332 0.000225011 0.000220245
## 34 NA NA 0.000033400 0.000033700 0.000032300 0.000031500
## 37 0.000039000 0.000194235 0.000199976 NA 0.000224998 0.000220217
## 38 0.000039000 0.000194246 0.000199942 0.000033700 0.000225029
## 44 NA 0.000194211 0.000199962 0.000201384 NA
                                                                    NA
## 45 0.000214541 0.000194250 0.000200010
                                              NA 0.000032300 0.000220235
## 48 NA NA 0.000199986 0.000201358 0.000225006 0.000220246
         NA 0.000194222 0.000200025 0.000201353 0.000225015 0.000220225
## 56 0.000039000 0.000035400 NA NA 0.000224967 0.000031500 NA NA 0.000033700 NA NA
## 58 0.000214471 0.000194253 0.000200015 0.000201357
                                                        NA 0.000220241
## 62 NA 0.000035400 NA 0.000033700
                                                        NA 0.000031500
## 73 0.000039000 0.000194214 0.000033400 NA 0.000225014 0.000219927
## 74 0.000039000 NA NA 0.000201320 0.000224935 0.000031500  
## 82 0.000214510 0.000194244 NA 0.000201337 NA 0.000220288
     X2009 X2010
                               X2011 X2012
                                                      X2013
                                                                  X2014
## 1
                      NA 0.000027700 0.000267289
                                                      NA
             NA
              NA 0.000030000 0.000027700 0.000027900 0.000027800 0.000030200
              NA 0.000226549 NA 0.000267204 0.000261734
## 5 0.000236996 0.000226523 0.000027700 NA 0.000261700
## 8 0.000237054 0.000226533 NA 0.000267345 NA 0.000260982
             NA 0.000030100
                                  NA 0.000267133 0.000027800 NA
## 9
## 10
             NA 0.000226397 0.000258207 0.000267262 0.000027800 0.000030200
             NA NA 0.000258298 0.000267312 0.000261715
## 12 0.000237039 0.000226570 0.000258338 0.000267283 0.000261500 0.000261008
## 16 0.000237084 0.000226597 0.000258431 0.000267414 0.000261826 0.000261067
## 17 NA 0.000226614 0.000258427 0.000267414 0.000261804 0.000261052
```

```
## 18 NA 0.000226610 NA 0.000267411 NA 0.000261038
## 20 0.000237093 0.000226628 NA 0.000267399 0.000261808 NA
## 23 0.000237080
                          NA 0.000258388 0.000267380
                                                               NA
## 24 0.000237059 0.000226587 0.000258354 0.000267352 0.000261780 0.000261028
## 25 0.000237010 NA 0.000258301 0.000267221 0.000261703
## 34 0.000029900 0.000030000 0.000027700
                                                  NA
                                                               NA 0.000030200
## 37 0.000237019 0.000226590 0.000258400 0.000267374 0.000261767 0.000261021
## 38
                           NA 0.000027700 0.000267305 0.000261791 0.000261001
## 44
               NA 0.000226486
                                       NA 0.000267310 0.000027800 0.000261041
## 45 0.000237035 0.000226544 0.000258292 0.000267273 0.000261756 0.000261017
## 48 0.000237038 0.000226585 0.000258376 0.000267358
                                                               NA 0.000261016
## 49 0.000237035
                           NA
                                      NA 0.000267276 0.000261748 0.000261023
## 56 0.000237035
                           NA
                                       NA 0.000027900
                                                               NA 0.000030200
              NA 0.000030100
                                       NA 0.000267389
                                                               NA
                                                                           NA
                           NA 0.000258300 0.000267304
## 58 0.000236999
                                                               NA
                                                                           NA
              NA 0.000226527
                                      NA 0.000267254 0.000261675
                                                                           NA
## 73 0.000029900
                           NA
                                       NA 0.000267135
                                                               NA 0.000030200
                           NA
                                       NA
## 74 0.000237107
                                                   NA
                                                              NA 0.000030200
## 82 0.000237016 0.000030100 0.000258420 0.000267299
                                                             NA 0.000261012
                  X2016
##
           X2015
                                    X2017
## 1 0.000229892
                          NΔ
                                       NΑ
## 3 0.000030400
                          NA 0.000038800
                          NA 0.000226378
              NΔ
## 5
              NA 0.000257882
              NA 0.000257906 0.000226432
## 9 0.000030400 0.000034000 0.000038800
## 10 0.000030400 0.000034000
## 11 0.000229929
                          NA
                                       NΑ
## 12 0.000229992 0.000257841 0.000226392
## 16 0.000229998 0.000257956 0.000226467
## 17 0.000229975 0.000257969
                                       NA
## 18 0.000230000
                 NA
## 20
              NA 0.000257966 0.000226477
              NA
                          NA 0.000226454
## 24 0.000229991 0.000257931 0.000226425
## 25 0.000030400
                           NA 0.000226463
## 34 0.000030400 0.000257829
## 37 0.000229911
                           NA
                                       NA
## 38 0.000030400 0.000257887
## 44 0.000229983 0.000257870 0.000226427
## 45 0.000229986 0.000257900 0.000226434
## 48 0.000229967
                           NA
## 49
              NA
                           NA 0.000226450
## 56 0.000229736 0.000257892 0.000038800
              NA 0.000257792
## 57
## 58
               NA 0.000257880 0.000226451
## 62
               NA
                           NA 0.000038800
## 73
              NΑ
                          NA 0.000038800
## 74
              NA
                          NA 0.000226425
## 82 0.000230008 0.000034000 0.000226387
```

```
M <- as.matrix(dflthcl[,4:24])</pre>
         X1997 X1998 X1999
                                        X2000 X2001
                                                               X2002
             NA 0.000050700 0.000043500
                                         NA 0.000177707 0.000178931
             NA NA 0.000043500 0.000040400 0.000040800
                          NA 0.000177073 0.000177769
## 4
             NA 0.000176783
## 5 0.000056700 NA 0.000043500
                                            NA 0.000040800 0.000178902
## 8 0.000173072 0.000176787 0.000168101 0.000177059 0.000177750 0.000178986
## 9
             NA NA 0.000043500 0.000040400 NA 0.000040100
                      NA 0.000043500 0.000177055
## 10
             NA
                                                      NA
## 11 NA NA 0.000168080 NA 0.000177721
## 12 0.000173026 0.000050700 0.000043500 NA 0.000177749
                                                                  NA
     NA NA 0.000168072 0.000177067 0.000177710 0.000179011
## 17 0.000173073 0.000050800 0.000168093 0.000177062 NA 0.000040100
                          NA
                                            NA 0.000040800
             NA 0.000050700
             NA NA 0.000043500 0.000040400 NA
## 20
## 23 0.000173072 0.000176797 0.000168085 0.000177045 0.000177751 0.000178980
## 24 0.000173067 0.000176792 0.000168081 0.000177050 0.000177741 0.000040100
## 25 0.000056600 0.000176767 NA 0.000040400 0.000177734 0.000178945
             NA 0.000050800 0.000043500 0.000040400
                                                      NA
## 37 0.000173073 0.000176796 NA 0.000177049 0.000177747
                                 NA NA 0.000177741 0.000178974
## 38 0.000173040 0.000050800
## 44 0.000173043 NA
                                 NA
                                            NA
                                                      NA 0.000178978
## 45 0.000173061 0.000176794 0.000168095 0.000177050 0.000177746 0.000178984
             NA 0.000176774 0.000168081 0.000177041 NA 0.000040100
## 49 0.000173068 0.000176801 0.000168104 0.000177063
## 56 0.000172986 NA 0.000168000 0.000176991 0.000040800
            NA
                      NA 0.000043500 NA 0.000040800
## 57
                                           NA NA 0.000178937
NA 0.000040800 0.000040100
                          NA
## 58
             NA 0.000176789
            NA 0.000050700 0.000168075
## 73 0.000056600 NA NA NA 0.000040800 0.000040100  
## 74 NA 0.000176791 0.000043500 NA 0.000177740 NA
             NA 0.000176792 0.000168067 0.000177032 0.000177771 0.000178976
## 82
                    X2004 X2005 X2006
          X2003
                                                    X2007
## 1 0.000214465 0.000194169
                              NA
                                             NA 0.000032300 0.000220207
             NA 0.000194221 0.000199991 0.000033700
                                                NA
## 4 0.000214522 0.000035400 0.000033400 NA 0.000224936
## 5
     0.000214478 0.000035400 0.000199929 0.000201323 0.000032400 0.000220127
             NA 0.000194221 0.000199991 0.000201369 0.000225029 0.000220218
## 9 0.000214513 0.000035400 0.000199959 0.000033700 0.000032300 NA
## 10 0.000039000 0.000194081 NA 0.000033700 0.000224937 0.000220057
## 11 0.000214499 0.000194223 0.000199992 NA 0.000225011 NA
## 12 0.000214449 0.000194211 0.000199962 0.000201341 0.000225012 0.000220239
     NA NA 0.000200002 0.000201355 0.000225028 NA
## 17 0.000214532 0.000035400 0.000033400 0.000201351 NA 0.000220254
## 18 0.000214537 0.000194260 0.000199990 0.000201370 0.000224999 0.000220265
             NA NA 0.000200000 0.000201363 NA 0.000031500
## 23 0.000214497 0.000194254 0.000199994 0.000201368 0.000225018 0.000220258
## 24 0.000039000 0.000194229 0.000200020 0.000201360 0.000224995 0.000220232
```

```
## 25 0.000214524 0.000194185 0.000199959 0.000201332 0.000225011 0.000220245
            NA NA 0.000033400 0.000033700 0.000032300 0.000031500
## 37 0.000039000 0.000194235 0.000199976 NA 0.000224998 0.000220217
## 38 0.000039000 0.000194246 0.000199942 0.000033700 0.000225029
## 44 NA 0.000194211 0.000199962 0.000201384 NA
                                                                NA
## 45 0.000214541 0.000194250 0.000200010
                                           NA 0.000032300 0.000220235
## 48 NA NA 0.000199986 0.000201358 0.000225006 0.000220246
           NA 0.000194222 0.000200025 0.000201353 0.000225015 0.000220225
## 56 0.000039000 0.000035400 NA NA 0.000224967 0.000031500
## 57 0.000039000 NA NA 0.000033700 NA
                                                     NA 0.000220241
## 58 0.000214471 0.000194253 0.000200015 0.000201357
## 62 NA 0.000035400 NA 0.000033700
                                                     NA 0.000031500
## 73 0.000039000 0.000194214 0.000033400 NA 0.000225014 0.000219927
## 74 0.000039000 NA NA 0.000201320 0.000224935 0.000031500
## 82 0.000214510 0.000194244 NA 0.000201337 NA 0.000220288
## X2009 X2010 X2011 X2012 X2013 X2014
     X2009 X2010
## 1
            NA
                    NA 0.000027700 0.000267289
                                                   NA
             NA 0.000030000 0.000027700 0.000027900 0.000027800 0.000030200
            NA 0.000226549 NA 0.000267204 0.000261734
## 4
## 5 0.000236996 0.000226523 0.000027700 NA 0.000261700
## 8 0.000237054 0.000226533 NA 0.000267345 NA 0.000260982
                                NA 0.000267133 0.000027800 NA
## 9
            NA 0.000030100
            NA 0.000226397 0.000258207 0.000267262 0.000027800 0.000030200
## 10
            NA NA 0.000258298 0.000267312 0.000261715 NA
## 12 0.000237039 0.000226570 0.000258338 0.000267283 0.000261500 0.000261008
## 16 0.000237084 0.000226597 0.000258431 0.000267414 0.000261826 0.000261067
           NA 0.000226614 0.000258427 0.000267414 0.000261804 0.000261052
## 23 0.000237080 NA 0.000258388 0.000267380 NA
                                                                NA
## 24 0.000237059 0.000226587 0.000258354 0.000267352 0.000261780 0.000261028
## 25 0.000237010 NA 0.000258301 0.000267221 0.000261703 NA
## 34 0.000029900 0.000030000 0.000027700 NA NA 0.000030200
## 37 0.000237019 0.000226590 0.000258400 0.000267374 0.000261767 0.000261021
     NA NA 0.000027700 0.000267305 0.000261791 0.000261001
                         NA 0.000267310 0.000027800 0.000261041
            NA 0.000226486
## 45 0.000237035 0.000226544 0.000258292 0.000267273 0.000261756 0.000261017
## 48 0.000237038 0.000226585 0.000258376 0.000267358
                                                     NA 0.000261016
## 49 0.000237035 NA
                                NA 0.000267276 0.000261748 0.000261023
## 56 0.000237035 NA
                                 NA 0.000027900
                                                      NA 0.000030200
## 57 NA 0.000030100
                                NA 0.000267389
## 58 0.000236999 NA 0.000258300 0.000267304
                                                      NA
     NA 0.000226527 NA 0.000267254 0.000261675 NA 0.000029900 NA NA 0.000267135 NA 0.000030200
## 73 0.000029900 NA
                                NA NA
## 74 0.000237107
                       NA
                                                     NA 0.000030200
## 82 0.000237016 0.000030100 0.000258420 0.000267299 NA 0.000261012
         X2015
               X2016
                               X2017
## 1 0.000229892
                   NA
                                 NA
## 3 0.000030400
                      NA 0.000038800
## 4 NA NA 0.000226378
```

```
NA 0.000257882
## 5
## 8
              NA 0.000257906 0.000226432
## 9 0.000030400 0.000034000 0.000038800
## 10 0.000030400 0.000034000
## 11 0.000229929
                          NA
                                       NA
## 12 0.000229992 0.000257841 0.000226392
## 16 0.000229998 0.000257956 0.000226467
## 17 0.000229975 0.000257969
                                       NA
## 18 0.000230000
                                       NA
## 20
              NA 0.000257966 0.000226477
## 23
              NA
                          NA 0.000226454
## 24 0.000229991 0.000257931 0.000226425
## 25 0.000030400
                          NA 0.000226463
## 34 0.000030400 0.000257829
## 37 0.000229911
                          NA
                                      NA
## 38 0.000030400 0.000257887
## 44 0.000229983 0.000257870 0.000226427
## 45 0.000229986 0.000257900 0.000226434
## 48 0.000229967
                          NA
## 49
              NA
                          NA 0.000226450
## 56 0.000229736 0.000257892 0.000038800
              NA 0.000257792
## 57
## 58
              NA 0.000257880 0.000226451
## 62
              NA
                          NA 0.000038800
## 73
              NA
                          NA 0.000038800
## 74
              NA
                          NA 0.000226425
## 82 0.000230008 0.000034000 0.000226387
dim(M)
## [1] 30 21
```

