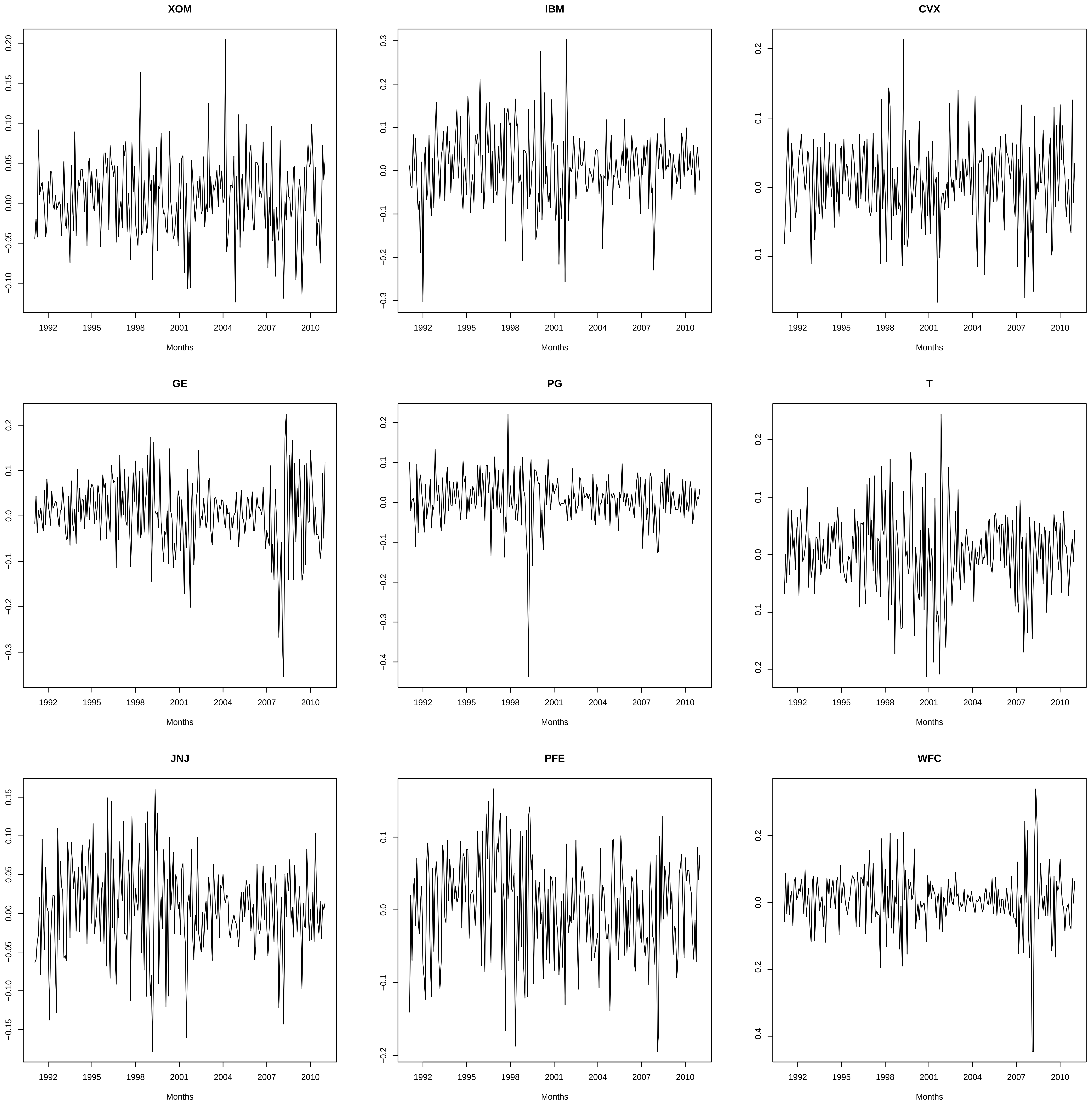
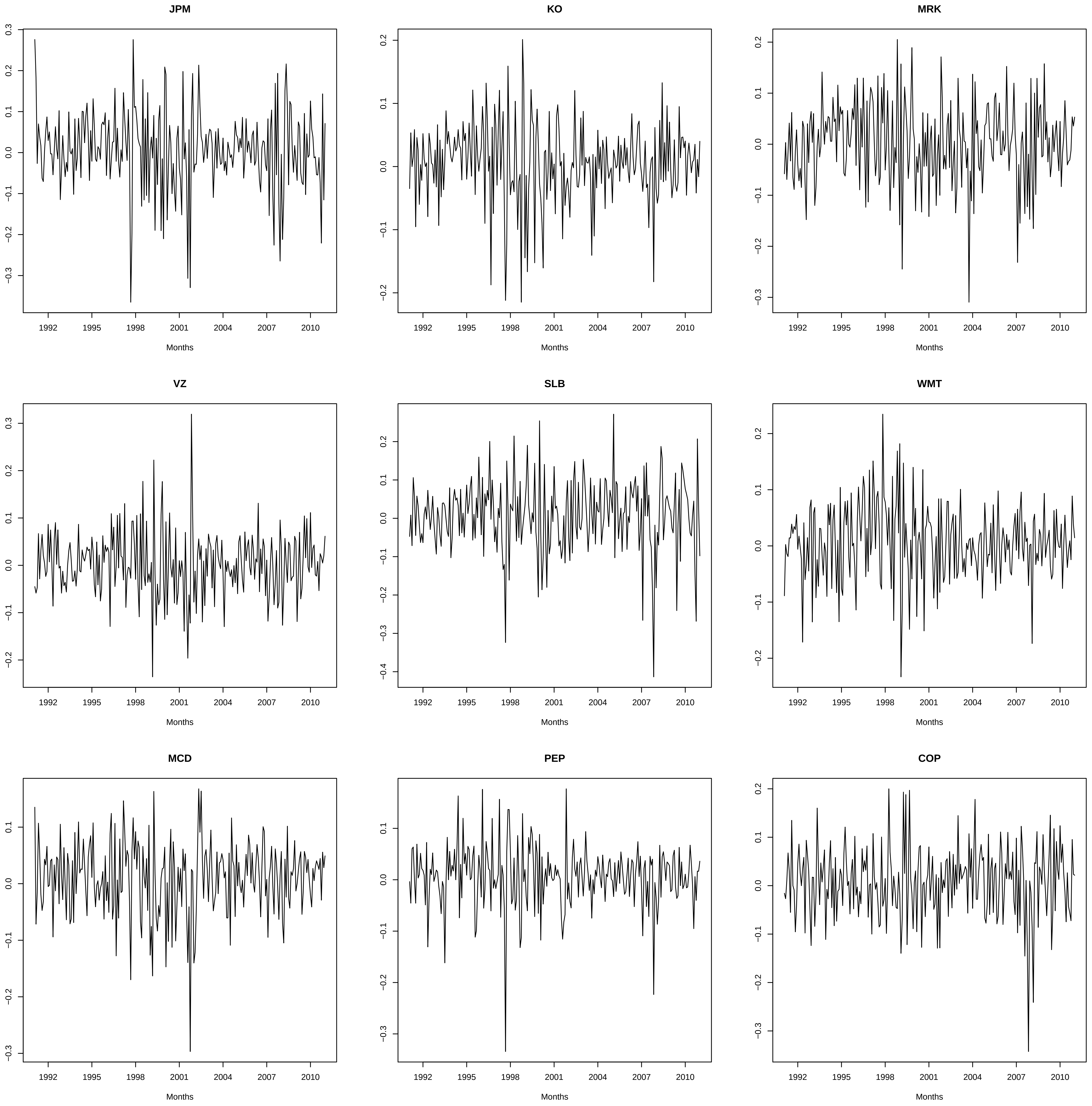
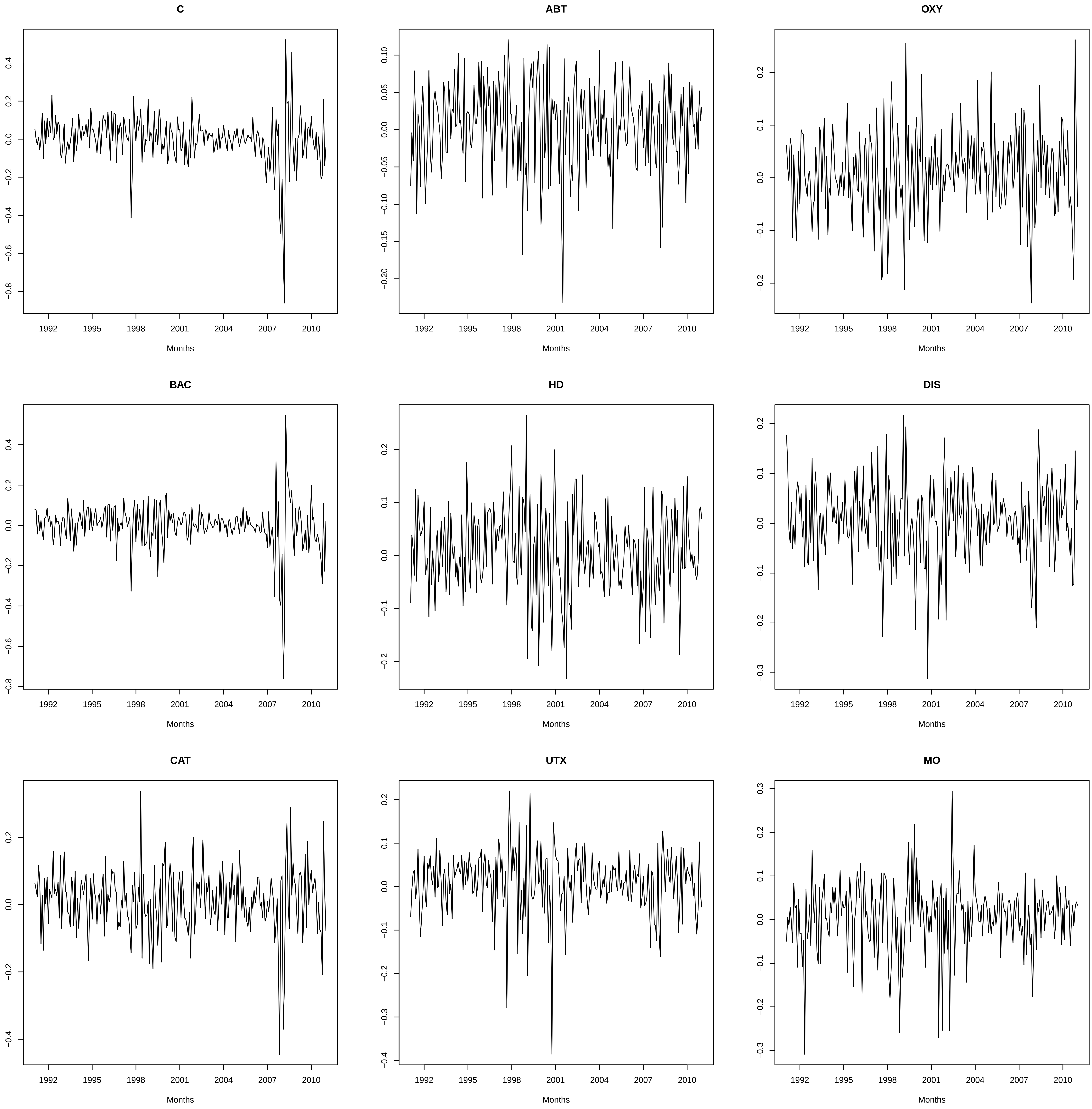
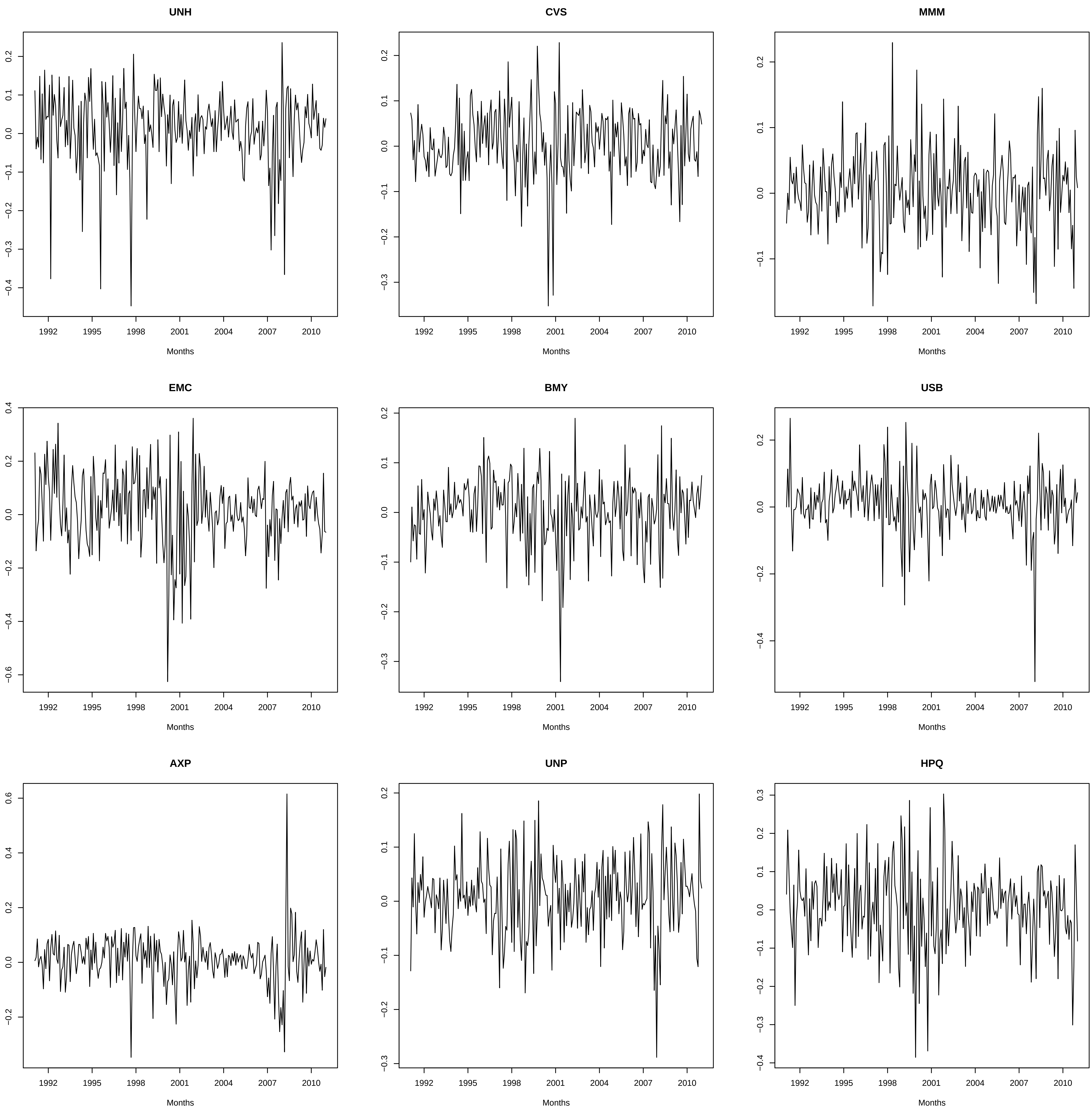
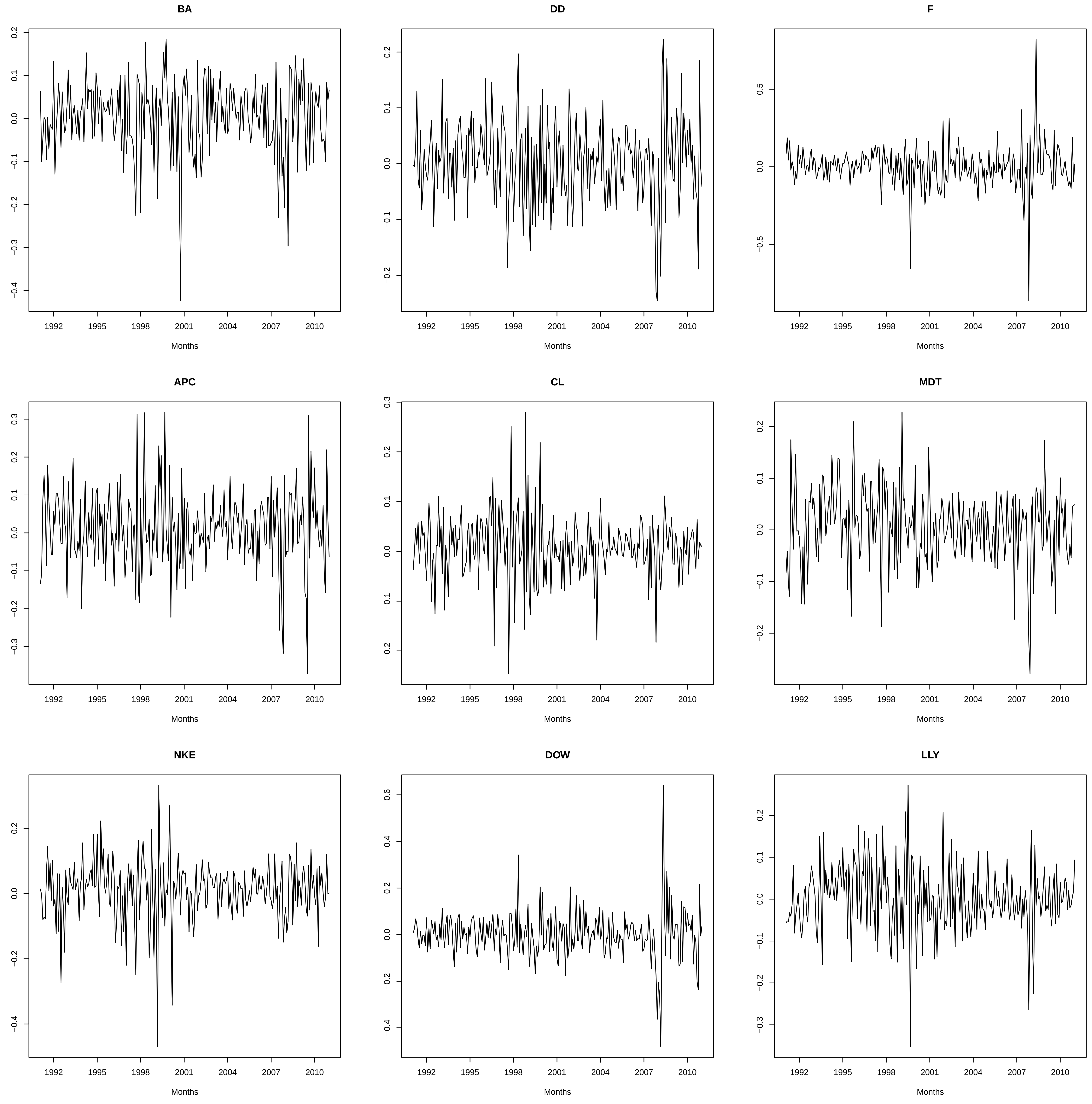

XOM
IBM
CVX
GE
PG
T
JNJ
PFE
WFC
1992
1995
1998
2001
2004
2007
2010
Months

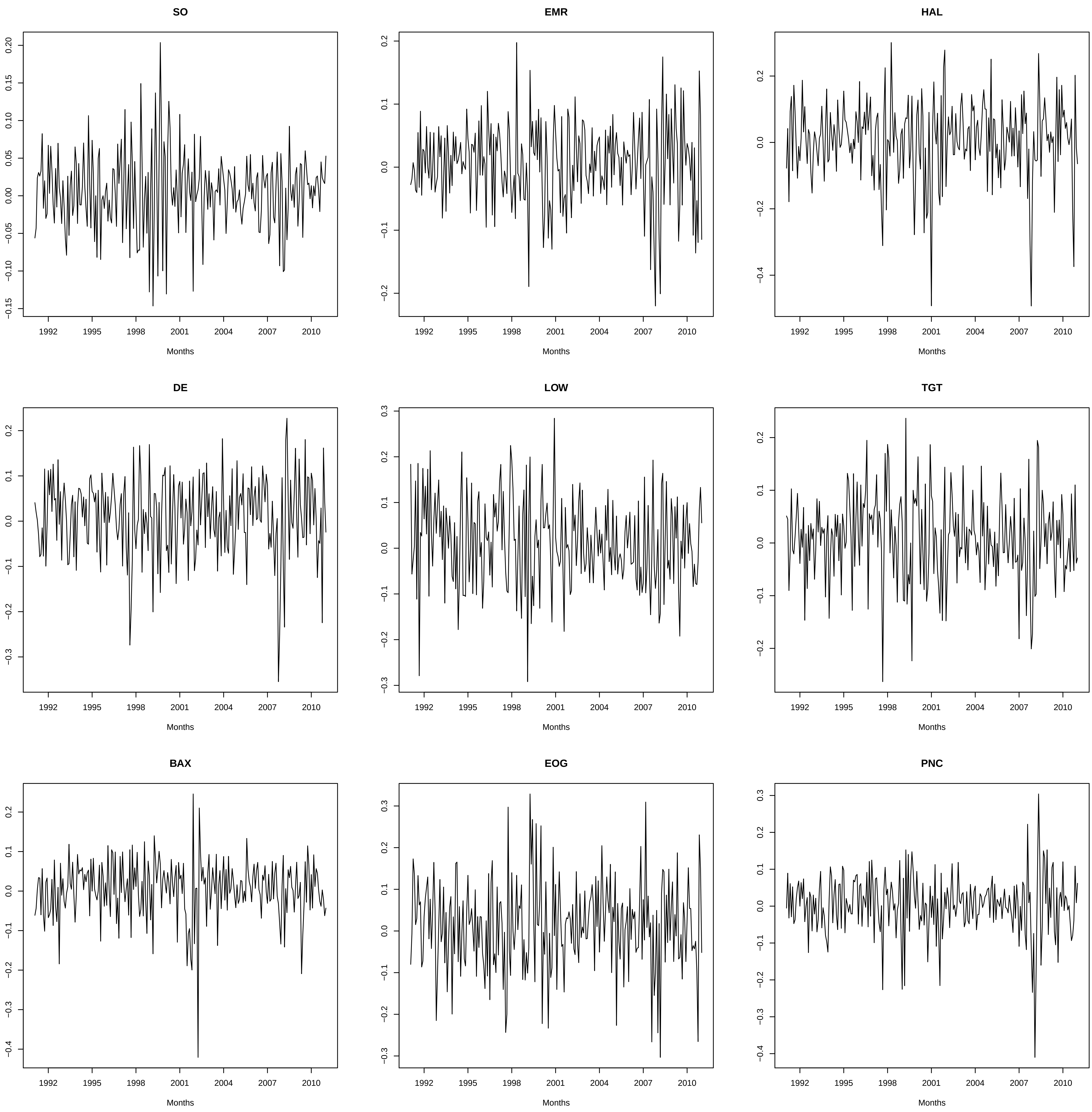


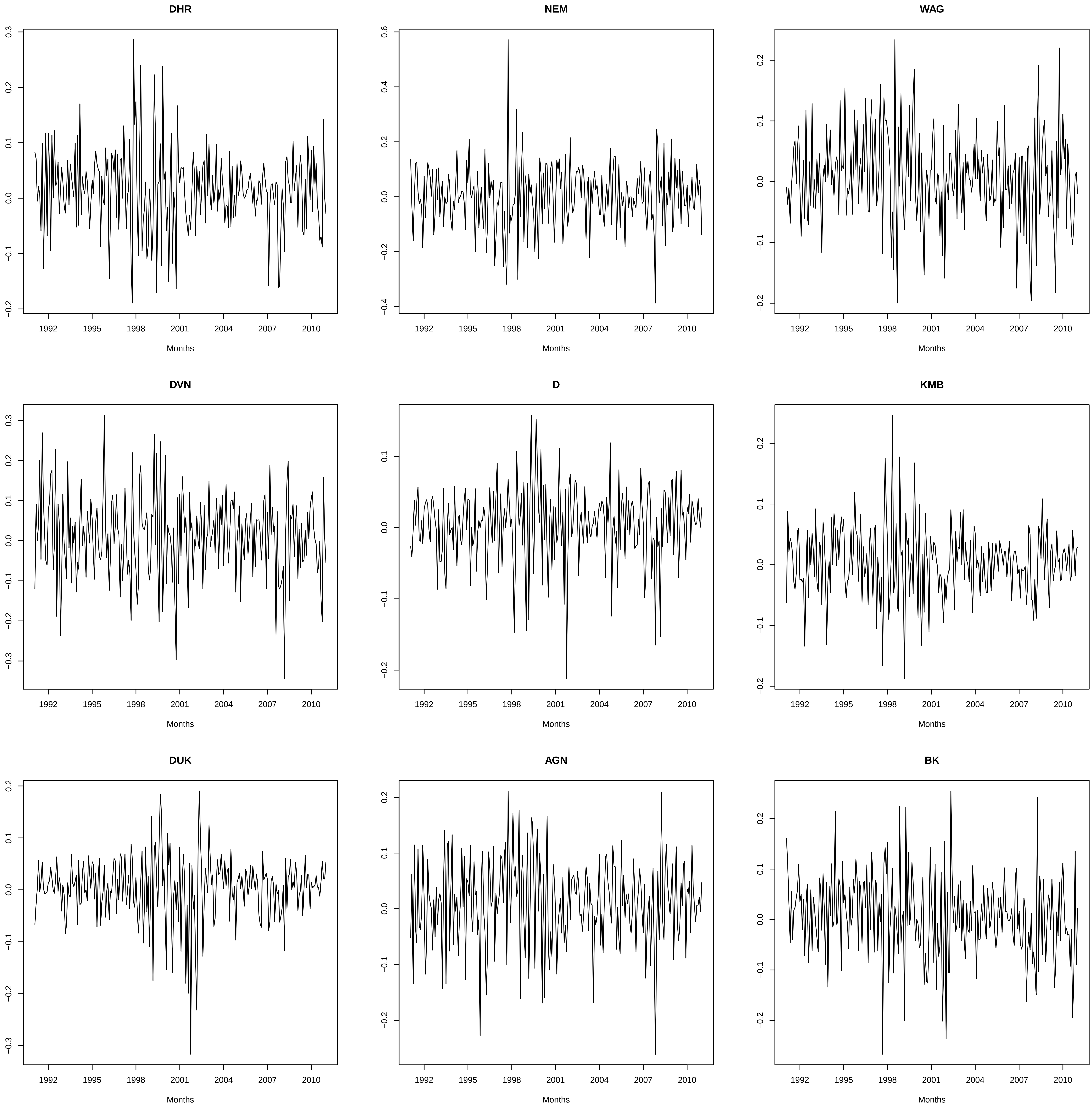
JPM
KO
MRK
VZ
SLB
WMT
MCD
PEP
COP
1992
1995
1998
2001
2004
2007
2010
Months

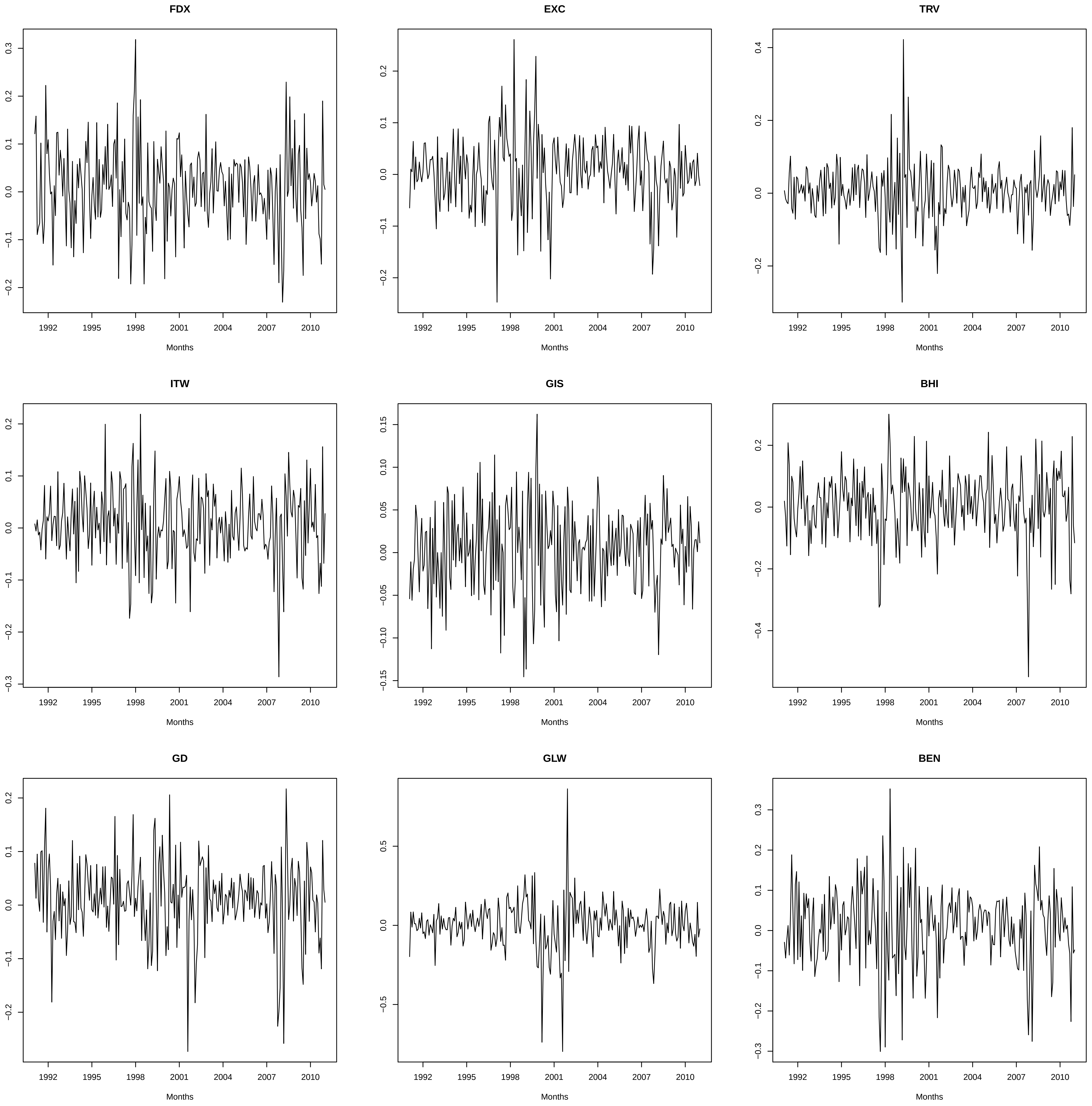

C
0.4
0.2
0.0
−0.2
−0.4
−0.6
−0.8
1992
1995
1998
2001
2004
2007
2010
Months
ABT
0.10
0.05
0.00
−0.05
−0.10
−0.15
−0.20
1992
1995
1998
2001
2004
2007
2010
Months
OXY
0.2
0.1
0.0
−0.1
−0.2
1992
1995
1998
2001
2004
2007
2010
Months
BAC
0.4
0.2
0.0
−0.2
−0.4
−0.6
−0.8
1992
1995
1998
2001
2004
2007
2010
Months
HD
0.2
0.1
0.0
−0.1
−0.2
1992
1995
1998
2001
2004
2007
2010
Months
DIS
0.2
0.1
0.0
−0.1
−0.2
−0.3
1992
1995
1998
2001
2004
2007
2010
Months
CAT
0.2
0.0
−0.2
−0.4
1992
1995
1998
2001
2004
2007
2010
Months
UTX
0.2
0.1
0.0
−0.1
−0.2
−0.3
−0.4
1992
1995
1998
2001
2004
2007
2010
Months
MO
0.3
0.2
0.1
0.0
−0.1
−0.2
−0.3
1992
1995
1998
2001
2004
2007
2010
Months

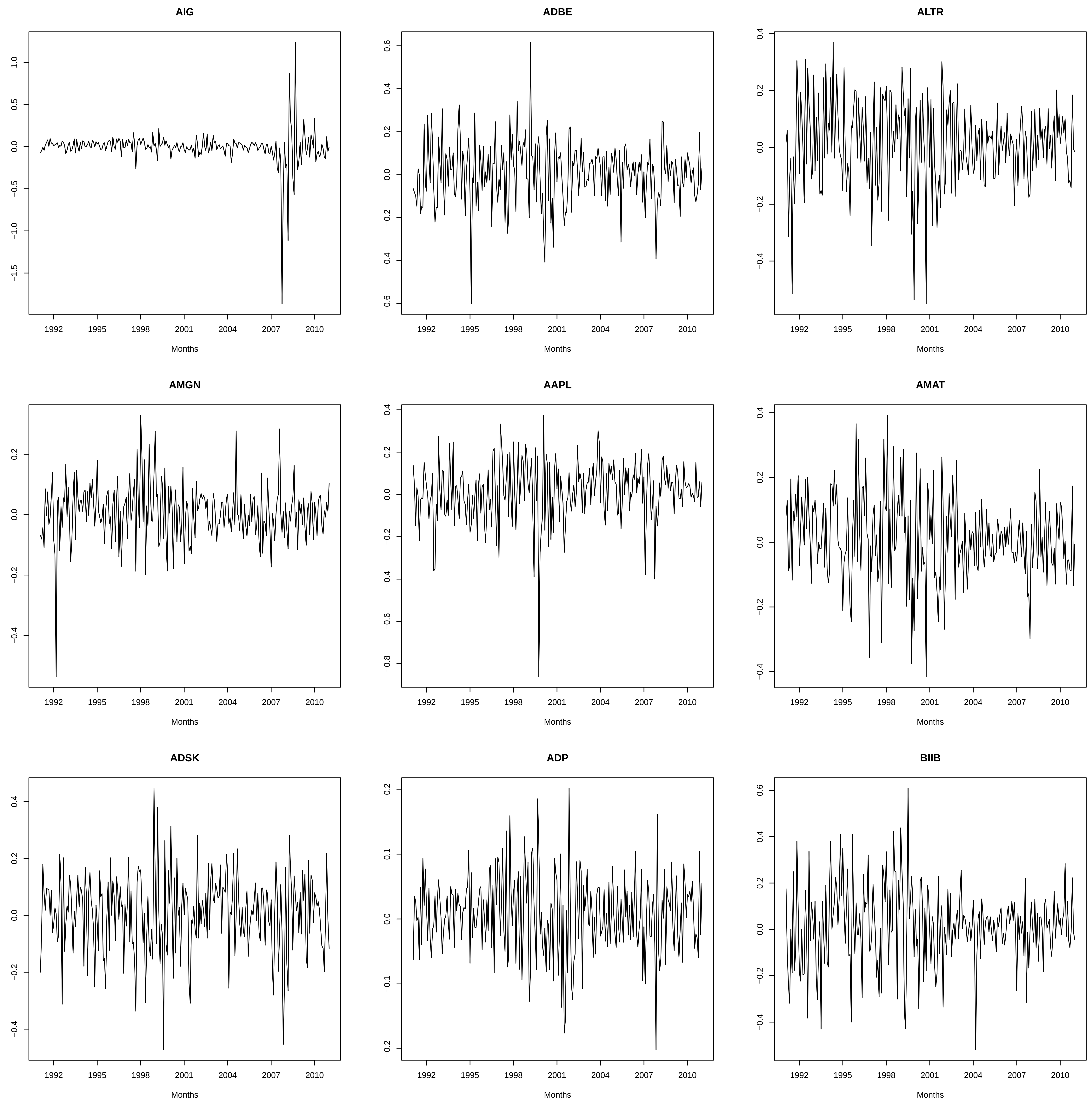

UNH
CVS
MMM
EMC
BMY
USB
AXP
UNP
HPQ
1992
1995
1998
2001
2004
2007
2010
Months

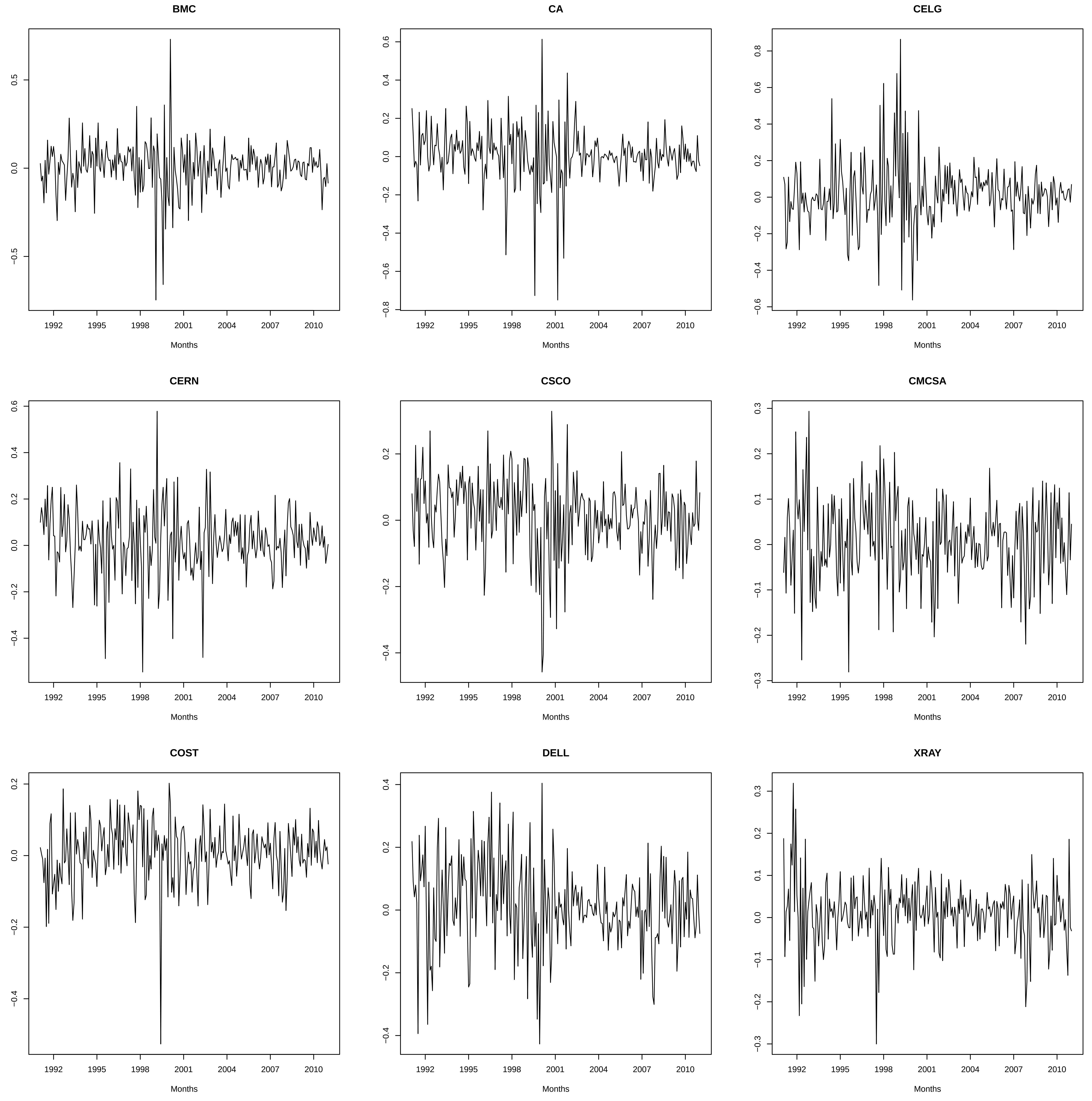

BA
DD
F
APC
CL
MDT
NKE
DOW
LLY
Months
1992
1995
1998
2001
2004
2007
2010


SO
EMR
HAL
DE
LOW
TGT
BAX
EOG
PNC
Months
1992
1995
1998
2001
2004
2007
2010

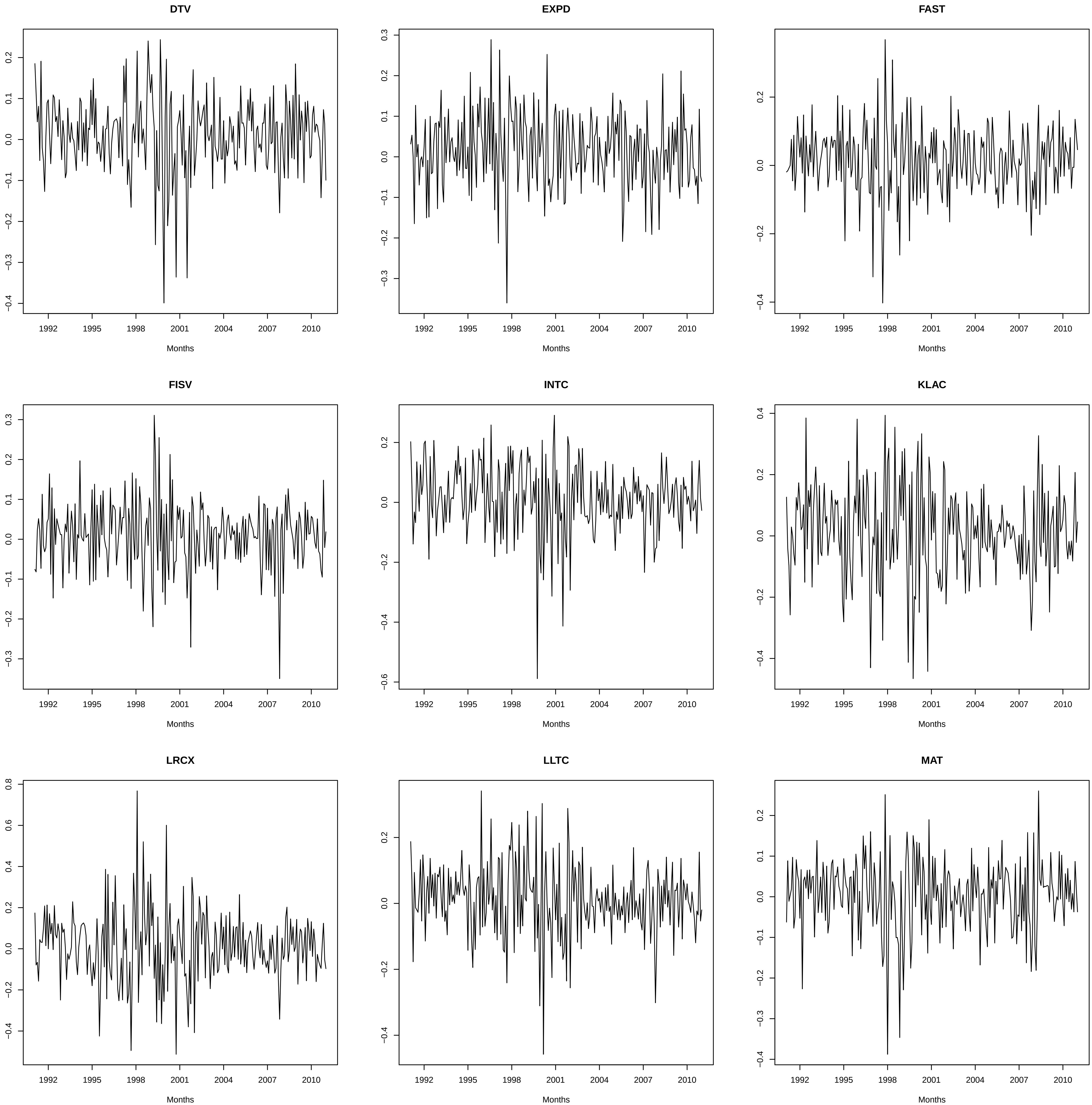

DHR
NEM
WAG
DVN
D
KMB
DUK
AGN
BK
1992 1995 1998 2001 2004 2007 2010
Months

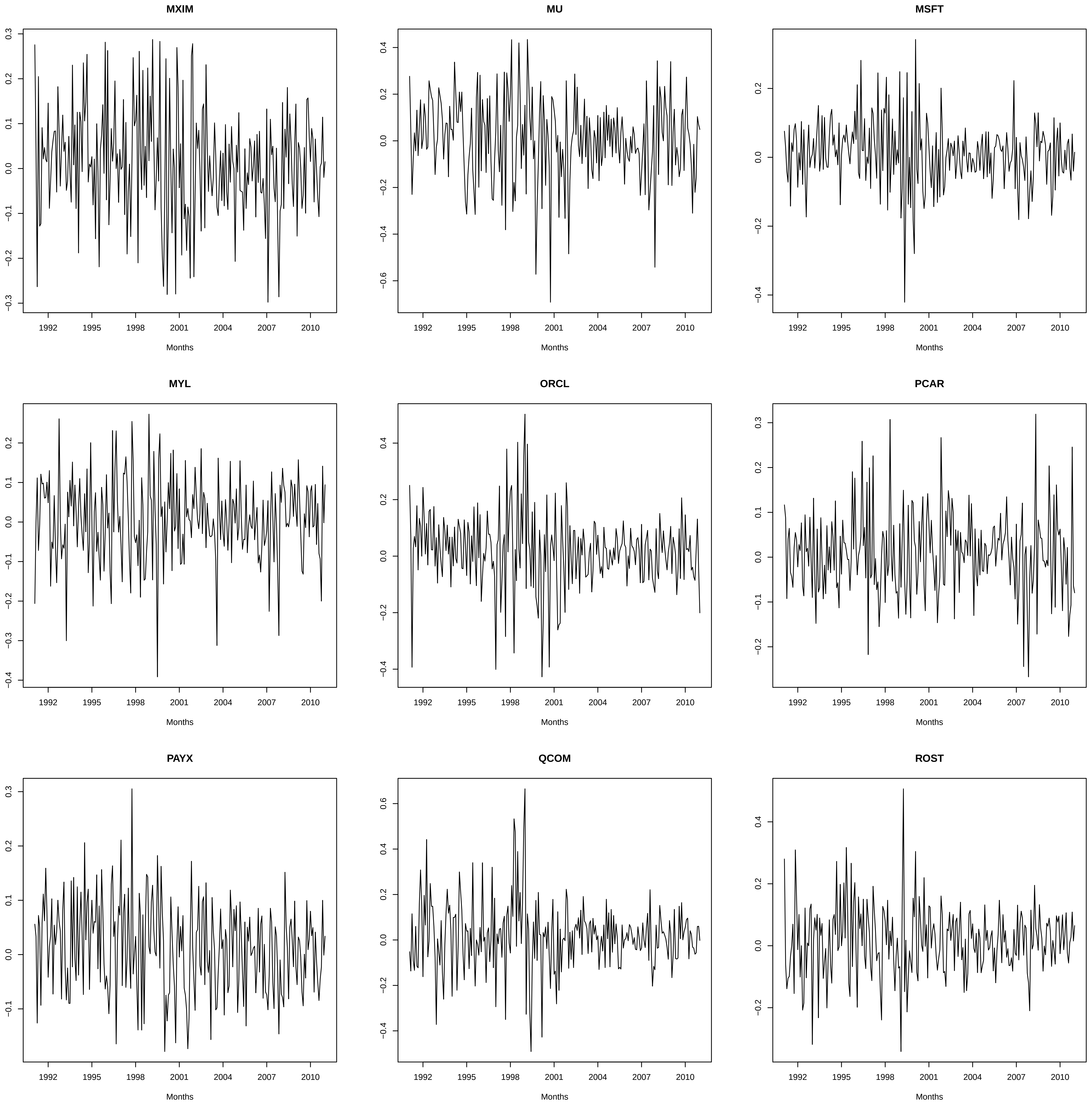

FDX
EXC
TRV
ITW
GIS
BHI
GD
GLW
BEN
1992 1995 1998 2001 2004 2007 2010
Months

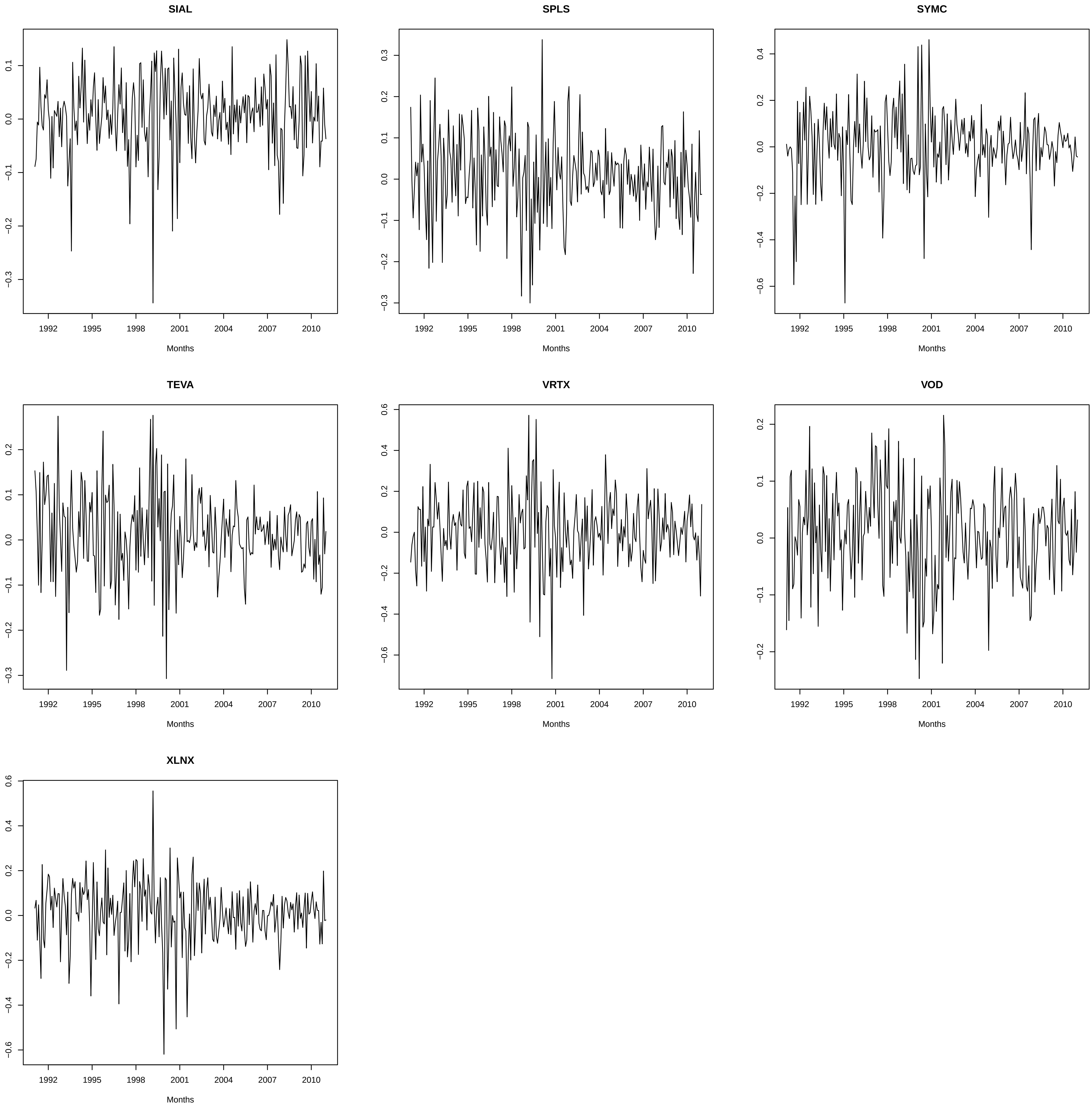

AIG
ADBE
ALTR
AMGN
AAPL
AMAT
ADSK
ADP
BIIB
Months
1992
1995
1998
2001
2004
2007
2010

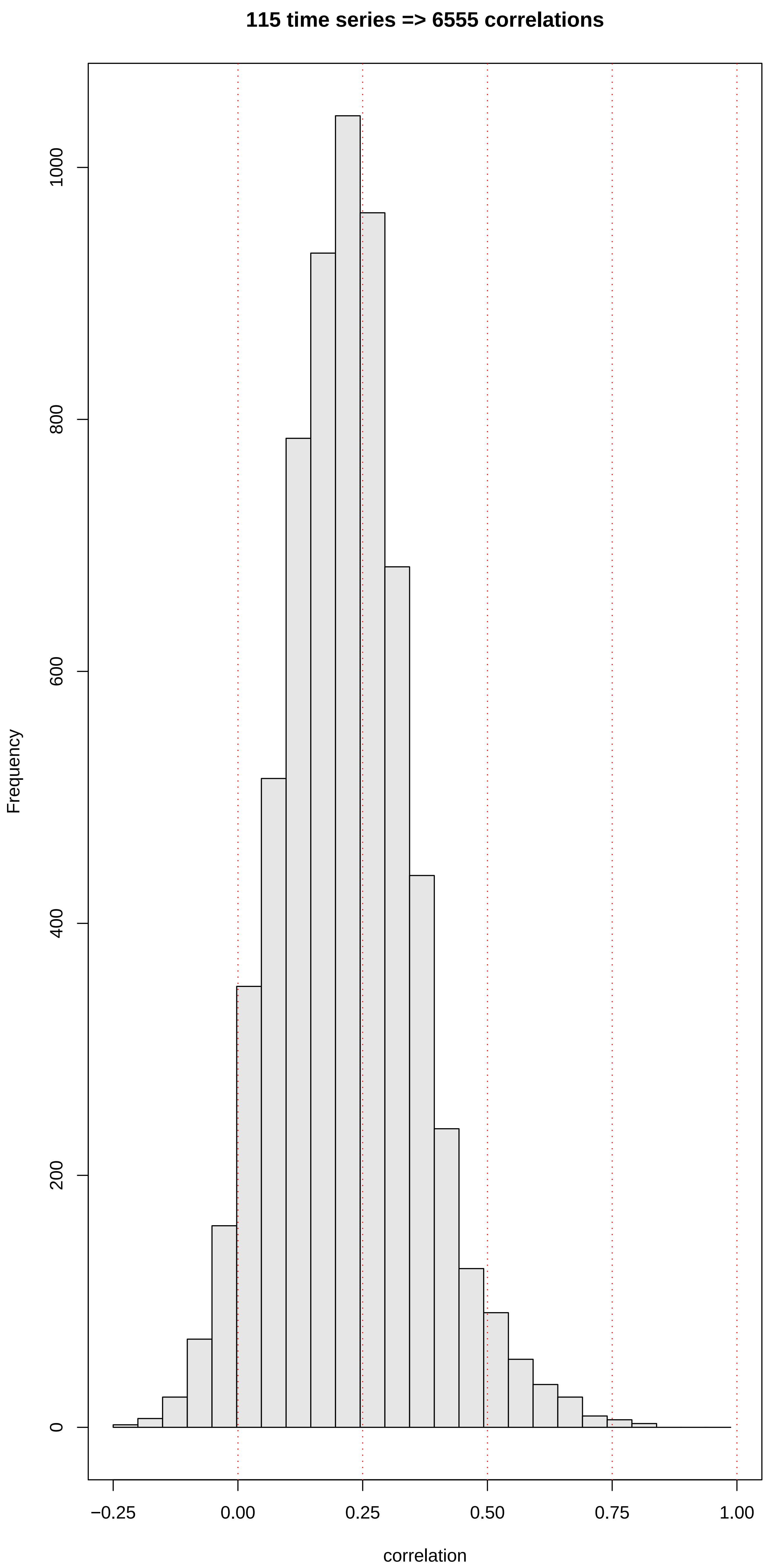


BMC
CA
CELG
CERN
CSCO
CMCSA
COST
DELL
XRAY
1992
1995
1998
2001
2004
2007
2010
Months

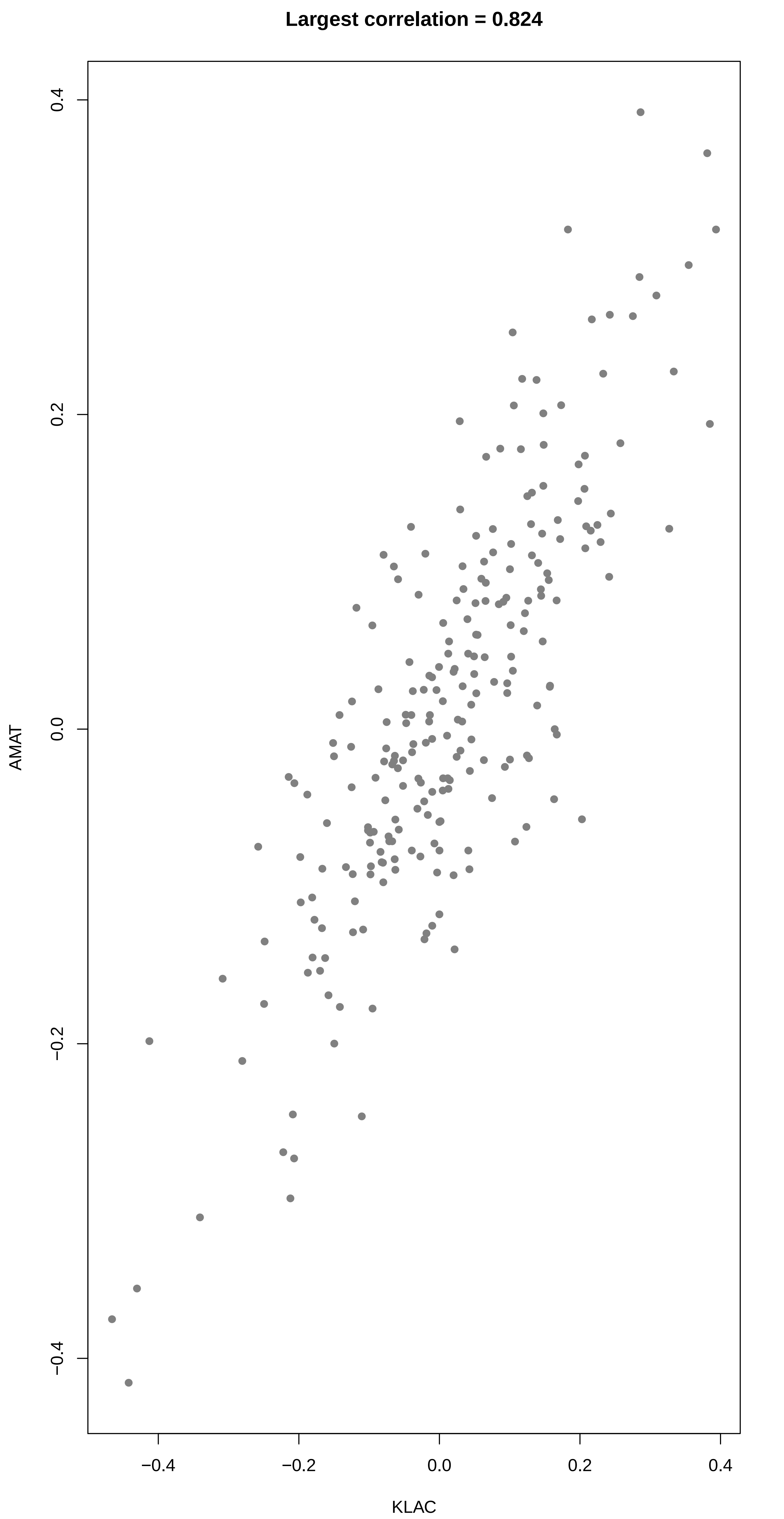

DTV
EXPD
FAST
FISV
INTC
KLAC
LRCX
LLTC
MAT
Months
1992
1995
1998
2001
2004
2007
2010


MXIM
MU
MSFT
MYL
ORCL
PCAR
PAYX
QCOM
ROST
Months
1992
1995
1998
2001
2004
2007
2010

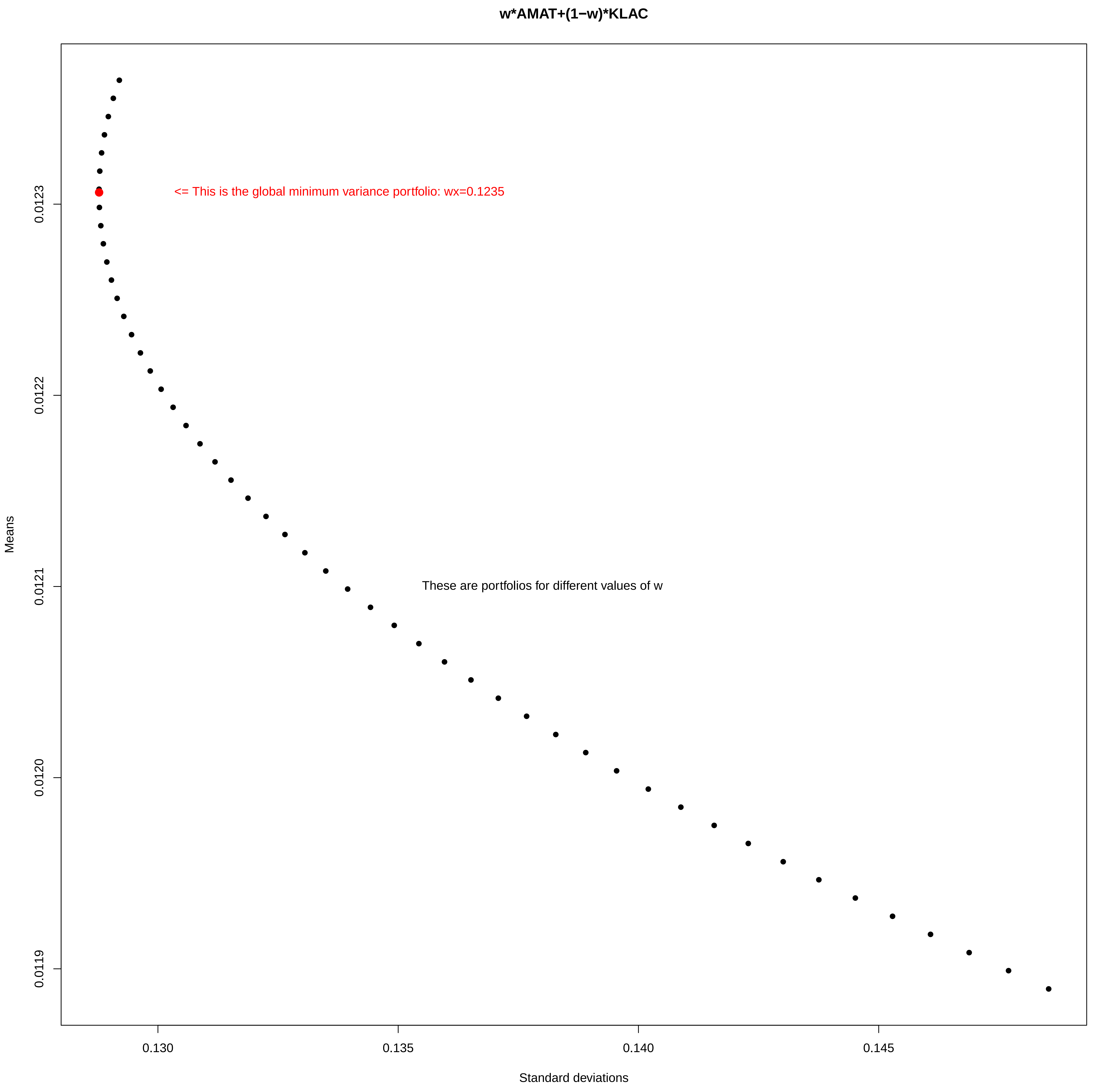

SIAL
SPLS
SYMC
TEVA
VRTX
VOD
XLNX
Months
1992 1995 1998 2001 2004 2007 2010



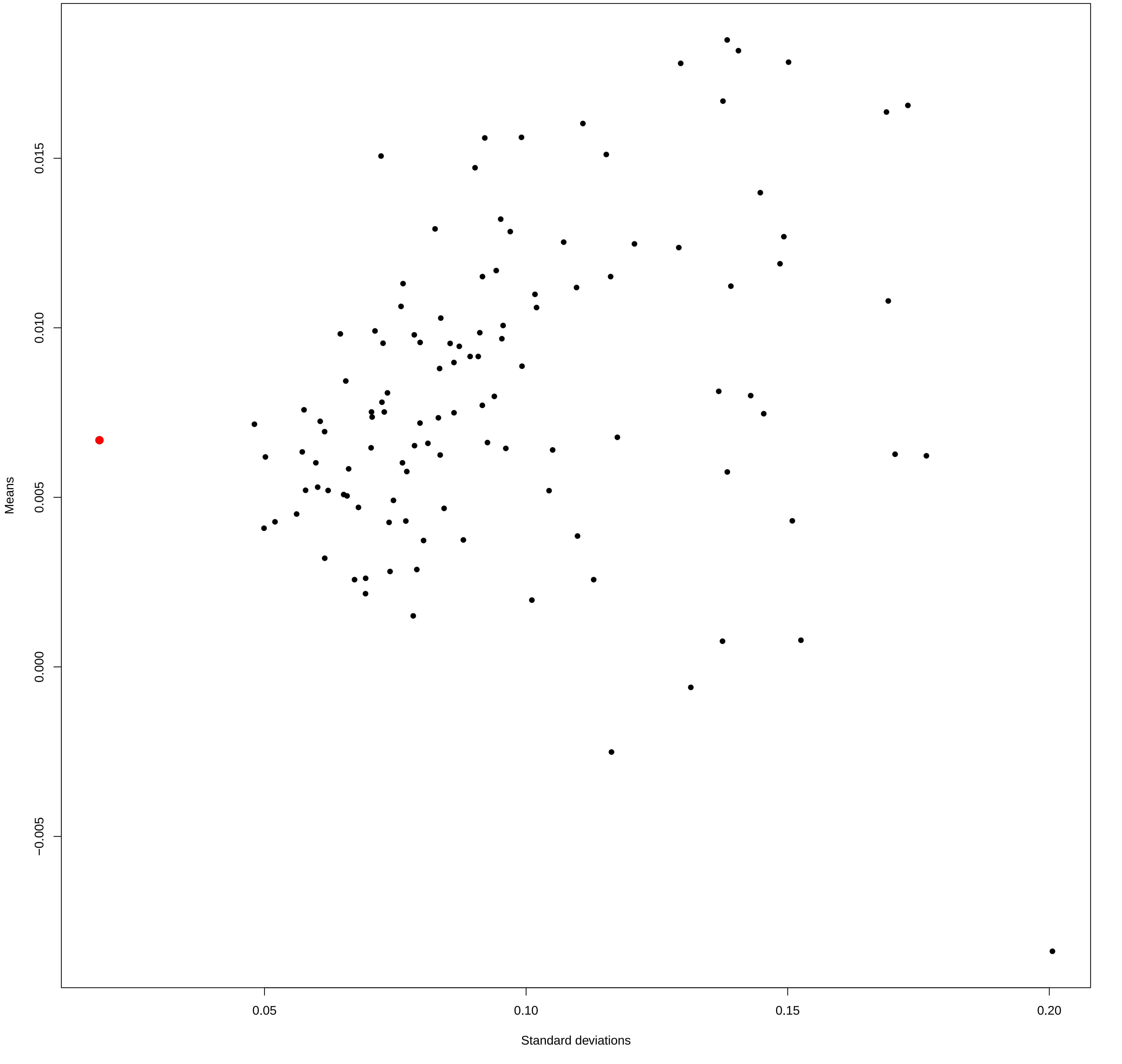
115 time series => 6555 correlations
Frequency
0
200
400
600
800
1000
−0.25
0.00
0.25
0.50
0.75
1.00
correlation

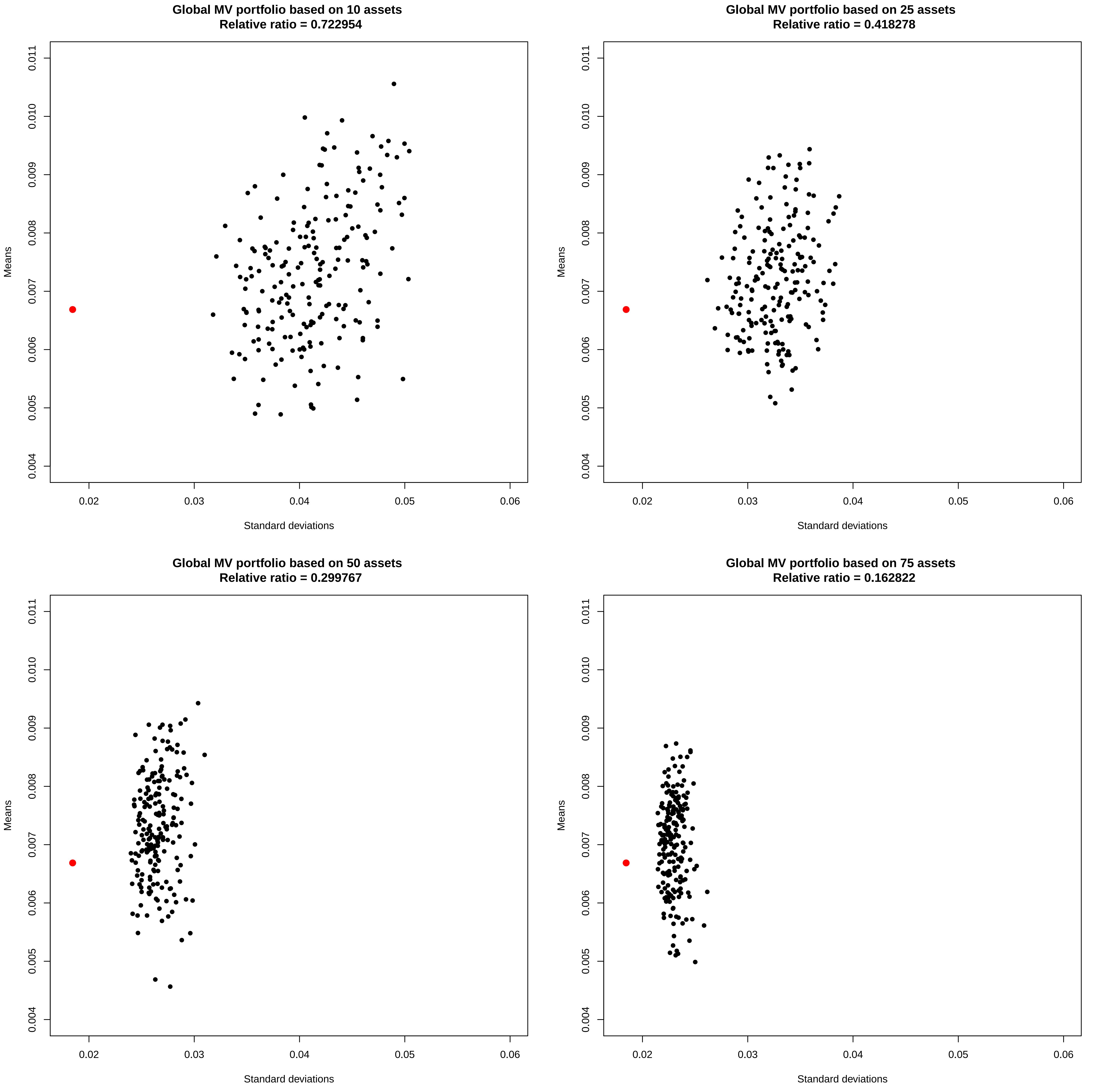


Largest correlation = 0.824
AMAT
−0.4
−0.2
0.0
0.2
0.4
KLAC


w*AMAT+(1−w)*KLAC
<= This is the global minimum variance portfolio: wx=0.1235
These are portfolios for different values of w
Means
0.0119
0.0120
0.0121
0.0122
0.0123
Standard deviations
0.130
0.135
0.140
0.145

Global minimum variance portfolio (red dot) based on ALL 115 assets
Standard deviations and means (black dots) for the 115 assets




Global MV portfolio based on 10 assets
Relative ratio = 0.722954
Global MV portfolio based on 25 assets
Relative ratio = 0.418278
Global MV portfolio based on 50 assets
Relative ratio = 0.299767
Global MV portfolio based on 75 assets
Relative ratio = 0.162822
Means
Standard deviations
0.004
0.005
0.006
0.007
0.008
0.009
0.010
0.011
0.02
0.03
0.04
0.05
0.06