I have taken the close price data from 1st Jan 2014 to 6th Nov 2024, then calculated the return series. The indices are as follows:
BSE SENSEX - **SENSEX**
Oil and Gas - **OG** (as India heavily dependent on oil imports)
DOLLEX 200 - **D200**
Financial Services - **FS**
IPO - **IPO**

Then I ran Vector AutoRegression (VAR), considering appropriate lag length (criteria followed FPE, AIC). Optimal lag length is 5.

Plotted the Impulse Responses (Residual One Unit) of different assets to SENSEX (market) innovation.

Variances are decomposed using the Cholesky factor. On the basis of variance decomposition, three assets are chosen to construct the portfolio, that are D200, FS and IPO.

Equally Weighted (**EWPF**) and Minimum Variance Portfolio (**MVPF**) Return series are constructed.

To check the risk resilience of the portfolio (in this case MVPF), I considered the Financial Stress Index (**FSI**). After that I performed the Discrete Threshold Regression (DTAR), selecting MVPF as the dependent variable and FSI as a threshold variable.
Equation: MVPF = Constant + FSI + MVPF(-1) + FSI(-1)
The coefficient of FSI is negative and significant (**-0.012038**), so global stress lowers the portfolio return, concluding that the portfolio is not so risk resilient to global financial stress.
The Value at Risk (VaR) of MVPF is **1.96**, at 99% confidence interval.

Data Sources: BSE India (SENSEX, OG, D200, FS, IPO)
Office of Financial Research (FSI)

VAR Lag Order Selection Criteria
Endogenous variables: D200 FS IPO OG SENSEX
Exogenous variables: C
Date: 11/06/24 Time: 23:40
Sample: 1/02/2014 11/06/2024
Included observations: 2674

Lag	LogL	LR	FPE	AIC	SC	HQ
0	44063.59	NA	3.36e-21	-32.95332	-32.94231	-32.94934
1	46151.26	4165.971	7.18e-22	-34.49608	-34.42999*	-34.47217
2	46248.53	193.7299	6.80e-22	-34.55013	-34.42896	-34.50629
3	46297.12	96.61247	6.68e-22	-34.56778	-34.39153	-34.50401
4	46353.47	111.8117	6.53e-22	-34.59123	-34.35989	-34.50753*
5	46380.58	53.68146	6.52e-22*	-34.59280*	-34.30639	-34.48917
6	46401.67	41.69101*	6.54e-22	-34.58988	-34.24838	-34.46632
7	46417.79	31.82002	6.58e-22	-34.58324	-34.18667	-34.43976
8	46436.90	37.63504	6.61e-22	-34.57884	-34.12718	-34.41542

* indicates lag order selected by the criterion
LR: sequential modified LR test statistic (each test at 5% level)
FPE: Final prediction error
AIC: Akaike information criterion
SC: Schwarz information criterion
HQ: Hannan-Quinn information criterion

Vector Autoregression Estimates
Date: 11/06/24 Time: 23:45
Sample (adjusted): 1/09/2014 11/06/2024
Included observations: 2677 after adjustments
Standard errors in ( ) & t-statistics in [ ]

	D200	FS	IPO	OG	SENSEX
D200(-1)	-0.196972	0.154746	0.285442	0.082958	-0.208980
	(0.03684)	(0.07793)	(0.06220)	(0.06475)	(0.03067)
	[-5.34635]	[1.98570]	[4.58930]	[1.28122]	[-6.81404]
D200(-2)	-0.050428	0.127539	0.011141	0.142012	-0.008842
	(0.03735)	(0.07900)	(0.06305)	(0.06564)	(0.03109)
	[-1.35016]	[1.61436]	[0.17669]	[2.16350]	[-0.28438]
D200(-3)	0.003357	-0.148103	-0.038359	-0.008213	0.002650
	(0.03739)	(0.07908)	(0.06311)	(0.06570)	(0.03112)
	[0.08979]	[-1.87285]	[-0.60777]	[-0.12500]	[0.08515]
D200(-4)	-0.020158	-0.134442	0.058057	-0.009750	-0.056552
	(0.03734)	(0.07897)	(0.06303)	(0.06562)	(0.03108)
	[-0.53993]	[-1.70239]	[0.92110]	[-0.14860]	[-1.81961]
D200(-5)	0.011207	0.245334	-0.052750	0.022073	-0.008005
	(0.03719)	(0.07866)	(0.06278)	(0.06535)	(0.03095)
	[0.30139]	[3.11907]	[-0.84028]	[0.33775]	[-0.25861]
FS(-1)	0.756007	0.013892	0.630964	0.650319	0.684538
	(0.00920)	(0.01945)	(0.01553)	(0.01616)	(0.00766)
	[82.2051]	[0.71416]	[40.6401]	[40.2360]	[89.4168]
FS(-2)	0.120665	-0.267624	0.010061	0.088238	0.116513
	(0.01933)	(0.04088)	(0.03263)	(0.03397)	(0.01609)
	[6.24309]	[-6.54611]	[0.30833]	[2.59771]	[7.24169]
FS(-3)	0.100160	0.052671	-0.075926	-0.007008	0.070082
	(0.01959)	(0.04144)	(0.03308)	(0.03443)	(0.01631)
	[5.11198]	[1.27088]	[-2.29542]	[-0.20352]	[4.29685]
FS(-4)	-0.036850	-0.051776	0.144327	0.033937	-0.050648
	(0.01961)	(0.04147)	(0.03310)	(0.03446)	(0.01632)
	[-1.87942]	[-1.24842]	[4.36028]	[0.98486]	[-3.10313]
FS(-5)	0.076338	0.009429	0.037847	-0.012814	0.074495
	(0.01955)	(0.04135)	(0.03300)	(0.03435)	(0.01627)
	[3.90522]	[0.22803]	[1.14687]	[-0.37299]	[4.57806]
IPO(-1)	0.038807	-0.031476	0.058894	-0.007052	0.028867
	(0.01222)	(0.02586)	(0.02064)	(0.02148)	(0.01018)
	[3.17466]	[-1.21732]	[2.85391]	[-0.32825]	[2.83683]
IPO(-2)	0.024706	-0.004601	0.032024	0.018256	0.016566
	(0.01222)	(0.02585)	(0.02063)	(0.02147)	(0.01017)
	[2.02189]	[-0.17801]	[1.55244]	[0.85012]	[1.62861]
IPO(-3)	0.015117	-0.006950	-0.007240	-0.005771	0.013049
	(0.01216)	(0.02573)	(0.02053)	(0.02138)	(0.01013)
	[1.24282]	[-0.27013]	[-0.35260]	[-0.26995]	[1.28874]
IPO(-4)	-0.005455	0.063501	-0.018266	0.023204	-0.007840
	(0.01198)	(0.02535)	(0.02023)	(0.02106)	(0.00998)
	[-0.45526]	[2.50528]	[-0.90294]	[1.10184]	[-0.78599]

Vector Autoregression Estimates

IPO(-5)	0.002057	-0.031436	0.018657	-0.013454	0.003393
	(0.01140)	(0.02411)	(0.01924)	(0.02003)	(0.00949)
	[0.18042]	[-1.30380]	[0.96952]	[-0.67159]	[0.35759]
OG(-1)	0.046202	-0.008656	-0.062837	0.025727	0.036576
	(0.01246)	(0.02635)	(0.02103)	(0.02190)	(0.01037)
	[3.70846]	[-0.32849]	[-2.98761]	[1.17500]	[3.52678]
OG(-2)	0.011687	-0.003041	0.017113	-0.026786	0.009071
	(0.01252)	(0.02648)	(0.02113)	(0.02200)	(0.01042)
	[0.93366]	[-0.11484]	[0.80986]	[-1.21765]	[0.87057]
OG(-3)	-0.023640	-0.005965	-0.026616	-0.008031	-0.018487
	(0.01252)	(0.02649)	(0.02114)	(0.02201)	(0.01043)
	[-1.88754]	[-0.22519]	[-1.25886]	[-0.36487]	[-1.77331]
OG(-4)	0.035102	-0.029011	-0.038308	0.002418	0.025805
	(0.01250)	(0.02644)	(0.02110)	(0.02197)	(0.01041)
	[2.80791]	[-1.09714]	[-1.81519]	[0.11006]	[2.47975]
OG(-5)	0.013489	-0.029385	0.002078	0.005380	0.013621
	(0.01251)	(0.02646)	(0.02111)	(0.02198)	(0.01041)
	[1.07847]	[-1.11072]	[0.09842]	[0.24476]	[1.30824]
SENSEX(-1)	-0.019162	0.250732	-0.260455	-0.217346	-0.011478
	(0.04266)	(0.09024)	(0.07202)	(0.07498)	(0.03551)
	[-0.44917]	[2.77855]	[-3.61639]	[-2.89890]	[-0.32321]
SENSEX(-2)	-0.103464	-0.226365	0.136744	-0.092266	-0.109790
	(0.04268)	(0.09028)	(0.07205)	(0.07501)	(0.03553)
	[-2.42412]	[-2.50735]	[1.89780]	[-1.23005]	[-3.09012]
SENSEX(-3)	0.072724	0.307021	-0.155563	-0.000224	0.076594
	(0.04281)	(0.09056)	(0.07228)	(0.07524)	(0.03564)
	[1.69861]	[3.39020]	[-2.15229]	[-0.00298]	[2.14913]
SENSEX(-4)	-0.114409	0.195363	-0.053211	-0.001123	-0.075523
	(0.04283)	(0.09060)	(0.07231)	(0.07528)	(0.03566)
	[-2.67099]	[2.15624]	[-0.73585]	[-0.01492]	[-2.11807]
SENSEX(-5)	-0.030472	-0.289361	0.053127	-0.008026	-0.005025
	(0.03930)	(0.08312)	(0.06634)	(0.06906)	(0.03271)
	[-0.77545]	[-3.48122]	[0.80084]	[-0.11622]	[-0.15361]
C	-1.82E-05	0.000528	0.000421	5.04E-05	0.000108
	(0.00012)	(0.00026)	(0.00021)	(0.00022)	(0.00010)
	[-0.14679]	[2.00981]	[2.00741]	[0.23103]	[1.04551]
R-squared	0.727151	0.054265	0.429916	0.400245	0.761469
Adj. R-squared	0.724578	0.045346	0.424540	0.394589	0.759219
Sum sq. resids	0.106163	0.474995	0.302564	0.327899	0.073565
S.E. equation	0.006328	0.013386	0.010683	0.011122	0.005268
F-statistic	282.6003	6.084445	79.96762	70.76558	338.5136
Log likelihood	9767.514	7761.997	8365.675	8258.043	10258.47
Akaike AIC	-7.277934	-5.779602	-6.230612	-6.150200	-7.644731
Schwarz SC	-7.220704	-5.722372	-6.173383	-6.092971	-7.587501
Mean dependent	0.000451	0.000575	0.000849	0.000435	0.000506
S.D. dependent	0.012058	0.013700	0.014083	0.014294	0.010735

Determinant resid covariance (dof adj.)	6.28E-22
Determinant resid covariance	5.98E-22
Log likelihood	46417.28
Akaike information criterion	-34.58146
Schwarz criterion	-34.29531

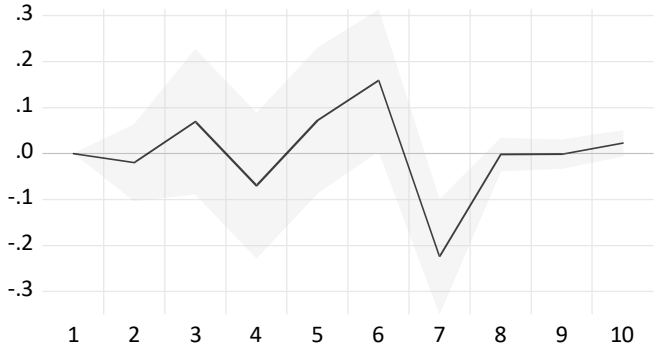
Vector Autoregression Estimates

Number of coefficients	130

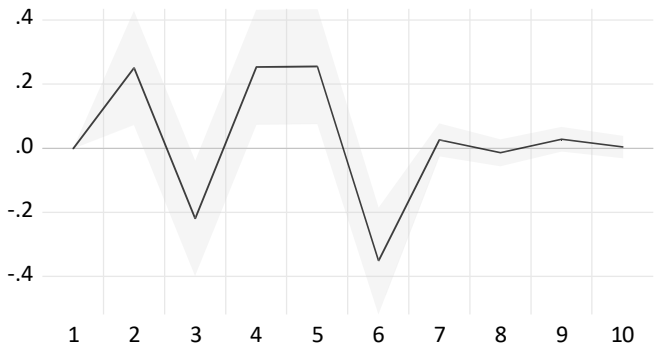
Response to Nonfactorized One Unit Innovations

95% CI using analytic asymptotic S.E.s

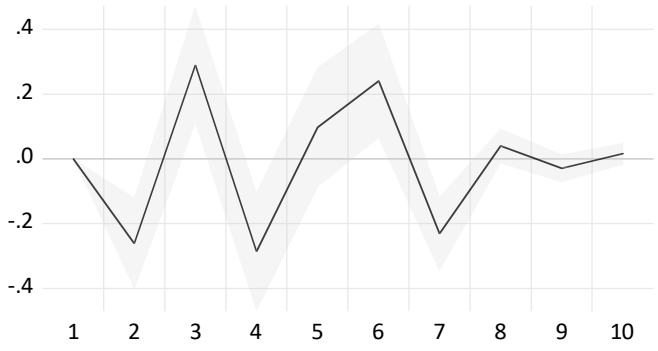
Response of D200 to SENSEX Innovation



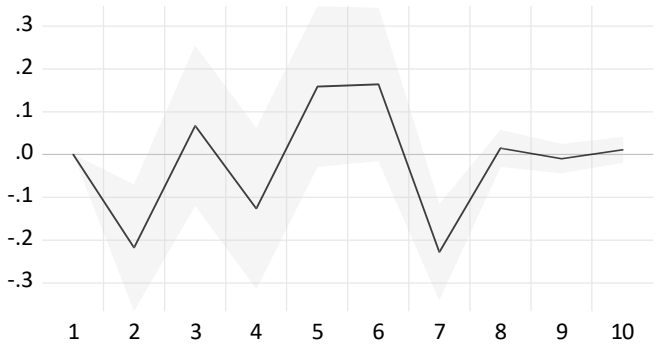
Response of FS to SENSEX Innovation



Response of IPO to SENSEX Innovation



Response of OG to SENSEX Innovation



Variance Decomposition using Cholesky (d.f. adjusted) Factors

Variance Decomposition of D200:

Period	S.E.	D200	FS	IPO	OG	SENSEX
1	0.006328	29.00804	0.000000	0.000000	1.731633	69.26033
		(0.96598)	(0.00000)	(0.00000)	(0.26979)	(0.99265)
2	0.011963	8.250921	70.81852	0.011148	0.608075	20.31133
		(0.34833)	(1.10490)	(0.07034)	(0.17431)	(0.93028)
3	0.012015	8.299742	70.27233	0.014423	0.602794	20.81071
		(0.39445)	(1.08270)	(0.10311)	(0.18858)	(0.94668)
4	0.012021	8.354895	70.21561	0.027366	0.612593	20.78954
		(0.41074)	(1.09315)	(0.11479)	(0.20443)	(0.94616)
5	0.012036	8.496604	70.05191	0.033139	0.648356	20.76999
		(0.42849)	(1.08912)	(0.13768)	(0.24268)	(0.94588)
6	0.012062	8.475431	69.87632	0.199307	0.671929	20.77701
		(0.43421)	(1.11353)	(0.21054)	(0.25378)	(0.94708)
7	0.012101	8.653461	69.68337	0.240920	0.697492	20.72476
		(0.46537)	(1.12010)	(0.21786)	(0.25391)	(0.95272)
8	0.012113	8.639694	69.71532	0.240512	0.706026	20.69845
		(0.46462)	(1.12551)	(0.21747)	(0.25487)	(0.95694)
9	0.012114	8.640946	69.70487	0.241076	0.707571	20.70554
		(0.46550)	(1.12737)	(0.21744)	(0.25496)	(0.95687)
10	0.012114	8.642290	69.70233	0.241127	0.708917	20.70534
		(0.46580)	(1.12772)	(0.21762)	(0.25449)	(0.95703)

Variance Decomposition of IPO:

Period	S.E.	D200	FS	IPO	OG	SENSEX
1	0.013386	3.921511	0.000000	88.68414	6.631415	0.762938
		(0.74853)	(0.00000)	(1.18782)	(0.95105)	(0.36659)
2	0.013558	3.190597	37.70421	54.07201	4.534384	0.498803
		(0.59784)	(1.51375)	(1.52810)	(0.63905)	(0.24103)
3	0.013590	3.206011	36.86527	52.51715	4.423217	2.988356
		(0.61113)	(1.52181)	(1.47638)	(0.62528)	(0.56391)
4	0.013615	3.150188	36.46583	51.44404	4.353174	4.586772
		(0.59970)	(1.50095)	(1.49183)	(0.62385)	(0.77719)
5	0.013659	3.142813	36.35313	51.28862	4.513790	4.701645
		(0.59412)	(1.49762)	(1.50399)	(0.63690)	(0.79470)
6	0.013730	3.217878	36.31054	51.20316	4.520989	4.747423
		(0.64202)	(1.49726)	(1.53150)	(0.64278)	(0.78536)
7	0.013757	3.260227	36.34551	50.94279	4.497506	4.953957
		(0.63692)	(1.50090)	(1.51158)	(0.64047)	(0.80406)
8	0.013762	3.274503	36.35106	50.81413	4.485933	5.074376
		(0.63330)	(1.50017)	(1.50680)	(0.63853)	(0.82467)
9	0.013762	3.275691	36.33948	50.79428	4.484730	5.105822
		(0.63361)	(1.49915)	(1.50529)	(0.63809)	(0.83032)
10	0.013763	3.278343	36.34095	50.79058	4.484414	5.105711
		(0.63398)	(1.49893)	(1.50547)	(0.63789)	(0.83004)

Variance Decomposition of FS:

Period	S.E.	D200	FS	IPO	OG	SENSEX
1	0.010683	0.022460	98.96783	0.260734	0.696593	0.052384
		(0.05417)	(0.42621)	(0.21338)	(0.31342)	(0.10823)
2	0.013683	0.138830	96.48912	0.312029	0.681206	2.378816
		(0.16827)	(0.74749)	(0.25430)	(0.31914)	(0.54537)
3	0.013886	0.148668	96.03906	0.313031	0.701612	2.797627
		(0.18066)	(0.76517)	(0.25635)	(0.32309)	(0.59458)
4	0.014030	0.239496	95.69354	0.312664	0.717511	3.036793
		(0.22471)	(0.78603)	(0.26142)	(0.32616)	(0.62522)
5	0.014056	0.327709	95.24057	0.555359	0.778404	3.097955
		(0.27465)	(0.74278)	(0.32102)	(0.32500)	(0.61216)
6	0.014090	0.603718	94.63041	0.613973	0.780391	3.371507
		(0.32940)	(0.77807)	(0.32841)	(0.32056)	(0.61870)
7	0.014130	0.617598	94.52474	0.612261	0.783128	3.462272

Variance Decomposition using Cholesky (d.f. adjusted) Factors

		(0.33136)	(0.79382)	(0.32623)	(0.32195)	(0.63161)
8	0.014148	0.629808	94.46498	0.611869	0.783045	3.510296
		(0.33360)	(0.80428)	(0.32613)	(0.32154)	(0.63718)
9	0.014151	0.633574	94.46092	0.611846	0.783376	3.510283
		(0.33527)	(0.80504)	(0.32663)	(0.32141)	(0.63758)
10	0.014151	0.636104	94.45214	0.613871	0.783413	3.514470
		(0.33595)	(0.80640)	(0.32816)	(0.32168)	(0.63865)

Variance Decomposition of OG:

Period	S.E.	D200	FS	IPO	OG	SENSEX
1	0.011122	0.000000	0.000000	0.000000	87.78186	12.21814
		(0.00000)	(0.00000)	(0.00000)	(1.14512)	(1.14512)
2	0.014140	0.079340	37.50890	0.132881	54.38897	7.889912
		(0.10139)	(1.39747)	(0.12688)	(1.29659)	(0.77749)
3	0.014269	0.492580	36.88103	0.133253	53.42570	9.067432
		(0.27694)	(1.38217)	(0.14545)	(1.32949)	(0.88867)
4	0.014289	0.491797	36.86433	0.132896	53.27707	9.233909
		(0.28634)	(1.38225)	(0.15135)	(1.33475)	(0.91123)
5	0.014299	0.526712	36.83268	0.149859	53.20381	9.286940
		(0.30273)	(1.36859)	(0.16978)	(1.33303)	(0.92556)
6	0.014317	0.532803	36.79327	0.202974	53.09455	9.376405
		(0.30713)	(1.36238)	(0.19388)	(1.33155)	(0.91933)
7	0.014351	0.627007	36.83302	0.228288	52.84595	9.465745
		(0.31990)	(1.36835)	(0.19056)	(1.32355)	(0.92375)
8	0.014360	0.631419	36.87101	0.228763	52.78432	9.484486
		(0.31991)	(1.36719)	(0.19068)	(1.31812)	(0.92931)
9	0.014361	0.632881	36.86609	0.228745	52.77761	9.494678
		(0.32111)	(1.36727)	(0.19097)	(1.31759)	(0.92926)
10	0.014361	0.634388	36.86597	0.228779	52.77629	9.494569
		(0.32138)	(1.36721)	(0.19121)	(1.31778)	(0.92946)

Variance Decomposition of SENSEX:

Period	S.E.	D200	FS	IPO	OG	SENSEX
1	0.005268	0.000000	0.000000	0.000000	0.000000	100.0000
		(0.00000)	(0.00000)	(0.00000)	(0.00000)	(0.00000)
2	0.010621	0.234080	73.65677	0.027917	0.202750	25.87848
		(0.17999)	(1.06907)	(0.08721)	(0.19043)	(1.02758)
3	0.010683	0.444288	72.81365	0.040642	0.200511	26.50091
		(0.28248)	(1.06538)	(0.11920)	(0.20876)	(1.02418)
4	0.010686	0.493646	72.76460	0.054972	0.203747	26.48304
		(0.28635)	(1.07197)	(0.13074)	(0.21609)	(1.02417)
5	0.010709	0.800496	72.46567	0.063782	0.217233	26.45282
		(0.35960)	(1.09929)	(0.15414)	(0.24675)	(1.01941)
6	0.010733	0.826722	72.20188	0.253332	0.244953	26.47311
		(0.37204)	(1.12885)	(0.22596)	(0.25430)	(1.01169)
7	0.010771	1.058494	71.97842	0.302858	0.270931	26.38930
		(0.38783)	(1.13422)	(0.23585)	(0.25861)	(1.01760)
8	0.010784	1.058542	72.01014	0.302187	0.284483	26.34464
		(0.38837)	(1.13999)	(0.23515)	(0.26103)	(1.02143)
9	0.010785	1.061278	71.99898	0.302637	0.286497	26.35061
		(0.39018)	(1.14259)	(0.23520)	(0.26134)	(1.02157)
10	0.010785	1.064204	71.99587	0.302780	0.287747	26.34940
		(0.39215)	(1.14337)	(0.23547)	(0.26070)	(1.02174)

Cholesky One S.D. (d.f. adjusted) Innovations
Cholesky ordering: SENSEX OG D200 IPO FS
Standard errors: Monte Carlo (100 repetitions) standard deviations in parentheses

Dependent Variable: MVPF
Method: Discrete Threshold Regression
Date: 11/07/24 Time: 06:49
Sample (adjusted): 1/03/2014 11/04/2024
Included observations: 2610 after adjustments
No thresholds selected
Selection: Trimming 0.15, Max. thresholds 5, Sig. level 0.05

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	4.83E-06	0.000182	0.026532	0.9788
FSI	-0.012038	0.000593	-20.30506	0.0000
MVPF(-1)	0.365492	0.016846	21.69582	0.0000
FSI(-1)	0.011810	0.000591	19.99652	0.0000

R-squared	0.305078	Mean dependent var	0.000548
Adjusted R-squared	0.304278	S.D. dependent var	0.008655
S.E. of regression	0.007219	Akaike info criterion	-7.022563
Sum squared resid	0.135823	Schwarz criterion	-7.013571
Log likelihood	9168.444	Hannan-Quinn criter.	-7.019305
F-statistic	381.3533	Durbin-Watson stat	1.873447
Prob(F-statistic)	0.000000		