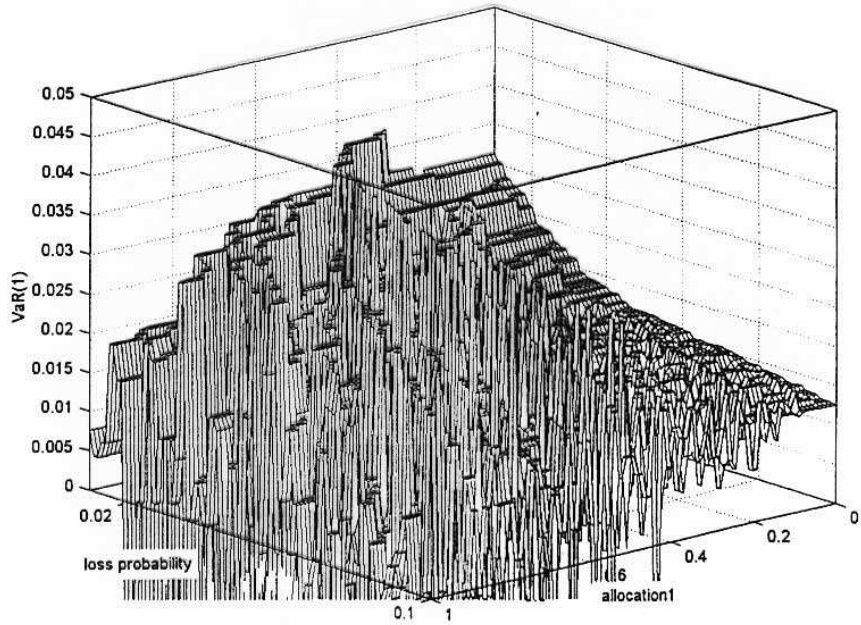
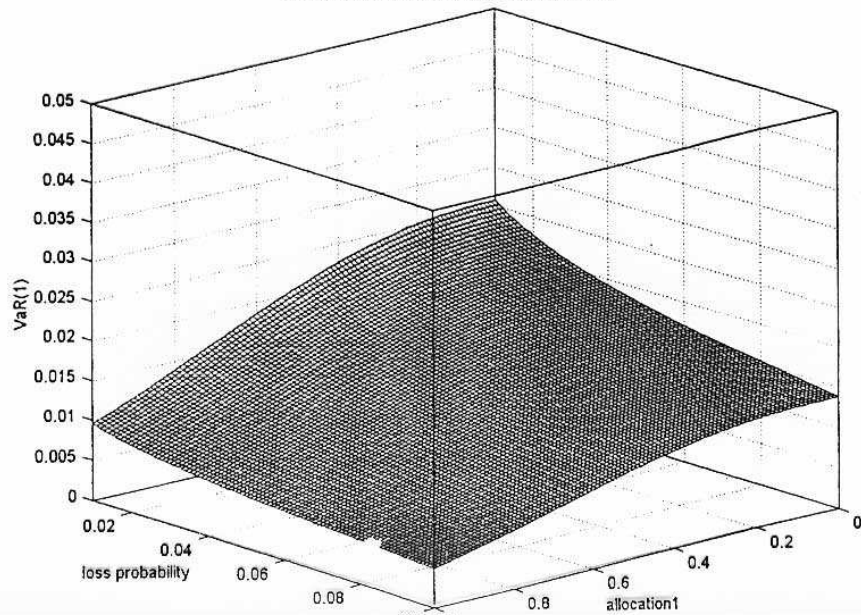
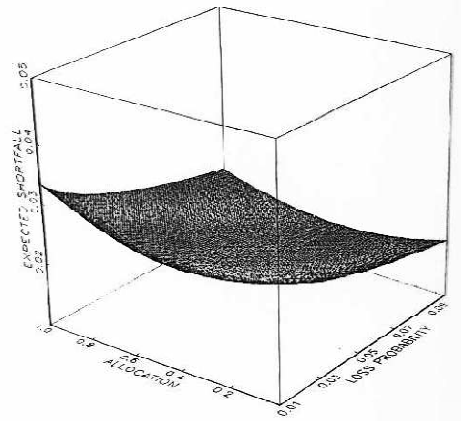
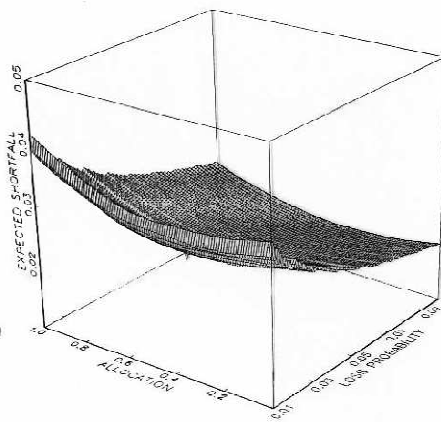
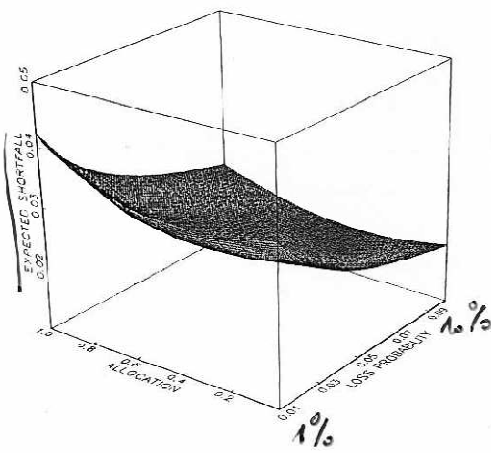


Finite differencing wrt α^2 of the Empirical VaR



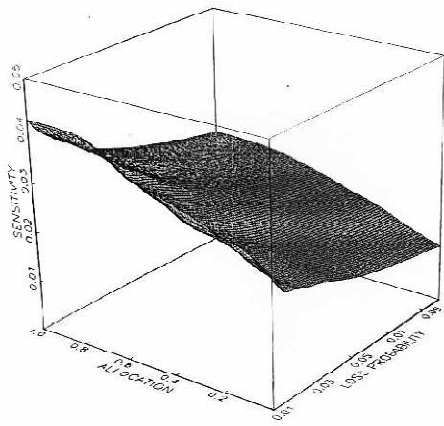
Gaussian assumption VaR sensitivity wrt α^2



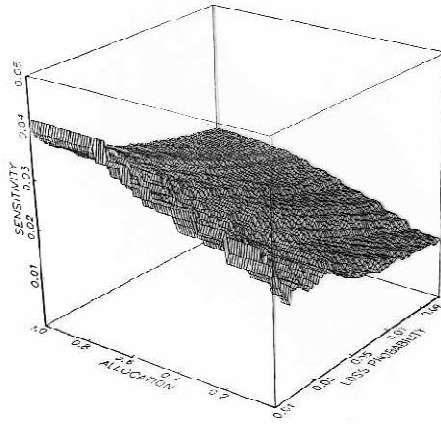


$$\begin{aligned}
 ES_c &= \frac{E[-\hat{\alpha}'\epsilon \mid \underline{M} - \hat{\alpha}'\epsilon > \text{Var}]}{\alpha} \\
 &= \frac{1/T \sum_{t=1}^T \alpha \cdot [-\hat{\alpha}'\epsilon \mid \underline{M} - \hat{\alpha}'\epsilon > \hat{\sigma}_\alpha R_t]}{\alpha}
 \end{aligned}$$

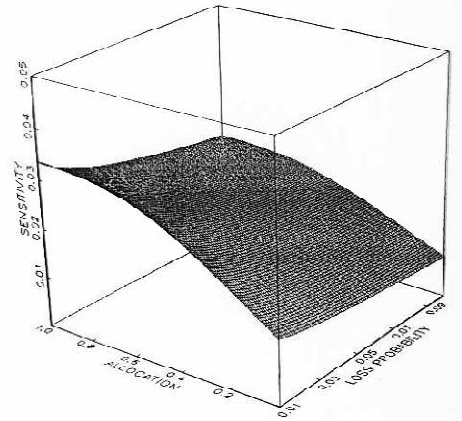
KERNEL



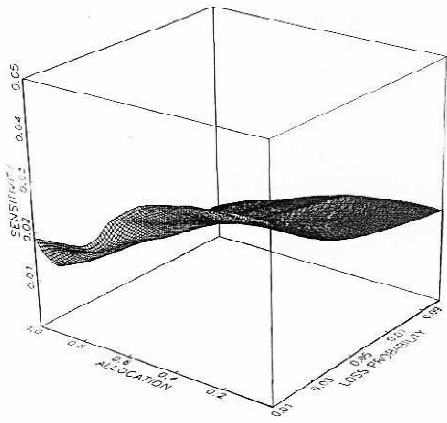
EMPIRICAL



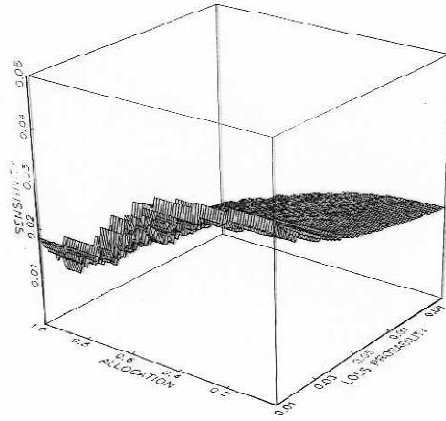
GAUSSIAN



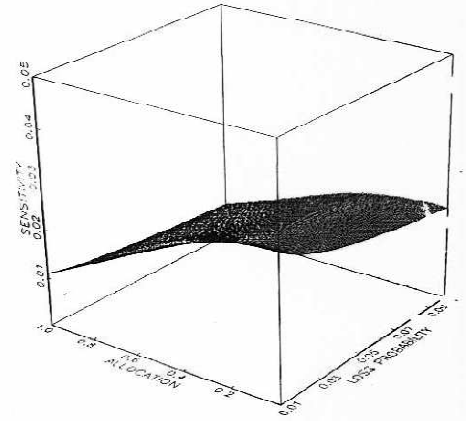
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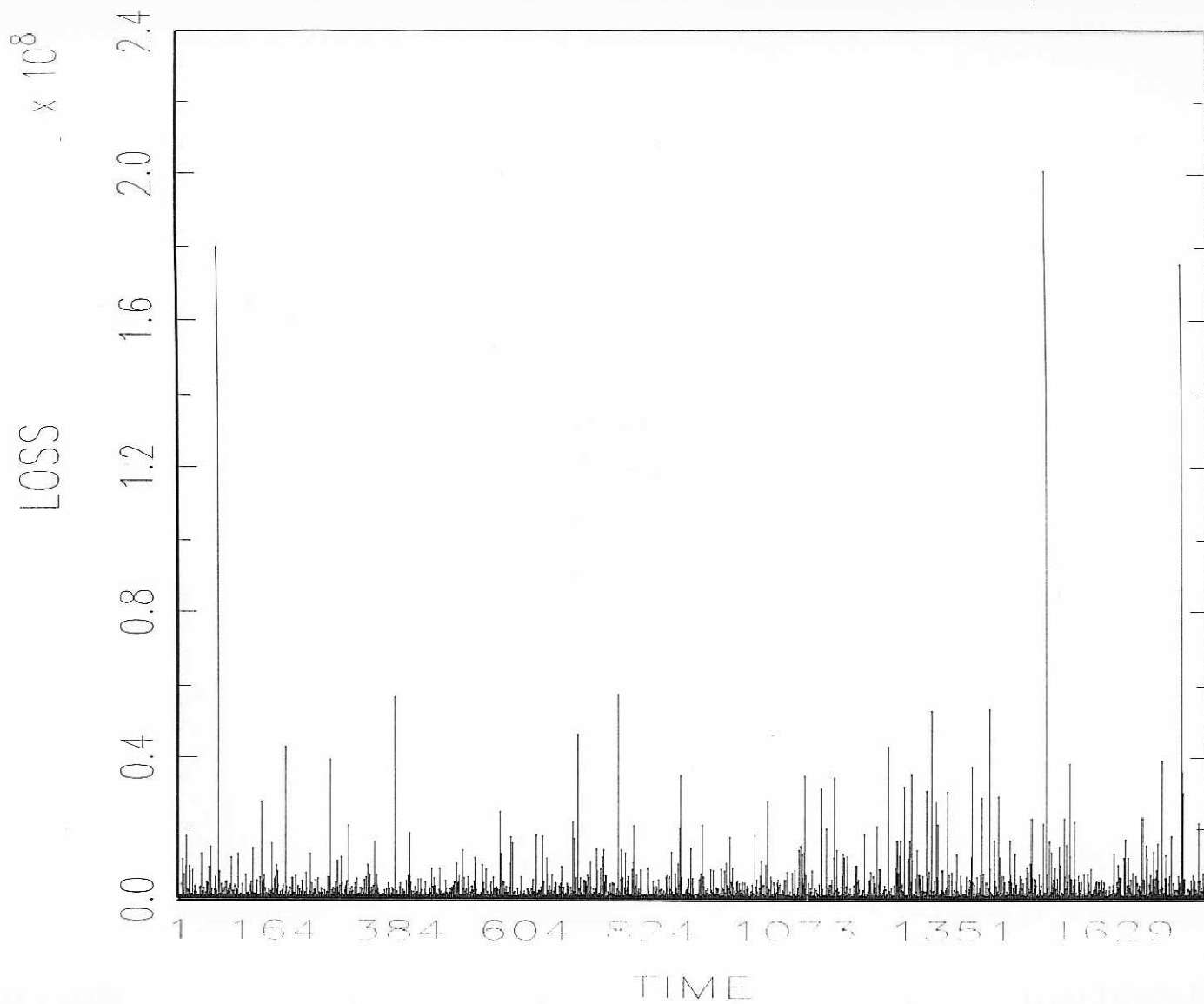


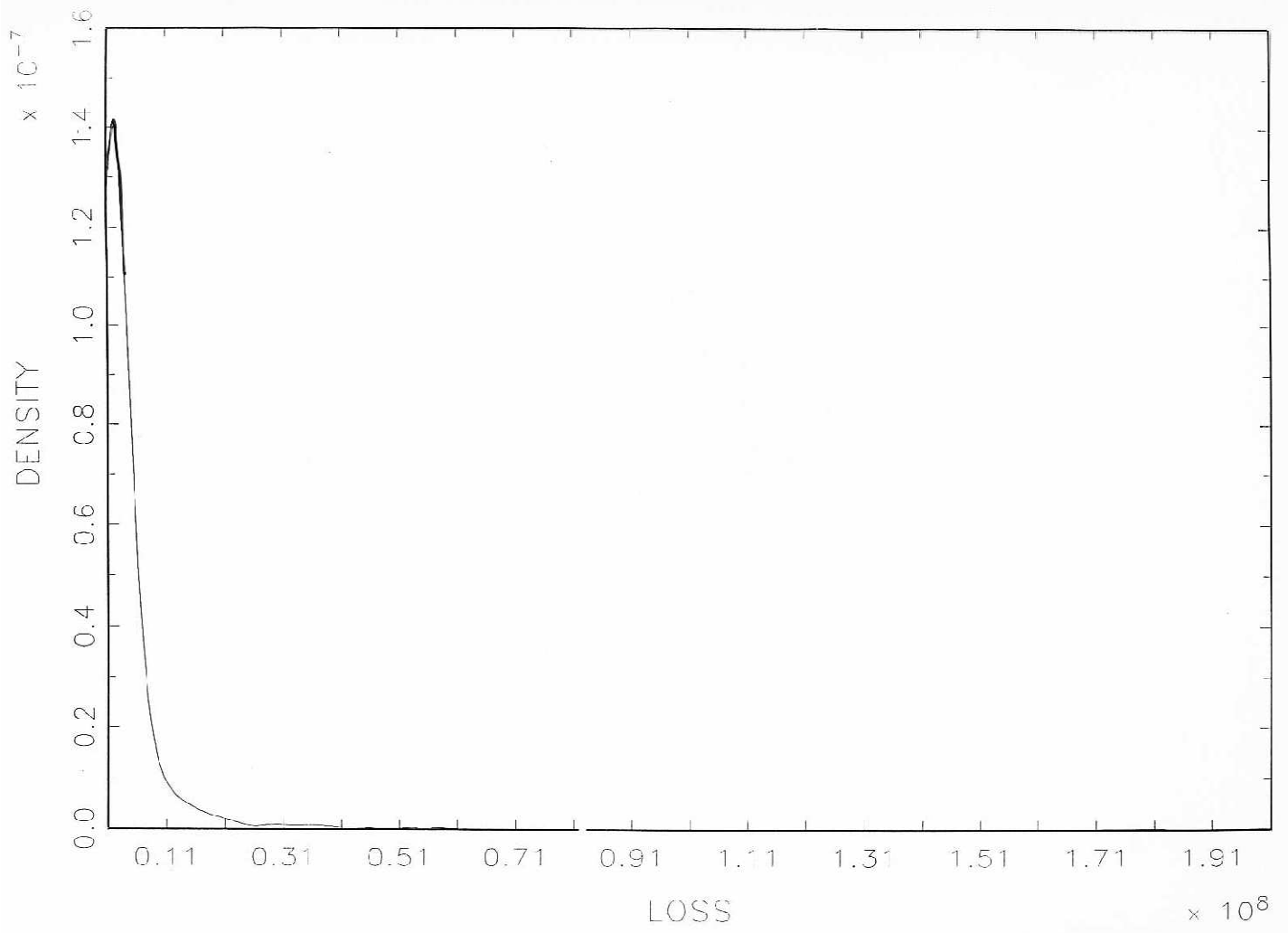
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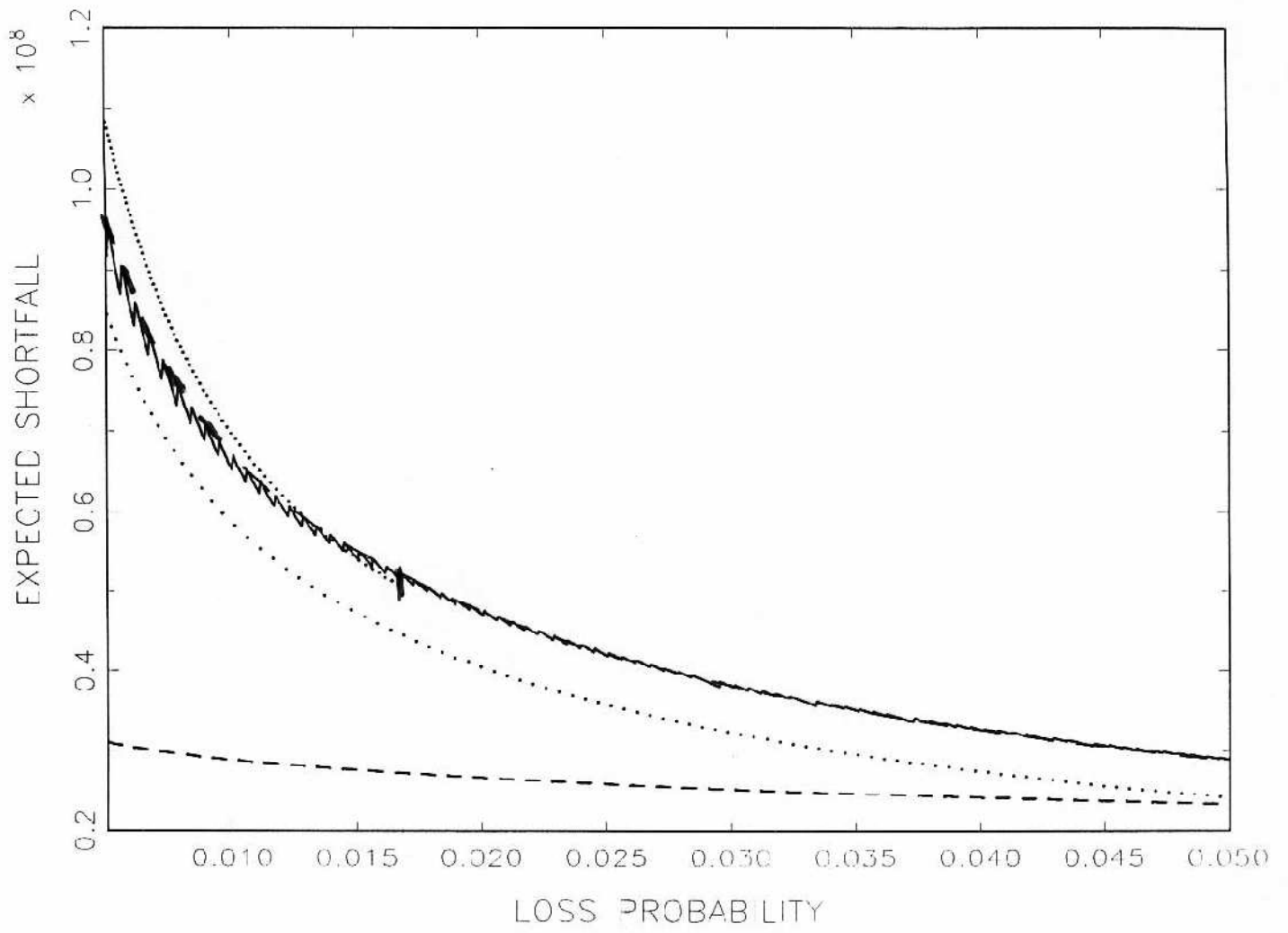


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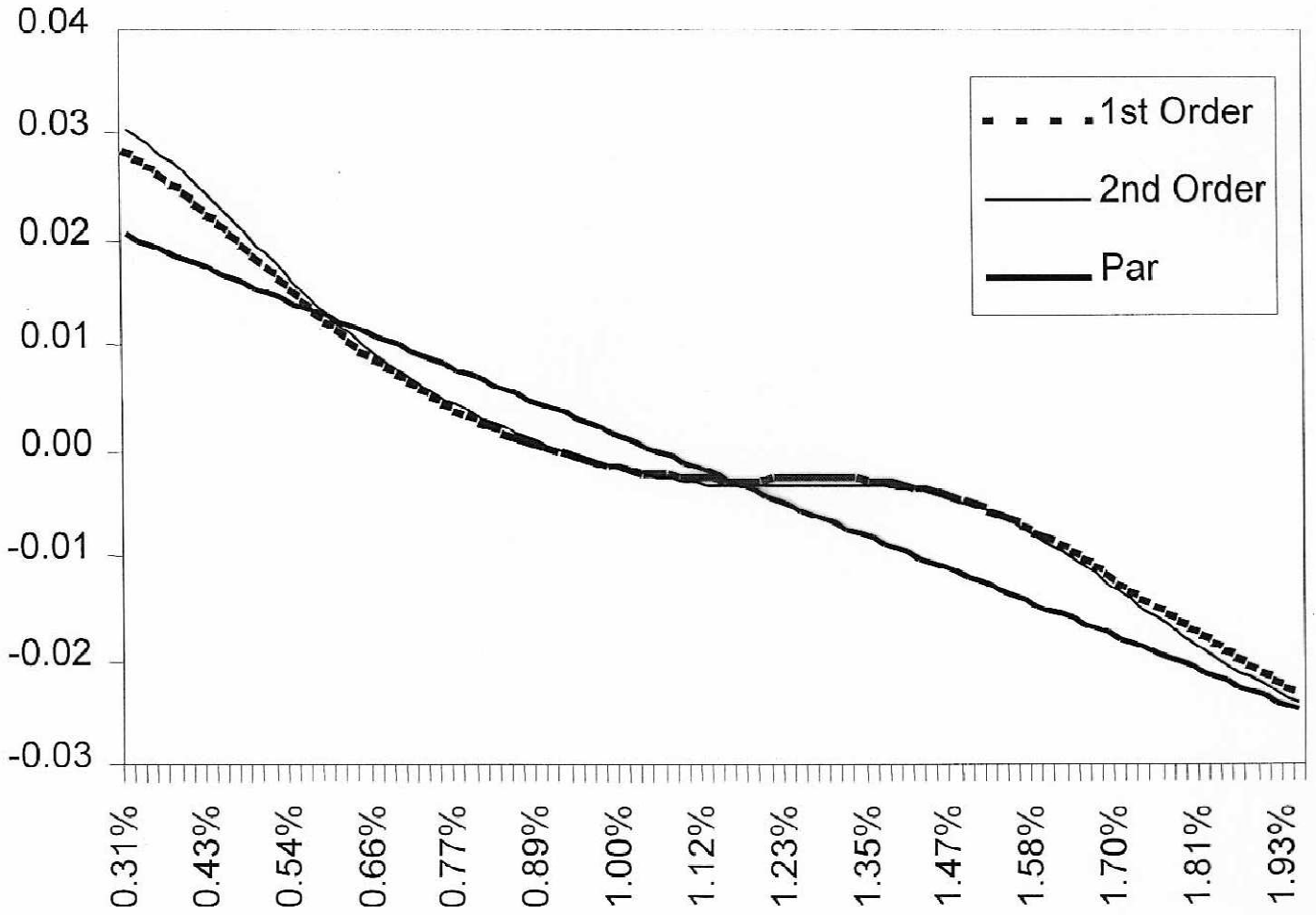




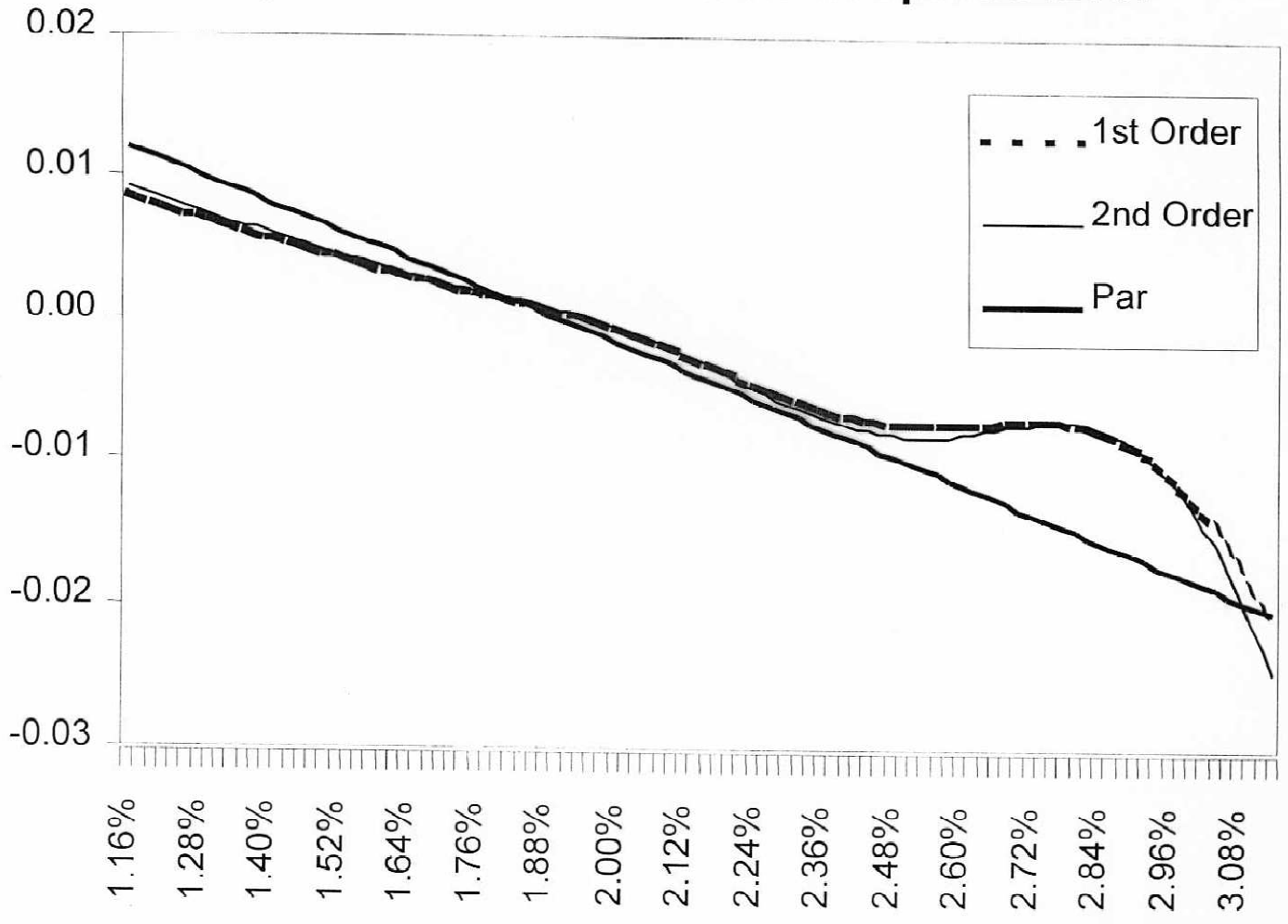




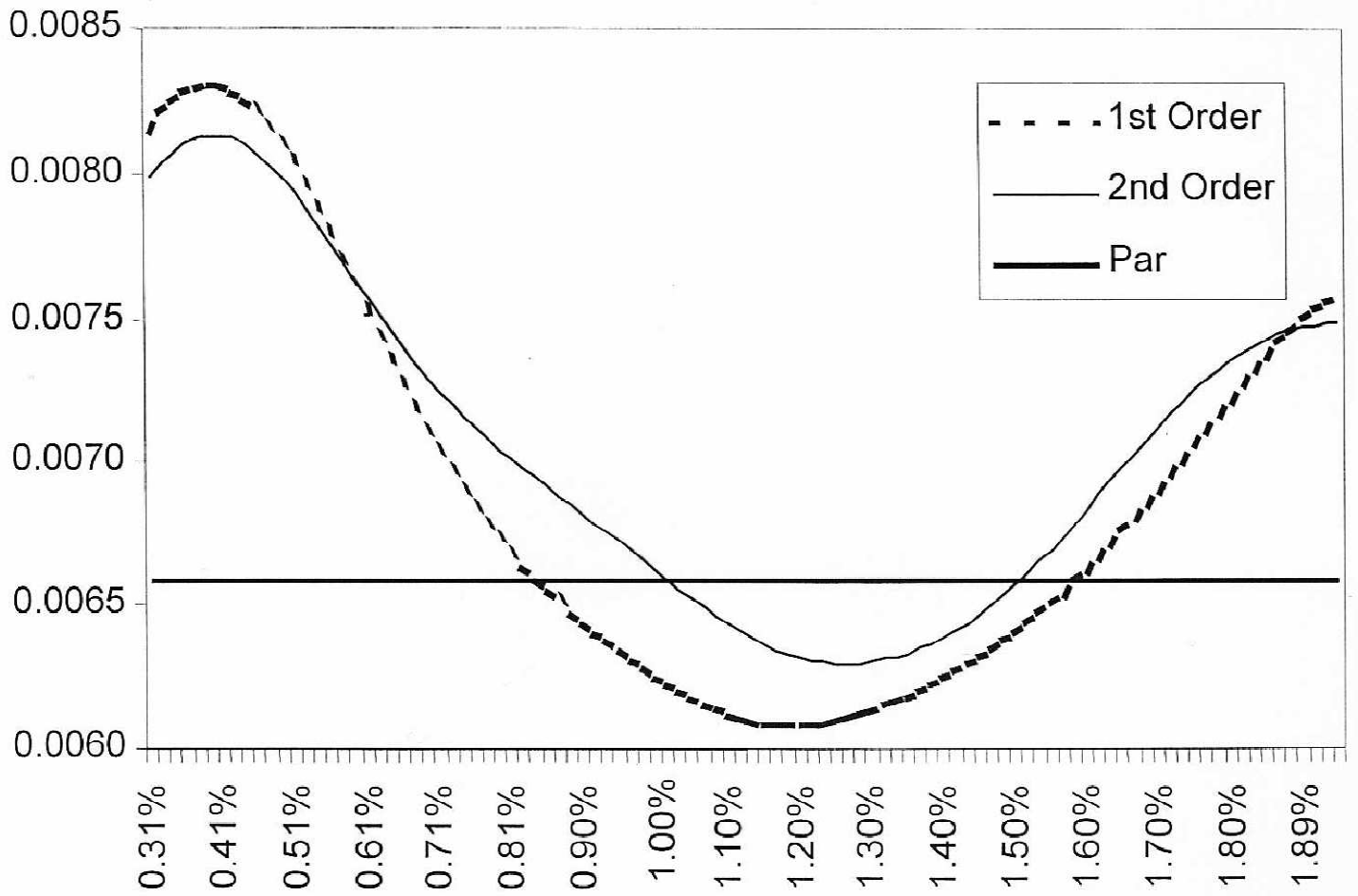
Aaa spread drift as a function of spread level



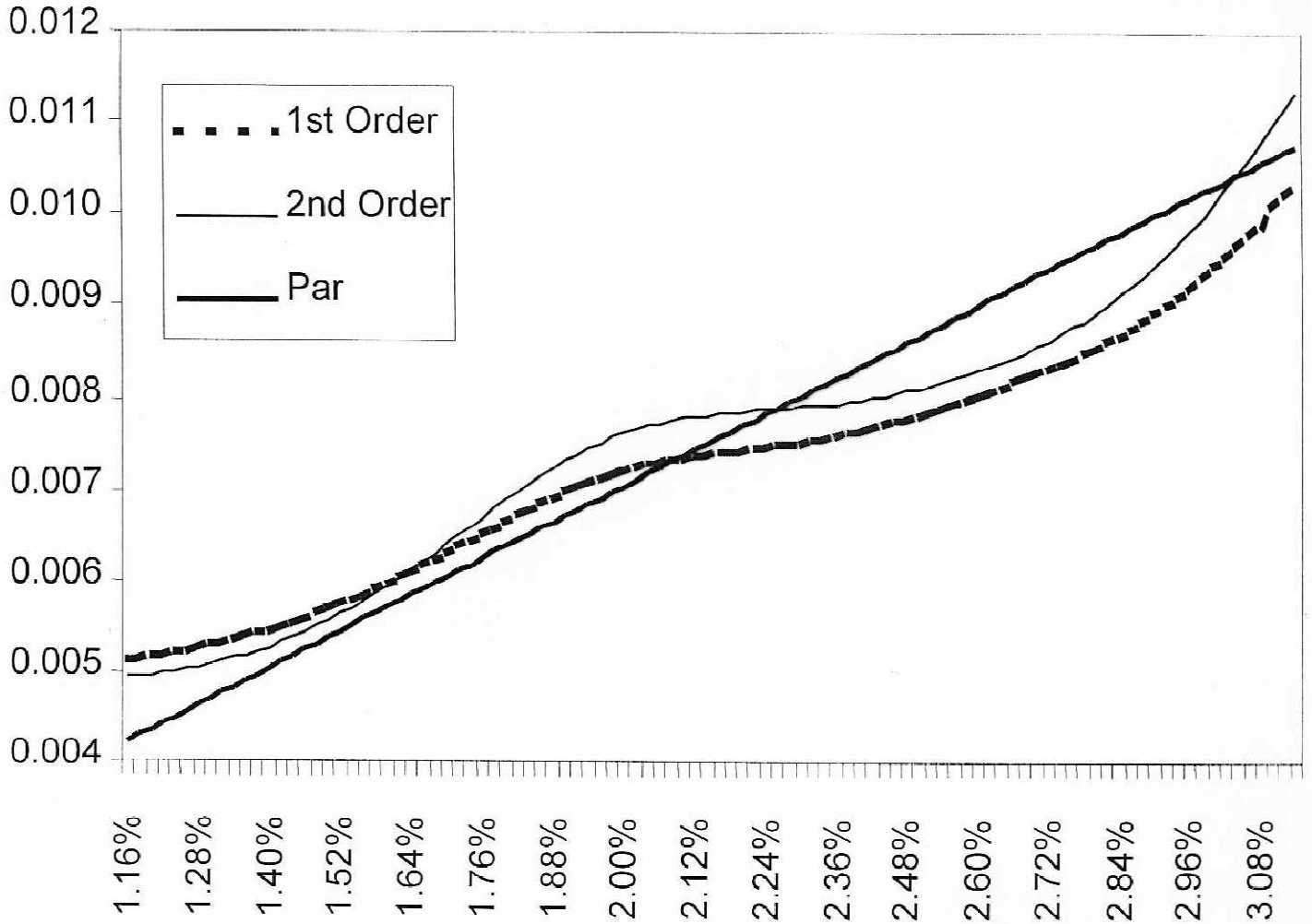
Baa spread drift as a function of spread level



Aaa spread volatility as a function of spread level

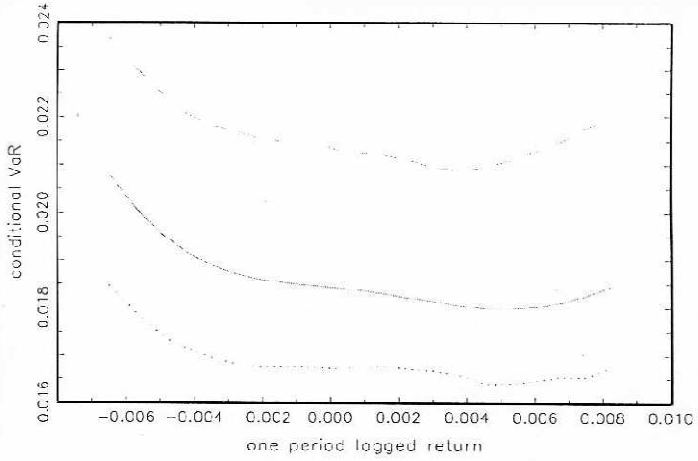


Baa spread volatility as a function of spread level

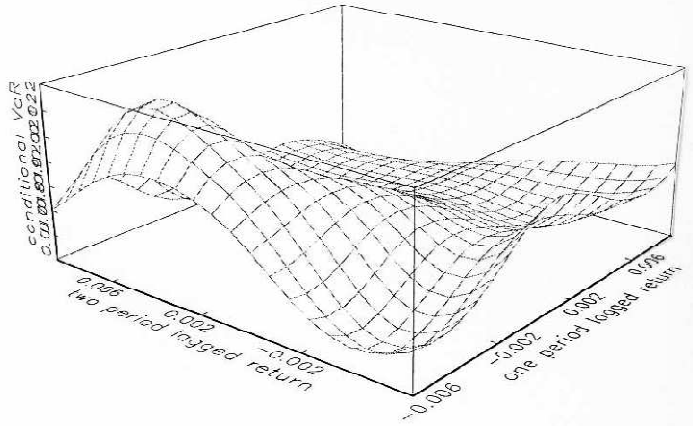


eae

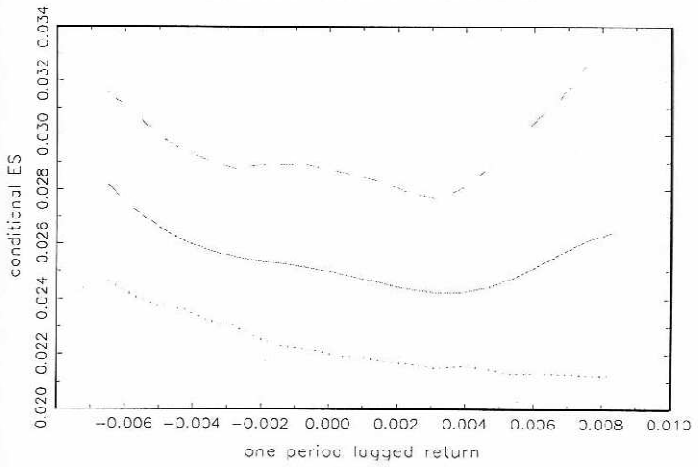
CONDITIONAL VaR



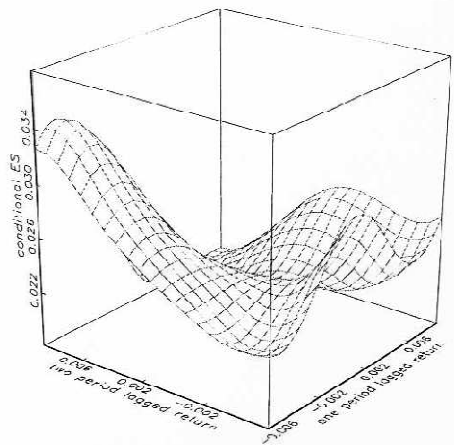
CONDITIONAL VaR



CONDITIONAL EXPECTED SHORTFALL

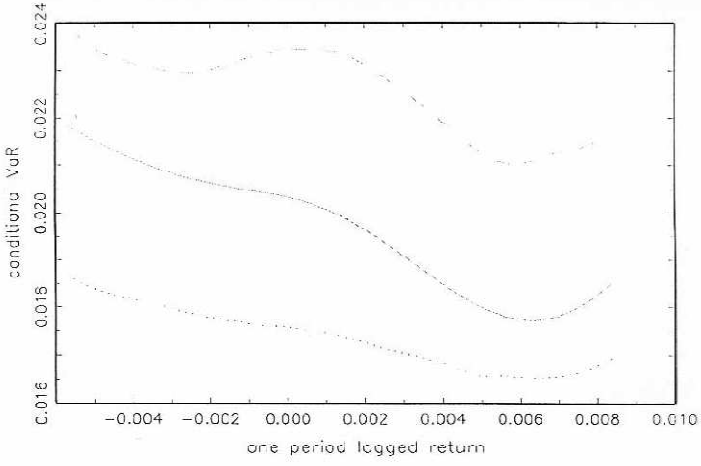


CONDITIONAL EXPECTED SHORTFALL

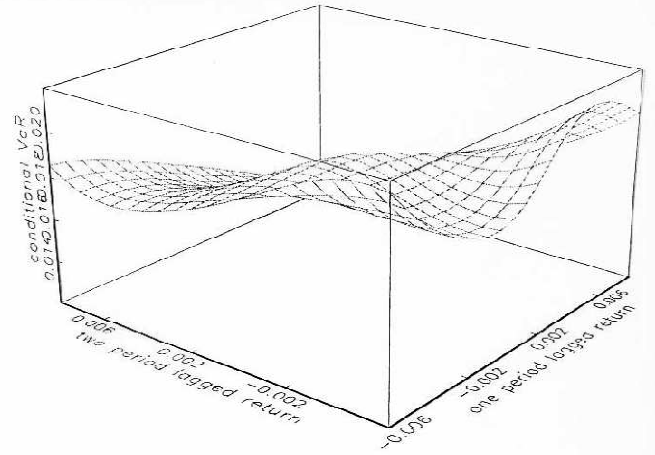


DAX

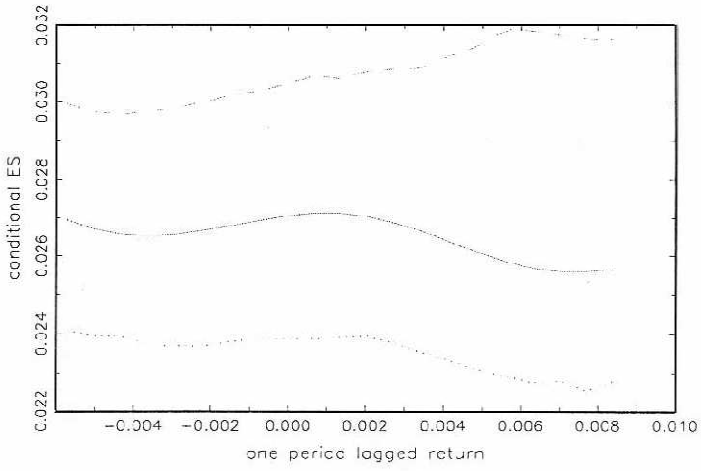
CONDITIONAL VaR



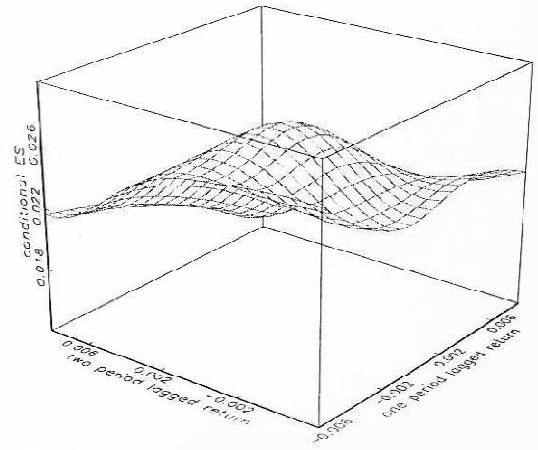
CONDITIONAL VaR

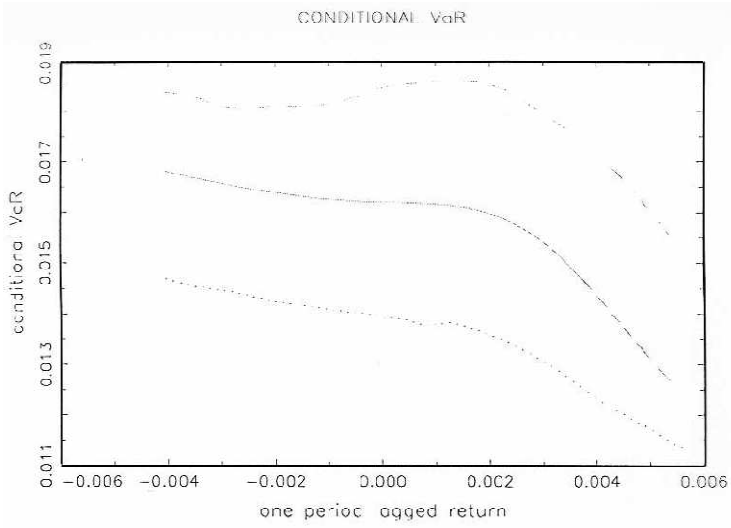


CONDITIONAL EXPECTED SHORTFALL

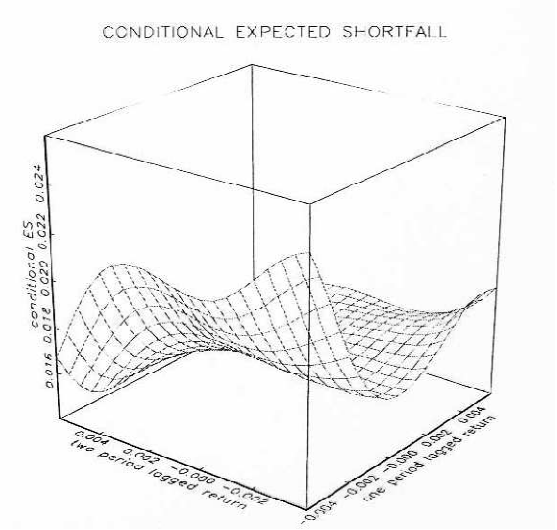
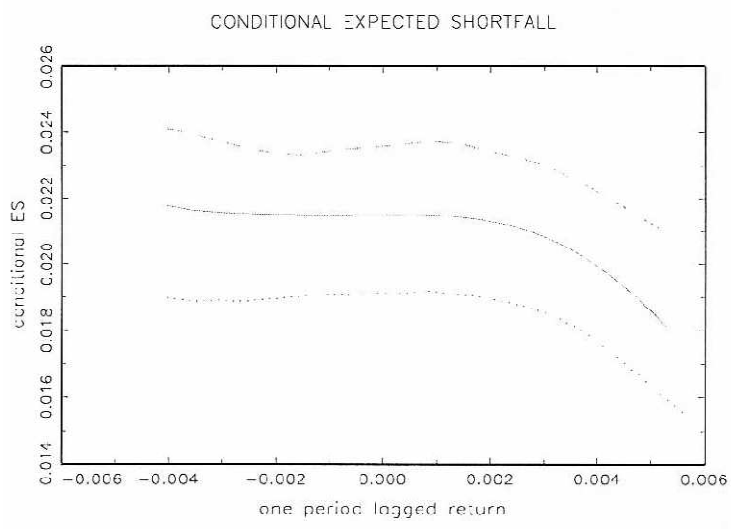
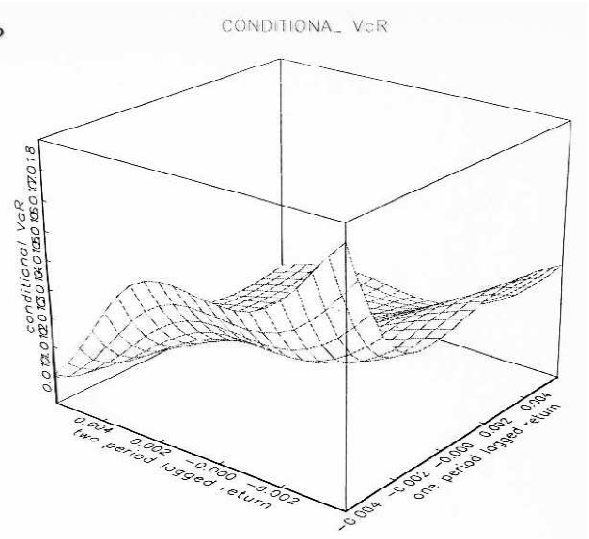


CONDITIONAL EXPECTED SHORTFALL



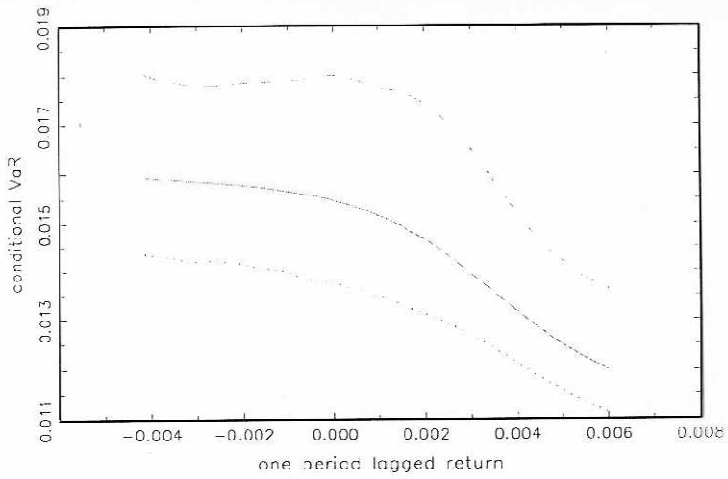


SNP

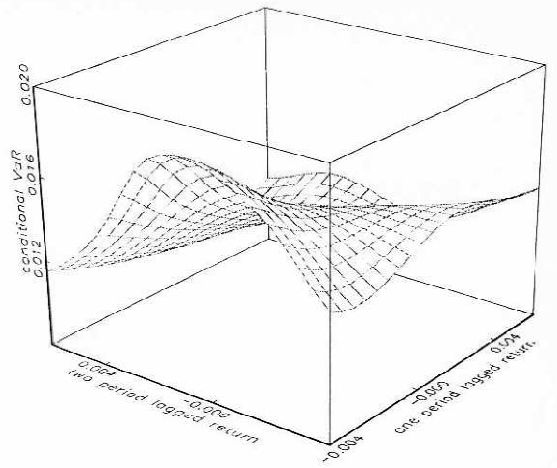


DJF

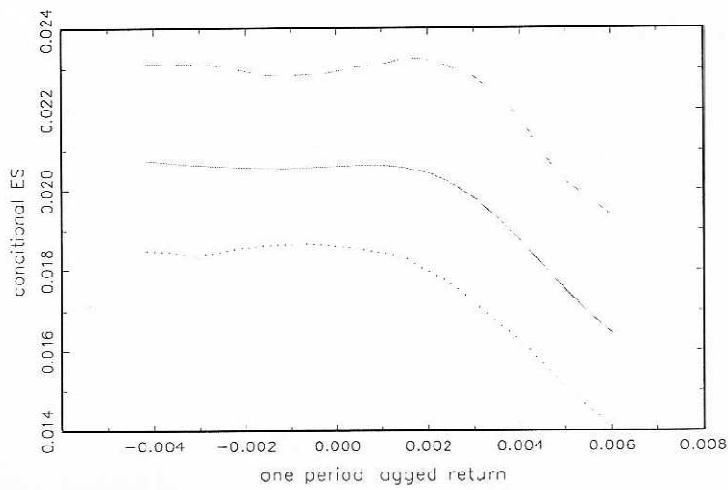
CONDITIONAL VaR



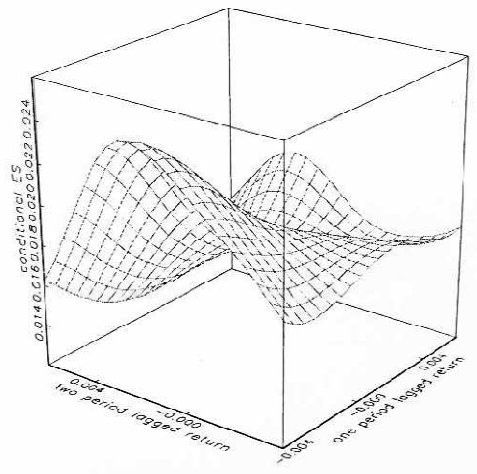
CONDITIONAL VaR



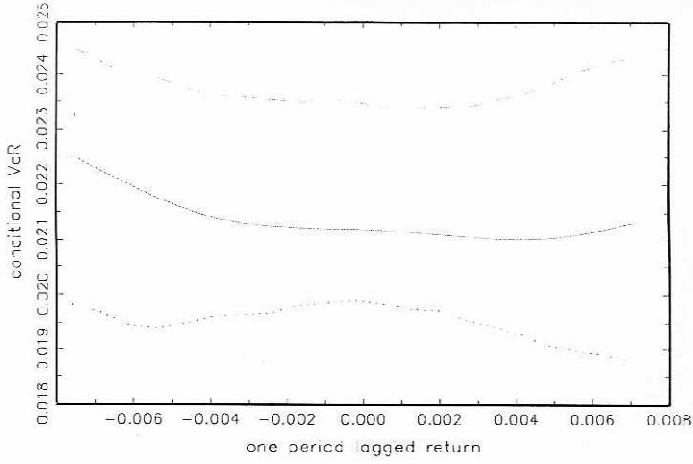
CONDITIONAL EXPECTED SHORTFALL



CONDITIONAL EXPECTED SHORTFALL

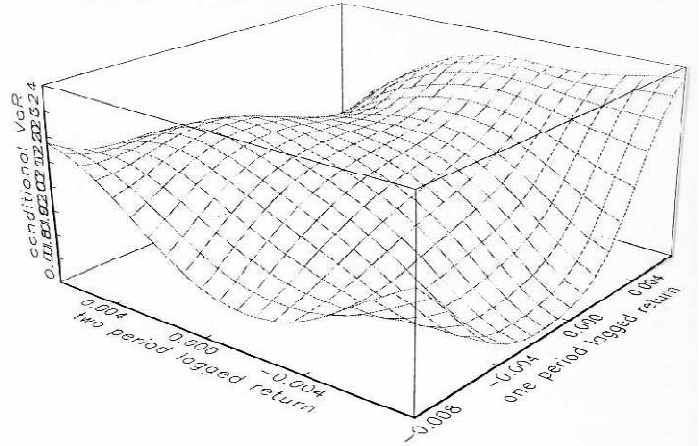


CONDITIONAL VaR

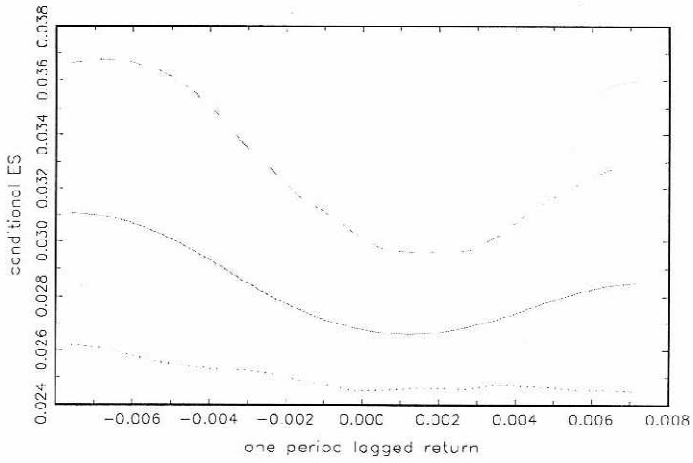


NIKKEI

CONDITIONAL VaR



CONDITIONAL EXPECTED SHORTFALL



CONDITIONAL EXPECTED SHORTFALL

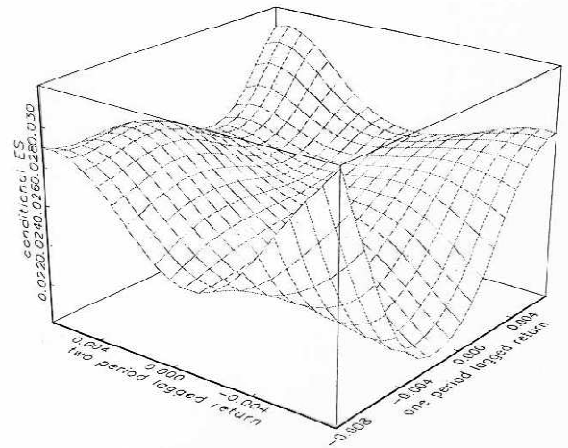


Table 4.1. Dollar/sterling exchange rate: QML estimates, $x_t \sim \text{AR}(1) - \text{ARCH}(p, q)$

	GARCH(0,0)	GARCH(1,1)	GARCH(2,1)	GARCH(1,2)
$\tilde{\Phi}_1$	0.0710 (5.13)	0.0777 (5.34)	0.0754 (4.19)	0.0700 (3.88)
$\tilde{\alpha}_0$	—	7.32 (2.13)	5.44 (1.63)	9.20 (1.87)
$\tilde{\alpha}_1$	—	0.0981 (5.95)	0.1365 (3.49)	0.1480 (5.01)
$\tilde{\alpha}_2$	—	—	-0.0476 (1.03)	—
$\tilde{\beta}_1$	—	0.9075 (63.6)	0.9161 (53.4)	0.4378 (2.76)
$\tilde{\beta}_2$	—	—	—	0.4233 (3.00)
$\Sigma(\tilde{\alpha}_i + \tilde{\beta}_i)$	—	1.0056	1.0050	1.0091
<i>ARCH</i> (12)	240.3 [0.00]	16.8 [0.16]	12.6 [0.40]	11.7 [0.47]
<i>Skewness</i>	-0.23	-0.07	-0.02	-0.04
<i>Kurtosis</i>	6.48	7.75	8.02	7.68
<i>Normality</i>	2666	4885	5461	4739
<i>Log-L</i>	15935.23	16390.38	16394.63	16394.88
L_1	0.000454	0.000444	0.000444	0.000446
L_2	29325.67	26406.22	26385.32	26376.15

Notes: Figures in () are robust t -statistics; figures in [] are prob-values. Under the null of strict white-noise normally distributed standardised residuals, *skewness* should be $N(0, 0.083)$ and *kurtosis* should be $N(3, 0.333)$. *Normality* is the Jarque-Bera (1980) statistic testing for normality and is distributed as χ^2_2 under the above null (see chapter 6 for details). *Log-L* is the log likelihood. L_1 and L_2 are loss functions described in the text. Estimation was performed in *EVIEWS* using the BHHH algorithm. Estimates of α_0 are scaled by 10^{-7} .

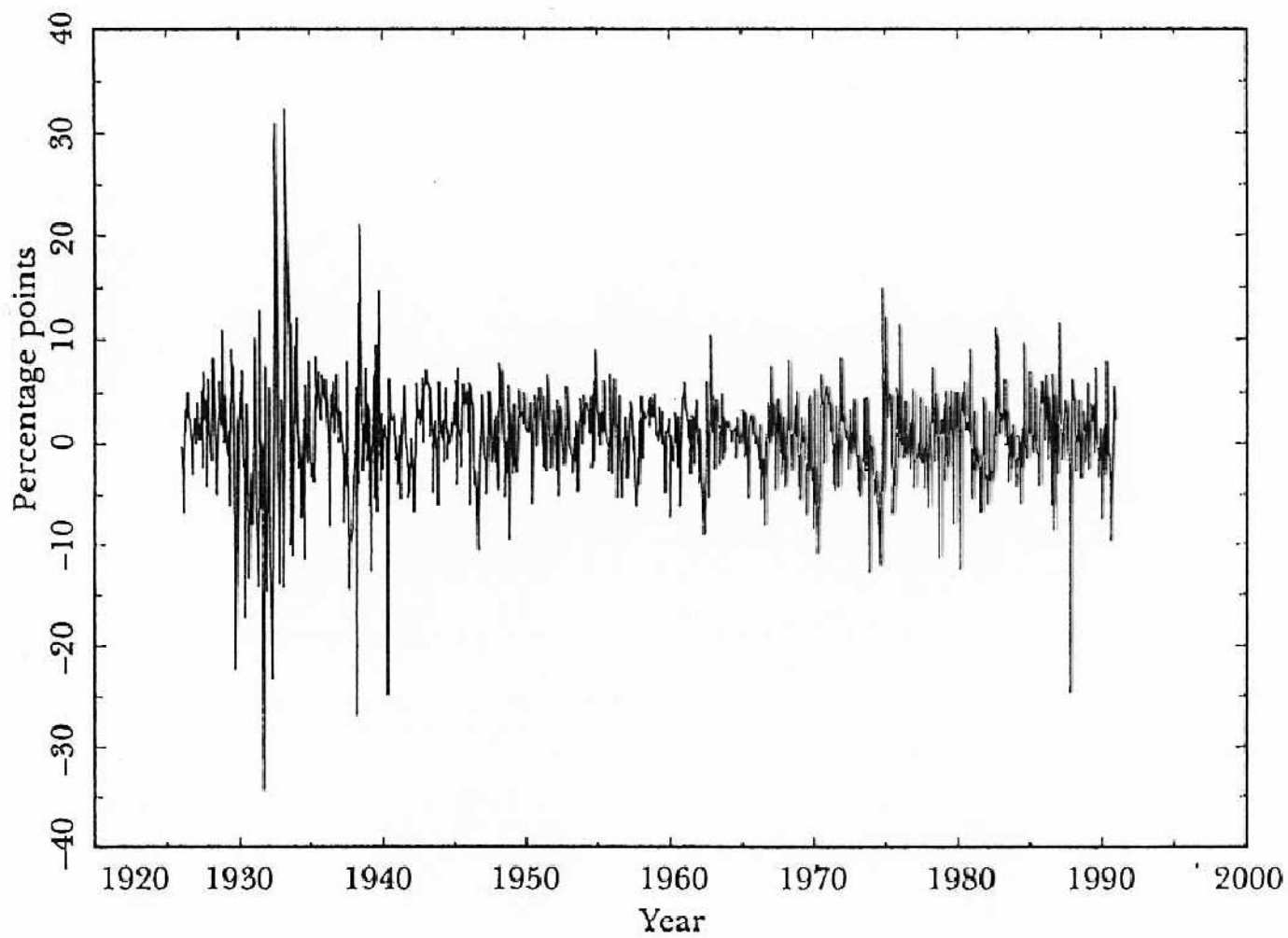


Figure 12.2. Monthly Excess Log US Stock Returns, 1926 to 1994

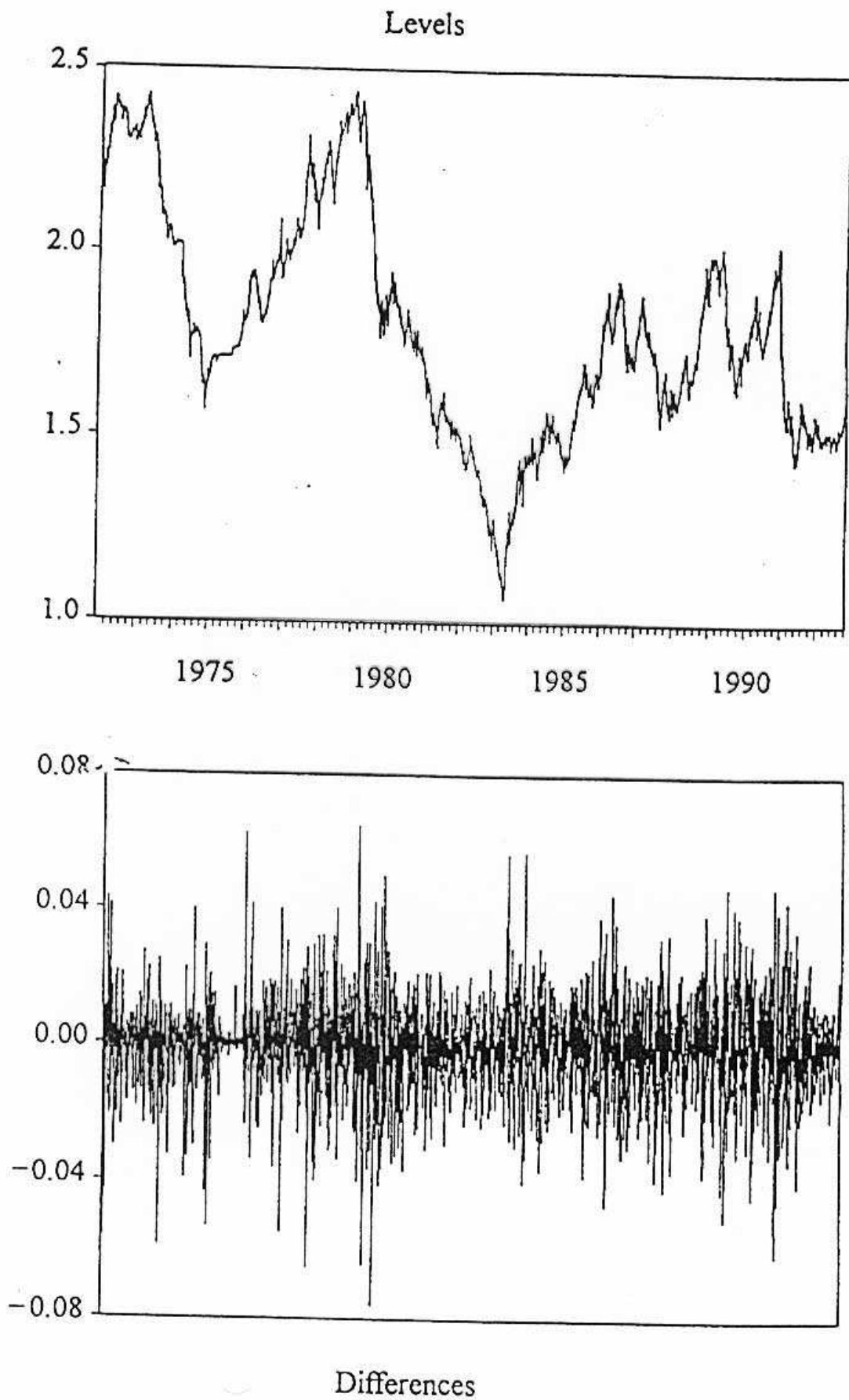


Figure 2.13 Dollar/sterling exchange rate (daily 1974–1994)

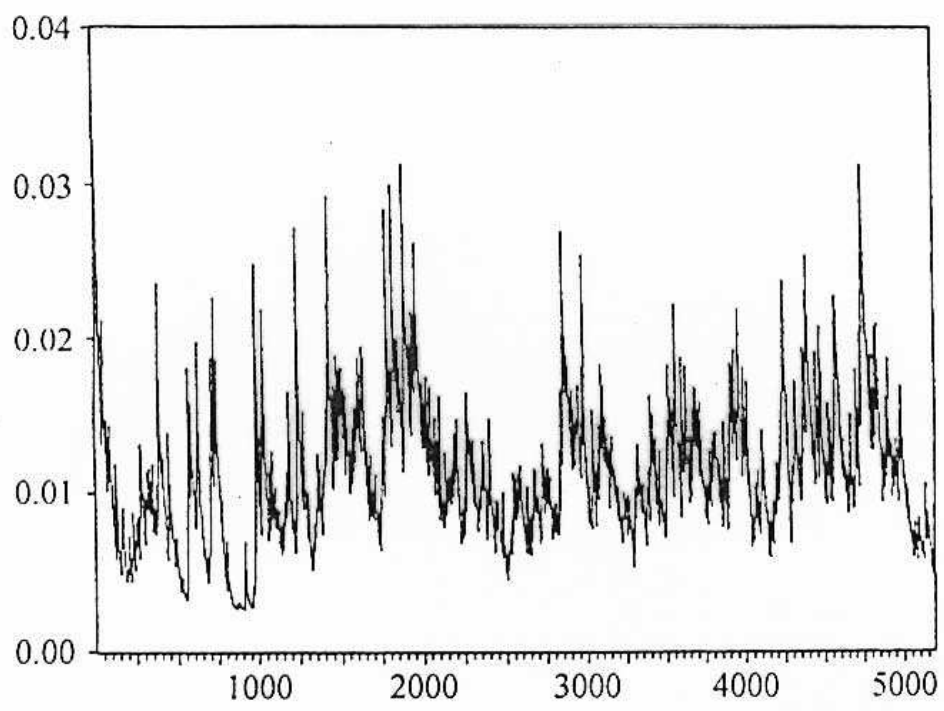


Figure 4.2 Conditional standard deviations from GARCH(1,2) model

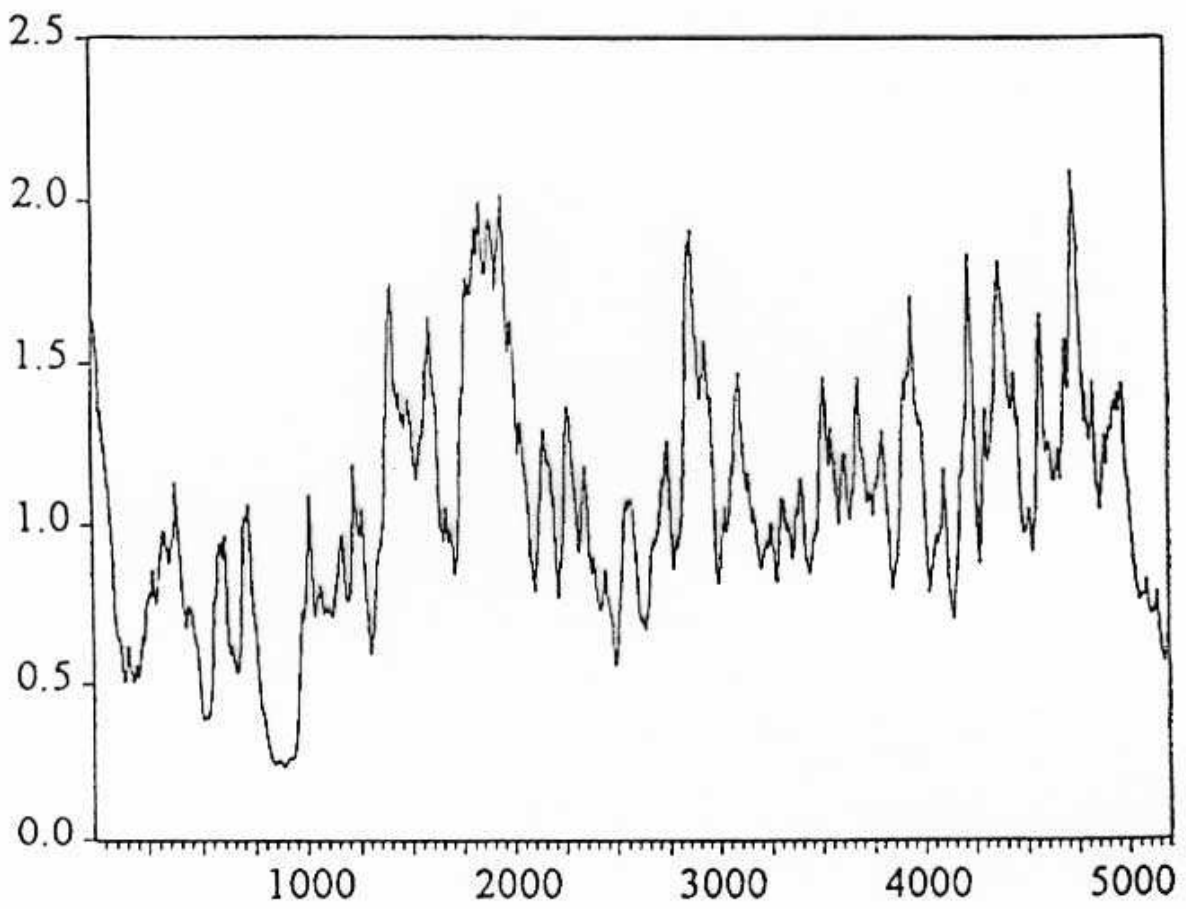


Figure 4.1 Dollar/sterling exchange rate 'volatility'

Figure 6.3: Simulated paths of ARCH(1) model

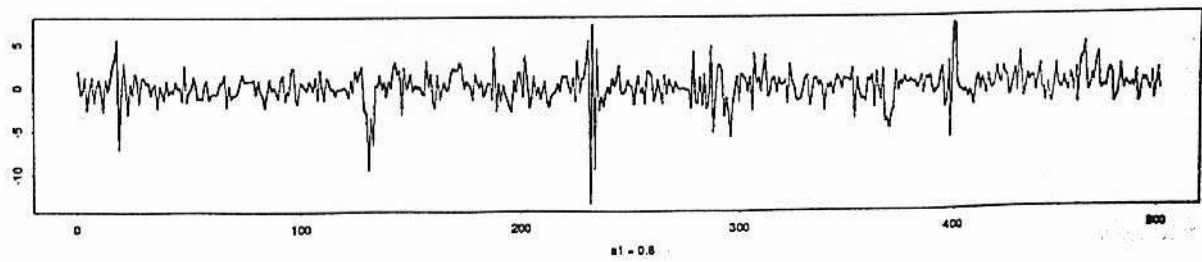
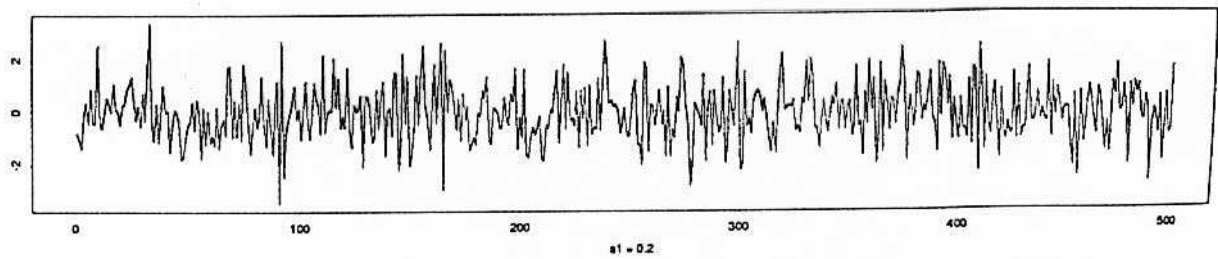
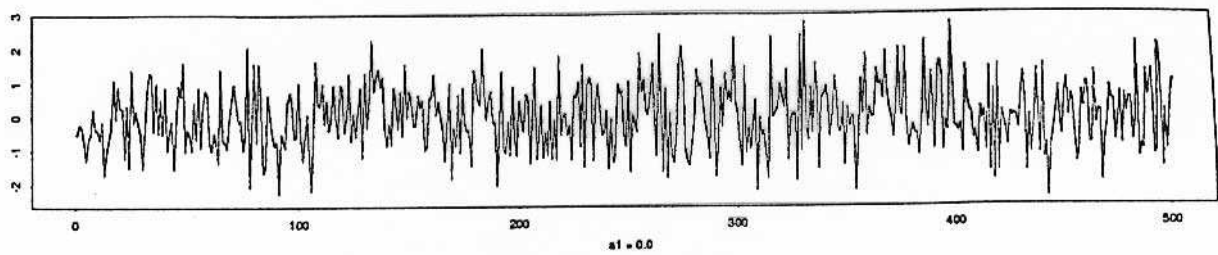


Figure 6.4: Squares of simulated paths of ARCH(1) model

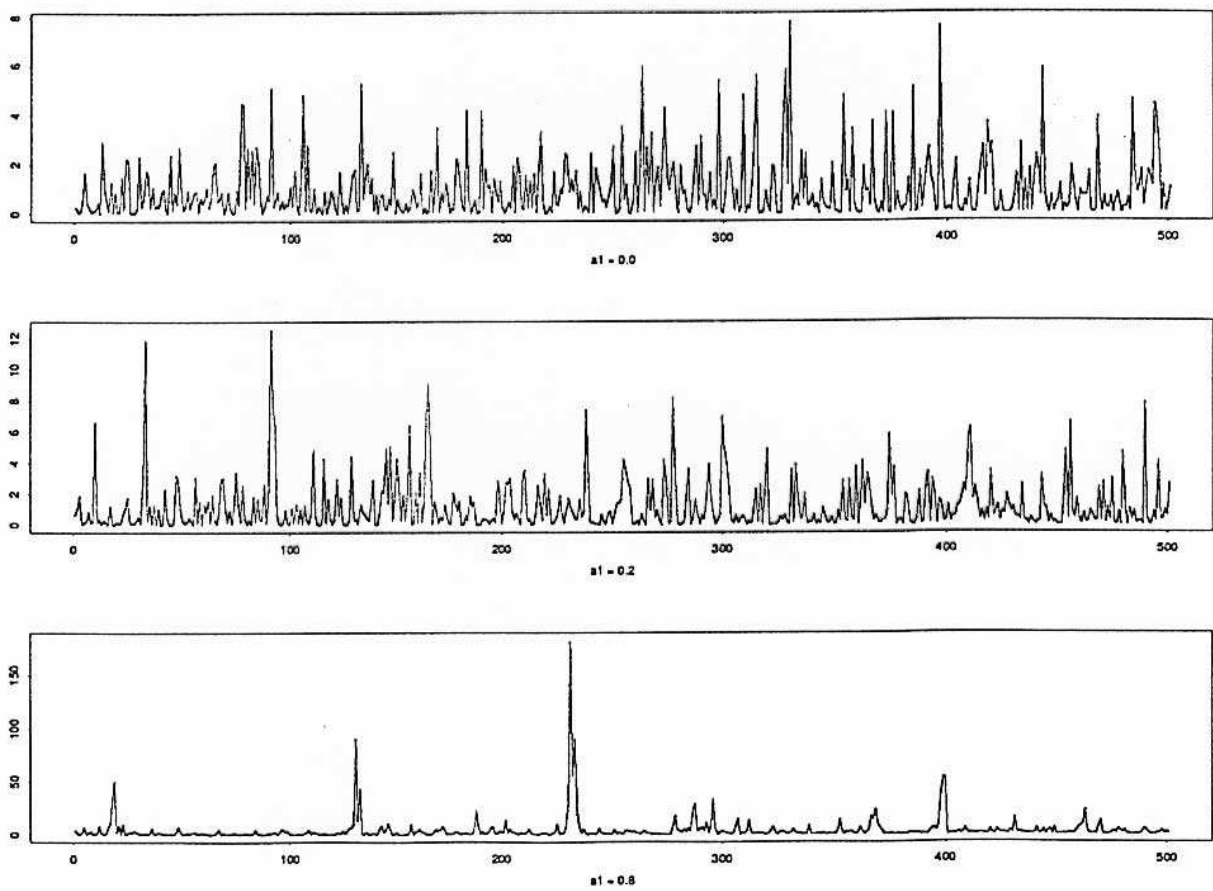


Figure 6.6: Autocorrelations of Squared Returns

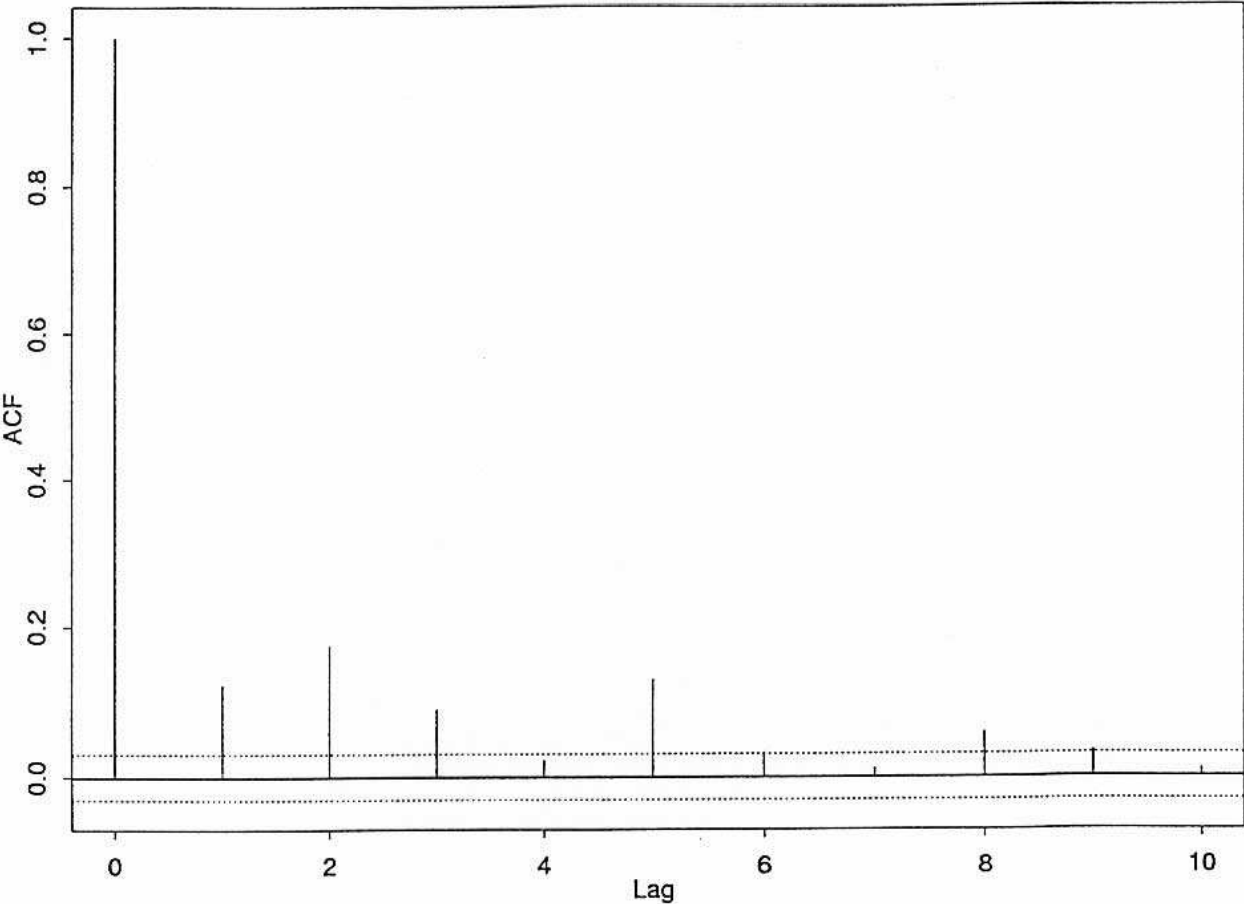


Figure 6.7: Fitted Volatility

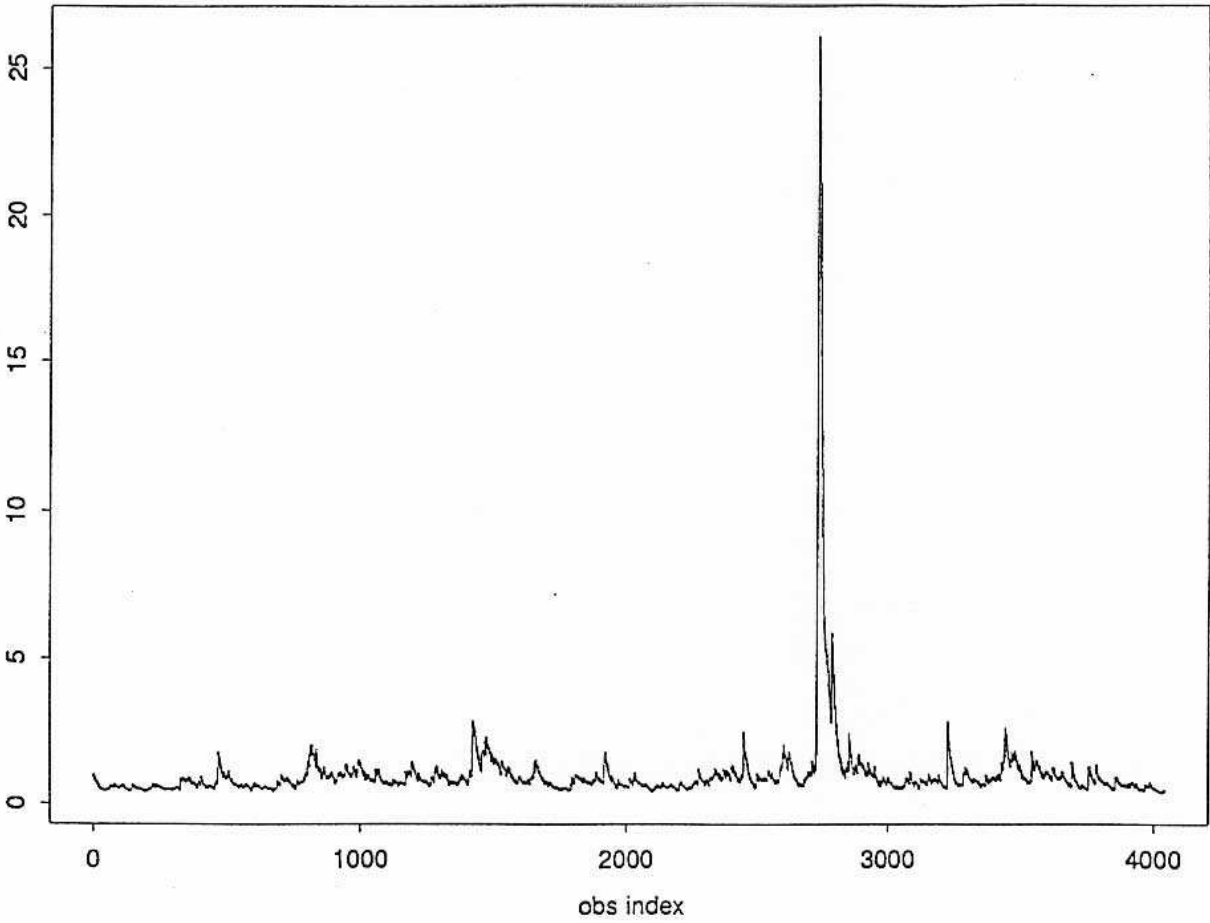


Figure 6.8: Estimated GARCH density

