

Risk & Asset Allocation

Fall Assignment

John A. Dodson

October 10, 2012

This assignment is not a regular homework. It is worth half of the module grade for the fall term. A solution to this problem is due in NetFiles at the beginning of the next session, which is 5:30 PM on Wednesday, October 17.

Your solution should include source code for programs and instructions for how to run them with the software available on Math Department computers, for example ‘shelby’ in VinH 314. I recommend you use `tar` or `zip` if you will be submitting several files.

I expect you to work alone and cite your sources. Please remind yourself of the University’s definition of scholastic dishonesty from the syllabus or University resources.

This assignment has been individualized. Please see the appendix to determine which asset you will be analyzing.

Problems

1. Estimate the quasi-MLE parameters, $\hat{\theta}$, of the NGARCH(1,1) model for continuous daily total returns on your issuer’s common equity shares over the 250 consecutive trading days through October 12, 2012. **(20 points)**
2. Use your estimates to produce a forecast, h_{251} , for the total return variance for the following trading day, October 15. **(10 points)**
3. Use your estimate, $\hat{\theta}$, to generate one hundred 250-point sample paths for residuals from your process. You may assume residuals are conditionally normal, $\epsilon_i^{(j)} | \mathcal{F}_{i-1}^{(j)} \sim \mathcal{N}(m_i, h_i^{(j)})$ for $i = 1, 2, \dots, 250$ and $j = 1, 2, \dots, 100$. **(10 points)**
4. Re-estimate quasi-MLE NGARCH(1,1) parameters, $\hat{\theta}^{(j)}$, from each of your simulated sample paths. **(20 points)**
5. Apply each of the re-estimated parameters $\hat{\theta}^{(j)}$ to your actual sample path of residuals to produce one hundred forecasts $h_{251}^{(j)}$ for the total return variance for October 15 and summarize your results with a sample mean and standard deviation. **(10 points)**

Rubric

This assignment is worth one hundred points, which is ten times as many as each of the previous five assignments.

- You follow the instructions. **(5 points)**
- I can reproduce your results with the code and documentation you provide. **(10 points)**
- You include adequate citations. **(10 points)**
- Your write-up is clear and professional. **(5 points)**

Appendix

This assignment has been individualized. Use the table below to determine which asset you will be analyzing. Contact me if you have any questions.

Table 1: (Common) equity share issuer assignments

UMN Id	Ticker	Company	Headquarters
1604919	AAPL	Apple Inc.	Cupertino, California
2183728	ADBE	Adobe Systems Inc	San Jose, California
2664270	ADSK	Autodesk Inc	San Rafael, California
2974769	ALTR	Altera Corp	San Jose, California
3019297	AMAT	Applied Materials Inc	Santa Clara, California
3133672	AMD	Advanced Micro Devices	Sunnyvale, California
3152594	BRCM	Broadcom Corporation	Irvine, California
3295770	CRM	Salesforce.com	San Francisco, California
3372243	CSCO	Cisco Systems	San Jose, California
3731205	EA	Electronic Arts	Redwood City, California
3864379	EBAY	eBay Inc.	San Jose, California
4012800	FFIV	F5 Networks	Seattle, Washington
4096255	HPQ	Hewlett-Packard	Palo Alto, California
4312040	IBM	Int'l Bus. Machines	Armonk, New York
4339589	INTC	Intel Corp.	Santa Clara, California
4353442	INTU	Intuit Inc.	Mountain View, California
4382948	JDSU	JDS Uniphase Corp.	Milpitas, California
4423239	JNPR	Juniper Networks	Sunnyvale, California
4430148	KLAC	KLA-Tencor Corp.	Milpitas, California
4432681	LLTC	Linear Technology Corp.	Milpitas, California
4437170	LRCX	Lam Research	Fremont, California
4455566	LSI	LSI Corporation	Milpitas, California
4456094	MSFT	Microsoft Corp.	Redmond, Washington
4456739	MU	Micron Technology	Boise, Idaho
4465567	NFLX	NetFlix Inc.	Los Gatos, California
4467652	NTAP	NetApp	Sunnyvale, California
4471757	NVDA	Nvidia Corporation	Santa Clara, California
4472232	ORCL	Oracle Corp.	Redwood Shores, California
4474195	QCOM	QUALCOMM Inc.	San Diego, California
4476427	SNDK	SanDisk Corporation	Milpitas, California
4476432	SYMC	Symantec Corp.	Mountain View, California
4476476	WDC	Western Digital	Irvine, California
4689219	XLNX	Xilinx Inc	San Jose, California
4709926	YHOO	Yahoo Inc.	Sunnyvale, California