WI3421TU
Risicomanagement
Huiswerk 3

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9.20

Estimates for:

TSE300: $\lambda \approx 0.991$

AUD: $\lambda \approx 0.978$

Formulas used:

```
F1: Lambda
A: Dates
B: Values

C: Returns: =LN(B4/B3)
D: Variance: =VAR(C3:C28)
E: Prediction: =E2*$F$1+(1-$F$1)*C3^2
F: Difference: =(E3-D3)^2
G1: Total: =SUM(F2:F884)
```

Minimized on G1 for $0 \leq F1 \leq 1$.

9.22

For EWMA:

```
F1: Lambda
A: Dates
B: Values

C: Returns: =LN(B4/B3)
E: Prediction: =E2*$F$1+(1-$F$1)*C3^2
F: Term: =-LN(E3)-C3^2/E3
G1: Total: =SUM(F2:F884)
```

Maximized on G1 for $0 \leq F1 \leq 1$.

For GARCH(1,1):

```
I1: w
J1: alpha
K1: beta

A: Dates
B: Values

C: Returns: =LN(B4/B3)
E: Prediction: =$I$1+$J$1*C3^2+$K$1*E2
F: Term: =-LN(E3)-C3^2/E3
G1: Total: =SUM(F2:F884)
```

Maximized on G1 for $J1 + K1 < 0$.

10.18

Use the formula for WCDR to get the worst case default rate. The parameter T for time is one year, the parameter X for confidence is 0.9997. We want to know the value for copula correlations 0, 0.1, 0.2 .... 1.0.

Filled in that means we need to evaluate:

$$N\left(\frac{N^{-1}(0.012) + \sqrt{\rho}N^{-1}(0.9997)}{\sqrt{1-\rho}}\right)$$

ρ	WCDR(1, 0.9997)
0.0	0.012
0.1	0.108
0.2	0.210
0.3	0.326
0.4	0.455
0.5	0.595
0.6	0.737
0.7	0.869
0.8	0.965
0.9	0.999
1.0	N/A (1.000)*

* The formula does not apply to $\rho = 1$, but it is obviously 1.000: there is a 1.2% chance for getting a 100% default rate, and this chance is higher than our confidence level allows.

11.21

Part	Risk Weight	Credit Equivalent	
a	100%	max(3M, 0) + 0.005 * 100M =	3.5M
b	100%	max(-5M, 0) + 0.10 * 150M =	15M
c	100%	max(7M, 0) + 0.01 * 50M =	0.5M

Under Basel I, the capital requirement is 8% of the risk-weighted assets. That computes to 1.52 million.

If netting is used, the credit equivalent amount of the entire transaction changes. The NRR is equal to $\frac{\max(3M+7M-5M,0)}{3M+7M+0} = 0.5$.

That makes the credit equivalent of the transaction:

$$\max(3M + 7M - 5M, 0) + (0.4 + 0.6 * 0.5) * (0.005 * 100M + 0.1 * 150M + 0.01 * 50M) = 16.2M$$

This reduces the capital requirement to $16.2 * 0.08 = 1.296M$.

The risk weight for a AA-rated corporation under the standardized approach is 20%. That reduces the risk-weighted assets to 3.8M, and the capital requirement to 0.304 million.