



## Financial Forecasting 2018-2019

Master in Finance

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Practice Exam - Solution Topics

1.
  - i. False
  - ii. True
  - iii. False
  - iv. False
  - v. False
2.  $\hat{a}_{2004Q2} = 0.67 \times (1520 - 4.185) + 0.33 \times (1432.857 + 2.263) = 1489.176$   
 $\hat{b}_{2004Q2} = 0.5 \times (1489.176 - 1432.857) + 0.5 \times 2.263 = 29.276$   
 $\hat{f}_{2004Q2,1} = 1489.176 + 29.276 + 15.988 = 1534.44$   
 $\hat{f}_{2004Q2,2} = 1489.176 + 29.276 \times 2 - 11.155 = 1536.573$
3. 2.5
4.  $\beta \in ]-0.5, 0.5[$
5. *ARIMA*(1, 0, 5) with restricted parameters:  $\theta_2 = \theta_3 = 0$  and  $\theta_5 = \theta_1\theta_4$
6. (a) Not stationary. Indpro plot: not stationary mean. Correlogram: high values of sample autocorrelations that decay slowly to zero.  
(b) We find evidence of a unit root process.
7. Choose two models and justify using the theoretical characteristics of PACF and ACF of ARMA models.
8. The residual series present significant correlations.
9.  $f_{T,1} = E[Y_{t+1}|I_T] = c + \phi_1 Y_T$   
 $\hat{f}_{T,1} = 2.297 \times (1 + 0.246) - 0.246 \times 2.5 = 2.247$   
 $\sigma_{T+1|T}^2 = \text{Var}(e_{T+1|T}) = \text{Var}(\varepsilon_{T+1}) = \sigma_\varepsilon^2$   
 $\widehat{\sigma_{T+1|T}^2} = 1.117^2$
10. (a)  $r_t = \mu + \phi r_{t-1} + \varepsilon_t \quad \varepsilon_t = \sigma_{t|t-1} z_t \quad \sigma_{t|t-1}^2 = \omega + \alpha \varepsilon_{t-1}^2 + \beta \sigma_{t-1|t-2}^2$   
 $\hat{\mu} = 0.023 \times (1 - 0.064) \quad \hat{\phi} = 0.064 \quad \hat{\omega} = 0.001 \quad \hat{\alpha} = 0.058 \quad \hat{\beta} = 0.940$   
(b)  $\widehat{\sigma_{T+1|T}^2} = 0.001 + 0.058 \times (-0.134 - 0.021)^2 + 0.94 \times 0.224 \approx 0.213$

**11.** Nonstationarity of stock prices.

Returns have time varying-volatility;

Volatility Clustering: large (small) movements tend to be followed by large (small) movements;

Returns are non normally distributed (fat tails) : they are leptokurtic with kurtosis coefficient larger than 3;