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Empirical

Summary statistics

| | Mean | Std | corr(g_c,g.) | AC(4) | AC(8) |
|-------|---------|--------|--------------|---------|---------|
| g_c | 0.0087 | 0.0050 | | -0.0244 | -0.1237 |
| g_d | 0.0053 | 0.0202 | 0.1019 | -0.0083 | 0.0194 |
| g_e | 0.0019 | 0.0766 | 0.1059 | -0.0844 | -0.0772 |
| r_m | 0.0216 | 0.0777 | | -0.0250 | -0.0285 |
| (p-d) | 4.7083 | 0.3018 | | 0.7467 | 0.5620 |
| (p-e) | 16.0950 | 0.3521 | | 0.7181 | 0.5349 |

| | Mean | Std | corr(g_c,g.) | AC(4) | AC(8) |
|-------|---------|--------|--------------|---------|---------|
| g_c | 0.0075 | 0.0043 | | -0.0244 | -0.1237 |
| g_d | 0.0045 | 0.0144 | 0.1728 | -0.0083 | 0.0194 |
| g_e | 0.0034 | 0.0741 | 0.2481 | -0.0844 | -0.0772 |
| r_m | 0.0193 | 0.0833 | | -0.0250 | -0.0285 |
| (p-d) | 4.7078 | 0.2825 | | 0.7467 | 0.5620 |
| (p-e) | 16.1848 | 0.2781 | | 0.7181 | 0.5349 |

Table 2

ARIMA(1,0,0) Model:

Conditional Probability Distribution: Gaussian

| Parameter | Value | Standard Error | t Statistic |
|-----------|-------------|-------------------|----------------|
| Constant | 0.00697646 | 0.000526012 | 13.2629 |
| AR{1} | 0.195556 | 0.0530574 | 3.68574 |
| Variance | 2.42008e-05 | 1.74301e-06 | 13.8845 |

ARIMA(1,0,0) Model:

Conditional Probability Distribution: Gaussian

| Parameter | Value | Standard Error | t Statistic |
|-----------|------------|-------------------|----------------|
| Constant | 0.0199532 | 0.0062261 | 3.20476 |
| AR{1} | 0.0779554 | 0.0649359 | 1.2005 |
| Variance | 0.00600511 | 0.000473208 | 12.6902 |

ARIMA(1,0,0) Model:

Conditional Probability Distribution: Gaussian

| Parameter | Value | Standard Error | t Statistic |
|-----------|------------|-------------------|----------------|
| Constant | 0.00700651 | 0.000831304 | 8.42834 |
| AR{1} | 0.19454 | 0.0841556 | 2.31168 |

GARCH(1,1) Conditional Variance Model:

Conditional Probability Distribution: Gaussian

| Parameter | Value | Standard Error | t Statistic |
|-----------|-------------|-------------------|----------------|
| Constant | 1.39159e-05 | 4.14519e-06 | 3.35712 |
| GARCH{1} | 0.127887 | 0.237493 | 0.538487 |
| ARCH{1} | 0.297326 | 0.115287 | 2.57902 |

ARIMA(1,0,0) Model:

Conditional Probability Distribution: Gaussian

| Parameter | Value | Standard Error | t Statistic |
|-----------|-----------|-------------------|----------------|
| Constant | 0.0193859 | 0.0065259 | 2.9706 |
| AR{1} | 0.101148 | 0.0935808 | 1.08086 |

GARCH(1,1) Conditional Variance Model:

Conditional Probability Distribution: Gaussian

| <i>Parameter</i> | <i>Value</i> | <i>Standard Error</i> | <i>t Statistic</i> |
|------------------|-------------------|---------------------------|------------------------|
| ----- | ----- | ----- | ----- |
| <i>Constant</i> | <i>0.00204175</i> | <i>0.00144054</i> | <i>1.41735</i> |
| <i>GARCH{1}</i> | <i>0.525254</i> | <i>0.281542</i> | <i>1.86564</i> |
| <i>ARCH{1}</i> | <i>0.141232</i> | <i>0.0815079</i> | <i>1.73273</i> |

| | | const | A1 | w0 | w1 | w2 | | AC(1) | AC(4) | AC(8) |
|----|-----------------------------|------------|--------|------------|--------|--------|----------|--------|---------|---------|
| 1 | AR(1) estimates | | | | | | | | | |
| 2 | | | | | | | | | | |
| 3 | Panel A: Consumption growth | | | | | | | | | |
| 4 | Estimate | 0.0070 | 0.1956 | | | | Estimate | 0.2104 | 0.0663 | 0.0344 |
| 5 | S.E. | 5.2601e-04 | 0.0531 | | | | Q-stat | 9.0284 | 19.3894 | 32.8089 |
| 6 | | | | | | | | | | |
| 7 | Panel B: Market return | | | | | | | | | |
| 8 | Estimate | 0.0200 | 0.0780 | | | | Estimate | 0.1152 | 0.0581 | -0.0817 |
| 9 | S.E. | 0.0062 | 0.0649 | | | | Q-stat | 2.7066 | 9.4510 | 16.0491 |
| 10 | | | | | | | | | | |
| 11 | AR(1)-GARCH(1,1) estimates | | | | | | | | | |
| 12 | | | | | | | | | | |
| 13 | Panel C: Consumption | | | | | | | | | |
| 14 | Estimate | 0.0070 | 0.1945 | 1.3916e-05 | 0.2973 | 0.1279 | | | | |
| 15 | S.E. | 8.3130e-04 | 0.0842 | 4.1452e-06 | 0.1153 | 0.2375 | | | | |
| 16 | | | | | | | | | | |
| 17 | Panel D: Market return | | | | | | | | | |
| 18 | Estimate | 0.0194 | 0.1011 | 0.0020 | 0.1412 | 0.5253 | | | | |
| 19 | S.E. | 0.0065 | 0.0936 | 0.0014 | 0.0815 | 0.2815 | | | | |

Table 3

ans =

Linear regression model:

$$y \sim 1 + x1$$

Estimated Coefficients:

| | Estimate | SE | tStat | pValue |
|-------------|----------|---------|---------|-----------|
| | ----- | ----- | ----- | ----- |
| (Intercept) | -2.1204 | 1.2185 | -1.7401 | 0.083392 |
| x1 | -0.84436 | 0.25813 | -3.271 | 0.0012641 |

Number of observations: 200, Error degrees of freedom: 198

Root Mean Squared Error: 1.1

R-squared: 0.0513, Adjusted R-Squared 0.0465

F-statistic vs. constant model: 10.7, p-value = 0.00126

ans =

Linear regression model:

$$p_min_d \sim 1 + sigma_c_1$$

Estimated Coefficients:

| | Estimate | SE | tStat | pValue |
|-------------|-----------|----------|--------|------------|
| | ----- | ----- | ----- | ----- |
| (Intercept) | 4.3408 | 0.11509 | 37.717 | 2.4755e-92 |
| sigma_c_1 | -0.060718 | 0.018562 | -3.271 | 0.0012641 |

Number of observations: 200, Error degrees of freedom: 198

Root Mean Squared Error: 0.294

R-squared: 0.0513, Adjusted R-Squared 0.0465

F-statistic vs. constant model: 10.7, p-value = 0.00126

| | J | b | t-stat | R^2 | t(2.5%) | t(5%) | R^2(95%) | | b | t-stat | R^2 | t(2.5%) | t(5%) | R^2(95%) |
|---|-------------------------------|---------|---------|--------|---------|-------|----------|--|---------|---------|------------|---------|-------|----------|
| 1 | Panel A: price-dividend ratio | | | | | | | | | | | | | |
| 2 | 1 | -0.0607 | -3.2710 | 0.0465 | | | | | -0.0547 | -2.9372 | 0.0369 | | | |
| 3 | 4 | -0.2520 | -6.8447 | 0.1896 | | | | | -0.1201 | -3.0898 | 0.0418 | | | |
| 4 | 8 | -0.3501 | -8.2710 | 0.2599 | | | | | -0.1658 | -3.4387 | 0.0534 | | | |
| 5 | | | | | | | | | | | | | | |
| 6 | Panel B: price-earnings ratio | | | | | | | | | | | | | |
| 7 | 1 | -0.0559 | -2.6057 | 0.0283 | | | | | -0.0232 | -1.0703 | 7.3129e-04 | | | |
| 8 | 4 | -0.2594 | -6.3092 | 0.1653 | | | | | -0.0093 | -0.2117 | -0.0049 | | | |
| 9 | 8 | -0.3902 | -8.7852 | 0.2841 | | | | | -0.0126 | -0.2380 | -0.0049 | | | |

Figure 1

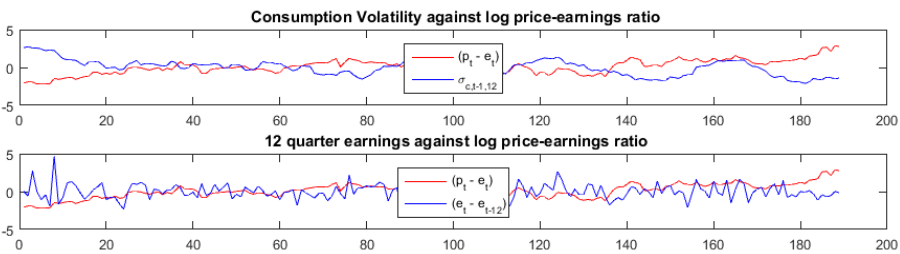


table 4

| | J | a | t-stat | R ² | t(2.5%) | t(5%) | R ² (95%) | | a | t-stat | R ² | t(2.5%) | t(5%) | R ² (95%) |
|---|-------------------------------|---|---------|----------------|---------|-------|----------------------|--|---------|---------|----------------|---------|-------|----------------------|
| 1 | Panel A: price-dividend ratio | | | | | | | | | | | | | |
| 2 | | 1 | -0.0032 | -4.1869 | 0.0767 | | | | -0.0038 | -0.3113 | -0.0046 | | | |
| 3 | | 4 | -0.0033 | -4.0846 | 0.0741 | | | | 0.0130 | 0.9933 | -6.8021e-05 | | | |
| 4 | | 8 | -0.0024 | -2.9332 | 0.0381 | | | | 0.0182 | 1.2867 | 0.0034 | | | |
| 5 | | | | | | | | | | | | | | |
| 6 | Panel B: price-earnings ratio | | | | | | | | | | | | | |
| 7 | | 1 | -0.0029 | -4.3787 | 0.0837 | | | | 0.0120 | 1.1522 | 0.0016 | | | |
| 8 | | 4 | -0.0030 | -4.3805 | 0.0849 | | | | 0.0129 | 1.1736 | 0.0019 | | | |
| 9 | | 8 | -0.0021 | -3.1564 | 0.0446 | | | | 0.0034 | 0.2941 | -0.0048 | | | |

Table 5

| | J | a | t-stat | R ² | t(2.5%) | t(5%) | R ² (95%) | R ² (97.25%) |
|----|--|---------|---------|----------------|---------|-------|----------------------|-------------------------|
| 1 | Panel A: Predicting price-earnings ratio | | | | | | | |
| 2 | $p_t - e_t = a_0 + a_1 \log(\sigma_{c,t-1}^2) + \epsilon_{p,t}$ | | | | | | | |
| 3 | a1 | -0.2397 | -3.9013 | 0.0667 | | | | |
| 4 | | | | | | | | |
| 5 | $p_t - e_t = a_0 + a_1(p_{t-1} - e_{t-1}) + a_2 \log(\sigma_{c,t-1}^2) + \epsilon_{p,t}$ | | | | | | | |
| 6 | a2 | -0.0019 | -0.1019 | 0.9201 | | | | |
| 7 | a1 | 0.9474 | 45.9932 | | | | | |
| 8 | | | | | | | | |
| 9 | Panel B: Predicting volatility | | | | | | | |
| 10 | $\log(\sigma_{c,t}^2) = a_0 + a_1(p_{t-1} - e_{t-1}) + \epsilon_{\sigma,t}$ | | | | | | | |
| 11 | a1 | -0.3364 | -4.5111 | 0.0886 | | | | |
| 12 | | | | | | | | |
| 13 | $\log(\sigma_{c,t}^2) = a_0 + a_1(p_{t-1} - e_{t-1}) + a_2 \log(\sigma_{c,t-1}^2) + \epsilon_{\sigma,t}$ | | | | | | | |
| 14 | a1 | -0.2346 | -3.2035 | 0.1883 | | | | |
| 15 | a2 | 0.3346 | 5.0307 | | | | | |

Table 6

| | J | beta_J | t-stat | R^2 | beta_J | t-stat | R^2 | beta_J | t-stat | R^2 |
|----|-------------------------------|---------|---------|------------|------------|---------|-------------|---------|---------|--------|
| 1 | Panel A: Price-dividend ratio | | | | | | | | | |
| 2 | 4 | -0.0499 | -1.2306 | 0.0026 | 3.1123e-04 | 0.0258 | -0.0051 | -0.1500 | -3.8725 | 0.0667 |
| 3 | 8 | -0.0766 | -1.3359 | 0.0041 | -0.0187 | -0.9032 | -9.6047e-04 | -0.2531 | -4.5745 | 0.0940 |
| 4 | 12 | -0.0702 | -1.0544 | 5.9447e-04 | -0.0492 | -1.7883 | 0.0116 | -0.3732 | -5.7895 | 0.1475 |
| 5 | 16 | -0.0178 | -0.2450 | -0.0051 | -0.0909 | -2.7833 | 0.0354 | -0.5021 | -6.8984 | 0.2020 |
| 6 | | | | | | | | | | |
| 7 | Panel B: Price-earnings ratio | | | | | | | | | |
| 8 | 4 | 0.0655 | 1.9311 | 0.0137 | -0.0379 | -3.8829 | 0.0670 | -0.1216 | -3.7217 | 0.0615 |
| 9 | 8 | 0.1096 | 2.4018 | 0.0242 | -0.0647 | -4.0386 | 0.0739 | -0.1930 | -4.3125 | 0.0840 |
| 10 | 12 | 0.1555 | 3.0538 | 0.0424 | -0.0839 | -4.0392 | 0.0753 | -0.2480 | -4.8073 | 0.1052 |
| 11 | 16 | 0.2244 | 4.2376 | 0.0844 | -0.1059 | -4.3692 | 0.0895 | -0.3239 | -5.6186 | 0.1425 |

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