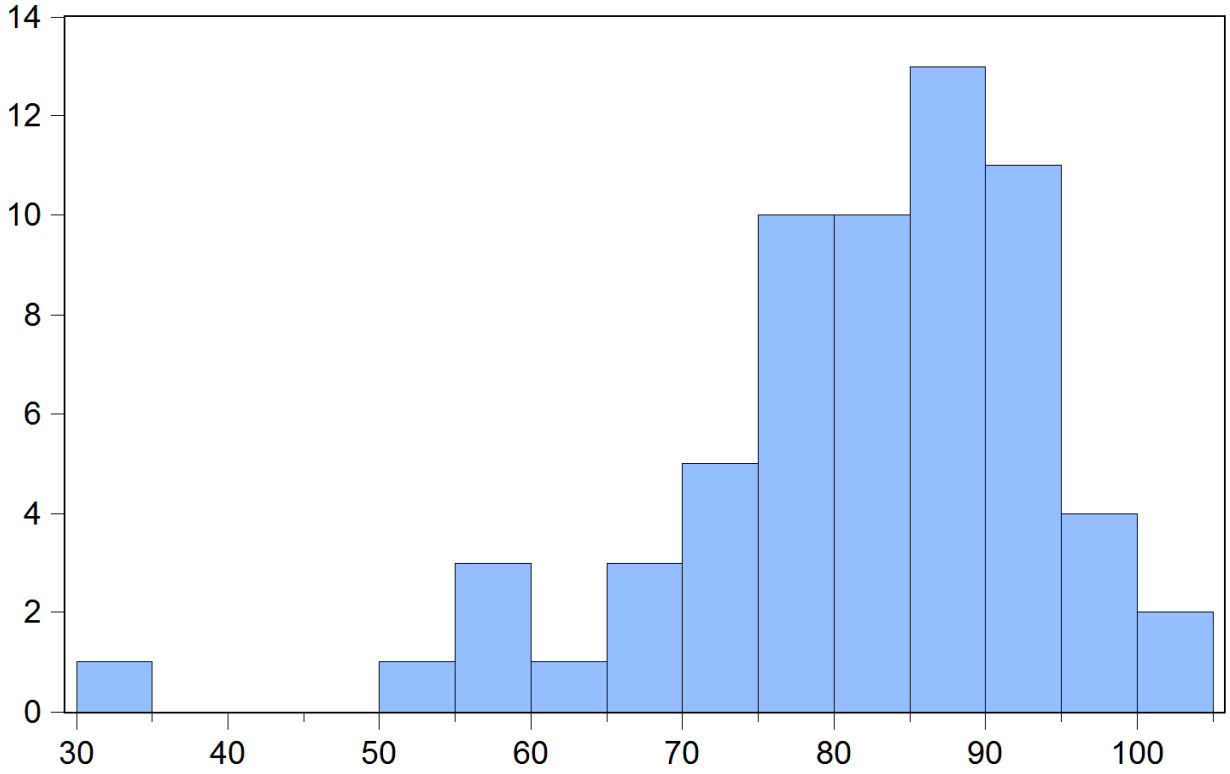
Announcement:

Hello Fellow Speculators,

I am starting the UCSC Capitalism Club. Participants will start with 100K which they can invest in traded US equities. The competition will start 11/1/2010 and end 6/1/2011. The prize is the honor of outperforming your fellow grad students. This is an opportunity to have fun competing and learn about investing strategy.

Sign up for the competition at
http://vse.marketwatch.com/Game/StartViewGame.aspx?id=UCSC_Club

ECON 133 Midterm 1

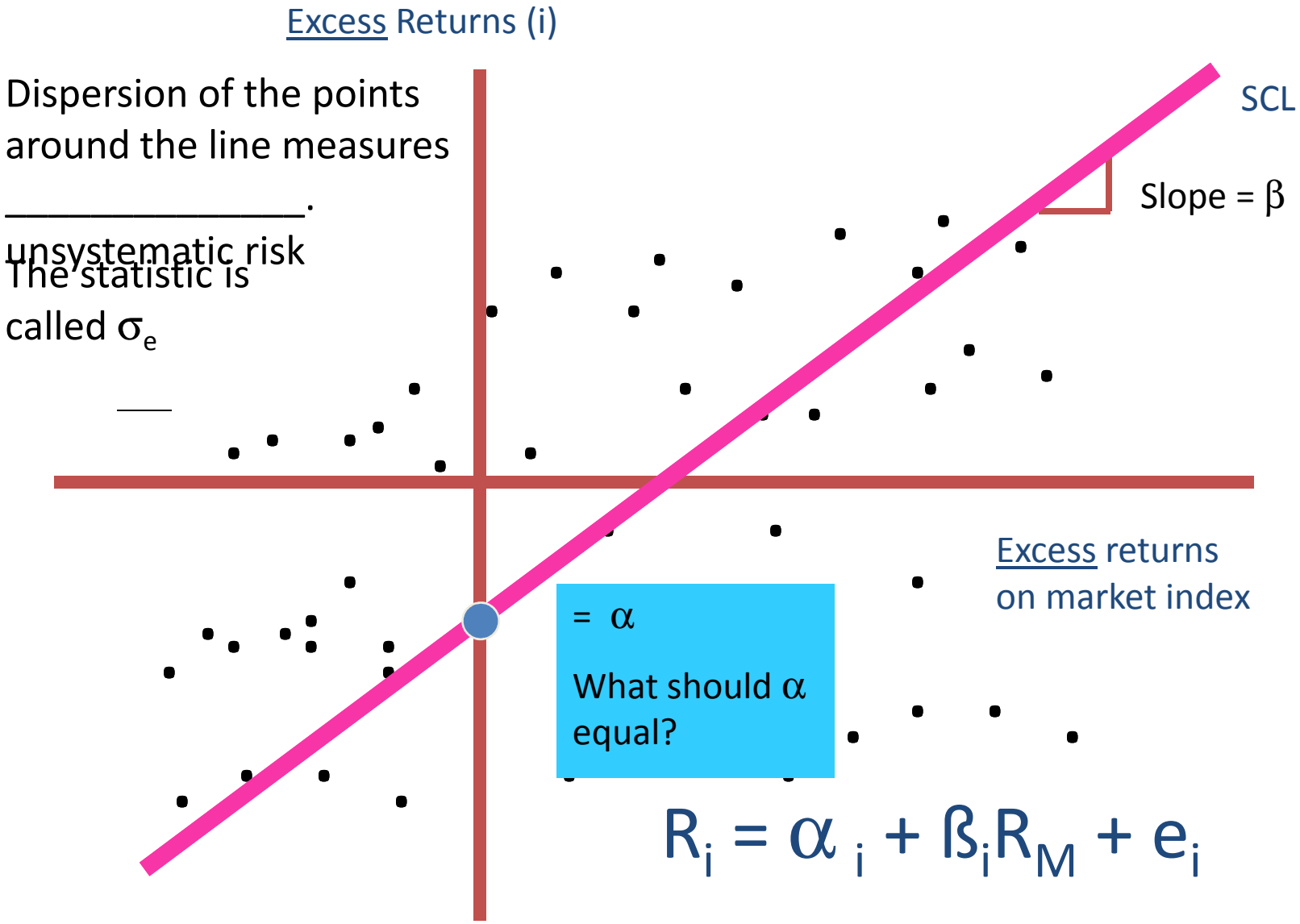


Series: Score	
Sample 1 64	
Observations 64	
Mean	81.18750
Median	84.00000
Maximum	100.0000
Minimum	30.00000
Std. Dev.	12.91348
Skewness	-1.405836
Kurtosis	5.784270
Jarque-Bera	41.75375
Probability	0.000000

Chapter 7

Capital Asset Pricing and Arbitrage Pricing Theory

Security Characteristic Line (SCL)



$$R_i = \alpha_i + \beta_i R_M + e_i$$

GM Excess Returns May 00 to April 05

Month	GM ER	Rm- Rf	Month	GM ER	Rm- Rf
Apr-05	-0.12382	-0.0258	Nov-02	0.192943	0.0601
Mar-05	-0.17793	-0.0187	Oct-02	-0.14659	0.079
Feb-05	-0.03366	0.019	Sep-02	-0.1886	-0.1044
Jan-05	-0.0831	-0.0275	Aug-02	0.026767	0.0042
Dec-04	0.036243	0.0339	Jul-02	-0.13052	-0.0825
Nov-04	-0.00072	0.0456	Jun-02	-0.14143	-0.0717
Oct-04	-0.09401	0.0145	May-02	-0.03264	-0.0138
Sep-04	0.026922	0.0162	Apr-02	0.059749	-0.0527
Aug-04	-0.04367	0.0006	Mar-02	0.139472	0.0431
Jul-04	-0.07518	-0.0404	Feb-02	0.034513	-0.0231
Jun-04	0.025363	0.0185	Jan-02	0.050863	-0.0144
May-04	-0.04368	0.0124	Dec-01	-0.02357	0.0152
Apr-04	0.002798	-0.0184	Nov-01	0.201216	0.0764
Mar-04	-0.01887	-0.0129	Oct-01	-0.03866	0.0247
Feb-04	-0.03218	0.0133	Sep-01	-0.21868	-0.0929
Jan-04	-0.07041	0.0207	Aug-01	-0.14202	-0.0637
Dec-03	0.247489	0.0436	Jul-01	-0.01465	-0.0212
Nov-03	0.001786	0.0129	Jun-01	0.127956	-0.0193
Oct-03	0.041728	0.0607	May-01	0.035048	0.0074
Sep-03	-0.00494	-0.0124	Apr-01	0.053779	0.0808
Aug-03	0.097241	0.0227	Mar-01	-0.03135	-0.0728
Jul-03	0.038956	0.0236	Feb-01	-0.01125	-0.1
Jun-03	0.018181	0.0137	Jan-01	0.049825	0.0336
May-03	-0.02088	0.0608	Dec-00	0.02409	0.0126
Apr-03	0.07132	0.0816	Nov-00	-0.20852	-0.1063
Mar-03	-0.0054	0.0106	Oct-00	-0.04947	-0.0253
Feb-03	-0.07146	-0.0179	Sep-00	-0.07658	-0.0556
Jan-03	-0.01537	-0.0251	Aug-00	0.224185	0.0703
Dec-02	-0.07254	-0.0582	Jul-00	-0.02449	-0.0247
			Jun-00	-0.18276	0.0441
			May-00	-0.25065	-0.0425

Regression of GM ER and Rm-Rf from FF

SUMMARY OUTPUT

Regression Statistics	
Multiple R	0.585804
R Square	0.343166
Adjusted R	0.331841
Standard E	0.085658
Observatio	60

ANOVA

	df	*SS*	*MS*	*F*	*ignificance F*
Regressior	1	0.222336	0.222336	30.30238	8.79E-07
Residual	58	0.42556	0.007337		
Total	59	0.647896			

	Coefficients	*tandard Err*	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*
Intercept	-0.0143	0.011077	-1.29047	0.202008	-0.03647	0.007879
Rm- Rf	1.276019	0.231803	5.50476	8.79E-07	0.812016	1.740022

"True" β is between 0.81 and 1.74!

If rf = 5% and $r_m - r_f$ = 6%, then we would predict GM's return (r_{GM}) to be

5% + 1.276(6%) = 12.66%

Regression Results:

$r_{GM} - r_f = \alpha + ß(r_m - r_f)$

	α	ß
Estimated coefficient	-0.0143	1.276
Std error of estimate	0.011080.2318	

ρ = 0.5858

R^2 = (Adjusted) = 33.18%

σ_e= 8.57%

Evaluating the CAPM

- The CAPM is "false" based on the validity of its assumptions.

- The CAPM could still be a useful predictor of expected returns. That is an empirical question.

- Huge measurability problems because the market portfolio is unobservable.
  Conclusion: As a theory the CAPM is untestable.

Evaluating the CAPM

- However, the _____ of the CAPM is testable.

  practicality

  Betas are _____ at predicting returns as other measurable factors may be.

  not as useful

  - More advanced versions of the CAPM that do a better job at _____ are useful at predicting stock returns.

    estimating the market portfolio

Still widely used and well understood.

Evaluating the CAPM

- The principles we learn from the CAPM are still entirely valid.
  - Investors should diversify.
    Systematic risk is the risk that matters.
  - A well diversified risky portfolio can be suitable for a wide range of
  - investors.

    - The risky portfolio would have to be adjusted for tax and liquidity differences.
    - Differences in risk tolerances can be handled by changing the asset allocation decisions in the complete portfolio.

- Even if the CAPM is "false," the markets can still be "efficient."

Fama-French (FF) 3 factor Model

Fama and French noted that stocks of smaller firms and stocks of firms with a high book to market have had higher stock returns than predicted by single factor models.

- Problem: Empirical model without a theory
- Will the variables continue to have predictive power?

Fama-French (FF) 3 factor Model

FF proposed a 3 factor model of stock returns as follows:

- r_M – rf = Market index excess return
- Ratio of book value of equity to market value of equity measured with a variable called HML:
  - HML:
    High minus low or difference in returns between firms with a high versus a low book to market ratio.
- Firm size variable measured by the SMB variable
  - SMB:
    Small minus big or the difference in returns between small and large firms.

Fama-French (FF) 3 factor Model

$$r_{GM} - rf = \alpha_{GM} + \beta_M(r_M - rf) + \beta_{HML} r_{HML} + \beta_{SMB} r_{SMB} + e_{GM}$$

Month	GM ER	Rm- Rf	SMB	HML
Apr-05	-0.12382	-0.0258	-0.0421	-0.0028
Mar-05	-0.17793	-0.0187	-0.0131	0.0183
Feb-05	-0.03366	0.019	-0.0066	0.0097
Jan-05	-0.0831	-0.0275	-0.0155	0.0037
Dec-04	0.036243	0.0339	0.0033	0.0042
Nov-04	-0.00072	0.0456	0.0408	0.0157
Oct-04	-0.09401	0.0145	0.0025	0.0067
Sep-04	0.026922	0.0162	0.0295	-0.0043
Aug-04	-0.04367	0.0006	-0.0132	0.017
Jul-04	-0.07518	-0.0404	-0.0372	0.0319
Jun-04	0.025363	0.0185	0.0247	0.0183
May-04	-0.04368	0.0124	-0.0014	-0.0154
Apr-04	0.002798	-0.0184	-0.0214	0.0163
Mar-04	-0.01887	-0.0129	0.0173	0.0169
Feb-04	-0.03218	0.0133	-0.0101	0.0118
Jan-04	-0.07041	0.0207	0.0265	-0.0063
Dec-03	0.247489	0.0436	-0.0236	0.051
Nov-03	0.001786	0.0129	0.0237	0.0087
Oct-03	0.041728	0.0607	0.0267	-0.0044
Sep-03	-0.00494	-0.0124	0.0063	0.0025
Aug-03	0.097241	0.0227	0.0284	0.0141
Jul-03	0.038956	0.0236	0.0463	-0.0168
Jun-03	0.018181	0.0137	0.0198	0.0075
May-03	-0.02088	0.0608	0.0522	0.0546
Apr-03	0.07132	0.0816	0.0229	0.0408
Mar-03	-0.0054	0.0106	0.0033	-0.0173
Feb-03	-0.07146	-0.0179	-0.0103	-0.019
Jan-03	-0.01537	-0.0251	0.0076	-0.0107
Dec-02	-0.07254	-0.0582	-0.006	-0.0211
Nov-02	0.192943	0.0601	0.0426	0.1032
Oct-02	-0.14659	0.079	-0.0338	-0.0048
Sep-02	-0.1886	-0.1044	0.0317	-0.0245
Aug-02	0.026767	0.0042	-0.0164	0.0086
Jul-02	-0.13052	-0.0825	-0.0532	-0.0454
Jun-02	-0.14143	-0.0717	0.0386	-0.0114
May-02	-0.03264	-0.0138	-0.0351	0.0011
Apr-02	0.059749	-0.0527	0.0453	0.0202
Mar-02	0.139472	0.0431	0.0473	0.0175
Feb-02	0.034513	-0.0231	-0.0186	0.0298
Jan-02	0.050863	-0.0144	0.018	-0.0083
Dec-01	-0.02357	0.0152	0.0585	0.0114
Nov-01	0.201216	0.0764	0.0163	0.033
Oct-01	-0.03866	0.0247	0.0924	-0.0218
Sep-01	-0.21868	-0.0929	-0.0575	-0.0042
Aug-01	-0.14202	-0.0637	0.0196	0.0248
Jul-01	-0.01465	-0.0212	-0.0332	0.0181
Jun-01	0.127956	-0.0193	0.0658	-0.0066
May-01	0.035048	0.0074	0.0495	0.0111
Apr-01	0.053779	0.0808	0.0173	-0.035
Mar-01	-0.03135	-0.0728	-0.0057	0.0319
Feb-01	-0.01125	-0.1	-0.0192	0.0569
Jan-01	0.049825	0.0336	0.0872	0.1343
Dec-00	0.02409	0.0126	0.007	0.0353
Nov-00	-0.20852	-0.1063	-0.02	0.0695
Oct-00	-0.04947	-0.0253	-0.0453	0.0423
Sep-00	-0.07658	-0.0556	-0.0012	0.0457
Aug-00	0.224185	0.0703	-0.0116	-0.0208
Jul-00	-0.02449	-0.0247	-0.0245	0.0878
Jun-00	-0.18276	0.0441	0.0846	-0.1497
May-00	-0.25065	-0.0425	-0.045	0.0749

Fama-French (FF) 3 factor Model

$$r_{GM} - rf = \alpha_{GM} + \beta_M(r_M - rf) + \beta_{HML}r_{HML} + \beta_{SMB}r_{SMB} + e_{GM}$$

SUMMARY OUTPUT						
Regression Statistics						
Multiple R	0.645353					
R Square	0.416481					
Adjusted R	0.385221					
Standard E	0.082165					
Observatio	60					
ANOVA						
	df	*SS*	*MS*	*F*	*Significance F*	
Regressior	3	0.269836	0.089945	13.32314	1.13E-06	
Residual	56	0.37806	0.006751			
Total	59	0.647896				
	Coefficients	*tandard Erı*	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*
Intercept	-0.02616	0.011639	-2.2477	0.028552	-0.04948	-0.00285
Rm- Rf	1.202913	0.24113	4.988641	6.24E-06	0.719871	1.685955
SMB	0.364624	0.332656	1.096098	0.277727	-0.30177	1.031013
HML	0.692292	0.274888	2.518448	0.014672	0.141625	1.24296

If rf = 5%, $r_m - r_f$ = 6%, & return on HML portfolio will be 5%, then we would predict GM's return (r_{GM}) to be

5% + -2.62% + 1.2029(6%) + 0.6923(5%) = 13.06%

Regression Results:

$$r_{GM} - rf = \alpha_{GM} + \beta_M(r_M - rf) + \beta_{HML}r_{HML} + \beta_{SMB}r_{SMB} + e_{GM}$$

	α	β_M	β_{HML}	β_{SMB}
Estimated coefficient	-0.0262*	1.2029*	0.6923*	0.3646
Std error of estimate	0.0116	0.2411	0.2749	0.3327

ρ = 0.6454

R^2 = (Adjusted) = 38.52%

σ_e = 8.22%

Compared to single factor model: Better Adjusted R^2; lower β_M higher E(r), but negative alpha.