Sharpe (I)

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FROM SML TO SCL

- From the Security Market Line…
- To the Security Characteristic Line

$$\text{SML} : E(R_i) = R_f + \beta_i[E(R_M) - R_f]$$

$$\text{SCL} : R_{i,t} - R_f = \alpha_i + \beta_i\,(R_{M,t} - R_f) + \epsilon_{i,t}$$

where:

α_i is called the asset's alpha (abnormal return)

$\beta_i(R_{M,t} - R_f)$ is a nondiversifiable or systematic risk

$\varepsilon_{i,t}$ is the non-systematic or diversifiable, non-market or idiosyncratic risk.

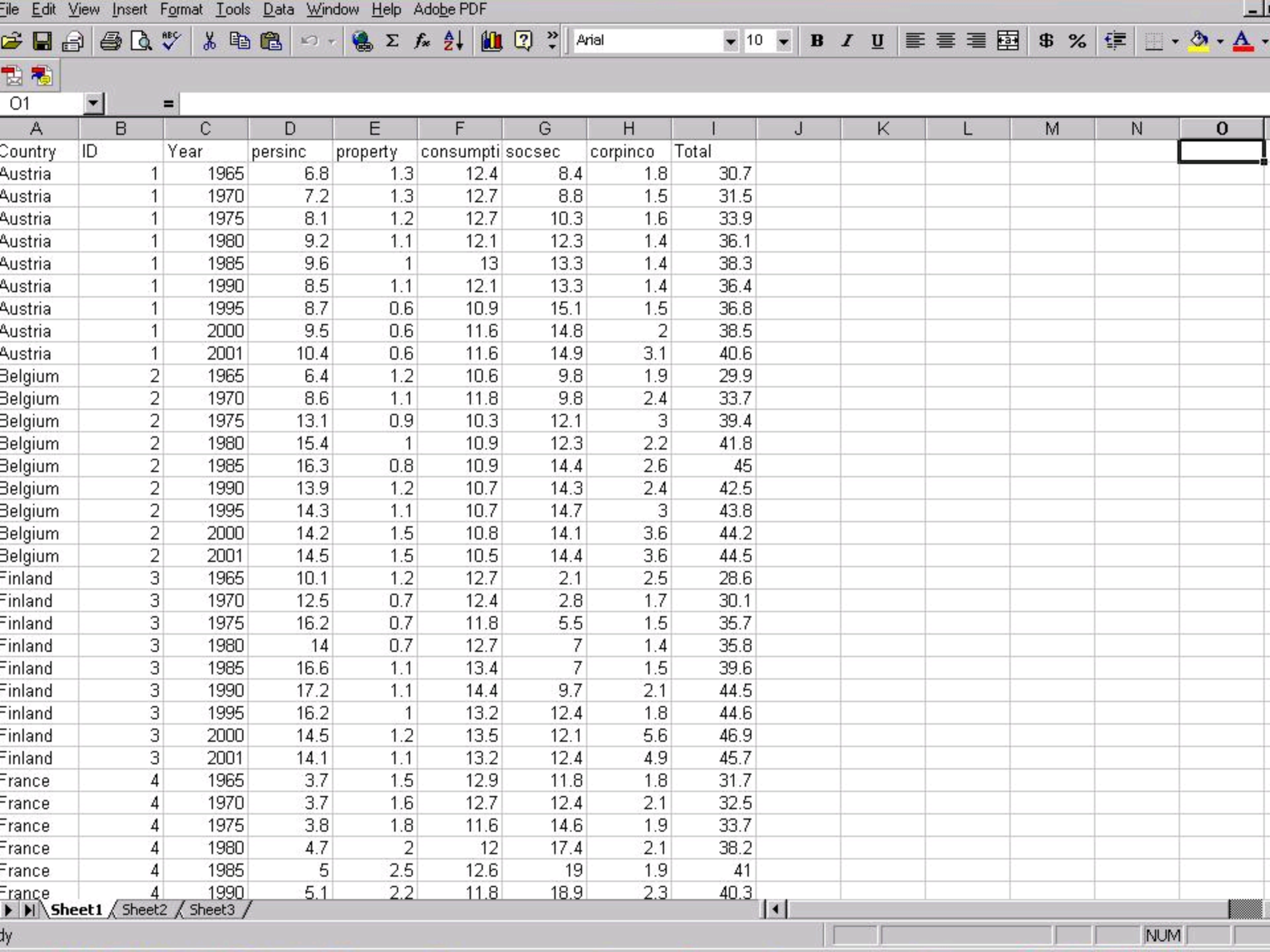
- $\alpha_i < 0$: the investment has earned too little for its risk (or, was too risky for the return)
- $\alpha_i = 0$: the investment has earned a return adequate for the risk taken
- $\alpha_i > 0$: the investment has a return in excess of the reward for the assumed risk

A LITTLE BIT OF ECONOMETRICS

- **Econometrics**
- I. Data classification
  - 1. Economists have data
    - longitudinal series = time-series analysis
    - cross-sectional series = panel data analysis
    - cross-sectional time series = time-dominant panel data analysis
  - 2. Economists have no data
    - Game theory
    - Simulations: cross-generation analysis

- II. Database: AMECO
- 1. Open AMECO
  - select Ameco_on_line
- 2. Click on Chapter/subs/sections
- 3. Select your data
- 4. Select your countries
- 5. Select the time period
- 6. Click on download
- 7. Select and copy what you need
- 8. Open MS Excel
- 9. Paste using the paste special menu
- 10. Remove what you don't need, make all the calculations you want
- 11. Put the data in a panel data presentation

- III. Panel data presentation
- 1. An illustration
- 2. download the file on taxation
- 3. Save it as an CSV file in order to make it readable by Stata



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Country	ID	Year	persinc	property	consumpti	socsec	corpinco	Total
Austria	1	1965	6.8	1.3	12.4	8.4	1.8	30.7
Austria	1	1970	7.2	1.3	12.7	8.8	1.5	31.5
Austria	1	1975	8.1	1.2	12.7	10.3	1.6	33.9
Austria	1	1980	9.2	1.1	12.1	12.3	1.4	36.1
Austria	1	1985	9.6	1	13	13.3	1.4	38.3
Austria	1	1990	8.5	1.1	12.1	13.3	1.4	36.4
Austria	1	1995	8.7	0.6	10.9	15.1	1.5	36.8
Austria	1	2000	9.5	0.6	11.6	14.8	2	38.5
Austria	1	2001	10.4	0.6	11.6	14.9	3.1	40.6
Belgium	2	1965	6.4	1.2	10.6	9.8	1.9	29.9
Belgium	2	1970	8.6	1.1	11.8	9.8	2.4	33.7
Belgium	2	1975	13.1	0.9	10.3	12.1	3	39.4
Belgium	2	1980	15.4	1	10.9	12.3	2.2	41.8
Belgium	2	1985	16.3	0.8	10.9	14.4	2.6	45
Belgium	2	1990	13.9	1.2	10.7	14.3	2.4	42.5
Belgium	2	1995	14.3	1.1	10.7	14.7	3	43.8
Belgium	2	2000	14.2	1.5	10.8	14.1	3.6	44.2
Belgium	2	2001	14.5	1.5	10.5	14.4	3.6	44.5
Finland	3	1965	10.1	1.2	12.7	2.1	2.5	28.6
Finland	3	1970	12.5	0.7	12.4	2.8	1.7	30.1
Finland	3	1975	16.2	0.7	11.8	5.5	1.5	35.7
Finland	3	1980	14	0.7	12.7	7	1.4	35.8
Finland	3	1985	16.6	1.1	13.4	7	1.5	39.6
Finland	3	1990	17.2	1.1	14.4	9.7	2.1	44.5
Finland	3	1995	16.2	1	13.2	12.4	1.8	44.6
Finland	3	2000	14.5	1.2	13.5	12.1	5.6	46.9
Finland	3	2001	14.1	1.1	13.2	12.4	4.9	45.7
France	4	1965	3.7	1.5	12.9	11.8	1.8	31.7
France	4	1970	3.7	1.6	12.7	12.4	2.1	32.5
France	4	1975	3.8	1.8	11.6	14.6	1.9	33.7
France	4	1980	4.7	2	12	17.4	2.1	38.2
France	4	1985	5	2.5	12.6	19	1.9	41
France	4	1990	5.1	2.2	11.8	18.9	2.3	40.3

Sheet1 Sheet2 Sheet3

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- IV . In Stata
  - 1. Import the CSV file
  - 2. open the data editor and label everything you need: **drop** colums, **rename** colums, **generate** new colums, etc.
  - 3. Declare your data set as a panel (**xtreg**) if it is a panel:**iis** country: **tis** year
  - 4. Declare your data set as a time-series (**regress**) if it is one: **tsset** year

- IV. In Stata
- 1. Run your first regressions
- 2. Read the result tables
- Make the difference between the *overall model* and the *independent variables*
- 3. Diagnostics:
- Independent variables
  - Non normality
  - Non linearity
  - Multicollinearity
  - Outliers
- Residuals
  - Heteroscedasticity
  - Auto-correlation
- 4. Read the different tests: hettet, ovtest, dwstat. etc.

- IV. Diagnostics:
- Independent variables
  - Non normality
    - **kdensity** variable**, normal**
  - Non linearity
    - quadratic? logarithmic? squared root?
  - Outliers
  - Multicollinearity
    - It occurs when two explanatory variables have approximate linear relationships. Testing for multicollinearity: here
- Residuals
  - Heteroscedasticity
    - each observation has its own error variance. For example, if data was gathered across different neighborhoods, then it may be unreasonable to assume that the error variance across neighborhoods is equal. This would introduce heteroscedasticity into the model. Testing for heteroscedasticity: **hettest**
  - Auto-correlation or serial correlation
    - time-series. Testing for serial correlation: Durbin-Watson test

- IV. How to present your results?
  - 1. Present your data set
  - 2. Explain your methodology
  - 3. Pick up the right "best" model
  - 4. Put your results in a table:

Table 1. Results before and after 1999 [Double-Lin specification]

Dependent variable: Public deficit excluding interest. Mean: -1.118796, Std. Dev.: 2.352955

Variable	Mean	Std. Dev.	Coefficient	t-statistic
Before euro (1991-1998)				
Interest rate (short-term)	3.360142	10.55083	.0371655	1.16
Interest rate (long-term)	-9.93521	1318145	-.1211262	-3.73**
Total tax burden	.3297132	2.444388	.590339	2.70**
Public debt	-18.72086	41.99511	.0641482	7.41**
CPI	-.5588889	1.145572	-.0541292	-.23
GDP	.1056176	5.080516	.1007741	2.98**
Intercept			-1.129198	-2.47*
n	36			
After euro (>1998)				
Interest rate (short-term)	3.360142	10.55083	.0307668	2.22*
Interest rate (long-term)	-9.93521	1318145	-.1496309	-6.33**
Total tax burden	.3297132	2.444388	.4533793	4.70**
Public debt	-18.72086	41.99511	.0810636	9.88**
CPI	-.5588889	1.145572	-.5056889	-1.56
GDP	.1056176	5.080516	.2511768	4.70**
Intercept			-1.312543	-4.89**
n	30			
** .01 significance level				
* .05 significance level				