UNIVERSITÄT TÜBINGEN
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# FINANCIAL ECONOMETRICS (University of Mannheim 2006)

## Empirical Asset Pricing (Practical Part)

If this part of the exam is solved with EViews (recommended):

- Use the EVIEWS workfile from the course page
- Name your work file `surname_name.WF1`.
- Save your work file after each task.
- Save your EViews systems and estimation results as written below. (You may want to paste them in an editor, like word)

In his 1996 paper Cochrane suggests an "Investment Growth Factor Model" (IGFM). The stochastic discount factor of a simplified version of the IGFM can be denoted as follows:

$$m_{t+1} = b_0 + b_1 \Delta i_{t+1} \ ,$$

where $\Delta i_t$ denotes growth of the nonresidential investment ($\Delta i_t = i_t / i_{t-1}$). In your EViews work file the series $\Delta i_t$ is named `delta_inr`.

### Task A: Unconditional Estimation, Non-Scaled Model

**[A1]** Estimate the parameters of the IGFM using GMM. Use the ten sample portfolios `decile1` - `decile10` as test assets. Perform both *first stage* and *iterated* GMM estimation. You can estimate the model using either returns or excess returns. A risk free rate proxy is given in the series `avustret`.

**Save your system as `task_A_sys` in your work file and report your results in the tables `task_A_table_fs` (first stage) and `task_A_table_it` (iterated). (Click on the button "freeze" and save the new table as `task_A_table_...`).**

**[A2]** Justify your choice of test assets (returns or excess returns) and interpret the results. Emphasize in your interpretation of the estimation results

- the economic plausibility and statistical significance of the parameter estimates (specially $b_1$),
- the $J$-statistic,
- any (possible) differences between first stage and iterated GMM results.

**Task B: Conditional Estimation**

**[B1]** Estimate the IGFM using managed portfolios. Use as instruments Lettau/Ludvigson's `cay` (contained in work file) and a constant. In order to avoid a large number of orthogonality conditions use only the *five* portfolios:
`decile1`, `decile3`, `decile5`, `decile8` and `decile10` as suggested by Cochrane (1996).

**[B2]** Perform first stage and iterated GMM estimation and interpret the results as requested in task [A2].

**Save your system as `task_B_sys` in your work file and report your results in the tables `task_B_table_fs` (first stage) and `task_B_table_it` (iterated).**

**[B3]** Justify the use of cay as an instrument. What other instruments could have been used? Motivate some.

**Task C: Conditional Estimation with scaled factors**

**[C1]** Estimate the IGFM by using managed portfolios and the variable `cay` as scaling factor.

**[C2]** Motivate the use of scaling factors from an economic point of view. Report and interpret first stage and iterated GMM results as in [A2].

**Save your system as `task_C_sys` in your work file and report your results in the tables `task_C_table_fs` (first stage) and `task_C_table_it` (iterated).**

## Market Microstructure

**[M1]**

(i) Explain what is specific about the equations for the fundamental asset price in microstructure models like Madhavan, Richardson and Rooman (1997)(MRR) and Huang and Stoll (1997) in comparison to the typical equations in asset pricing.

(ii) Interpret the results of the following estimation of an MRR model for two stocks, TUI and SAP. Which stock has a higher adverse selection share of the spread?

| STOCK | $\phi \times 100$ | $\theta \times 100$ | $\rho$ |
|---|---|---|---|
| TUI | 0.39 | 0.54 | 0.2142 |
| | (0.0002) | (0.0003) | (0.0039) |
| SAP | 1.07 | 1.43 | 0.1954 |
| | (0.0000) | (0.0000) | (0.0021) |

Standard errors in parentheses.

(iii) Which components of the spread are explained in the Huang/Stoll three way model? What is their economic meaning? What causes the problems in empirical applications of the Huang/Stoll (1997) three way model?

**[M2]**

(i) Compute the effective spread, the realized spread (x=5min) and the price impact for the two trades (at 10:25:23 and 15:17:43) in the following trade and quote data:

| Time | Price | Bid | Ask | Type |
|---|---|---|---|---|
| 10:25:23 | \$9.85 | \$9.70 | \$9.90 | TRADE (BUY) |
| ⋮ | ⋮ | ⋮ | ⋮ | ⋮ |
| 10:30:23 | . | \$9.80 | \$10.10 | QUOTE |
| ⋮ | ⋮ | ⋮ | ⋮ | ⋮ |
| 15:17:43 | \$10.25 | \$10.25 | \$10.65 | TRADE (SELL) |
| ⋮ | ⋮ | ⋮ | ⋮ | ⋮ |
| 15:22:43 | . | \$10.02 | \$10.38 | QUOTE |

(ii) Interpret the informational content of the two trades.

**[M3]**

(i) Why does it make sense to estimate the Huang/Stoll two way model with GMM instead of OLS? Or is there no difference? Why is GMM be required for the estimation of the Huang/Stoll (1997) three way model.

(ii) How would you adjust the Glosten/Harris (1988) model to allow for a convex relation between volume and adverse selection costs and a concave relation between volume and order processing costs instead of a linear effect? How could you test your new specification against the classic model?

## Event Studies

**[E1]**

Present an argument for the use of the market model when computing expected returns in an event study? Why do we not use an asset pricing model like the CAPM?

**[E2]**

(i) Why is the assumption of non-overlapping event windows so important for an event study analysis? Explain.

(ii) Event day uncertainty is an important issue in an event study analysis. Why? Would you agree that extending the event period is a good solution to circumvent the problem of event day uncertainty? Discuss.

**[E3]**

(i) In an event study the effect of worker layoff announcements on the stock return was analyzed. Interpret the results in the following table:

| $\overline{CAR}$ | $\overline{SCAR}$ | Event Window[a] | $J_1$ | $J_2$ |
|---|---|---|---|---|
| -0.015 | -0.08 | 0 | -2.7 | -1.5 |
| -0.003 | -0.01 | -2 to 2 | -0.87 | -0.24 |

[a] Note, that the announcement day is day 0.

(ii) Computing Boehmer's test statistic $t_{BMP}$ for the above example (event window: $\tau = 0$) yields

$$t_{BMP} = \frac{\overline{SCAR}_i}{\sqrt{\widehat{Var}(\overline{SCAR}_i)}} = -3.12$$

Interpret the result and provide an explanation for the differences and possibly different conclusions that one can draw from the $J_1$ and $J_2$ statistics on the one hand and Boehmer's statistic on the other.