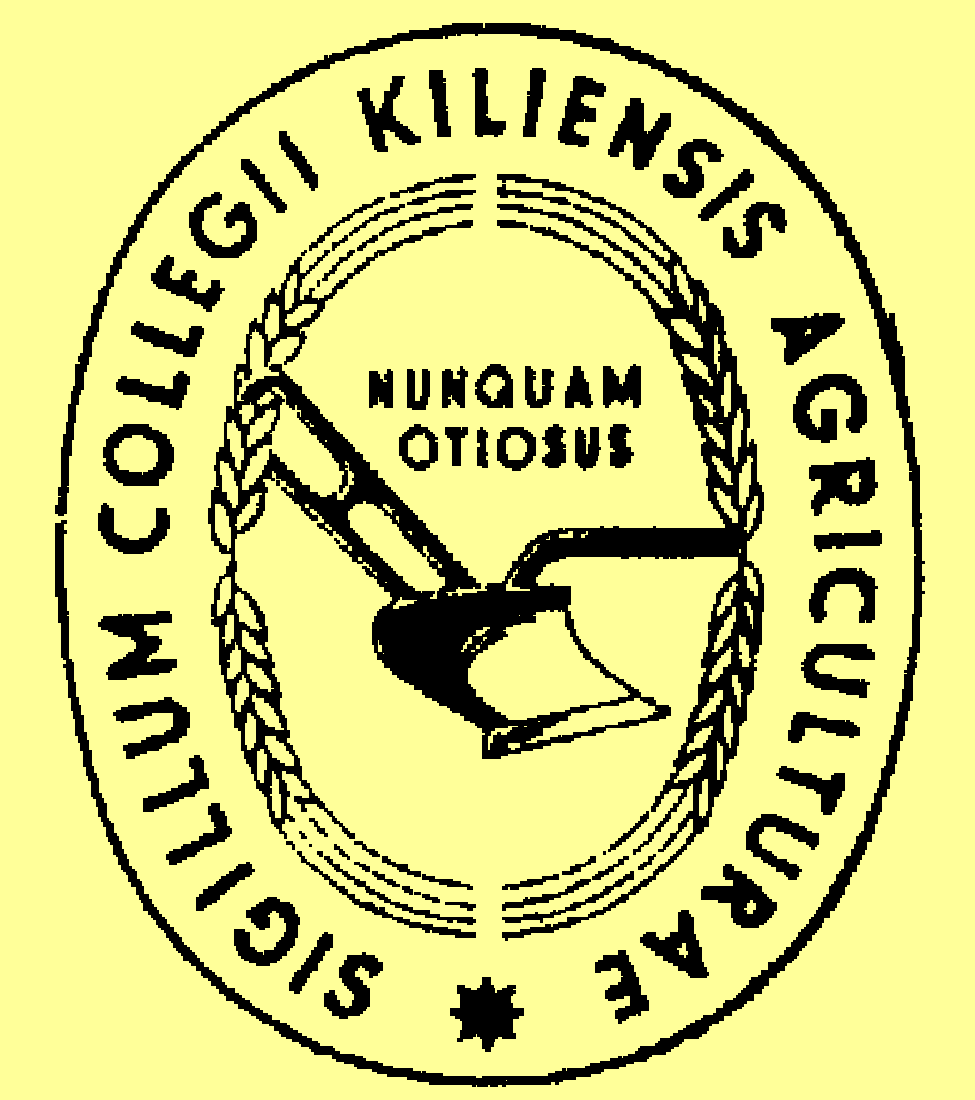




How to estimate the “Almost Ideal Demand System”

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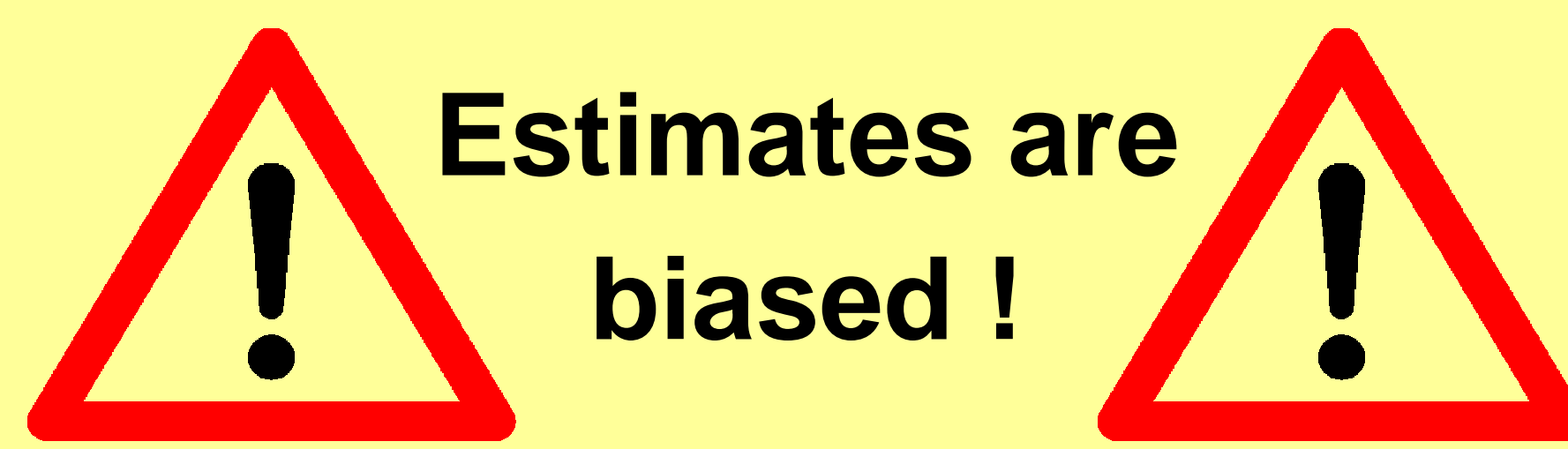
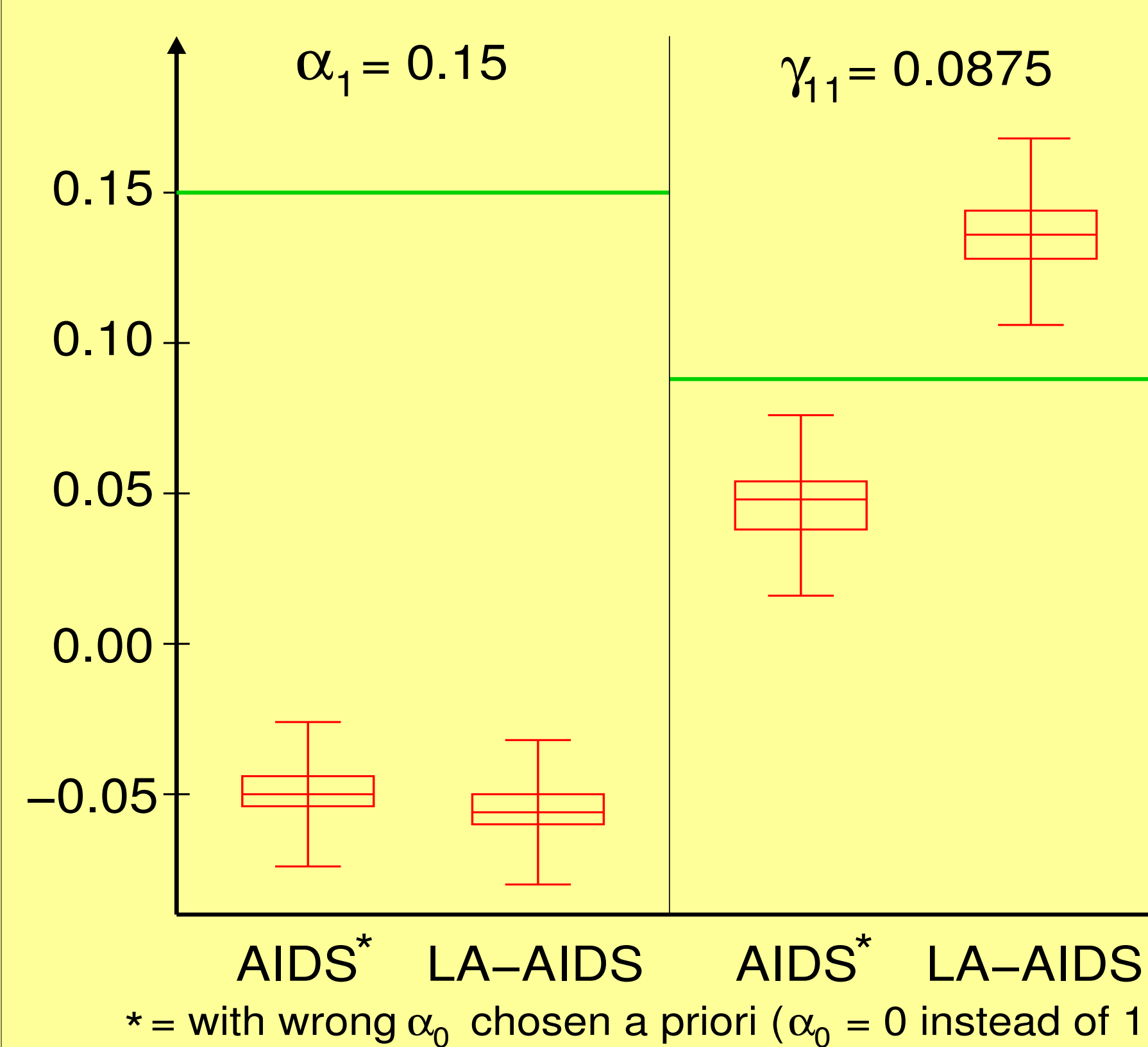
The Almost Ideal Demand System (AIDS)

The Almost Ideal Demand System (AIDS) proposed by Deaton and Muellbauer (1980) is widely used in applied demand analysis, because it unifies almost all desirable properties. In empirical demand analysis mainly a linear approximation of the AIDS (LA-AIDS) that uses the Stone index instead of the Translog price index is applied. However, a closer look shows that estimating the AIDS as well as the LA-AIDS leads to several problems.

Problems

- The nonlinearity of the AIDS often leads to estimation problems.
- The intercept of AIDS's Translog price index (α_0) is almost not identified in econometric estimation.
- Estimated LA-AIDS parameters are poor approximations of AIDS parameters.
- Econometric estimation of LA-AIDS is plagued by the simultaneity bias, the errors-in-variables problem and no invariance to units of measurement.
- The LA-AIDS is not an integrable demand system and, thus, it is theoretically not consistent.

Figure 1: Distribution of estimated coefficients compared to "true" values



Suggested Solutions

- Iterative linear estimation procedures to estimate the nonlinear AIDS.
- Estimating the AIDS with different values of the intercept α_0 and choosing the value that gives the best fit to the model.
- Applying specific formulas to calculate elasticities for LA-AIDS-models.
- Replacing the Translog (or Stone) price index by different price indices.
- Using different estimation methods (Three-Stage Least Squares).

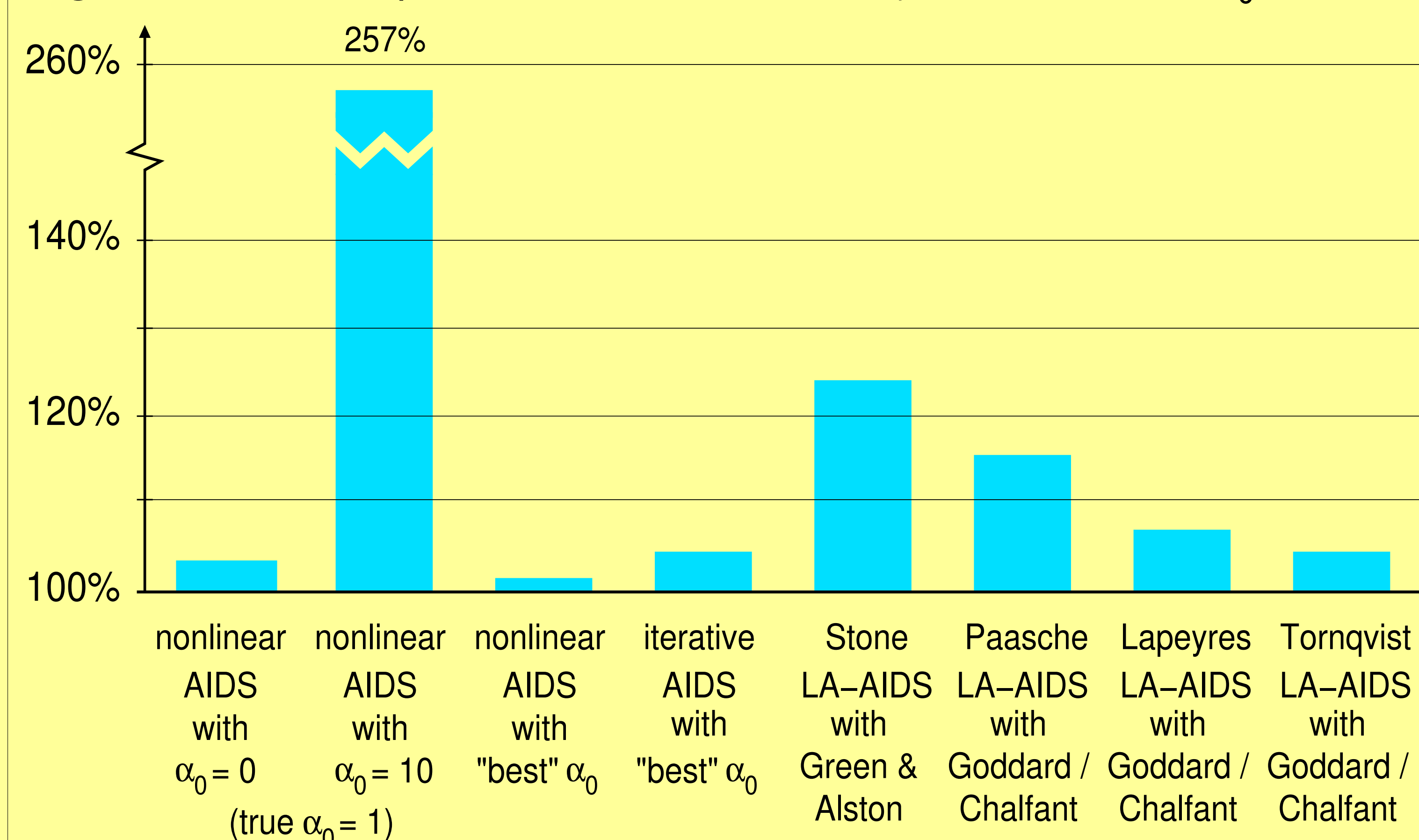
Monte Carlo Study

To analyze the suggested solutions to the problems of the AIDS and LA-AIDS mentioned above, we performed an extensive Monte Carlo study. Compared to previous Monte Carlo studies (Alston, Foster and Green (1994), Buse (1994), Buse and Chan (2000)), our analysis has several improvements and extensions.

Design

- Disturbances are more realistically simulated according to the Dirichlet distribution.
- Additional designs that are more realistic for several empirical analyses are applied.
- Iterative linear estimation methods are systematically analyzed the first time.
- The troublesome estimation of the coefficient α_0 is investigated.
- Effects of mean-scaling prices and total expenditure are analyzed.

Figure 2: Mean square error of elasticities (AIDS with true $\alpha_0 = 100\%$)



Results

- Choosing a priori a wrong α_0 may lead to poor estimation results.
- Selecting the α_0 that gives the best fit to the model solves this problem.
- The iterative estimation procedure proposed by Michalek and Keyzer (1992) leads to good approximations of the true AIDS.
- The LA-AIDS with Tornqvist or Laspeyres price index leads to good local approximations.
- Mean-scaling of prices and total expenditure improves the LA-AIDS estimation.

Conclusions

Acceptable estimates of elasticities can be obtained by LA-AIDS estimation with Tornqvist or Laspeyres price index and appropriate elasticity formulas.

The LA-AIDS remains only an approximation of the AIDS. Therefore, the further efforts of estimating the full AIDS might be worth it.

Nonlinear estimation can be done by the simple iterative linear estimation procedure suggested by Michalek and Keyzer (1992).

If a full AIDS is estimated, it is very important to choose the value for the α_0 that gives the best fit to the model.

Mean-scaling of prices does not bias the results and can be used to simplify the calculation of elasticities.