



Demand Analysis with the AIDS and LA-AIDS

- Problems and Possible Solutions -

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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.

Main problems

- › The non-linear demand equations often lead to severe estimation problems.
- › The intercept of the translog price index (α_0) is almost not identified in econometric estimation and it cannot be chosen a priori in a reasonable way.

Suggested Solutions

- › Linear approximation (taking the Stone price index instead of the translog price index)
- › Iterative linear estimation procedures to estimate the non-linear AIDS
- › Choosing the α_0 a posteriori that gives the best fit to the model.

Linear Approximation of AIDS (LA-AIDS)

The linear approximation of AIDS (LA-AIDS) occurs if the translog price index of the AIDS is approximated with the Stone index, which leads to linear share equations.

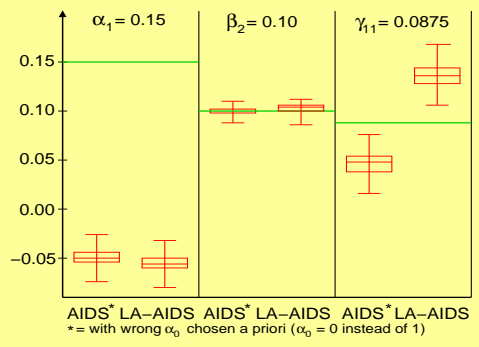
Main problems

- › Estimated LA-AIDS parameters are a poor approximation of the original AIDS parameters (see Figure 1).
- › Econometric estimation is plagued by the simultaneity bias, errors-in-variables problem and no invariance to units of measurement.
- › The LA-AIDS is not an integrable (and theoretically consistent) demand system.

Suggested Solutions

- › Specific formulas to calculate elasticities for LA-AIDS-models
- › Different price indices (Paasche, Laspeyres or Tornqvist)

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



The Researcher's Problem:

No approach is free of any problems. Therefore, it is difficult for demand analysts to decide, which approach to take.

Solution: A Monte Carlo Study

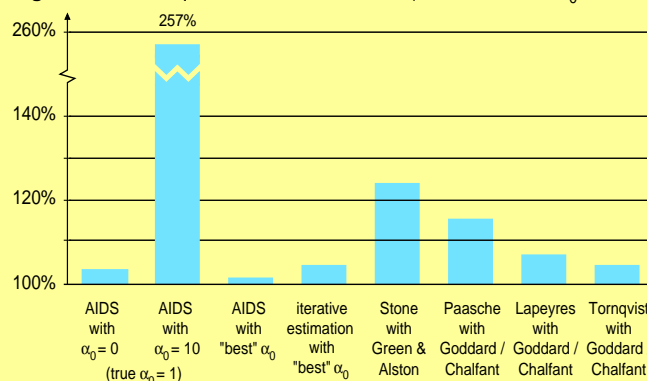
We performed an extensive Monte Carlo study analyzing the various solutions to the AIDS and LA-AIDS mentioned above.

Design

Our analysis has several improvements compared to previous Monte Carlo studies (ALSTON, FOSTER and GREEN (1994), BUSE (1994), BUSE and CHAN (2000)), e.g.:

- › Disturbances are more realistically simulated according to the Dirichlet distribution.
- › Additional designs that are more realistic for several empirical demand analysis are applied.
- › Iterative linear estimation methods are systematically analyzed the first time.

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 estimates of the elasticities. Choosing the α_0 that gives the best fit to the model solves this problem.
- › The iterative estimation procedure proposed by MICHALEK and KEYZER (1992) generally leads to very good approximations of the true AIDS.
- › The LA-AIDS with Laspeyres or Tornqvist index and the formula of GODDARD (1983) or CHALFANT (1987) leads to good local approximations.

Conclusions

- › Acceptable estimates of elasticities can be obtained by the LA-AIDS with Laspeyres or Tornqvist index.
- › For an extensive demand analysis (e.g. welfare effects) a fully specified AIDS seems to be superior. Estimation can be done either by a non-linear or an iterative linear estimation procedure. The α_0 should be chosen that gives the best fit to the model.