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Overview of Useful Econometric Tools

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Preface

The following are a diverse set of econometric tools useful in economic analysis. Each section gives an overview of a different tool. The main purpose is to serve as a quick reference. Each section is written to be independent of the others. I will also try to add useful papers and book chapters to serve as more complete references. Please note this is a work in progress and I will add to it as time goes on. Please feel free to email me with any mistakes.

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1 Hedonic Regression

This technique is common in evaluating real estate assets.

Suppose the price of a product are defined by,

$$p_i = f(z_{i,1}, \dots, z_{i,k}, e) \quad (1)$$

Assumptions: $\mathbb{E}[e_i|z_i] = 0$ (Mean Independence - needed for unbiasedness), Homogeneity of Preferences, Information of Features, No Multico (A possible problem if there is a large number of categorical variables).

Where the z 's define k characteristics and e is a random error term of unobservables.

In housing price models it is often common to assume these characteristics may be sorted into structural s , location n , and environmental v characteristics. As such one may often see the model,

$$P = f(s, n, v)$$

Our goal is to get the marginal contributions of each characteristic to price. As such, we need to make a parametric assumption to identify these contributions. In housing price analysis this is often a linearity assumption as in Equation 2. In other goods we can also specify a log-linear model as shown in Equation 3 - this is often done for high tech codes. This form is useful if we believe there is a multiplicative relationship between the features.

$$p_i = \beta_0 + \sum_{k=1}^K \beta_k z_{ik} + u \quad (2)$$

$$\ln p_i = \beta_0 + \sum_{k=1}^K \beta_k z_{ik} + u \quad (3)$$

In the second stage we estimate the willingness of the consumer to pay. As such,

$$p_i = g(X, Y, u)$$

Where X are the covariates of the product, Y is the consumer income, and u are individual level unobservables which we often are assume proxy for tastes.

1.1 References

Diewert (2003). Hedonic Regression: A Consumer Theory Approach.