# Hedonic Price Models with Omitted Variables and Measurement Errors: A Constrained Autoregression - Structural Equation Modeling Approach with Application to Urban Indonesia*

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* Published as: Suparman Y, Folmer H, Oud JHL(2013) Hedonic Price Models with Omitted Variables and Measurement Errors: A Constrained Autoregression - Structural Equation Modeling Approach with Application to Urban Indonesia. *Journal of Geographical System,* 16(1):49:70. DOI:10.1007/s10109-013-0186-3

**Abstract**

Omitted variables and measurement errors in explanatory variables frequently occur in hedonic price models. Ignoring these problems leads to biased estimators. In this paper we develop a constrained autoregression - structural equation model (ASEM) to handle both types of problems. Standard panel data models to handle omitted variables bias are based on the assumption that the omitted variables are time-invariant. ASEM allows handling of both time-varying and time-invariant omitted variables by constrained autoregression. In the case of measurement error, standard approaches require additional external information which is usually difficult to obtain. ASEM exploits the fact that panel data are repeatedly measured which allows decomposing the variance of a variable into the true variance and the variance due to measurement error. We apply ASEM to estimate a hedonic housing model for urban Indonesia. To get insight into the consequences of measurement error and omitted variables, we compare the ASEM estimates with the outcomes of (i) a standard SEM, which does not account for omitted variables, (ii) a constrained autoregression model, which does not account for measurement error, and (iii) a fixed effects hedonic model which ignores measurement error and time-varying omitted variables. The differences between the ASEM estimates and the outcomes of the three alternative approaches are substantial.

*Keywords: hedonic housing price model, panel model, structural equation model, constrained autoregression, measurement error, omitted variable bias, urban Indonesia.*

*JEL code: C18, C33, C51, R15, R21.*