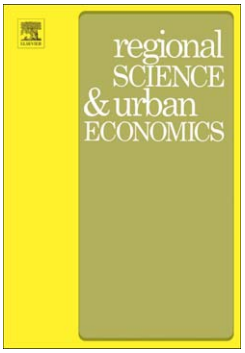

Semi-Parametric Regression Models and Economies of Scale in the Presence of an Endogenous Variable

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PII: S0166-0462(14)00105-7
DOI: doi: 10.1016/j.regsciurbeco.2014.10.002
Reference: REGEC 3091

To appear in: *Regional Science and Urban Economics*

Received date: 5 March 2013
Revised date: 8 August 2014
Accepted date: 3 October 2014

Please cite this article as: Cohen, Jeffrey P., Osleeb, Jeffrey P., Yang, Ke, Semi-Parametric Regression Models and Economies of Scale in the Presence of an Endogenous Variable, *Regional Science and Urban Economics* (2014), doi: 10.1016/j.regsciurbeco.2014.10.002

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Abstract: Applied microeconomic applications of semi-parametric regressions in the presence of an endogenous variable have been largely ignored but are deserving of attention. Recognizing the impacts of spatial heterogeneity captured by semi-parametric models for cost function estimation can impact economies of scale estimates. In this paper we estimate several cost function models, using annual data for each of Connecticut's 30 hospitals over a 10 year time period. We consider a variety of semi-parametric regression models as in McMillen and Redfearn (2010). One innovation is that we address both the space and time dimensions in the kernel weights of our panel data semi-parametric regression models. We find that a life expectancy measure for years above average lifespan is positively and significantly related to hospital costs. We also address endogeneity of the life expectancy variable through a variation of a semi-parametric instrumental variables (IV) estimation approach for panel data models, as first suggested more generally by Baltagi and Li (2002). With our semi-parametric IV approach the elasticities of scale estimates are smaller but still less than 1, implying a greater degree of economies of scale. Also, when we omit the life expectancy variable the elasticity of scale from our fixed effects estimations are smaller than with the semi-parametric estimation. Monte Carlo simulations indicate the semi-parametric IV estimator performs well.

Keywords: semi-parametric regressions; economies of scale

JEL Codes: R1, C4, I1