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USING GODAMBE-DURBIN ESTIMATING FUNCTIONS IN ECONOMETRICS

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ABSTRACT

This paper explains why Godambe-Durbin "estimating functions" (EFs) from 1960 are worthy of attention in econometrics. Godambe and Kale (1991) show the failures of Gauss-Markov and least squares and prove the small-sample superiority of EFs. There are many areas of Econometrics including unit root estimation, generalized method of moments (GMM), panel data models, etc., which can use some simplification, a little greater emphasis on finite sample properties and greater flexibility. We show why statistical inference using the EFs in conjunction with the bootstrap can be superior. For example, compared to the GMM, our EF estimates of the 'risk aversion parameter' are economically more meaningful and have shorter bootstrap confidence intervals.

Key Words: Generalized method of moments, bootstrap, confidence intervals, small sample Gauss consistent, optimal estimation

1 Introduction

The aim of this paper is to continue a dialogue between statisticians working with Godambe-Durbin estimating functions (EFs) and econometricians, apparently started by Crowder's (1986) lead article in an econometrics journal. Though Crowder proves consistency of estimates as roots of EFs, he neglects to mention (i) the "main lesson" of EF theory, and (ii) that Durbin's (1960) two-regression (TR) estimator for autoregressive distributed lag (ADL) models is an optimal EF (OptEF)

Ordinary least squares (OLS) estimators are roots of "normal equations" and maximum likelihood (ML) estimators are roots of "score equations." The "main lesson" from Godambe's EF theory is to deemphasize the estimates (roots) and focus on the underlying equations called the EFs. One considers the bias and variance of EFs themselves. Minimizing the variance of (standardized) EFs is Godambe's (1960) G-criterion. It provides optimal EF, $g^* = 0$, whose roots are the OptEF estimators. The large and recently growing EF literature, surveyed by Godambe and Kale (1991), Dunlop