

Instrumental Variable Estimation and its Limitations:

Weak Instruments and Weakly Endogeneous Regressors

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1. PROGRAM

1. Introduction
 - 1.1. Correlation and causality
 - 1.2. Endogeneous regressors
 - 1.3. Main causes of endogeneity
 - 1.4. IV estimation as a general solution to the endogeneity problem

2. IV estimation

3. Violations to the relevance condition
 - 3.1. Irrelevant instruments
 - 3.2. Weak instruments

4. Violations to the exclusion condition
 - 4.1. Endogeneous regressors
 - 4.2. Weakly endogenous regressors

5. Detection of weak instruments

6. Inference robust to weak instruments

2. REFERENCES

Textbooks

Angrist, J.D. and J.S. Pischke. *Mostly Harmless Econometrics: An Empiricist's Companion*, 2008, Princeton University Press.

Stock, J. H. and M. W. Watson *Introduction to econometrics*, 2nd edition, 2007, Pearson.

Wooldridge, J.M. *Econometric analysis of cross section and panel data*, 2002, The MIT Press.

Surveys

Stock J, Yogo M, Wright J.(2002) "A Survey of Weak Instruments and Weak Identification in Generalized Method of Moments" *Journal of Business and Economic Statistics*, 20, 518-529.

Mikusheva (2013) "Survey on statistical inferences in weakly-identified instrumental variable models," *Applied Econometrics* (2013), 29(1), pp. 116-131

Articles

Anderson, T. W. and H. Rubin (1949) "Estimators of the Parameters of a Single Equation in a Complete Set of Stochastic Equations" *Annals of Mathematical Statistics*, 21, 570-582.

Andrews, D. W. K.; M.Moreira; and J. H. Stock.(2006) "Optimal Two-Sided Invariant Similar Tests for Instrumental Variables Regression" *Econometrica*, 74, 715-752.

Andrews, D. W. K.; M.Moreira; and J. H. Stock.(2008) "Efficient Two-Sided Nonsimilar Invariant Tests in IV Regression with Weak Instruments" *Journal of Econometrics*, 146, 241-254.

Chamberlain, G. (2008) "Decision Theory Applied to a Linear Panel Data Model" *Econometrica*, 77(1),107-133.

Kleibergen, F. (2002) "Pivotal Statistics for Testing Structural Parameters in Instrumental Variables Regression" *Econometrica*, 70(5),1781-1803

Moreira, M. (2003) "A Conditional Likelihood Ratio Test for Structural Models" *Econometrica*, 71 (4), 1027-1048.

Conley, T., Ch. B. Hansen, and P. E. Rossi (2012) "Plausibly Exogenous" *Review of Economics and Statistics*

Doko Tchatoka, F. S. and J.M. Dufour (2008) "Instrument endogeneity and identification-robust tests: some analytical results" *Journal of Statistical Planning and Inference*, 138, 2649-2661.

Staiger, D. and J. H. Stock (1997) "Instrumental Variables Regression with Weak Instruments" *Econometrica*, 65 (3), 557-586.