# ESTIMATION AND INFERENCE WITH MANY MOMENT INEQUALITIES

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Abstract: In this paper, I consider estimation of the identified set and inference on a partially identified parameter under moment inequalities when the number of moment restrictions is large relative to sample size. Many applications in the recent literature on set estimation have this feature - examples discussed in this paper include set-identified instrumental variables models, inference under conditional moment inequalities, and dynamic games.

I analyze weak (set) identification from a large number of moment inequalities and show that GMM-type test statistics will often be poorly centered in this setting. This paper establishes consistency of the set estimator based on a Wald-type criterion, and gives conditions for uniformly valid inference under many weak moment asymptotics for both plug-in and subsampling procedures. I show asymptotic normality for the Quasi-Likelihood Ration statistic, and demonstrate that subsampling procedures remain valid only under much slower growth rates for the number of moments than those permissible for plug-in methods. Furthermore, I analyze the performance of an Anderson-Rubin

(AR) type, and a modified Lagrange Multiplier (LM) test under weak moment inequalities. Both tests are robust to weak identification, however in most settings, conservative inference using the LM statistic appears to have greater power against local alternatives than the AR-type test.