

SEMINÁRIOS
SÉRIES TEMPORAIS, ONDALETAS E DADOS
FUNCIONAIS

LOCAL: **Unicamp, Sala 321**

DATA: **19 de novembro de 2015**

HORÁRIO: **15h30**

SMOOTHING QUANTILE REGRESSIONS
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We show that smoothing the objective function improves the efficiency of quantile regression estimation relative to smoothing only the check function. In particular, we show that our smoothing procedure entails only a negligible bias and establish a precise rate of convergence that one may uniformly control by choosing the bandwidth appropriately. In addition, we find that our smoothed quantile regression estimator is more linear than the standard quantile regression estimator in the sense that the stochastic order of the remainder term of the Bahadur-Kiefer representation is arbitrarily close to $1/n$ under some mild conditions. As for second-order properties, we show that our estimator achieves a lower AMSE if we employ the optimal bandwidth. As a corollary, we establish consistency and asymptotic normality of our estimator. Next, we provide a consistent estimator of the asymptotic covariance matrix which does not depend on the ancillary estimation of nuisance parameters. This allows us to build asymptotic confidence intervals in a straightforward manner, making Wald-type inference easily implementable. Note that our asymptotic theory is uniform both in the quantile level and in the bandwidth choice. The former is important because it allows one to recover the conditional cdf of the response (except perhaps to the tails) at any given level of the covariate. In turn, the second is crucial in that it encompasses data-driven bandwidth choices as well as functional bandwidths that depend on the quantile and covariates. Finally, extensive simulations provide numerical evidence in favor of our smoothed estimator.

(joint work with Emmanuel Guerre and Eduardo Horta)