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ABSTRACTS

Tax Evasion and Productivity (Job Market Paper)

Value-added taxes (VAT) allow firms to deduct the taxes paid on purchases from the taxes collected on sales, creating an incentive for firms to reduce their tax bill by overreporting input purchases. The fundamental issue in detecting input overreporting stems from two unobservables, true inputs and productivity. Because firms differ in productivity, a firm reporting high input use, for a given level of output, may be either overreporting or simply less productive. To distinguish between overreporting and productivity, I use a structural production-function approach and a benchmark group, a subset of firms that report inputs correctly. Assuming the benchmark firms share the same technology as the others, I estimate the technology's parameters from them. With the estimates, I compare the inputs that potentially tax-evading firms report with the true inputs they would use. I apply the method to a Colombian manufacturing survey from 1981 to 1991. During this period, the Colombian sales tax worked as a VAT and the data include a subset of firms that, due to government and market scrutiny, reported inputs correctly.

My approach yields a simple and robust statistical test to detect input overreporting. Under the null hypothesis of correct reporting, the test is agnostic about the specification of both the probability of detection and the cost of overreporting. Among the 5 largest industries, the test rejects the null hypothesis in all 4 industries subject to the sales tax, and, as expected, it fails to reject in the industry exempt from the sales tax. Depending on the industry, firms overreport on average between 4.5 and 23.1 percent of their true inputs.

The magnitude of detected overreporting matters for methods of estimating production functions that exploit a flexible input to identify productivity (Levinsohn and Petrin 2003; Doraszelski and Jaumandreu 2013; Ackerberg et al. 2015; Gandhi et al. 2020). These methods typically rely on materials, the input that firms overreport. I show that failing to correct for overreporting yields larger output elasticities of materials, and more dispersed and less persistent productivity distributions. Using the production-function parameters, I estimate a structural model of input overreporting. The model predicts that the current rate, a 1 percent increase in the rate lowers net sales-tax revenue by about 1.7 percent of gross sales-tax revenue. Undetected overreporting costs the government 4.7 percent of the gross sales-tax revenue from potentially tax-evading firms.

Cournot Profitability and Measurement Error (Summer Paper)

I develop a stochastic *Revealed Profitability* (RP) test for the Cournot model. Under the null, firms compete by choosing quantities (Cournot competition) and quantities are measured with error. The RP analysis derives a set of inequalities from the convexity of the firm's profit-maximization problem. In the Cournot model, the convexity stems from the firms' cost function and inverse demand, which are both unknown, but the test does not require any parametric assumptions on either (Carvajal et al. 2013). Under the null hypothesis, firms compete in quantities, but observed quantities are mismeasured. To address the measurement error, the test needs only a centering condition, which fixes the location of the true quantities. I apply the method to the international crude oil market, where measurement error might arise from meter and gauge calibration, human recording errors, and the conversion of raw volumes to standard barrels. As the centering condition, I assume measurement error on quantities is zero on average over each half-year and independent of prices. Unlike the deterministic test, the stochastic test no longer rejects the null hypothesis of Cournot competition.