Title: The Impact of Electrification on Quality and Productivity: Evidence from Japanese Cotton Spinning

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Abstract:

This paper examines the impact of electrification on product quality and physical productivity (TFPQ) in the Japanese cotton spinning industry (1914–1919). While steam-driven shafts caused speed fluctuations that restricted mills to coarse yarn, electric drives provided the stable spindle speeds required for finer, higher-value yarn. Using plant-level price, quantity, and input data, we separately recover unobserved product appeal and TFPQ via their differential persistence and instrument electric motor adoption with 1909 municipal grid access. Electrification substantially boosted quality by raising log appeal by 0.601 on impact and 1.802 in the long run—while leaving TFPQ unchanged. Recovered quality closely tracks observed yarn fineness (Count), and counterfactuals show electrification raised average appeal by 18 log points and revenue by 57 log points relative to non-adoption.