

# Public and Private R&D Spillovers and Productivity at the Plant Level: Technological and Geographic Proximity

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## **Paper Abstract:**

We examine the effects of public and private R&D spillovers on total factor productivity in a large panel of Japanese manufacturing plants matched with R&D survey data (1987-2007). We simultaneously examine the role of public (university and research institutions) and private (firm) R&D spillovers, and examine differential effects due to technological and geographic proximity. Estimating geographic decay functions based on the location of the universe of manufacturing plants and public research institutions in Japan, we find positive effects of technological proximity-weighted private R&D stocks, which decay in distance and become negligible at around 500 kilometres. The elasticity of TFP with respect to technologically relevant public R&D is higher, in particular for plants of R&D conducting parent firms, but no evidence of geographic decay in public R&D spillovers is observed. Simulations show that declining R&D spillovers are responsible for a substantial part of the decline in the rate of TFP growth Japanese manufacturing. The exit of geographically proximate plants operated by R&D intensive firms plays a notable role in this process and is an important phenomenon in major industrial agglomerations such as Tokyo and Osaka.