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Comments on "Sources of Private and Public R&D Spillovers: Technological, Geographic and Relational Proximity"

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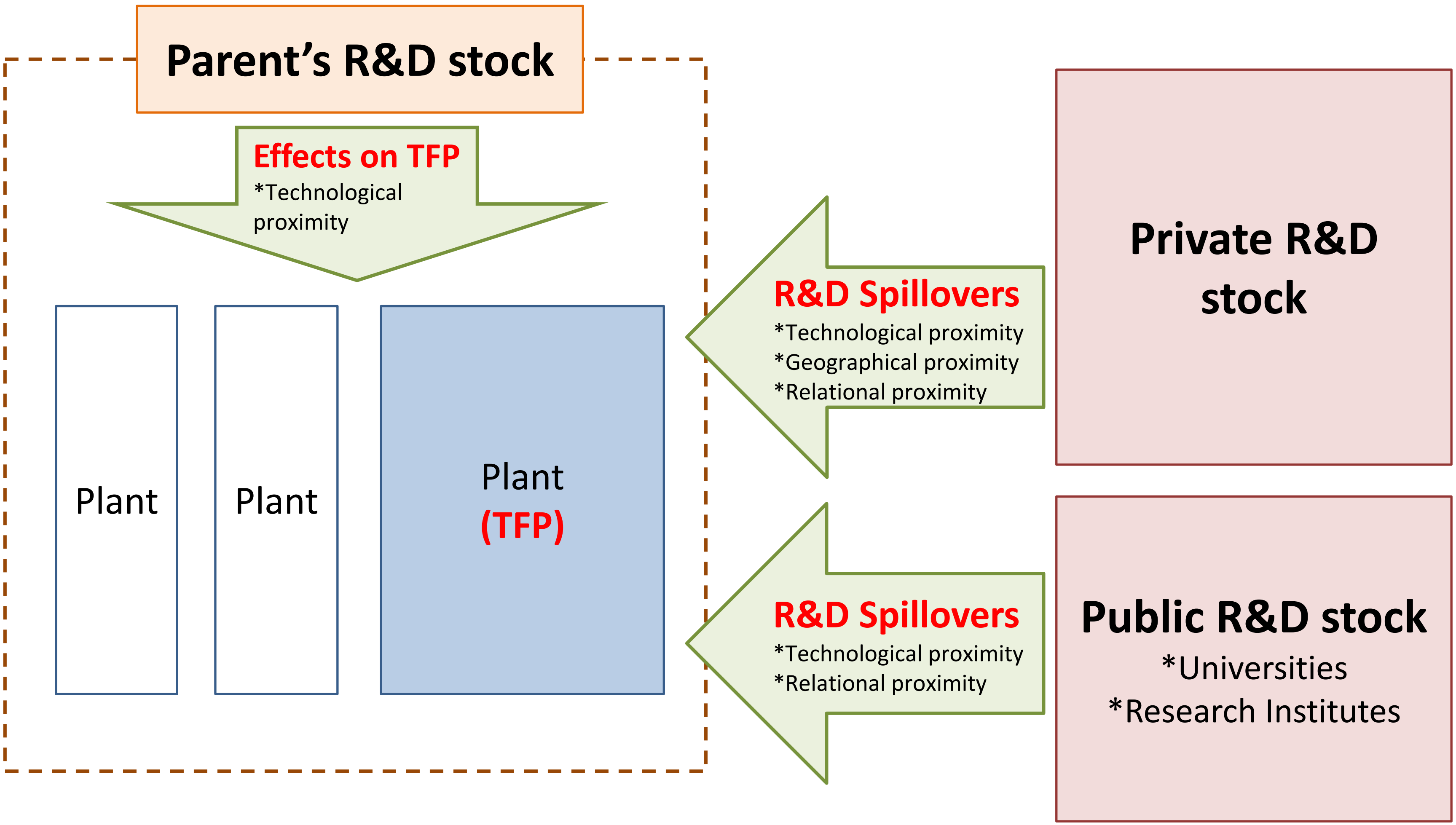
Summary of the paper

- This paper estimates spillover effects from private and public R&D on manufacturing plants' TFP using a large panel dataset. 1) Technological proximity, 2) geographic proximity, and 3) input-output relationship are taken into account as channels of R&D spillovers.

- The paper find significant spillover effects from both private and public R&D stocks on plant-level TFP.

- R&D spillovers through geographical proximity and supplier-customer relationship are found.

Outline of the analysis



Overall impression

- Construction of the dataset
  - The dataset used in this study is extremely rich and valuable. **The authors' efforts to make this unique dataset should be highly appreciated.**
- Policy relevance
  - From policy viewpoint, how to activate innovation is the most important issue for enhancing growth potential of the Japanese economy. The focus of this paper — effects of R&D on productivity — is a key to find out an answer.
  - **This paper potentially contributes not only to the academic literature but also to the policy planning.**
- The current paper seems to be under the process of further developments.

Comment 1: Originality of the research

- Spillovers from private R&D, spillovers from public R&D, effects of spatial proximity, and effects through input-output relationship have been studied individually.
- Basically, the results of this paper reconfirm the findings of past studies. The main contribution of this paper is its analysis of various spillover mechanisms with the same large dataset.
- **I recommend the authors to compare the relative importance of the various spillover mechanisms quantitatively, in order to stress the novelty of this study.**

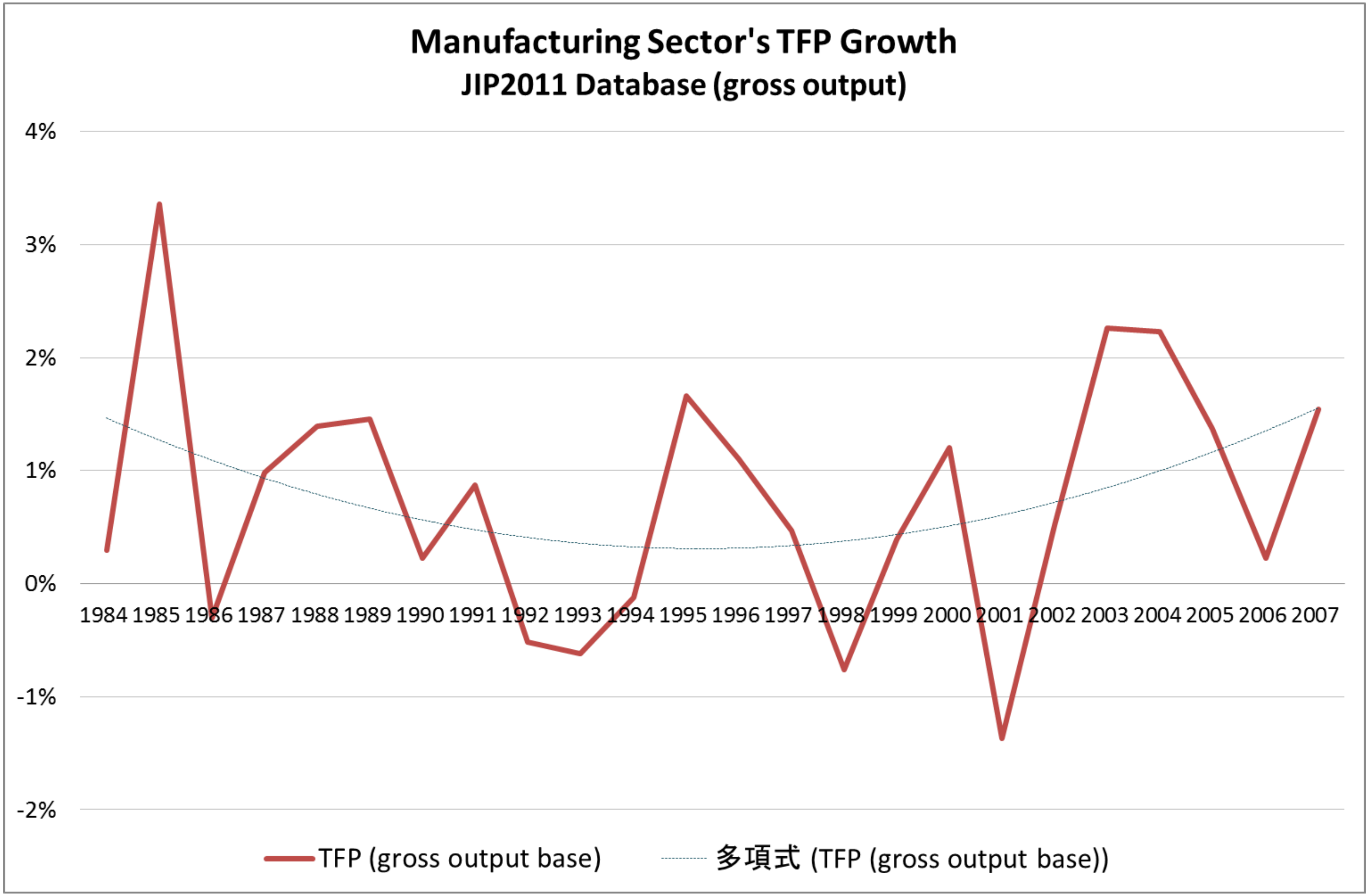
Comment 2: Policy implications

- The motivation of this paper is to find out causes of the recent decline in TFP growth in the Japanese manufacturing sector.
- **A natural question is how much the decline in aggregate TFP growth can be explained by the reduction in the R&D spillovers?**
- **What type of policy is effective to enhance spillover effects of R&D?**
- To analyze time-series change in the size of spillover effects is essential to draw policy implications.

Comment 3: Different TFP trends

- According to the published growth accounting of the JIP2011 database, manufacturing sector's TFP had been recovering in the 2000s (see table).
- **This aggregate TFP movement is different from the picture drawn from the sample used in this study. What is the reason for this discrepancy?**
  1. One possible reason is **the TFP measurement error** — insufficient control of the change in working hours and/or the quality changes in labor and capital in calculating TFP.
  2. Another possibility is **the sample bias** — the sample plants of this study may be very different from the whole manufacturing sector.

TFP Growth (JIP2011)



Comment 4: Agglomeration effects other than R&D spillovers

- The coefficient for geographic proximity to R&D in this paper may reflect not only proximity to R&D but also **agglomeration economies other than R&D spillovers** (labor pooling, input sharing, natural advantages, etc.).
  - By construction, the value of this variable will be large where a large number of plants located densely irrespective of R&D. (This problem is not specific to this study, but common to a number of past studies in this field.)
  - Agglomeration productivity premium have been observed even among low-tech service industry (Graham, 2009; Morikawa, 2011).
- **It is desirable to consider some controls (e.g. plant density) to abstract pure geographical R&D spillover effects.**

Comment 5: Index number TFP and I-O tables

- The panel analysis uses **industry level I-O tables** to explore spillover effects through relational proximity on plant level TFP.
- The index number TFP at the plant level is calculated as **deviation from the industry average**.
- **It is difficult to interpret the estimated coefficients for supplier or customer industries' R&D stocks as spillover effects on plant level TFP.**
- The cross-section analysis using TSR database seems to be more meaningful.

Minor comments/suggestions

1. According to the descriptive statistics, TFP dispersion is extremely large. In addition, the size of the coefficients for parent, private, and public R&Ds are very different between panel model and cross-section models. **The regression results may be improved by removing outliers.**
2. Some discussion about spatial sorting of plants and/or self-selection into supplier-customer relationship is useful (cf. Fukao et al. , 2011).
3. The reason to use 50km and 10km as thresholds to estimate effects of geographical proximity should be explained.
4. Although the authors notice well, explicit treatment of firms' research laboratories may substantially affect the estimation results. In addition, all parent's R&D is available for all plants of the firms is a strong assumption.
5. Lychagin et al. (2010: NBER W.P. No. 16188), which simultaneously assess the contributions to productivity of three sources of R&D spillovers: geographic, technology, and product–market proximity, may be referred.