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Selection and Agglomeration Impact on Firm Productivity: A Study of Taiwan's Manufacturing Sector

By

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Selected Poster prepared for presentation at the Agricultural & Applied Economics Association's 2013 AAEA & CAES Joint Annual Meeting, Washington, DC, August 4-6, 2013.

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Introduction

Firms in large markets have higher productivities. This has been traditionally attributed to agglomeration economies. However, another factor causing this higher productivity could be on account of selection due to competition which may cause the firms of low productivity to exit from the large market.

Science parks are planned clusters where firms are likely to benefit from agglomeration namely sharing, pooling and knowledge spillovers.

Objectives/Questions

- Are the firms located in a science park leading or lagging the ones located in large and small cities in terms of Total Factor Productivity (TFP).
- How the agglomeration and selection parameters affect the firm's TFP



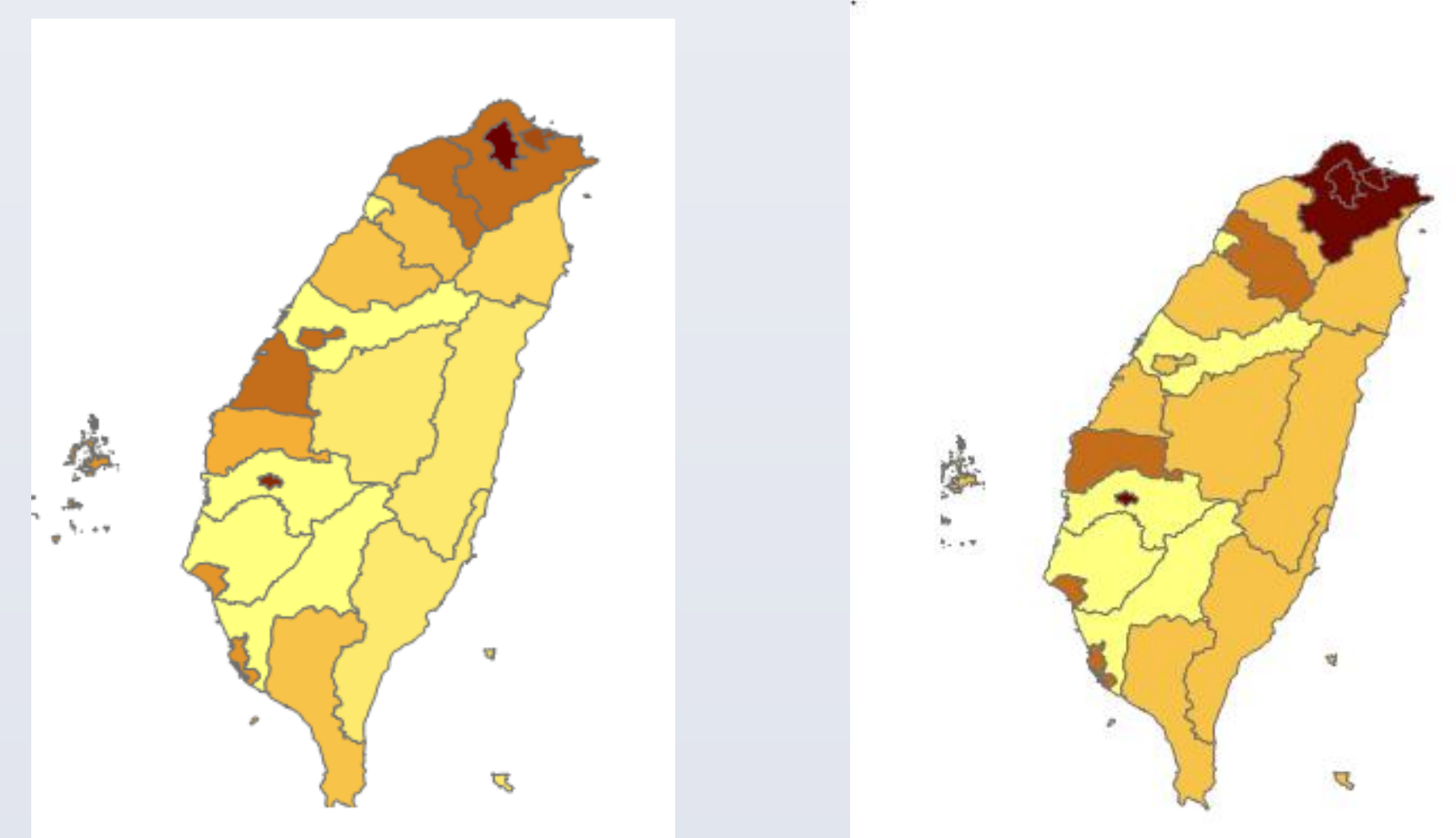
Science Parks Location in Taiwan



Hsinchu Science Park. (Annual Report,2011)

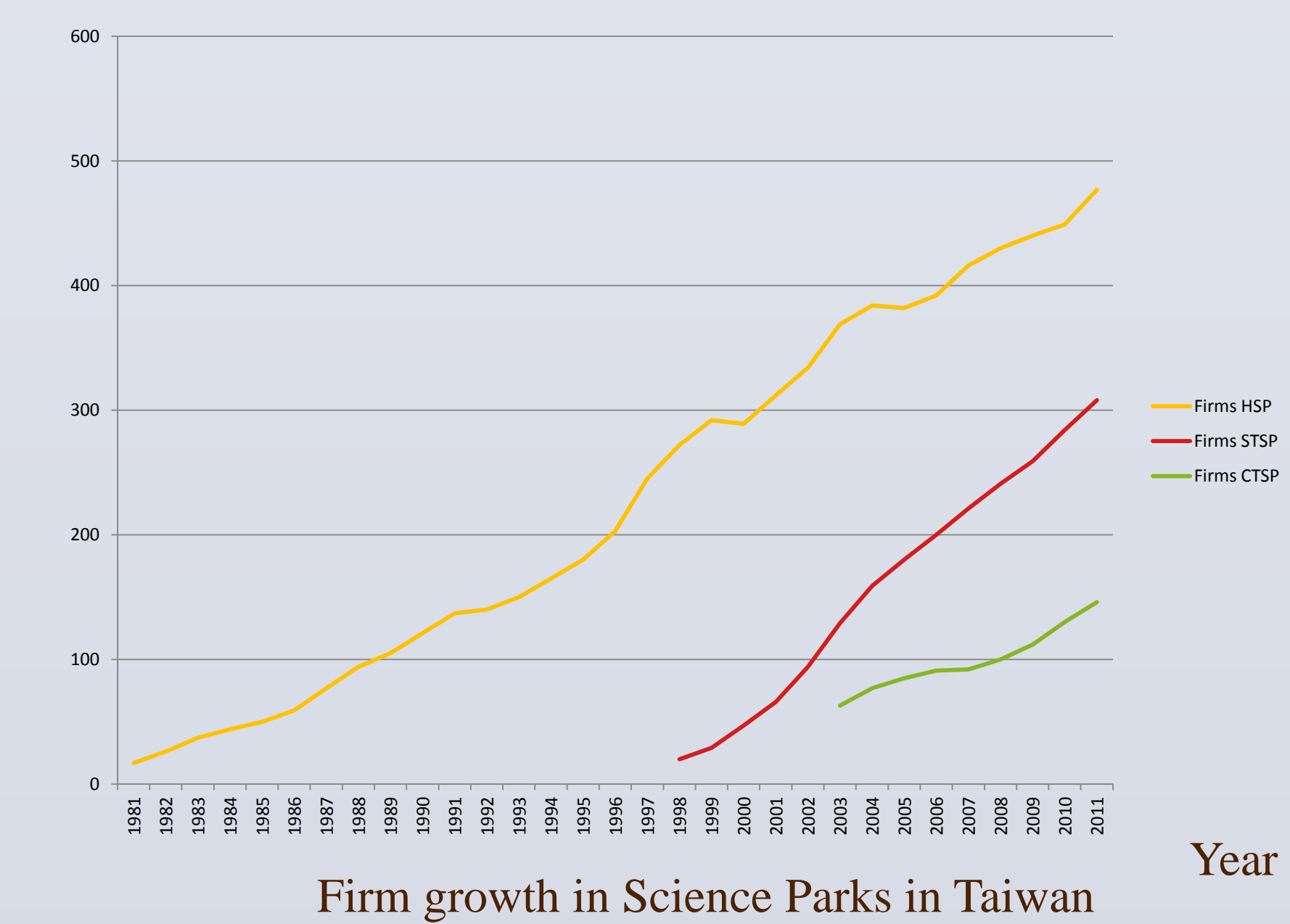
Methods

- Measuring firm's log TFP using Olley and Pakes (1996) and IV/2SLS methods to control for simultaneity and selectivity bias.
- Comparing TFP distributions using summary stats and non-parametric quantile - quantile plots.
- Using IQR, median and 10th percentile to measure dispersion, shift and truncation the TFP distributions.
- Regressing the above measures to determine the impact of agglomeration and selection on firm's TFP.

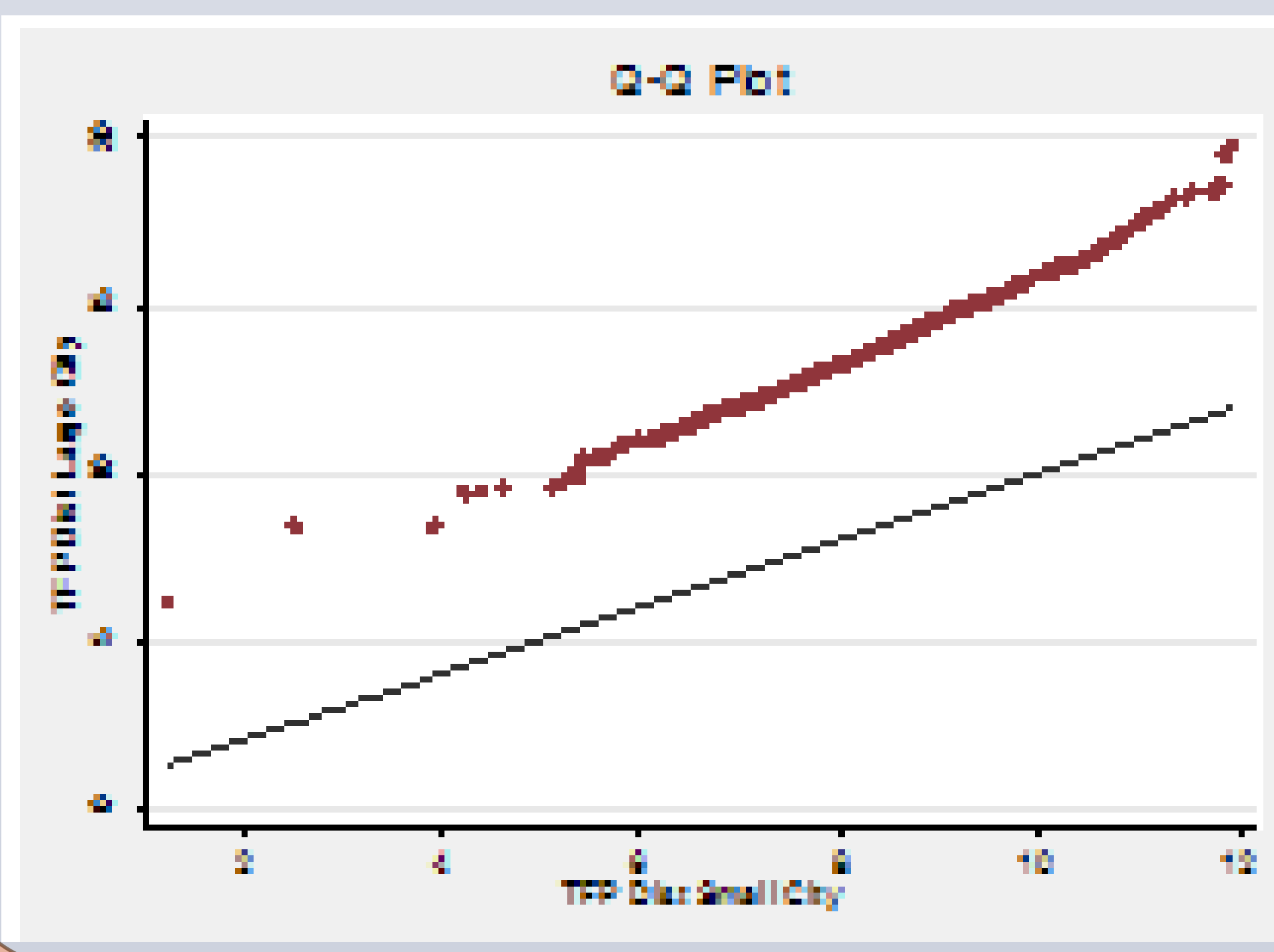


County market Mean TFP

County-level Labor Density

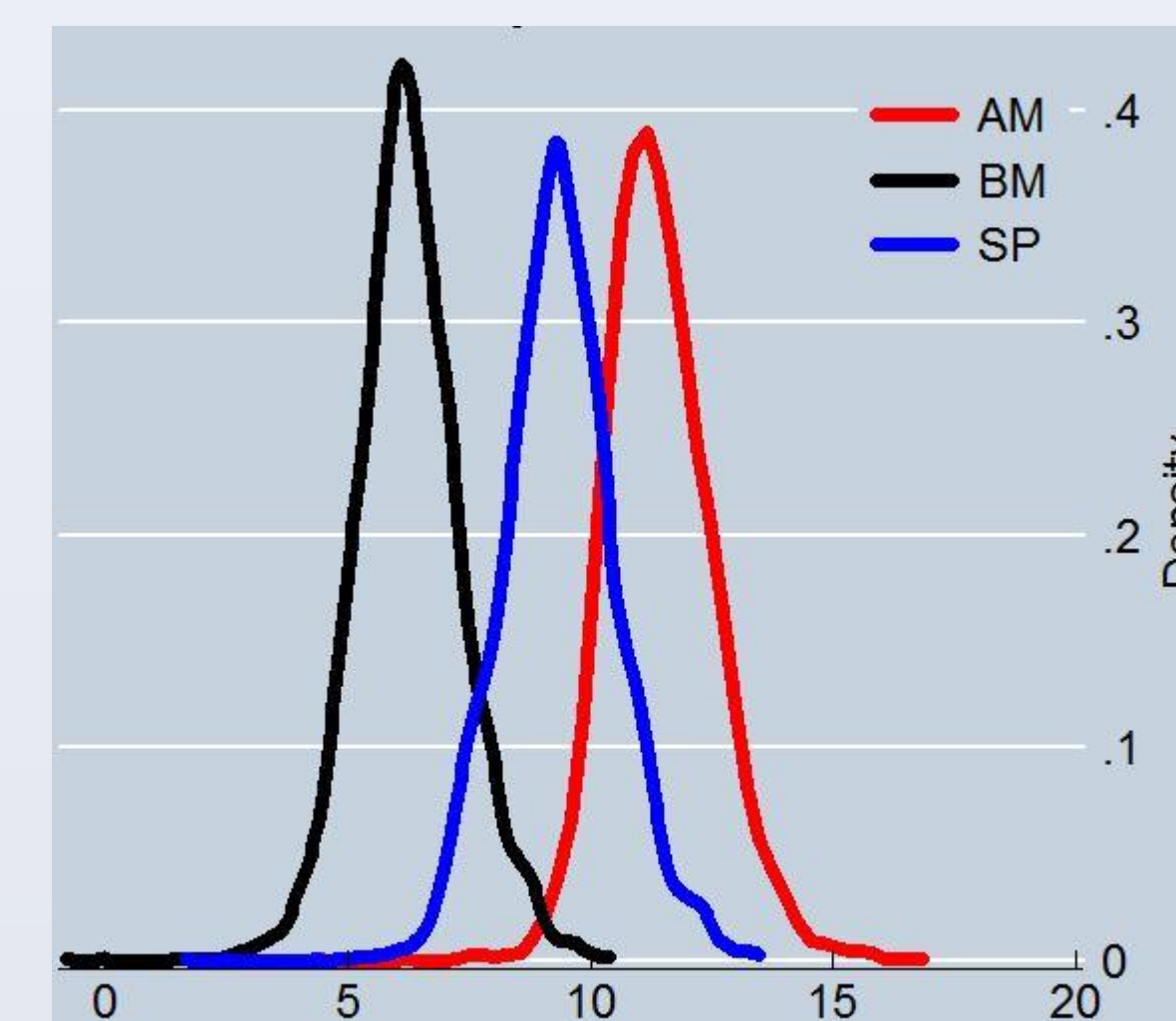


Firm growth in Science Parks in Taiwan

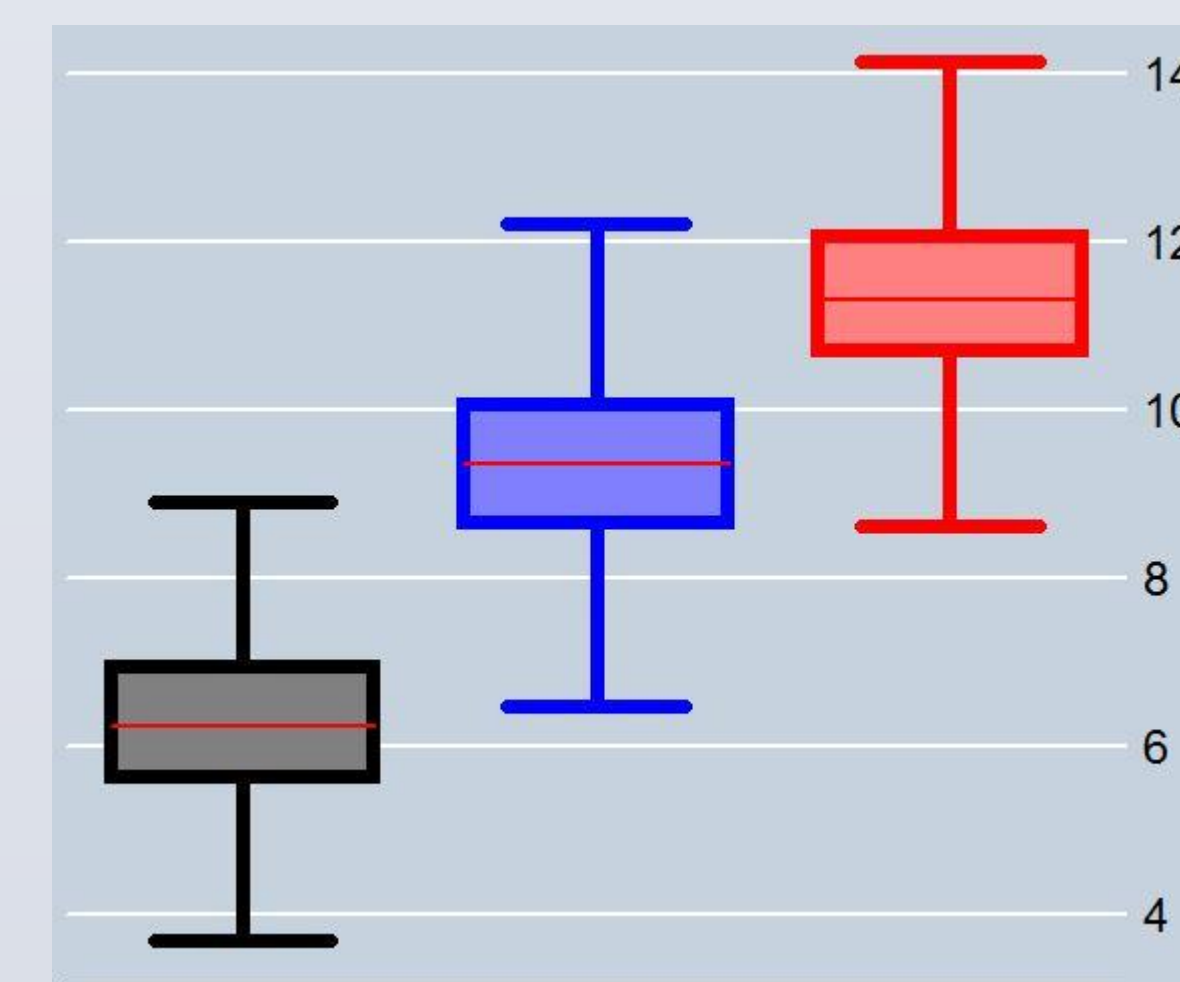


Results

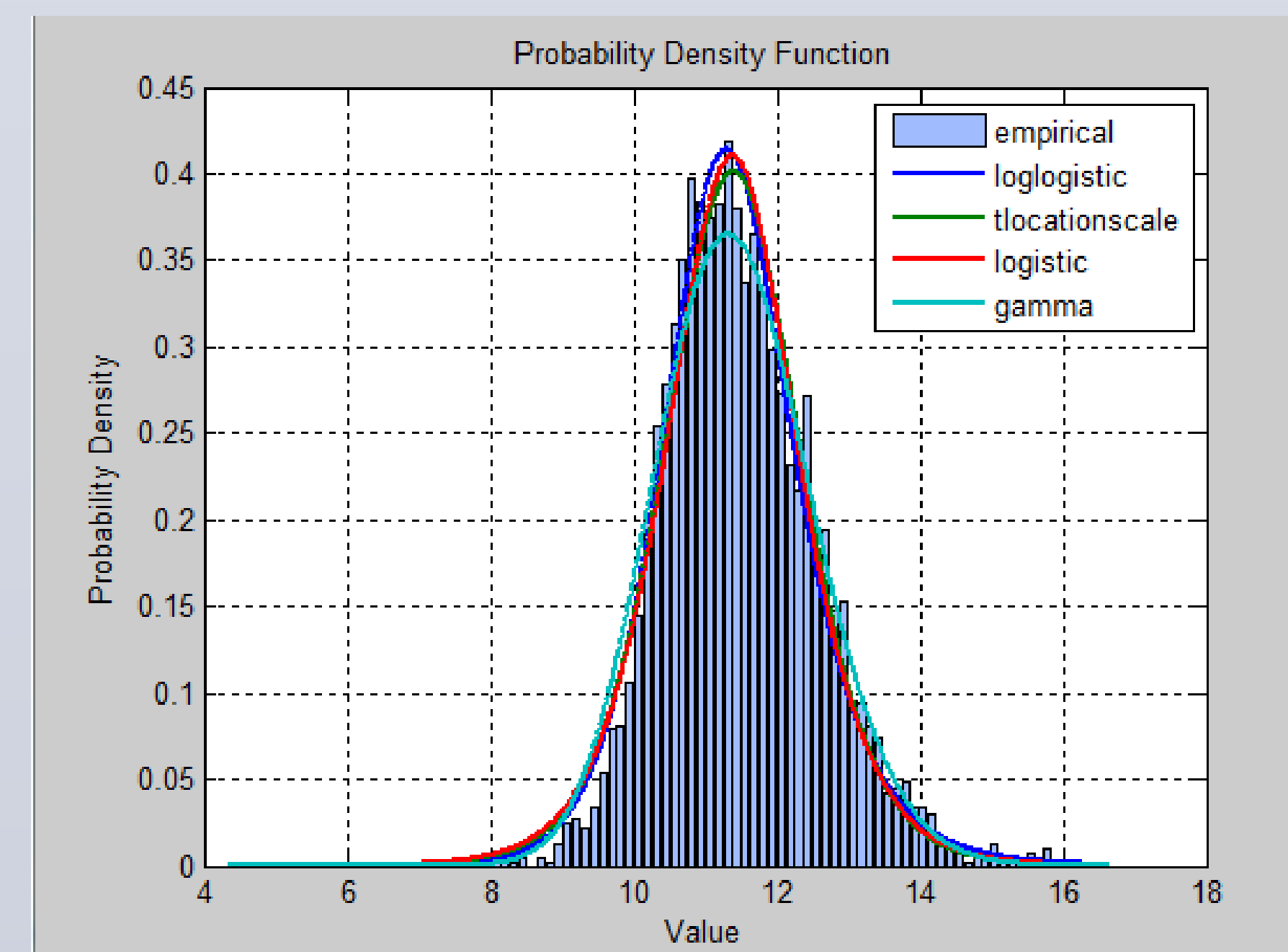
- Kernel density plot of TFP distributions indicate that science parks lag the firms in large cities
- Box-plots of TFP distributions
- The linear QQ-plot indicates similarity in the distributions



Legend: AM: LARGE CITY, BM:SMALL CITY,SP:SCIENCE PARK



Fitting log-TFP distribution shows that it is close to loglogistic (figure below)



Conclusion

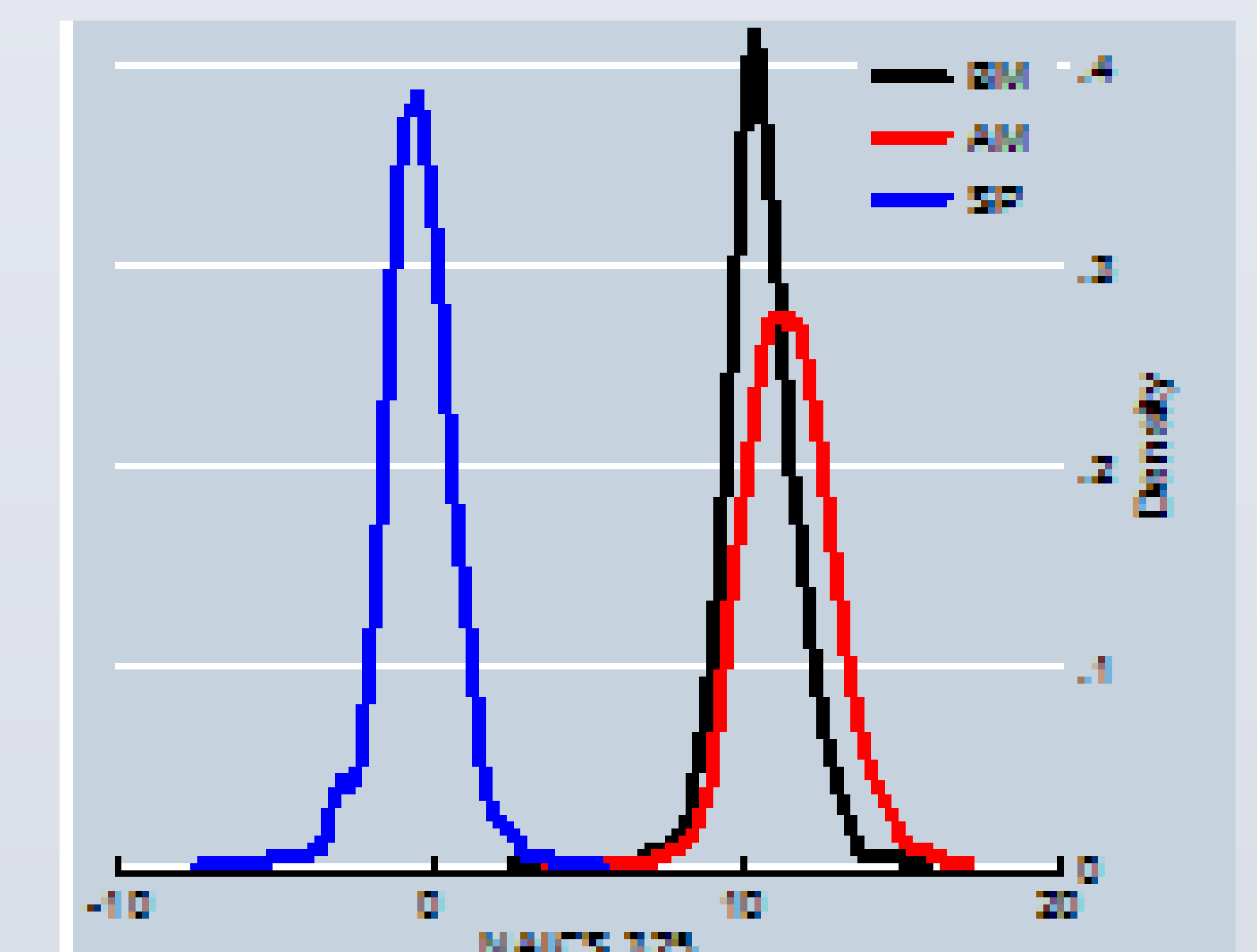
Firms located in science park have a mean TFP lagging those of large cities and leading those of small cities

Firms located in science parks benefit from localization and specialization.

Firms located in large cities benefit from diversification but are negatively affected by localization due to higher competition

	IQR		MED		10-TILE
	LOC	URB	LOC	URB	Labor Density
SP	0.43***	0.925***	0.161***	0.571***	0.0002***
	0.053	0.097	0.077	0.106	0.00001)
AM	-1.11***	-1.47***	-0.71***	-1.251***	-6.08exp(-06)***
	0.159	0.444	0.268	0.351	9.61exp(-07)
BM	0.533***	1.05***	0.301***	0.749***	-4.95exp(-05)
	0.06	0.118	0.077	0.145	0.0003

Regression results for NAICS 334



Competition is significant in science parks.

Hi-tech industries benefit from science parks but low-tech are better-off in large cities.

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