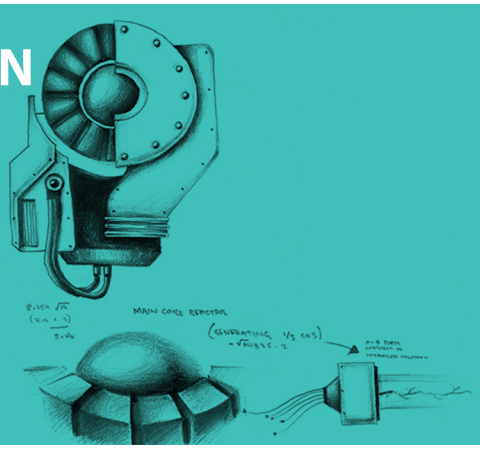
URBAN PRODUCTIVITY ESTIMATION WITH HETEROGENEOUS PRICES AND LABOUR



An Executive Summary of Motu Working Paper 16-xx

David C. Maré

Motu Economic and Public Policy Research

dave.mare@motu.org.nz

INTRODUCTION

Firms in big cities
hire well and price to compete
Are they better firms?

This paper's main objective is to estimate whether firms in large cities are more productive. We do this by controlling for the variation of input and output prices and for varying skill levels in the labour force in different locations. We also examine the biases that arise from ignoring these sources of variation.

METHODOLOGY

We examine firm level multi-factor productivity (mfp) and price variation according to where firms have employees. We focus particularly on the relative productivity performance of the Auckland urban area, compared with other urban and non-urban areas.

Urban productivity is estimated using data from Statistics New Zealand's Longitudinal Business Database, which integrates a broad range of administrative and survey data on most firms in New Zealand. We use a subset of these data for which reliable production measures are available, and focus on urban-focused industries – those in which more than half of industry employment is in urban centres. We use information on around 80,000 firms per year for 12 years (2001-1012), which account for over 60% of national output in the selected industries, and around 75% of employment.

The method we use relies on the assumption that firms are profit-maximising, and that they sell their output in imperfectly competitive markets.

URBAN LABOUR PRODUCTIVITY PREMIUM

Auckland firms have labour productivity that is 17.9% higher than that of firms in other urban areas, and 17.0% higher than firms in rural areas. Some of this premium is due to fact that highly productive industries are over-represented in Auckland. Adjusting for this reveals a smaller, but still sizeable, premium of 13.5% relative to other urban areas, and 11.3% relative to firms in rural areas.

For urban areas other than Auckland, Wellington firms have relatively high average labour productivity, with levels that are 4.2% lower than Auckland. For other urban areas, the gap ranges from 9.4% to 20.1%, with lower estimated mfp in less dense urban areas.

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URBAN MULTI-FACTOR PRODUCTIVITY PREMIUM

Some of Auckland's labour productivity advantage is due to more intensive use of non-labour inputs by Auckland firms. In addition, Auckland firms disproportionately employ workers who would be more productive anywhere and these labour quality differences contribute around 5.5% to Auckland's relative productivity performance.

Auckland's multi-factor productivity is between 7% and 15% (3% to 6% if adjusted for labour quality) higher than other urban areas. Wellington is an exception, with Wellington firms having productivity that is estimated to be 3.8% higher than that of comparable Auckland firms (2.7% if adjusted for labour quality).

PRICE VARIATION

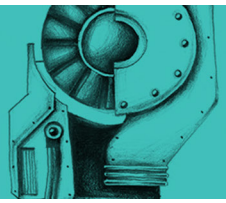
Auckland firms face higher labour and input prices, and are, on average, larger than other urban firms. Because of the assumed structure of imperfect competition, the larger size implies that Auckland firms charge lower output prices. Taking this into account reveals that Auckland firms are producing a greater quantity of output, and using a smaller quantity of inputs than is apparent from estimates that do not take account of spatial price variation.

If mfp is calculated in a way that ignores price variation (relying on revenue and expenditure as measures of output and input quantities), this yields estimates of the Auckland premium that are smaller by 2% - 5%. Estimates that adjust for labour quality but ignore price variation therefore fail to show a significant Auckland premium.

INDUSTRY PATTERNS

The productivity advantage of Auckland firms over same-industry firms in other urban areas is highest for the auxiliary finance and insurance sector (41%) and is over 30% in information media services and non-metallic mineral product manufacturing.

In industries that have a relatively strong presence in Auckland, there is a larger gap between productivity in Auckland and productivity in other urban areas.



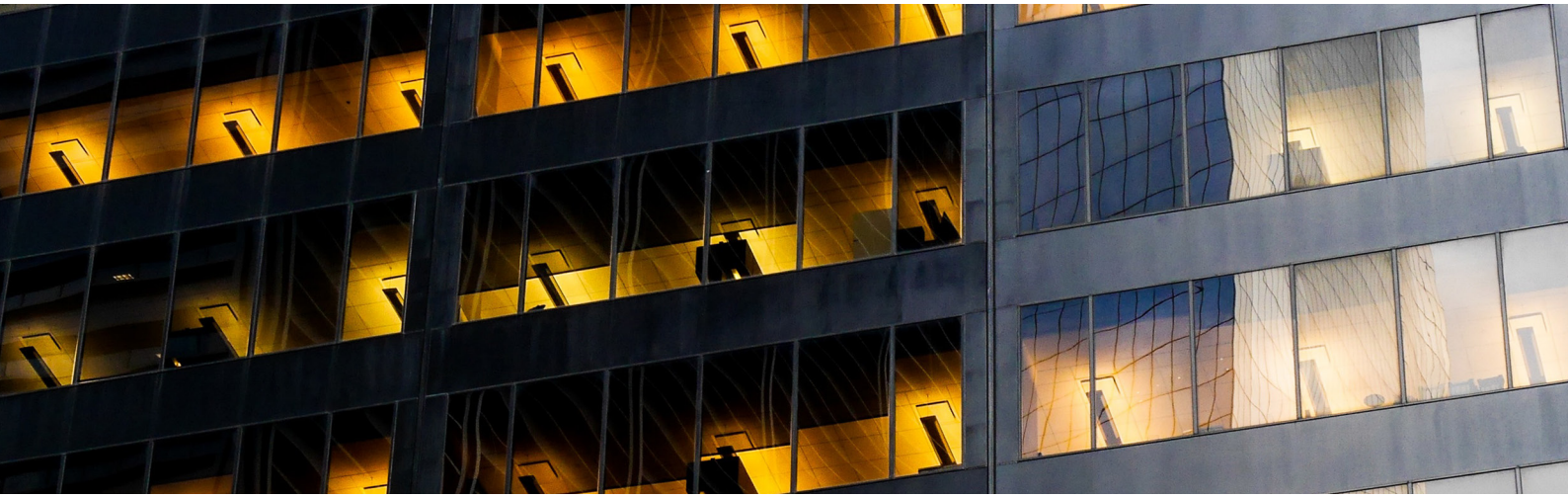
For other industries with a high proportion of their employment in Auckland, (e.g. finance and insurance, printing, and information media services), firms in other urban areas are 15% to 40% less productive than similar Auckland firms. In contrast, firms in the industry that is least concentrated in Auckland (food, beverage and tobacco manufacturing), are equally as productive in Auckland as other urban areas.

Our examination of whether the size of Auckland's productivity premium is related to industry characteristics failed to find strong systematic patterns. Similarly, although we find lower market power in exporting industries and greater market power in industries employing highly qualified workers, spatial differences in market power are small.

CONCLUSION

The paper provides improved estimates of urban productivity differences in New Zealand than have been available to date. It confirms that firms in Auckland have on average 13.5% higher labour productivity relative to firms in other urban areas. It attributes 5.6 percentage points of this to the greater quantity of other inputs used by Auckland, and a further 5.7 percentage points to the higher quality of Auckland workers.

Finally, we have demonstrated that failing to account for spatial variation in input and output prices biases downward the estimates of the Auckland premium, by 3 to 6 percentage points.



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