Ask: NUS Economists

Measuring the gains of expanding the MRT system

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Q: Do households benefit from an expansion of the MRT system even if they already live near a station?

A: Most Singaporeans are aware that a new MRT station increases the price of nearby flats. This price increase is caused primarily by individuals who value access to faster and easier travel, bidding up the price of housing around the new stations.

Shorter commuting times have also been shown to raise labour force participation, particularly for women, by providing easier access to employment opportunities. Public transit systems reduce traffic congestion, thus decreasing air emissions and improving air quality. They have even been shown to reduce drunk driving.

However, public transit systems are very expensive, with MRT lines costing billions of dollars. Hence, accurate measures of the benefits of public transit systems are necessary to help guide policymakers who are considering such huge investments.

In our recent research, we explored a previously unmeasured benefit of public transit systems, using Housing Board resale price data. We considered how an expansion of a transit system affected the price of housing already near a station before the expansion. In particular, we estimated how the opening of the North East Line in 2003 increased the prices of flats that were already near an MRT station on the East West Line or on the North South Line.

The North East Line was a major expansion of the MRT network, increasing the number of MRT stations from 21 in 2002 to 65 in 2003. The expansion provided new benefits to households already living near an MRT station by making it possible to travel to the MRT in, among other places, two of the most popular retail and commercial areas in Singapore: Harbourfront, which contains VivoCity, Singapore’s biggest mall, and Chinatown and China Square Central, which contain about 3.8 per cent of all retail space and 3.1 per cent of all office space in Singapore.

How did households living close to a station on the East West or North South Lines value access to more locations?

We used a statistical approach called difference-in-differences to answer this question. Presumably, in the absence of the MRT expansion, resale prices near and far away from an MRT station would have grown at the same rate. We could, therefore, use prices of flats far from an MRT station to predict post-expansion prices of flats near a station.

If the expansion of the MRT system had not affected the value of flats near an MRT station, these predicted prices would have tracked the actual prices. However, if the expansion had added value to flats near an existing MRT station, actual prices would be higher than the predicted prices.

The difference in predicted prices and actual prices of flats already near an MRT station was the difference-in-differences estimate of the impact of the MRT expansion on housing that was already near a station. A positive difference-in-differences estimate indicated that the premium of a flat near the East West Line or the North South Line had increased after the opening of the North East Line. That is, households that already had easy access to the MRT benefited from the expansion of the MRT network to the other areas of Singapore.

To eliminate other factors that may bias our estimate, we included a wide range of control variables in the analysis such as flat size, flat model and floor number.

Furthermore, we limited our data to resale flats in the mature towns and estates as of 2003 because the amenities and the housing supply in these areas were stable. This helped prevent bias that could arise, for example, by attributing price changes to the MRT expansion, while they were actually due to changes in the ambient environment, such as the addition of new shops and eateries.

We found that the North East Line increased the price, on average, of an HDB resale flat near an East West Line or a North East Line station by about 2.2 per cent relative to a flat not near a station. This price effect was very significant in aggregate. We estimated that the opening of the North East Line increased the value of flats near an MRT station in total by at least $386 million, which is equivalent to about 8 per cent of the estimated $5 billion cost of construction. Keep in mind that this percentage does not include the direct offset of the North East Line on the valuations of housing near the North East Line itself.

Our results suggest that the added benefits of a new transit line to housing already near a station are non-trivial and should be included in the cost-benefit analysis of public transit systems. This has important policy implications because correctly measuring total benefits ensures that investment projects that provide net benefits to society are undertaken. Otherwise, it is possible that such projects are rejected because their benefits are underestimated.

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