

**MAKAN INDEX 2017: AN INDICATOR FOR COST OF
EATING OUT IN SINGAPORE**

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May 2018
IPS Working Papers No. 29

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IN SINGAPORE**

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MAKAN INDEX 2017: AN INDICATOR FOR COST OF EATING OUT IN SINGAPORE

Abstract

In this paper, we introduce the Makan Index as a measure of the cost of eating out. This measure was built on survey data ($n = 2,389$) collected using a standard set of food items across 26 (URA) planning areas in Singapore, focusing on only three types of eating places: coffee shops, hawker centres and food courts. The Index was then compared across different planning areas and its correlation with socioeconomic characteristics of the planning areas was analysed.

The results of this study show that the cost of eating out differs across planning areas. Specifically, Sengkang, Tampines, and Sembawang are among the top three planning areas with high Makan Index score and Ang Mo Kio, Queenstown and Bukit Timah are among the planning areas with low Makan Index score. The price difference between the planning areas with highest (Sengkang) and the lowest (Ang Mo Kio) Makan Index score is about 22.9%. Mature planning areas tend to have a relatively cheaper basket of food items as compared to a younger planning area. In general, the price difference between mature and younger planning area is about 7.7%.

It was also found that the Makan Index is correlated with socioeconomic characteristics of the planning areas. Specifically, lower food prices are correlated with planning areas with higher income inequality; planning areas that are older; higher percentage of residents aged 65 and above; more households staying in rental flats; and fewer multi-generational households.

This paper first discusses how the cost of eating out can vary across geographical boundaries, and its relationship with the socioeconomic well-being of its residents. The concept of Makan Index is then introduced. Statistical tests were conducted to find out how Makan Index scores vary across different planning areas in Singapore and how the Index is correlated with socioeconomic characteristics in the planning areas. Practical implications from the results of this study are provided towards the end of this paper.

MAKAN INDEX 2017: AN INDICATOR FOR COST OF EATING OUT AND SOCIOECONOMIC WELL-BEING IN SINGAPORE

1. INTRODUCTION

Eating out is a consumer practice that is linked to modernity and the increase in availability of convenience food in commercial eating establishments (Díaz-Méndez & García-Espejo, 2017). Existing research into the practice of eating out has reflected that it is indeed a difficult concept to define. The movement on eating away from traditional domestic settings may, at the first glance, be viewed as being tied to economic factors (e.g., spending power). This is because the origins of eating outside of the home, in the first instance, would incur monetary costs for consumers in these commercial eating establishments. The economic factors can, however, coalesce with a myriad of social and contextual factors that drives consumers' decision to eat out (e.g., working, living or social habits).

In the context of Singapore, according to the Household Expenditure Survey (HES) 2012/13, the expenditure on eating out (i.e., food purchased from restaurants, food courts or hawker centres) is relatively higher as compared to food that required additional preparation such as cooking (e.g., raw grains, cereals, meat and seafood) within domestic settings (Foo & Hong, 2016). While the relatively high expenditure on eating out by households may be driven by the aforementioned reasons, different

conclusions can be drawn depending on the cost of eating out, which varies contextually.

As price differences on served food in commercial eating establishments can be expected to differ across different geographical boundaries in Singapore, it is thus problematic to determine of the cost of eating out. To address this issue, this study first aims at developing a standard measurement of the cost of eating out (hereafter described as the Makan Index) to gauge whether the cost of eating out is relatively high or low when comparing across geographical boundaries. Subsequently, this study further examines how the cost of eating out may correlate with certain socio-economic factors in the respective geographical boundaries. The implications of these results are discussed towards the end of this paper.

1.1. Cost of Eating Out Across Geographical Boundaries

The cost of eating out can vary across different geographic regions in a country. The geographic characteristics can influence the cost of eating out for residents living in the neighbourhood (Blundell et al., 2017); examples of these characteristics include the type of food, norms about eating, socioeconomic characteristics and traditions. For example, Pearce et al. (2007) found that neighbourhoods with different socioeconomic characteristics had different cost of eating out for residents. In particular, residents who resided in neighbourhoods with high percentage of residents with low socioeconomic status, tended to have greater access to inexpensive (and often unhealthy) food as compared to those who lived in wealthier neighbourhoods.

In Singapore, the General Household Survey 2015 reveals residents in different planning areas have different levels of household income, dwelling type composites, and education level.ⁱ These characteristics are reflective of the different purchasing power in the neighbourhood and by extension, could imply a different cost of eating out across planning areas. Therefore, the first research question (RQ) for this study is:

RQ1: Does the cost of eating out varies across different planning areas in Singapore?

1.2. Expenditure on Food and Socioeconomic Background

The results from the HES 2012/13 show that expenditure on eating out account for a significantly larger share in food expenditure for households across all income groupsⁱⁱ. Particularly, a majority of households have larger proportion (from 12 to 14%) of household expenditure on eating out as compared to households with higher income (11.8% of household expenditure on eating out). This implies that lower income households spend a larger proportion of their disposable income on food and thus more affected by the cost of eating out.

In a similar vein, in the United States, it was found that women food shoppers from lower-income households, and those with lower education level, who lived in rental homes and received food stamps, tended to have a higher price elasticity of demand for food (Bowman, 2006); they are more sensitive to changes in food prices. Ostensibly, this reflects the impact of food prices—and the cost of eating out in general—on livelihood. In the context of Singapore, we expect that the cost of eating

out in the neighbourhood to be correlated with socioeconomic characteristics of the residents. The second research question for this study is:

RQ2: How is the cost of eating out correlated with socioeconomic characteristics across different planning areas in Singapore?

1.3. Development and Computation of Makan Index

The development of Makan Index draws upon the concepts of existing economic indicators, such as the Consumer Price Index (CPI), Gross Domestic Product per Capita (GDP) and the Big Mac Index. The Consumer Price Index (CPI) calculates the change in the price of a representative basket of consumer goods (i.e., a comprehensive list of food and non-food items) over a period of time. Gross Domestic Product (GDP) per capita involves the aggregation of the value of all final goods and services in the country divided by the number of the person in the population. The Big Mac Index focuses on the price of a single food item (i.e., the Big Mac burger from McDonald's). One common characteristic of these economic indicators is that they are universal and affords the comparison of economic conditions across time and space (Chauvin, Glaeser, Ma, & Tobio, 2017).

While we do not presume the Makan Index to be as comprehensive as the CPI, we expect it to consist of more food items than a single-good basket like the Big Mac Index. Therefore, the development of the Makan Index involves the pre-selection of a standard set of food items that are representative of the dining culture and eating

habits of multicultural Singapore. The Makan Index value for each planning area was derived by adding the average price of each food item and then dividing the sum of prices by the lowest aggregate of all planning areas. Therefore, the planning area with the lowest Makan Index value will be one and a planning area with a value greater than one indicates a more expensive planning area to eat out.

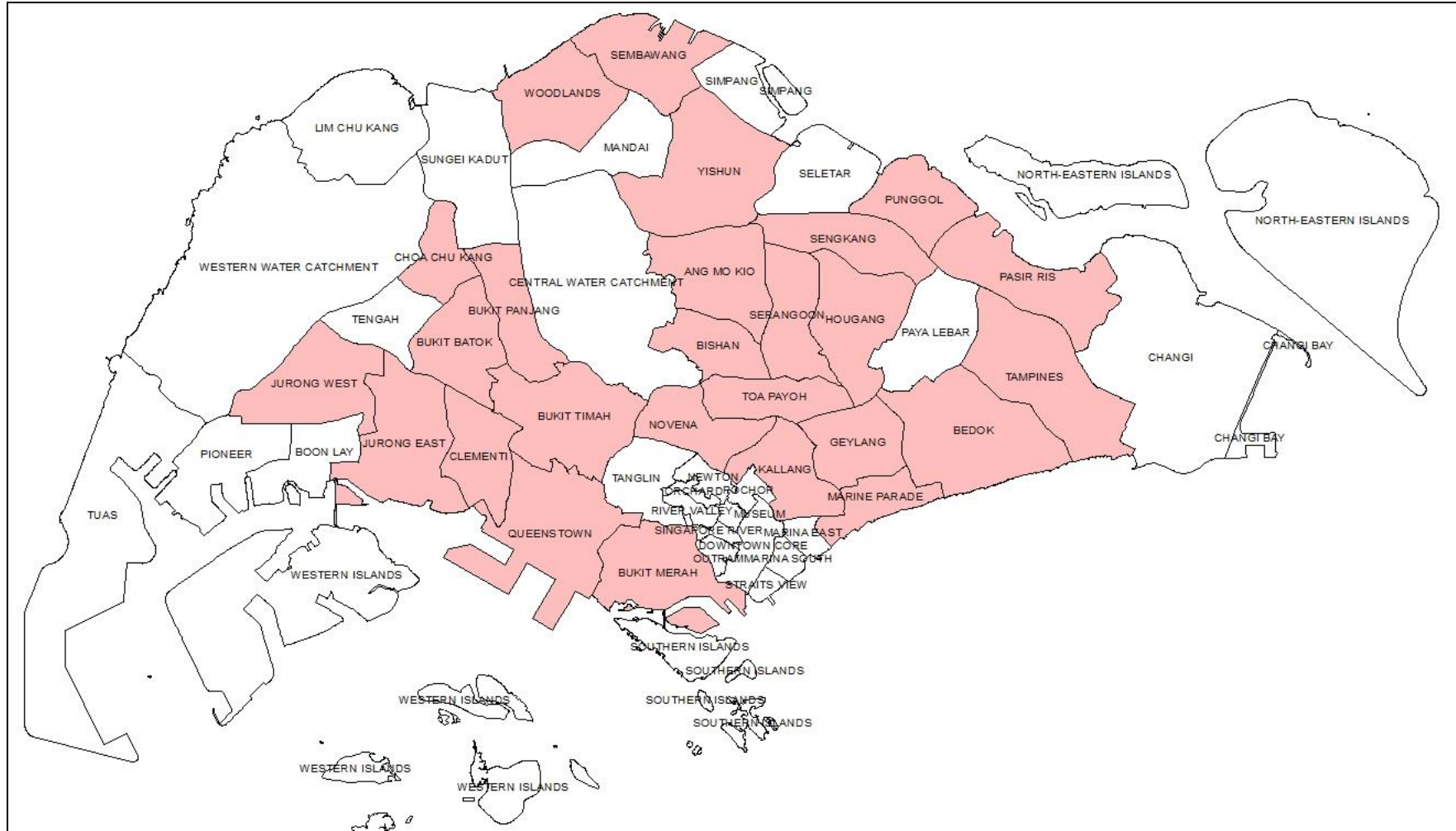
2. METHODOLOGY

This study only focuses on 26 planning areas,ⁱⁱⁱ out of the 55 demarcated by URA (see Figure 1). The rest are excluded due to low proportions of public housing or relatively sparse population, these include Outram, Downtown Core, Newton, Mandai, Tengah, and Tuas. The list of planning areas was also classified accordingly to their age and among the 26 selected planning areas, eight of them are recognised as “mature” (where public housing were developed before the 1980s) and 15 of them are recognised as “non-mature” (where public housing were developed in the 1980s or in the 1990s). Three planning areas were excluded from the classification.^{iv} Table 1 shows the classification of these 23 planning areas.

Table 1: Classification of mature and non-mature planning areas

Mature planning areas (Developed before the 1980s)	Non-mature planning areas (Developed in the 1980s or 1990s)
Ang Mo Kio	Bishan
Bedok	Bukit Batok
Bukit Merah	Bukit Panjang
Clementi	Choa Chu Kang
Geylang	Hougang
Kallang	Jurong East
Queenstown	Jurong West
Toa Payoh	Pasir Ris
	Serangoon
	Tampines
	Woodlands
	Yishun
	Punggol
	Sembawang
	Sengkang

Figure 1: 26 planning areas identified (highlighted) for this study



Based on data obtained from data.gov.sg

3. FIELDWORK

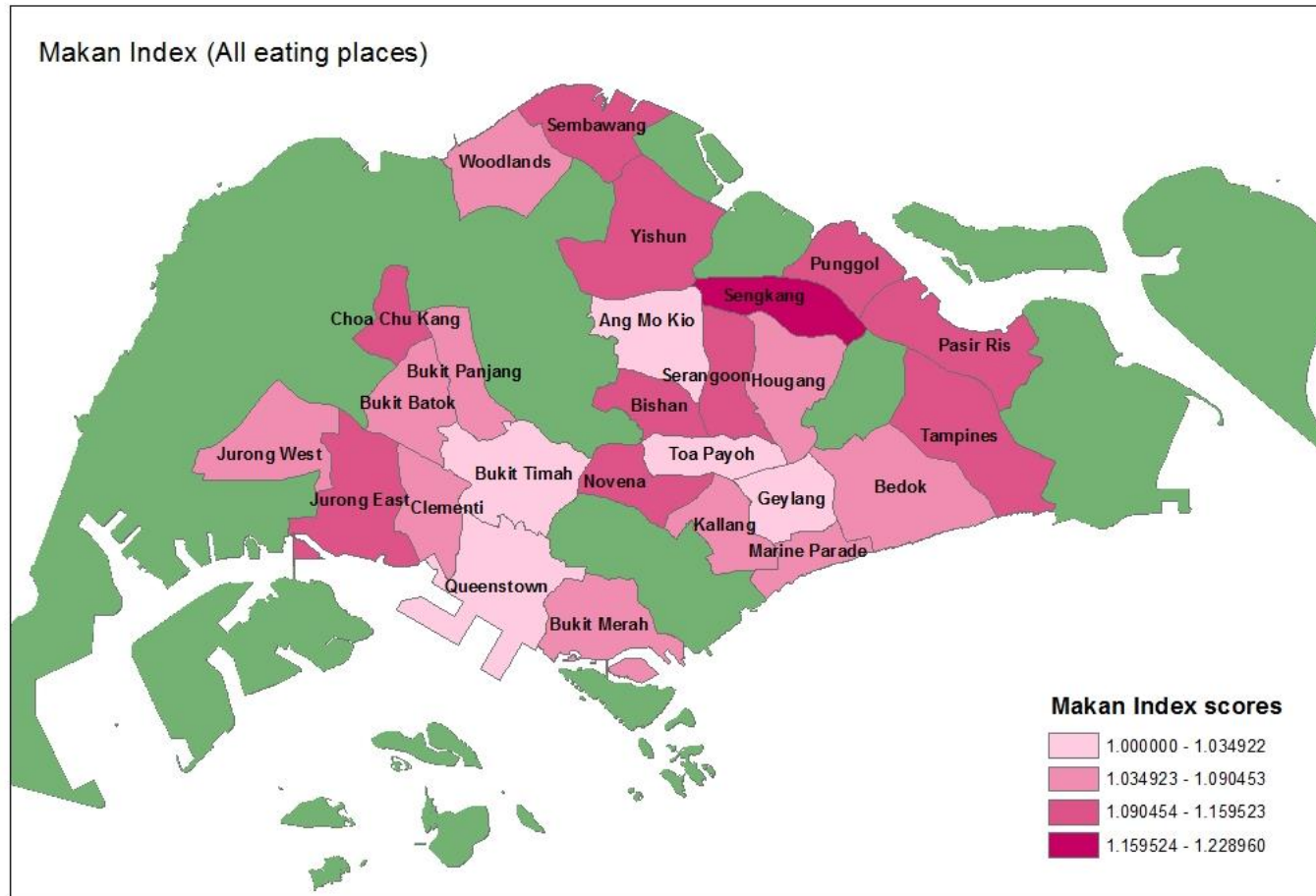
Fieldwork was carried out between March and June 2017 and was limited to three types of eating places: coffee shops, hawker centres and food courts. This study assumes that these three types of eating places offer the most common dining options for most Singaporeans. Hence, a reliable measure of the cost of eating out based on data collected from these places may be obtained. A total of 2,389 food stalls were visited in these eating places. Five food items were chosen to form the standard food items across all planning areas, namely, economic rice (2 vegetables and 1 meat option), mee rebus (Malay-style boiled noodle dish), chicken rice (steamed or roasted chicken with rice), iced Milo (iced chocolate malt drink), and kopi-O (black coffee with sugar). At least three prices were collected for each food item in each planning area for each type of eating place.

4. RESULTS

4.1. Difference in Cost of Eating Out Across Planning Areas

Sengkang, Tampines and Sembawang are among top three planning areas that have high Makan Index scores. Ang Mo Kio, Queenstown and Bukit Timah are among the cheapest planning areas with these food items. This indicates that the cost of eating out, within these common eating places, varies across different planning areas in Singapore. Figure 2 highlights these planning areas on the map alongside with the rest of the planning areas. Table 2, in the Appendix, presents the individual Makan Index scores for each of the planning areas as well as the breakdown of the average prices of all five food items.

Figure 2: Makan Index scores



Note: Makan Index scores computed from data-points collected in coffee shops, hawker centres and food courts. Darker regions represent higher Makan Index scores (i.e., more expensive areas).

4.2. Mature Planning Areas and Low Cost of Eating Out

In general, based on the ranking of the Makan Index, it was found that some of the non-mature planning areas (e.g., Sengkang and Sembawang) have a more expensive basket of food items. On the other hand, mature planning areas (e.g., Ang Mo Kio and Queenstown) have a cheaper basket of food items.

Statistical tests (i.e., independent sample t-test) were conducted to examine whether food prices in mature planning areas are indeed cheaper than non-mature planning areas (according to the classification in Table 1). A statistical comparison was conducted between the prices of the food items in these two groups. It was found that all selected food items are indeed cheaper in mature than those in non-mature areas. Table 3 shows the results of the comparison. On average, the price differences between mature and non-mature planning areas is about 7.7%. Table 2 shows the average price difference for each of the five food items across the two types of planning areas.

Table 3: Comparison of prices of food items—mature and non-mature planning areas

Food item	Planning area maturity	N	Price (\$)	(NM) – (M)	% difference
Economic rice	Non-mature (NM)	288	3.19	0.22**	7.41
	Mature (M)	237	2.97		
Chicken Rice	Non-mature (NM)	296	3.15	0.12*	3.96
	Mature (M)	266	3.03		
Mee rebus	Non-mature (NM)	147	3.12	0.20**	6.85
	Mature (M)	177	2.92		
Kopi- O	Non-mature (NM)	372	1.01	0.13**	14.8
	Mature (M)	526	0.88		
Iced-Milo	Non-mature (NM)	372	1.56	0.08**	5.41
	Mature (M)	517	1.48		

Note: ** $p < 0.001$, * $p < 0.05$ (two-tailed). Results from independent sample t-tests. N refers to the number of data-points for each food items in the non-mature and mature planning areas. Differences may not be exact due to rounding-off.

4.3. Correlations with Socioeconomic Characteristics

To find out the possible correlations of food prices and socioeconomic characteristics, correlation analysis was performed with selected socioeconomic variables^v obtained from the General Household Survey 2015. Table 4 shows the complete list of socioeconomic variables^{vi} that were correlated with the Makan Index.

In general, the Makan Index is negatively and significantly correlated with certain socioeconomic characteristics in the planning areas. Specifically, lower food prices are correlated with planning areas with higher income diversity, a higher percentage of residents aged 65 and above and a higher percentage of households staying in rental flats. The Makan Index, however, is positively correlated with the percentage of multi-generational households.^{vii} This suggests that high food prices are correlated with the high percentage of large multi-generational families.

Some of the aforementioned socioeconomic characteristics reflect socioeconomic vulnerability (e.g., residents aged 65 and above, income diversity and households staying in rental flats). Therefore, the results may suggest that food options provided by coffee shops, hawker centres and food courts might play an important role in meeting the needs of residents from the lower socioeconomic background.

Table 4. Correlation between Makan Index and socioeconomic characteristics (Pearson r)

Socioeconomic characteristics	Correlation Coefficient
% residents aged 65 and above	-0.579**
Gini Coefficient (i.e., income diversity)	-0.559**
% households stay in rental flats	-0.508**
% multi-generational households [^]	0.428*
% one and two-room flats	-0.386
% divorced or separated residents	-0.350
% single residents	-0.309
% households with monthly income \$10K and above	0.299
% residents with university /professional qualification and/or other diploma	-0.04
% professionals, Managers, Executives & Technicians	-0.007

Note: ** $p < 0.001$, * $p < 0.05$ (two-tailed). [^]Modified from the original term used by SingStat: "households of 1 family nucleus, 3 generations and above"

5. CONCLUSION

The findings from this study show that the cost of eating out differs across different planning areas in Singapore. The cost of eating out, based on the ranking of the Makan Index, is relatively higher in non-mature planning areas as compared to mature ones. Costs of eating out are correlated with selected socioeconomic characteristics which reflect social vulnerability. Specially, lower cost of eating out is correlated with higher percentage of households residing in rental flats, higher percentage residents aged 65 and above, mature planning areas and higher income

diversity within the planning areas. Low food prices are also correlated with planning areas with fewer multi-generational families.

Some practical implications can be derived from the results of this study.

First, the Makan Index may serve as a source of information on the cost of eating out for the residents whose expenditure on food forms a significant share of their household expenditure. For example, from the findings in 2012/13 HES, a third of the HDB 1- and 2-room residents' household expenditure was spent on food. The knowledge of the cost of eating out across different planning areas may allow residents to make better-informed choices while planning their food budget (i.e., whether to eat out or dine at home).

Second, voluntary welfare organisations and social initiatives that provide assistance to households facing food insecurity can make use of the study to make informed decisions on planning areas that demonstrate a higher cost of eating out. The correlations found between Makan Index and socioeconomic characteristics highlight the need to look beyond the strategies of rendering them assistance with food vouchers. Social enterprises such as NTUC Foodfare offers food vouchers for residents in need of financial assistance which can be used in any of their Foodfare outlets. However, further studies are required to find out the expenditure patterns and eating-out preferences of these vulnerable households to check the usefulness of food vouchers.

Finally, the development of the Makan Index provides an opportunity for researchers to find out cost differentials in food prices across planning areas alongside with other variables not mentioned in this study. For example, the use of latent factors such as perceptions of food quality (Janssen, 2018) and attitudes (Lee & Yun, 2015) towards purchase and consumption of food from coffee shops, hawker centres, and food courts. Observed variables such as spatial distances (e.g., Le, Engler-Stringer, & Muhajarine, 2016; Rummo et al., 2015) between residents and food environment were also found to be associated with the cost and type of food available. Therefore, on top of the variables examined in this study, the introduction of the aforementioned variables to this study may provide a more accurate perspective of cost of eating out across different planning areas in Singapore.

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APPENDIX

Table 2. Ranking of Makan Index

Planning Area	Economic Rice	Chicken Rice	Mee Rebus	Kopi-O	Iced Milo	Total price	Makan Index
Ang Mo Kio	2.89	2.95	2.73	0.87	1.41	10.84	1.0000
Queenstown	2.97	2.95	2.89	0.81	1.37	10.98	1.0131
Bukit Timah	2.96	3.00	2.90	0.87	1.36	11.09	1.0235
Toa Payoh	3.10	2.84	2.84	0.89	1.43	11.10	1.0243
Geylang	2.84	3.11	2.94	0.88	1.45	11.22	1.0352
Kallang	3.02	3.07	2.92	0.86	1.46	11.33	1.0459
Woodlands	2.99	3.03	3.07	0.91	1.39	11.38	1.0503
Bedok	2.88	3.03	3.02	0.89	1.56	11.39	1.0508
Hougang	3.15	2.90	2.98	0.94	1.46	11.42	1.0537
Clementi	2.94	3.04	2.94	0.92	1.61	11.45	1.0564
Jurong West	3.05	2.98	3.00	0.97	1.50	11.49	1.0606
Bukit Batok	3.00	3.03	3.00	0.99	1.49	11.52	1.0627
Bukit Merah	3.07	3.12	3.01	0.93	1.50	11.62	1.0726
Bukit Panjang	3.04	2.81	3.29	0.98	1.51	11.63	1.0733
Marine Parade	3.02	3.25	3.00	0.99	1.56	11.82	1.0908
Bishan	3.10	3.17	3.11	1.00	1.52	11.91	1.0988
Yishun	3.11	3.10	3.20	1.00	1.54	11.95	1.1027
Serangoon	3.22	3.14	3.18	1.07	1.63	12.24	1.1294
Novena	3.38	3.47	3.03	0.89	1.50	12.26	1.1316
Choa Chu Kang	3.25	3.13	3.30	1.05	1.55	12.27	1.1326
Punggol	3.24	3.26	3.13	1.07	1.63	12.33	1.1378
Pasir Ris	3.28	3.27	3.11	1.05	1.66	12.38	1.1422
Jurong East	3.35	3.37	3.11	1.00	1.64	12.46	1.1501
Sembawang	3.35	3.33	3.13	1.08	1.68	12.56	1.1588
Tampines	3.27	3.43	3.04	1.12	1.70	12.57	1.1598
Sengkang	3.57	3.36	3.56	1.03	1.80	13.32	1.2293

NOTES:

ⁱ Ranking is performed on data obtained from General Household Survey 2015, i.e., Table 148: Resident Households by Planning Area and Type of Dwelling; Table 149: Resident Households by Planning Area and Tenancy; and Table 152: Resident Households by Planning Area and Monthly Household Income from Work.

ⁱⁱ Household Expenditure Survey 2012/13. Full report. Page 17. Chart 1.6.

ⁱⁱⁱ These planning areas are not equivalent to HDB towns. One planning area can be different or overlap more than one HDB town of the same name. For instance, URA Novena planning area comprises Malcom, Balestier, Mount Pleasant, Moulmein and Dunearn but there is no equivalent Novena HDB estate.

^{iv} The list excludes Bukit Timah, Marine Parade and Novena as the three planning areas comprise a substantial proportion of private residential units which are not relevant to the distinction between mature and non-mature planning area.

^v While there can be other socioeconomic profiles (e.g. occupation type or take-home salary) of patrons, this study is limited to the selected socioeconomic variables from the General Household Survey 2015.

^{vi} Correlation coefficient for the age of planning area ($r = -0.690$, $p < 0.001$) is omitted in Table 4.

^{vii} This term is modified from the original term used by SingStat: "One family nucleus, three generations and above". A family nucleus, according to the definition from SingStat, refers to either: (a) married couple without child(ren); (b) married couple with child(ren) who are not married; or (c) one parent with unmarried child(ren). Each nucleus may comprise one or more generations.

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