SUMMARY

Sale prices are generally recognised as one of the best indicators of prevailing market conditions, be it upturn, boom, downturn or recession. Changes in sale prices of properties are often used as a measure of fluctuations in the general level of real estate activity. A study on how to measure such fluctuations through the construction of dynamic index numbers and the analysis of these indices will enable the analyst to produce more accurate forecasts based on past consistent patterns of movements.

As a logical starting point, a dynamic price index which acts as a good descriptor of the residential property market must be constructed. This index is different from all other property price indices available in Singapore in that the basket of properties is kept current and updated with what is actually transacted in the market. The historical patterns of movement of the overall residential dynamic price index, together with its sub-sectoral housing area and property type dynamic price indices are then analysed using univariate time series techniques.

One useful way of approaching the identification of past patterns in the dynamic indices and their extrapolation into the future is to treat the indices as comprising four elements: seasonality, trend, cyclicality and randomness. Univariate time-series methods seek to identify historical patterns in a data series (using time as a reference) and then forecast using a time-based extrapolation of those patterns. Assessing and building elementary components from data is by far one of the most important and worth-while goals in time series analysis.

The study concentrates mainly on quantitative time series smoothing and decomposition methods. These methods have been long established in literature and appear to hold the greatest promise in examining and forecasting the individual elements underlying residential property price movements. The main advantage of these methods is their ability to identify the elements of seasonality, trend, cyclicality and randomness in an efficient and objective manner. Subsequently, each of the three elements (seasonality, trend and cyclicality) is extrapolated to produce more accurate forecasts. By definition, randomness cannot be predicted, but once it is isolated, its magnitude can be estimated and used to determine the extent of variation likely between actual and predicted results.

The research findings and forecasts produced from the dynamic indices indicate the presence of two types of cycle within the residential property sector: a major "supply" cycle lasting for
eight years, and a minor "demand" cycle lasting about three and a half years. Seasonality was found to be minor and unstable in the market, and the long term trend of the sector appeared to follow a non-linear economic growth curve.

The research findings are then combined with a historical qualitative analysis of the residential property market in Singapore. This serves not only to test the integrity of the quantitative analysis, but also to inject judgmental elements (inference through experience gained from repeated observations) into the forecasts.

Finally, pictorial representations of the geographical distribution of residential property prices, at various years, are introduced in order to provide a spatial dimension to the analysis. These maps show clearly, the dispersion of private residential properties to more sub-urban housing areas.

With the integration of quantitative findings, qualitative reviews and pictorial representations, the basic elements underlying price movements in the Singapore residential property market are effectively presented.

**KEY WORDS:**
Dynamic Property Price Indices
Time Series Smoothing and Decomposition
Residential Property Price Cycle, Trend and Seasonality
Univariate Time Series Forecast
Qualitative Market Analysis
Residential Property Price Maps