Box Article

Methodological Framework for Computing Malaysia's Effective Exchange Rate Indices*

Highlights

- Effective exchange rates can provide insights into macroeconomic conditions and can facilitate price competitiveness assessments, inflation analysis and external balance evaluations
- Movements in the ringgit effective exchange rates have been relatively more muted, when comparing the movements of the NEER and REER series with the bilateral ringgit exchange rate against the US dollar

INTRODUCTION

Currency movements play an important role in the economy, particularly in trade and investment activity. Bilateral exchange rates, which indicate the value of one currency in relation to another provide a starting point for assessing a currency's performance. However, for a more comprehensive evaluation, economists also look at effective exchange rate indices. The nominal effective exchange rate (NEER) reflects a currency's performance against a group of currencies, weighted by the importance of each trade partner in a country's total trade. In addition, the real effective exchange rate (REER) adjusts the NEER for price differences, by considering relative price levels between these countries.

METHODOLOGICAL FRAMEWORK

At Bank Negara Malaysia (BNM), the methodology[1] used to derive the effective exchange rate indices for the ringgit is broadly similar to that adopted by other central banks and international organisations. The NEER is computed as a geometric weighted average[2] of the ringgit exchange rate against the currencies of Malaysia's main trade partners.[3] Trade flows are computed using merchandise trade sourced from the International Monetary Fund (IMF)'s Direction of Trade Statistics (DOTS), which provides timely and comprehensive trade data.[4] Only trade partners that comprise more than 1% of Malaysia's total trade are included in the group of currencies used to calculate NEER and REER - this is similar to the practice by the Bank of England (Lynch and Whitaker, 2004)[5] and European Central Bank (Schmitz et al., 2012).[6] Import weights are calculated directly from bilateral import shares. Export weights are calculated using a "double-weighting" approach. This means that we account for both the bilateral export shares and the indirect export competition in third markets.

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1 The methodological framework comprises several components, including the time period and frequency of the effective exchange rate series, the base period, and the coverage of trade partners. Additionally, the methodology involves determining the weighting method and formula for the trade weights, choosing the exchange rates, deflator, and source of the trade data, as well as the frequency and method of updating the trade weights.

2 The geometric weighted average uses the trade weights as exponents for the bilateral exchange rate indices, and then multiplies these numbers. Please refer to Brodsky (1982) for more information.

3 The formula is $NEER_t = \prod_{i=1}^{n} ER_t^{i,rm^{weight^i}}$ where i is the main trade partner, n is the total number of main trade partners and $weight_i$ is the trade weight for trade partner $ER_t^{i,rm}$ is an index of the bilateral exchange rate of the ringgit against the currency of trade partner i in period t, expressed as the foreign currency per ringgit. The weights sum to one, $\sum_{i=1}^{n} weight^i = 1$. Please refer to Schmitz et al. (2012) for further details on the calculations.

4 Except for trade flows data with Taiwan, which are from Global Trade Atlas (GTA).

5 For the UK, trade partners are included if the trade partner's share of either exports or imports with the UK exceeds 1% (Lynch and Whitaker, 2004).

6 The IMF, for example, uses a threshold of 0.45%.

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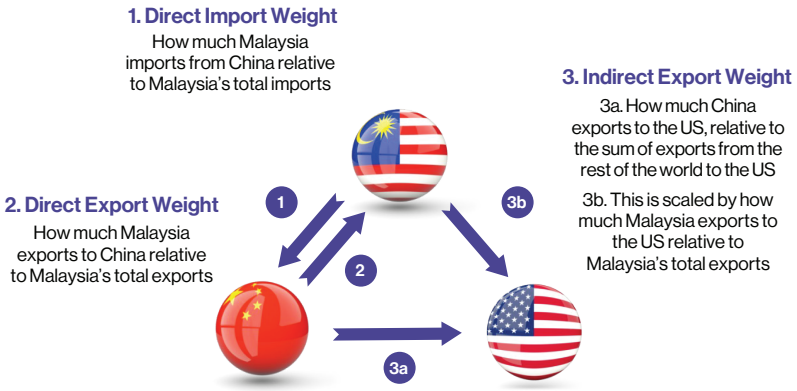
(Chart 1 provides a simplified example illustrating the calculation of import and export weights). The overall weight assigned to a trade partner is in turn a weighted average of how much Malaysia imports and exports with these trade partners. To reflect changes in trade patterns, the effective exchange rate indices are periodically revised, most recently with the updated annual trade weights from 2019 to 2021. The effective exchange rate indices are chain-linked[7] to account for discontinuity effects when Malaysia's trade weights change. The base period for both monthly indices is July 2005, which is the month that the ringgit exchange rate shifted from a fixed exchange rate against the US dollar to a then managed float regime.

The REER extends the NEER by adjusting for the relative prices between Malaysia and its trade partners. These relative prices, which serve as the deflators for the NEER, are determined using the consumer price indices (CPI) of Malaysia and the main trade partners.[8,9]

Chart 1: Simplified example illustrating the calculation of import and export weights

The example below illustrates how China's import and export trade weights for Malaysia are calculated, assuming the US is the only third market in which Malaysian exporters face competition from Chinese exporters



TRENDS IN THE RINGGIT NEER AND REER SERIES

Overall trends in the NEER and REER series since 2020 have remained broadly consistent despite changes to the latest updated trade weights. However, one difference is that the top five trade partners' share of the trade weights has increased; most noticeably the trade weight for China, which has increased by approximately four percentage points. At the same time, the ringgit has also depreciated against four of these five trade partners currencies (the renminbi, Singapore dollar, euro and US dollar), but appreciated against the Japanese yen, leading to a marginally weaker NEER for most periods following the updates to the weights.

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7 Chain linking refers to constructing a continuous series by combining indices that have different weight reference periods (United Nations, 2009). This methodology allows for a clear distinction between the factors driving the effective exchange rate, which can be attributed to movements in exchange rates and/or changes in trade weights.

8 The formula $REER_t = \prod_{i=1}^{n} \left(\frac{ER_t^{i,rm} P_t^{my}}{P_t^i}\right)^{weight^i}$ where P_t^{my} is the price index for Malaysia at time t, and P_t^i is the price index for trade partner i at time t. Please refer to Schmitz et al. (2012) for further details on the calculations.

9 Apart from the CPI, deflators that are typically considered are the producer price index (PPI), wholesale price index (WPI), unit labour costs (ULC) and gross domestic product (GDP) deflator. Like many other central banks and organisations, the CPI is chosen as the price deflator because it is reliable and comparable across countries and is released regularly.

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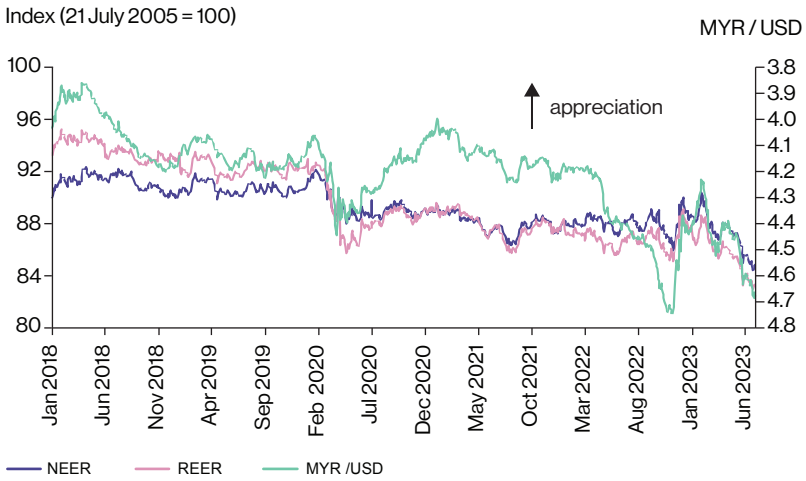
Chart 2 shows the calculated ringgit NEER and REER series. When the NEER or REER increases, it implies an appreciation of the ringgit and vice versa. The REER can also increase if Malaysian prices increase at a faster pace compared to those of trade partner countries, and vice versa. The trends in the ringgit NEER and REER series computed by BNM are in line with the broad trends of effective exchange rate indices computed by other organisations such as the Bank for International Settlements (2023)[10] and the International Monetary Fund (2019). When comparing the movements of the NEER and REER series with the bilateral ringgit exchange rate against the US dollar, movements in the effective exchange rate indices have been relatively more muted. This indicates that some of the other currencies in the indices also depreciated against the US dollar over this period. When observing the March 2020 to March 2022 period, during which the ringgit first appreciated by about 6% against the US dollar, the NEER was relatively unchanged.[11] This occurred amid broad-based US dollar weakness against most major and regional currencies as the US Federal Reserve reduced its policy rate and implemented quantitative easing measures. More recently, over the September 2022 to early November 2022 period, the ringgit depreciated by about 6% against the US dollar while the NEER only depreciated by about 2%, in line with the broad-based depreciation in major and regional currencies against the US dollar as global financial conditions continued to tighten and the global growth outlook weakened.[12]

Chart 2: Ringgit Nominal Effective Exchange Rate and Real Effective Exchange Rate Series



Note: Last date in the chart is 30 June 2023.
The daily REER is calculated by using the monthly CPI for each day of the month.

Source: Bank Negara Malaysia and Bloomberg

[10] Possible differences in methodologies by BNM and Klau and Fung (2006) of the effective exchange rate series include the coverage of trade partners, computation of export weights, frequency of updating the trade weights and data sources and adjustments.
[11] The NEER depreciated by 0.1% over this time period.
[12] Several central banks raised their policy rates during this time, and the IMF lowered its 2023 global growth forecast to 2.7% from 2.9%.

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CONCLUSION

Effective exchange rate indices offer an invaluable framework for assessing a currency's performance and providing insights into macroeconomic conditions, by facilitating price competitiveness assessments, inflation analysis, and external balance evaluations. Furthermore, these indices can also be used as inputs for the computations of other monetary or financial indices (Klau and Fung, 2006) and for macroeconomic modelling. Given the evolution of the global economic landscape, the weights assigned to different currencies in the effective exchange rate calculations will continue to be periodically updated to reflect the latest economic conditions and trade patterns. Such proactive adjustments will ensure that the effective exchange rate remains useful in reflecting the ringgit's overall movements and price competitiveness against main trade partners.

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