analytics
CONSULTING

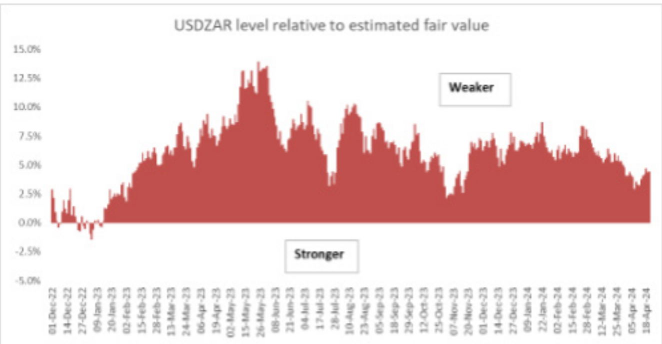
Decoder Series
ARTICLES

#2 OF 6

THE ANALYTICS CURRENCY DECODER

DECOMPOSING THE FAIR VALUE RESIDUAL

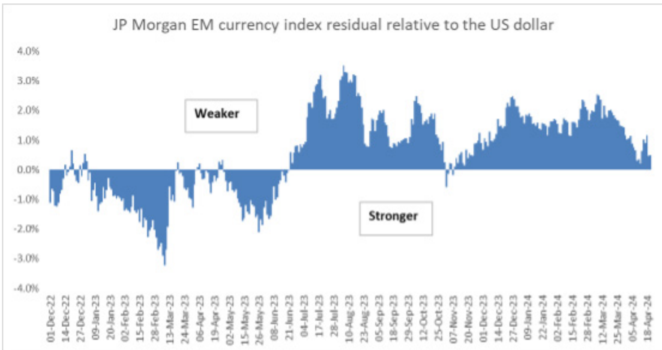
The first article in this series on the Analytics Currency Decoder outlined the concept of decoding currencies instead of modelling them. The machine learning algorithm at the heart of the Decoder is able to estimate a fair value level for a currency pair, or exchange rate, at any point in time. The prevailing exchange rate is then compared with this fair value estimate and the percentage difference between the two (the residual) is plotted over a chosen period of time, as shown below for the USDZAR exchange rate.



When the residual is positive, the USDZAR is weak relative to the US dollar and when the residual is negative, the USDZAR is strong relative to the US dollar. This residual and the actual exchange rate and fair value levels are used extensively for determining whether to buy, sell or wait on trading a currency pair.

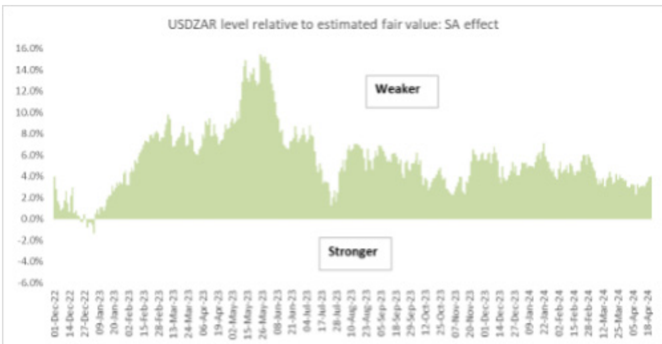
On the assumption that currencies are "all-knowing" we thought it would be interesting to see if it was possible to decompose this residual in an attempt to extract further information from the Decoder output. It is important to realise that once the fair value has been determined, the residual represents the aggregate of non-US dollar effects on the exchange rate. The objective of the decomposition study is then to break down the residual into an aggregate Emerging Market effect and a country-specific South Africa effect.

The first step is to estimate the impact on an Emerging Market exchange rate as a result of its inclusion in a broader currency index, and for this exercise we chose the JP Morgan Emerging Market Currency Index. This is an index comprised of 13 Emerging Market currencies of which the USDZAR is one. In the same way that the Analytics Currency Decoder is used to estimate a fair value level for the USDZAR exchange rate, the Decoder is used to estimate a fair value level for the JP Morgan Emerging Market Currency Index based on the underlying assumption that the index is primarily driven by the US dollar. The output is shown below.



As before, when this residual is positive the index is weak relative to the US dollar and when the residual is negative, the index is strong relative to fair value.

Once the Emerging Market impact on the exchange rate residual has been determined (as above), this impact can be subtracted from the exchange rate residual in the first chart and what is then left over, we argue is the country-specific South Africa effect. This effect is shown below.



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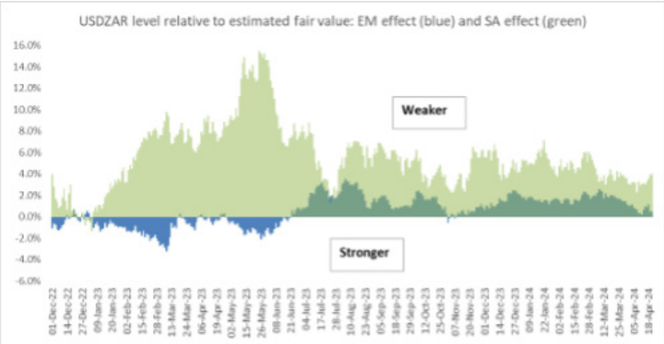
The relevance of such a decomposition can only be confirmed if the SA-specific effects can be closely related to particular positive or negative developments that are specifically linked to local economic and/or political events. The charts above do put an interesting perspective on the recent results of this decomposition, particularly when the decomposition is shown in a single chart as below.

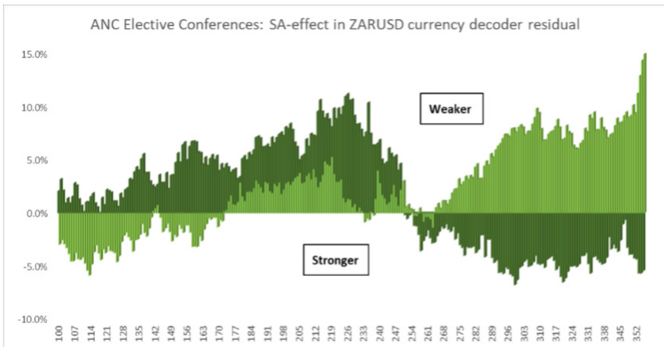


The first chart on the previous page shows that as we started 2023, the USDZAR exchange rate was trading close to its estimated fair value levels. The currency then started to weaken systematically as the South African economy buckled under the strain of persistent and heavy loadshedding. The decomposition chart above then shows that for the first 5 months of 2023, there was no pressure at all on the USDZAR exchange rate from aggregate Emerging Market effects leaving the residual entirely as a result of locally inflicted wounds.

The peak weakness in the USDZAR exchange rate in the first half of 2023 was on 25 May 2023 when the USDZAR level reached R19.80 at the height of the Lady R scandal when the US ambassador suggested that South Africa was shipping weapons out of Simonstown harbour to Russia. With fair value estimated at R17.38, the weakness amounted to 242c. At that point in time, Emerging Market currencies in aggregate were trading stronger relative to the US dollar and should have contributed some strength to the exchange rate. That strength contribution was estimated to be at least 26c. By implication then, the South Africa-specific impact on the exchange rate of these self-inflicted wounds was 270c, or 15.5% north of fair value.

While this is one example of how the decomposition of the fair value residual has enabled us to estimate the impact on the exchange rate of local economic and political events, there are a number of additional case studies that we have examined, both negative and positive, starting with the Soccer World Cup in 2010. In all of these case studies, the results have been credible and very informative.

A very revealing case study has been to quantify the impact on the exchange rate of the outcomes of the ANC Elective Conferences in December 2017 and then again in December 2022. By decomposing the exchange rate residuals over those two periods of time, we were able to extract the SA-specific effect and monitor that effect leading up to, and for a while after, each Conference. The chart below shows the extent to which the outcomes differed dramatically after each of the Conferences.



The dark green bars are the SA-specific effect leading up to and after the 2017 Conference and the light green bars are the SA-specific effect for the 2022 Conference over the same measurement time period. The exchange rate reflected significant weakness leading up to the 2017 Conference, but this was followed by significant strength as Cyril Ramaphosa ousted Jacob Zuma for the leadership of the ANC (measurement day 255 in the chart – 23 December).

After the Conference, the dark green bars reflected a very positive period for the USDZAR exchange rate that became known as "Ramaphoria".

The light green bars show that leading up to the 2022 Conference, the exchange rate also reflected some weakness, but not to the same extent as previously. However, the divergence in sentiment after these two Conferences was dramatic, and into 2023 there was an overwhelmingly negative SA-effect as local political and loadshedding realities overshadowed anything positive that may have come from the 2022 ANC Elective Conference.

This period of time could well have been called "Gloomaphosa".

This decomposition exercise now allows us to offer more detailed commentary on the behaviour of the USDZAR exchange rate relative to fair value and also to be able to quantify in rands and cents the impact of positive and negative local economic and political events that drive the direction of the exchange rate from time to time.

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