Dynamic Tolerances for Fund Oversight Validations

... hypothesis statement

- **presumed relationship** *"The tolerances for fund oversight validations (dependent variable) more closely align to current market movements with the increasing amount of market data used to update such tolerances and with the increasing frequency of such updates (independent variables)."*
- **anticipated change** *"If the market data and frequency of updates change, the dynamic tolerances will change as well."*
- **example** *"Fund validations will produce lot of exceptions in the fund oversight processes when the tolerances are set manually set on a sporadic basis, i.e. when tolerances are not updated to the current market conditions on a regular or real-time basis."*

Correlation of Fund Valuation to Market Behaviour

phenomenon	observation	data	approach

<table>
<tr>
<td>asset price movement (bottom level)</td>
<td>

this is the movement on granular / security level

movement of security price from one day to next vs tolerance
percentage movement of asset price

should be done together with holding impact
this asset price movement should help to explain the other levels (category, and top)

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<td>

hld113 validation
u280_benchmark

<pre>
select
        pcontrol_code, effective_date,
index_close,
   (1 - lag(index_close) over (order by
pcontrol_id) / index_close) * 100.0 as
pct_change
from u280_benchmark
where
pcontrol_code='TST_UP_ACV_10_DIT_BMK'
and p_batch_id='163925'
order by pcontrol_id
</pre>

u178_rates

<pre>
select
        pcontrol_code, effective_date,
        exchange_rate_bid,
exchange_rate_mid, exchange_rate_offer,
        (1 - lag(exchange_rate_bid) over
(order by pcontrol_id) /
exchange_rate_bid) * 100.0 as
pct_change_bid,
        (1 - lag(exchange_rate_mid) over
(order by pcontrol_id) /
exchange_rate_mid) * 100.0 as
pct_change_mid,
        (1 - lag(exchange_rate_offer)
over (order by pcontrol_id) /
exchange_rate_offer) * 100.0 as
pct_change_offer
from u178_fx_rates where
pcontrol_code='USD'
order by pcontrol_id
</pre>

fund risk factors
market movements

<pre>
select * from p202_holding_valid

select * from u175_security_prices where
pcontrol_code like 'SXN_TST_OS_001_POOL'
select * from u178_fx_rates where
pcontrol_code like 'SXN_TST_OS_001_POOL'
select * from u210_corporate_action
where pcontrol_code like
'SXN_TST_OS_001_POOL'
select * from u280_benchmark where
value_date = '20180302'
</pre>
</td>
<td>

taking variables from validations and linking them to tolerance

finding the market movement on those variables)
validations that have the highest amount of exceptions are the ones that we should look for in terms of data in the market (their variables)

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<td>category level tolerance (middle level)</td>
<td>

this is the sector level

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NAV price vs benchmark (top level)	• this is the fund level	• fund oversight validations (validation tolerance records for the fund) `select p299.effective_date, p299.pcontrol_code, p299.validation_code, p299.description, p299.calculation_detail, p299.tolerance_level, p299.tolerance_status, p299.tolerance_value_display, p299.value_display from p299_validation_detail p299 inner join l200_tolerance l200 on l200.pcontrol_code = p299.validation_code and l200.tolerance_value = p299.tolerance_value and l200.entity_code in ('DEFAULT', p299.pcontrol_code)`	

Notes

- holding impact
  - holding impact on the valuation (things like price of holding, etc.)
    - change and weighting of holding as a percentage of NAV
    - one of the impact to this is a security price, but it could be FX
  - clients usually want to skip such validations if the impact of holding is not material
    - market can influence this, depending how much you hold
  - it is about a combined validation and auto-clearance (it is already on the roadmap)
    - if the security not contributing to the NAV enough, it becomes less important
    - but small movements in security that has over half contribution to NAV, it is important
    - we may raise exceptions or auto clear depending on this
- user experience
  - clients with funds that are not easily valued will find dynamic tolerances beneficial (unlike static tolerances)
    - static tolerance records leads to high numbers of false-positive exceptions, especially on days with above-average movements in underlying fundamental NAV data
  - clients would expect on volatile day that tolerances go up and on the normal da go
- approach
  - tolerances for NAV validations can be dynamically updated based on the current market behaviour
    - market movements can be represented by changes in benchmark values, FX rates, etc.
    - applying dynamic tolerance records based upon movement in underlying fundamental data reduces the number of false-positive exceptions, while raising exceptions related to actual NAV errors / incorrect data
    - this will ensure that tolerances are breached when they should be or ensure that exceptions are raised due to current market conditions
  - dynamic tolerances will be adjusted only at the end of day (based on final / closing prices)
    - tolerances values will be based on how the market was moving that day and fund risk factors
    - it can look at asset level, asset class benchmarks, and benchmarks within a sector
  - market movement can be represented by changes in benchmark values FX rates
- questions
  - *Do we expect the synthetic benchmark to provide us with changes in FX rates as well?*
  - *Are we expecting to increase/decrease tolerance based on the level of risk in fund?*
  - *How should we incorporate the fund risk factors?*
    - asset level
    - asset class benchmarks
    - benchmarks within a sector