

HOW MUCH SHOULD WE ALLOCATE TO FOREIGN INVESTMENT?

26 July 2010

In searching for an answer to what the Strategic allocation to foreign assets should be – one sensible approach is to go as far back as possible in history to establish what the optimal allocation has been in the long-term past. Another approach would be to rely on theory rather than empirics and rigorously estimate the structural relationships between the asset classes to establish how to blend these assets. Yet another approach for the faint-hearted is to lever off all the research of the big houses in the AF LMW survey and take shelter behind their aggregate asset class decisions (bearing in mind there would be a lag – and unfortunately their foreign sub-allocations are not publically available). In this note we briefly give some response using these approaches to assist in refining a strategic foreign allocation decision (having a Global pension fund mandate in mind).

The Empirical approach

First, the long-term history approach. Whilst many would argue that the long term history of these asset classes is not a good representation of the future – and one should look for sub-periods in history that more closely resemble future expectations. One response would be that whilst this approach is suitable for *tactical* considerations, every sub-period is anomalous and for *strategic* purposes ironing out such anomalies is best achieved by having *all* of them embedded in the data. We are fortunate to have a history of the major asset classes dating back to 1930, but have given preferential treatment to the data subsequent to 1971 because this has enabled us to include a broader set of asset classes and to verify the reliability of the data.

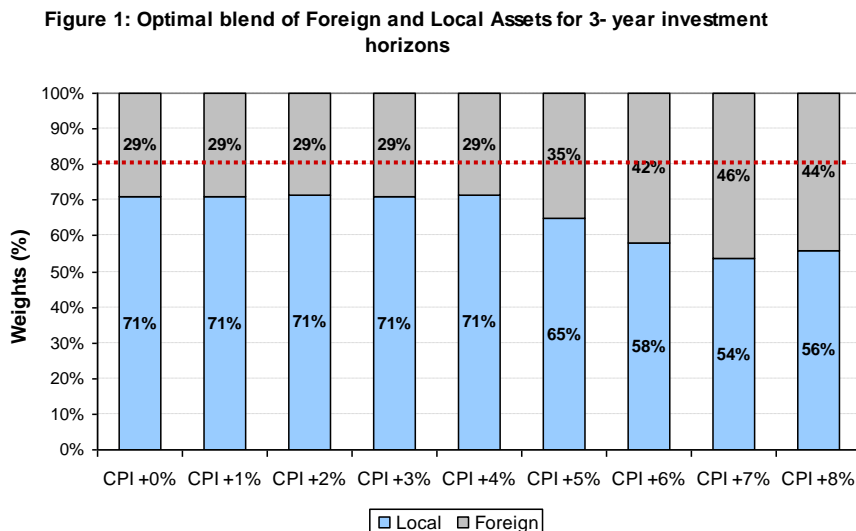
We have analysed this data from several angles using rigorous parametric optimization, non-parametric optimization, resampled optimization, thrown in global and local expansion and contraction overlays, and we are convinced that after all this torture – the data has finally confessed!

.....From a strategic perspective one should take ones full allocation abroad!

We give some motivating snippets for this view based on the evidence we gleaned using the non-parametric optimization approach. In essence this approach establishes which asset blends met the return targets specified most consistently (i.e. most often) in history.

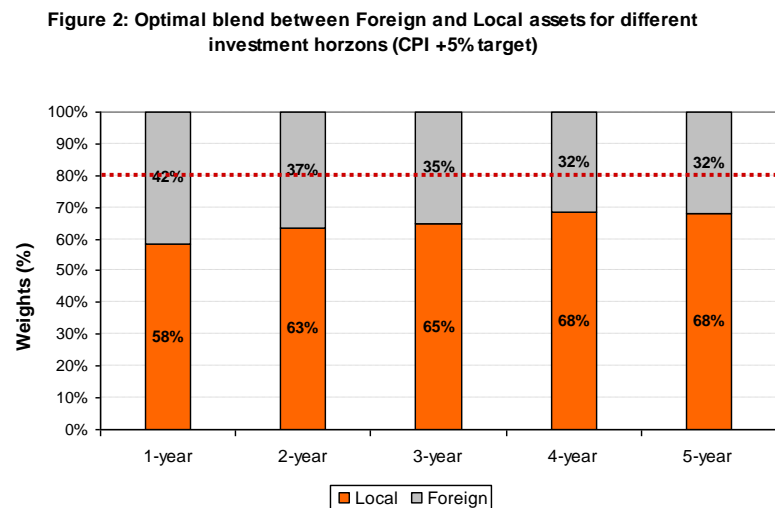
Whilst we only show the split between foreign and local assets, our analysis included all the major asset classes. That is, Local Equity (proxied by the ALSI), Local Bonds (proxied by the ALBI), Local Cash (proxied by the 3-month treasury bill), Local Property (proxied by a spliced SAPY), Foreign Equity (proxied by the MSCI) and Foreign Bonds (proxied by the JP Morgan World Bond Index).

Figure 1 that follows shows the Local/Foreign allocation weights most consistently breaching the absolute return targets specified on the horizontal axis over a 3-year investment horizon¹.



From Figure 1 we see that for all return targets it would have been optimal to have the maximum allowance of 20% abroad (demarcated by the red dashed line), and for absolute return targets of up to CPI + 4% a 29% allocation to foreign assets is optimal. For higher return targets the foreign allocation increases further to 35% and beyond.

Some mandates may have different investment horizons so we show the resulting blend for a CPI + 5% target – but having different investment horizons. The results are shown in Figure 2.



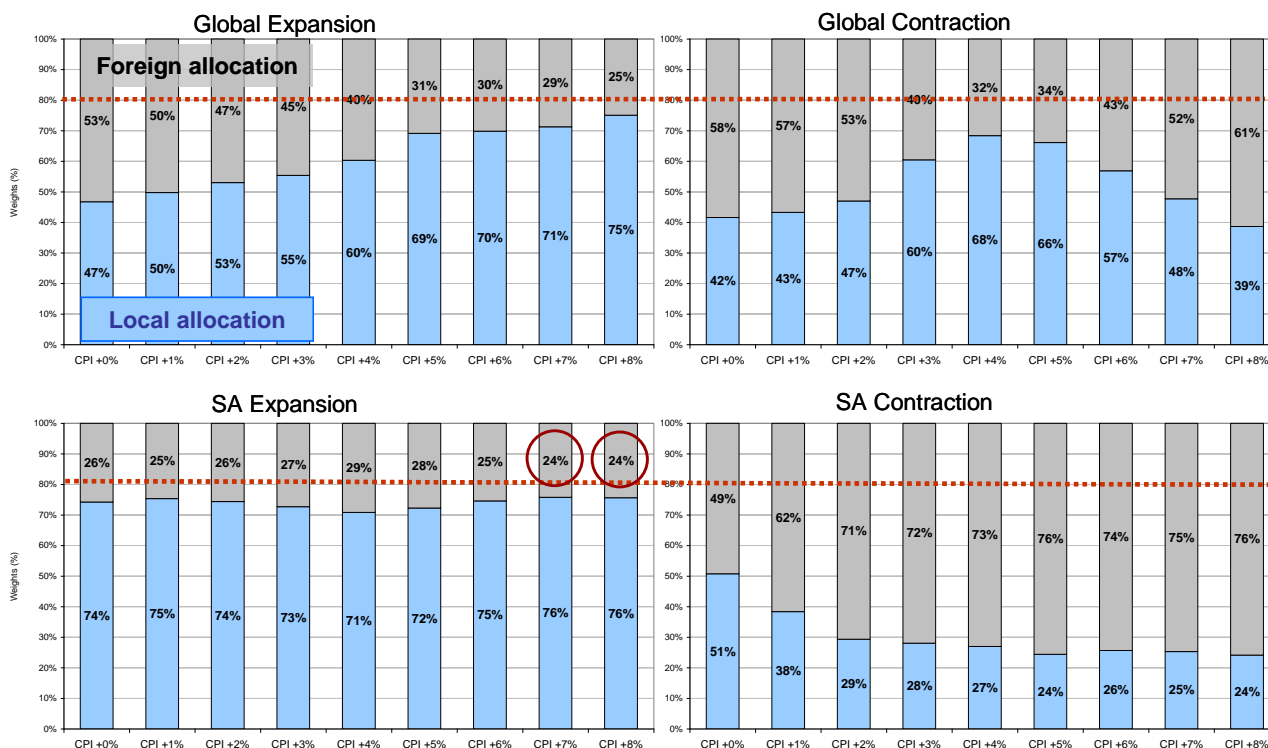
Again from Figure 2 we see even for different investment horizons the 20% limit to foreign assets has been exceeded – suggesting that from a strategic perspective one should be on the bound of the regulated limit.

¹ Note our data range in this study was January 1971 to June 2010. Foreign assets were converted to Rand values.

In 2006 we conducted an empirical study entitled ASSET ALLOCATION – HOW MUCH ABROAD (Swartz and Munro). On this occasion we used a similar non-parametric approach to answer the same question. We found that the unconstrained optimal allocation to foreign was 31%.

To stress test our current results yet further we turn our attention to varying economic conditions, splicing the historical data² into both global and local economic expansionary and contractionary environments³. We show the summarised results for these 4 scenarios in Figure 3 that follows.

Figure 3: Historical optimal blend for Global and SA (Local) in expansion and contraction environments



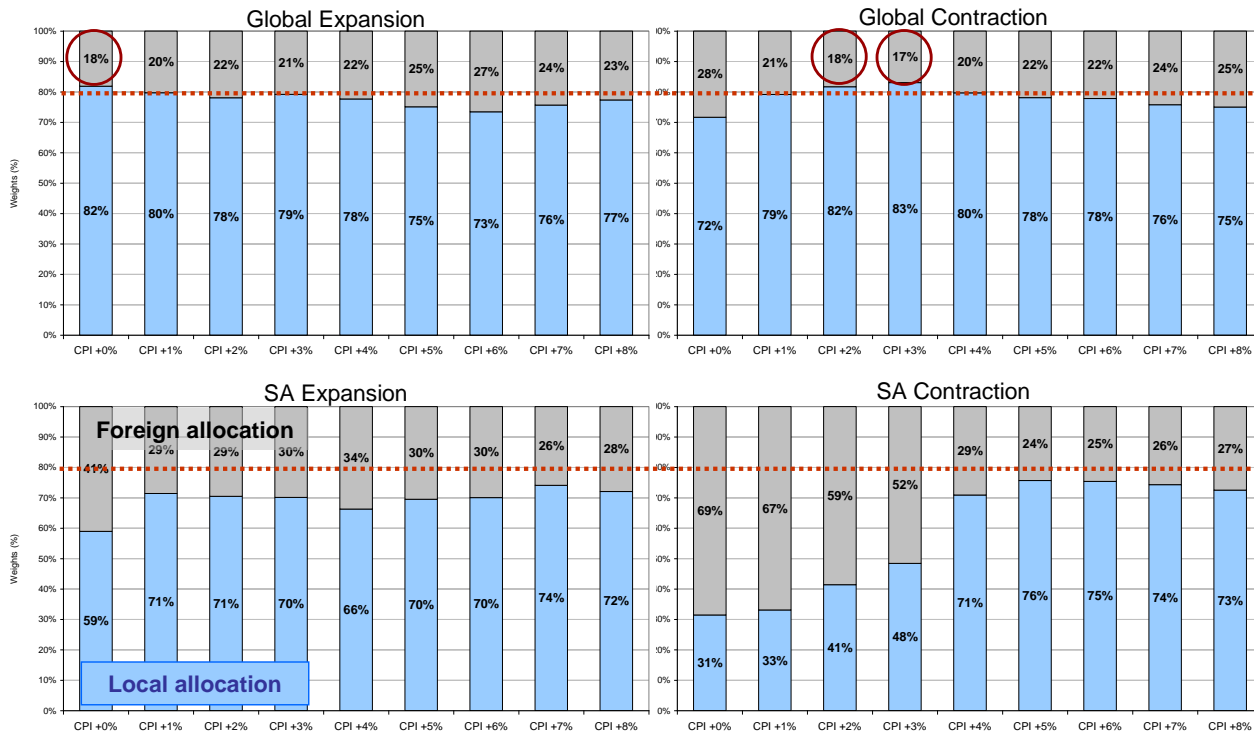
Surprisingly from the above Figure we see that under all of these economic conditions (for both Local and Global), all absolute return targets have resulted in the optimal allocation to Global assets exceeding the 20% limit. The lowest allocation to foreign is 24%, found in the SA Expansionary environment for return targets CPI + 7% and CPI + 8% (circled in red).

Some might argue that during the prior 40 years our currency was largely depreciating, leading to more attractive foreign returns (in Rand terms) and consequently higher optimal historical allocation results. To address this our final empirical scenario assumes instead a flat (or constant) Rand scenario. This of course assumes no additional return was gained from the currency depreciating. The summarised results of this flat Rand scenario together with the global and local economic overlays follow in Figure 4.

² Note in this study our data utilised data from January 1971 to March 2009.

³ Cadiz Securities economist, Kim Silberman determined the Expansion and Contraction periods based on inflation and growth.

Figure 4: Flat Rand scenario: Historical optimal blend for Global and SA (Local) in expansion and contraction environments



The results in Figure 4 summarising the flat Rand scenario once more support a compelling argument for a strategic foreign allocation at the 20% bound. Only in 3 amongst the host of scenarios is the foreign allocation marginally lower than the 20% bound (circled in red).

The Theoretical approach

We begin by reducing the dimension of the problem to a 2 asset case, i.e. a local portfolio and a foreign portfolio. With this approach we can find an explicit solution for the optimal blend between 2 portfolios. If we couch this expression in terms of the allowable allocation offshore, then the optimal weight to the offshore portfolio is given by:

$$w_{for}^{opt} = \frac{[R_{for} - r_f] \sigma_{loc}^2 - [R_{loc} - r_f] \text{cov}_{for;loc}}{[R_{for} - r_f] \sigma_{loc}^2 + [R_{loc} - r_f] \sigma_{for}^2 - [R_{for} - r_f + R_{loc} - r_f] \text{cov}_{for;loc}} \quad [1]$$

Where w_{for}^{opt} is the optimal allocation to the foreign portfolio,

R_{for} is the return expected on the foreign portfolio,

R_{loc} is the return expected on the local portfolio,

r_f is the local risk-free rate,

σ_{loc}^2 is the volatility of the local portfolio,

σ_{for}^2 is the volatility of the foreign portfolio,

$\text{cov}_{for;loc}$ is the covariance between the foreign and the local portfolio

How can we use this formula to assist with our problem of establishing or justifying our optimal allocation abroad?

First we assume it is reasonable to obtain all of the *risk* estimates in the RHS of the formula from historical data. As the *return* estimates will clearly differ from manager to manager, we can instead input the 20% foreign bound on the RHS of equation [1] and solve for the foreign/local *return differentials* that implicitly warrant this foreign investment. Thus we essentially reverse engineer out what the premium of return in the local portfolio will have to be above the foreign portfolio to warrant having the 20% limit offshore.

First we need to solve equation 1 explicitly for the local/foreign return differentials. As it turns out we can only find an explicit solution in terms of the return *ratios*...but that will do! We show this below:

$$\frac{R_{loc} - r_f}{R_{for} - r_f} = \frac{w_{for} \sigma_{loc}^2 - w_{for} \text{COV}_{for;loc} - \sigma_{loc}^2}{w_{for} \text{COV}_{for;loc} - w_{for} \sigma_{for}^2 - \text{COV}_{for;loc}} \quad [2]$$

This formulation can be interpreted as the **implied rate** of the expected excess return of the local portfolio relative to the expected excess return on the foreign portfolio (for a given foreign weight).

Utilizing this formula to establish what relative excess return rate would warrant foreign investment at the 20% bound we input the 20% allowable foreign investment weight in equation [2]:

$$\frac{R_{loc} - r_f}{R_{for} - r_f} = \frac{(0.2)\sigma_{loc}^2 - (0.2)\text{COV}_{for;loc} - \sigma_{loc}^2}{(0.2)\text{COV}_{for;loc} - (0.2)\sigma_{for}^2 - \text{COV}_{for;loc}} \quad [3]$$

For the risk estimates of the foreign and local portfolios required above we assume:

- the local portfolio is comprised of the aggregate weights of the domestic LMW asset class weights,
- the foreign portfolio is comprised of a 50:50 split between the MSCI and the JP Morgan world bond index.

Noting that; $\text{COV}_{for;loc} = \sigma_{for} \sigma_{loc} \rho_{for;loc}$

where $\rho_{for;loc}$ is the correlation between the foreign and the local portfolio

Using the prior 10 years of data for *strategic* purposes we obtained the following estimates:

$$\sigma_{for} = 16.2$$

$$\sigma_{loc} = 13.6$$

$$\rho_{for;loc} = 0.33$$

$$\text{COV}_{for;loc} = (16.2)(13.6)(0.33) = 72.7$$

Substituting these estimates into equation [3]

$$\frac{R_{loc} - r_f}{R_{for} - r_f} = \frac{(0.2)(13.6)^2 - (0.2)(72.7) - (13.6)^2}{(0.2)(72.7) - (0.2)(16.2)^2 - 72.7} = \frac{-162.50}{-110.78} = 1.47$$

How do we interpret this result?

We can conclude that if the local portfolio is expected to outperform by a rate of 47% we would take the full allocation abroad. If this outperformance rate (of local/foreign) was anything *less than the 47%* rate we would want to hold *more than the 20%* abroad. Only if we expected the local/foreign rate to be *more than the 47%* rate would we want to hold *less than 20%* in the foreign portfolio.

This number is perfectly intuitive, for example it translates into, an excess return of 14.7% for the local and 10% for the foreign portfolio. Or if we take half of this, a 47% rate premium of local over foreign translates into:

7.35% Local return premium above the risk free rate.

5.00% Foreign premium above the risk free rate.

Importantly at the above premiums we would hold exactly a 20% weight in the foreign portfolio. If these premiums narrowed we would want to hold more than 20% offshore. If they widened, we would want to hold less than the 20% in our offshore portfolio. Interestingly these above premiums are very close to the long term market risk premiums of these equity markets. We think most managers would be comfortable to conclude that these premiums are reasonably close to their strategic long-term expectations on these portfolios – thus supporting a 20% foreign allocation in their Strategic benchmark. A further interesting point is that from purely risk perspective, we find the *minimum variance* mix to be 37% ; 63% (foreign; local).

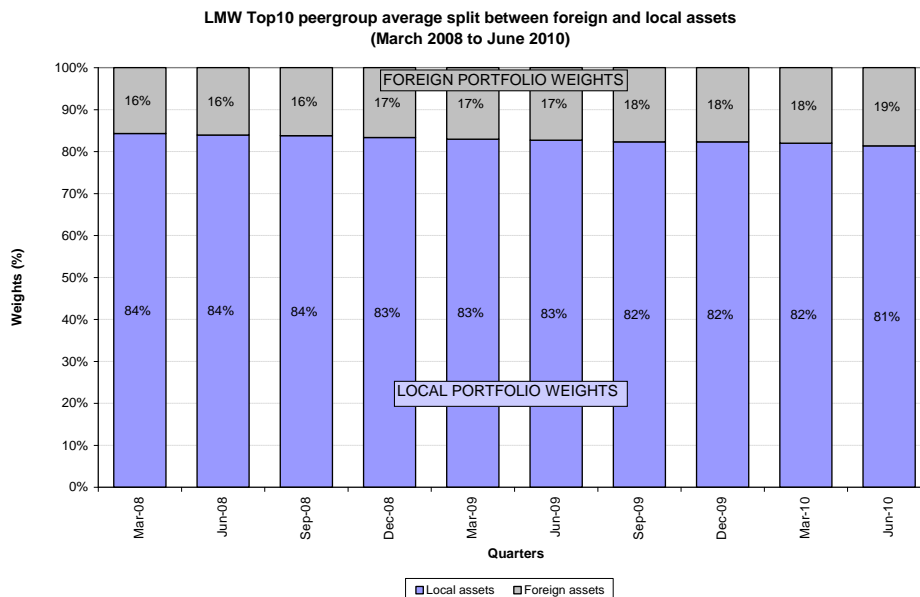
The aggregate peergroup decision

Finally we consider the aggregate **Large Manager Watch** (source Alexander Forbes) Local/Foreign decision. The current average (as at end June 2010) for the respective **Foreign/Local split is:**

19% : 81%.

Importantly the average will always be less than or equal to 20% because we are averaging a curtailed series.

Figure 5: Aggregate foreign/local split of the LMW subsequent to raising the bound to 20% abroad



Source: Alexander Forbes

In Figure 5 we show the recent aggregate foreign versus local split for the LMW managers. We find they are close to the 20% allowable allocation.

Conclusions

We have highlighted results from 3 independent angles of attack on the question of how much we should hold abroad from a strategic perspective:

- Evidence from a rigorous non-parametric optimisation investigation
- Evidence from a theoretical perspective
- Evidence from the largest 10 managers (LMW)

Each of these investigations gives compelling evidence in support of the strategic allocation to foreign investment being at the 20% bound. Additionally our evidence could go some way to supporting higher allocations to foreign investments should a mandate allow it.

Whilst some may counter that the risk and return expectations of foreign assets are not as favourable as local assets – one cannot ignore the less observable *diversification* benefit that the foreign allocation brings to our overall investment. After all diversification is central to why we blend assets in the first instance. When one takes this significant diversification benefit into account (as we have done in our studies) the evidence is indeed compelling for the foreign allocation to be at the 20% bound.

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