GAINING MARKET SHARE IN EMERGING MARKETS PORTFOLIOS BY MODERATING EXTREME RETURNS: THE CASE OF PERU

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ABSTRACT. Most countries compete for investments from abroad, whether the investment is made directly in the form of new ventures or indirectly through the shares of existing firms that are publicly traded. Both higher returns and lower volatility can attract a higher market share of global stock portfolios constructed by investors seeking positions in emerging markets, depending on the strategy such investors use to build their portfolios. These investors include mutual fund managers, pension fund managers, and savvy private investors. This paper tests three common investment strategies portfolio managers use: A) maximize "risk-adjusted" return based on Modern Portfolio Theory; B) maximize minimum return based on the minimax principal in Decision Theory; and C) maximize "absolute return." The results suggest that reducing volatility by moderating extreme returns would increase Peru's share of such portfolios and perhaps be more effective and attainable than increasing overall average returns. Using data from 1995 to 2014 for Peru as a case study, moderating (a form of "winsorizing") its best and worst returns by 20% would have increased its portfolio allocations from 9.4% to 16.5% for Strategy A managers, and from 0% to 48.5% for Strategy B managers. Strategy C managers ignore volatility and are thus unlikely to be influenced by its reduction. From a policy standpoint, Peru might attain the moderation by adopting more liberal net operating loss carry back and carry forward provisions in the tax code similar to those in the US tax code, though this paper does not provide evidence that such changes would accomplish this result. The positive effect could be lost, of course, if other countries quickly

retaliated by changing their own tax codes, but most governments are not known for being nimble when it comes to changing tax codes.

1. Introduction

Professional portfolio managers are attracted to emerging market stocks because of their returns. But they dislike them because of their volatility. The question then becomes: which policies should a country pursue to make itself more attractive to portfolio managers and gain a larger market share of the portfolio allocated to emerging markets (or within the portfolio of a mutual fund devoted entirely to emerging markets)? Will it be more successful if it takes steps to increase returns or decrease volatility by simply moderating its most extreme outlier returns? This paper seeks to answer such questions using Peru as an example.

Admittedly, any country could be used as an example (for a complete list of emerging market countries, see IMF, 2015). Peru was chosen primarily because data was readily available, it has been an emerging market for some time due to its stability, it was one of the earliest South American countries to become connected with Europe (the original Inca capital was located in Cusco, Peru, when Pizzaro arrived), and, on a personal note, Peru is the country personally visited several times by one of the authors in recent years.

The assumptions were also made that if 1) the results suggest that a moderation strategy would achieve the goal of capturing a larger market share and 2) policies were adopted that attained those results, other countries would not take immediate retaliatory steps to counter Peru. A larger study, perhaps for the future, would attempt to see if the strategy might work in other countries or if it is unique to Peru. Such a study would be questionable, of course, because it would require many speculations regarding lag effects, dynamic interactions, etc.

Using data on annual returns for 1995–2014, we explore how portfolio managers would allocate their funds to Peru versus other emerging market stocks for three of the most popular investment strategies: A) maximize risk adjusted returns (Sharpe, 1994); B) maximize minimum gain (Young, 1998; Huxley and Burns, 2016); C) maximize absolute return (Zask, 2013). Each

38

strategy is tested to see how sensitive the allocation to Peru stocks is within the emerging markets portion of a portfolio, assuming government policies were successful in efforts to increase returns overall or simply moderate extreme returns.

This approach differs from much of the prior research in emerging markets investing. Prior research tended to focus on explaining returns using the Fama-French three factor model (and its variants) or predicting returns based on technical analysis. The literature on explaining returns tends to demonstrate that the size and value premiums discussed for U.S. stocks in the original Fama-French article (Fama-French, 1992) hold true for developed international and emerging markets stocks as well as US stocks (Fama and French, 2012), though with a few minor exceptions (Cakicia, Fabozzi, and Tana, 2013). Other examples include D'Arcangelis and Galloppo (2015), Foye, Mramor, and Pahor (2013), and Martin and Rey (2006). Wagner and Margaritis (2017) provide the largest empirical study to date, analyzing returns from 5,175 emerging market funds over the period 1992–2012.

Examples of the literature on predicting returns include Ghysels, Palazzi, and Valkanov (2016), Li, Richarson, and Tuna (2014), Maio and Philip (2015), and Morck, Yu, and Yeung (2000). The focus on prediction presumably stems from the assumption by the researchers that investors follow an "active management" approach to investing, where predictions for market timing and individual stock selection drive investment decisions. The International Investment Funds Association (2016) reports that about $17 trillion was invested in mutual funds near the end of 2016, about two-thirds of which was in actively managed funds.

But to assume active management is the only strategy followed by portfolio managers is to ignore the other 33% of portfolios managers who eschew active management in favor of "passive management." Passive portfolio managers do not try to time the market or pick hot stocks. They develop long term strategies to create portfolios that include all stocks that fit the profile they are seeking. They prefer index mutual funds, low fees, and a buy-and-hold philosophy. Indeed, this is the strategy adopted by the investment company founded by French and Fama.

The debate as to which approach, active vs. passive, provides better returns over the long run has been ongoing for years. But empirical evidence has been piling up against active management. See Sinquefield (1995) and IFA (2009) for academic illustrations of the evidence and debate over time. Examples of books would include Bernstein (2001), Bogle (1999), Clyatt (2005), Malkiel (1996), Murray and Goldie (2010), Siegel (2008), Sherden (1998), Swedroe (1998), Taleb (2007). For websites, a simple Google search of "active vs. passive management" yields over 45 million hits.

Standard & Poor tracks the performance of actively managed funds against their index benchmarks in their SPIVA scorecard quarterly (S&P Dow Jones

39

Indices, 2017). At the end of 2016, they reported that 82% of actively managed funds failed to beat their benchmarks over the past 15 years. According to the Wall Street Journal (Maxey and Dietrich, 2017), approximately $1.2 trillion has been withdrawn from actively managed funds and nearly all of it, $1.1 trillion, has moved to passively managed index funds since 2007. According to Moody's, passive investing will become larger than active investing by 2024 (Moody's, 2017).

The bottom line is that analysis of global portfolio management behavior based on the presumption of passive management is as relevant as analysis based on the presumption of active management and is likely to become more so if current trends away from active management continue in the future.

2. How Portfolio Managers View Investing in Emerging Markets

For passive portfolio managers, getting the basic asset allocation correct is crucial. Unlike their active management peers, once their allocation strategy has been decided upon, they are pledged to stick to it. A typical sequence of decisions is: 1) choose how to divide the portfolio between stocks and bonds; 2) choose how to distribute the equity portion globally; and 3) allocate among various asset classes categorized in the size/style box (small cap, medium, or large cap, value, blend, or growth).

For U.S. managers, the decision regarding the global dispersion generally divides the world into three types of markets: 1) United States, 2) Developed markets ex US, and 3) Emerging markets.

Portfolio managers have much to choose from in terms of allocating their funds among the three broad categories. Total equity market capitalization for the world, including the $17 trillion in mutual funds, had reached about $46 trillion at the end of 2014 (Dimensional Fund Associates Matrix Book, 2015). This excludes the global bond market, which accounted for about another $36 trillion investment capital. The U.S. is by far the largest equity market, capturing 52% of the world's total. Developed markets outside the U.S. account for 35%. Emerging markets account for 12%. (The remaining 1% of publicly traded stocks fall outside these three categories and are located in a fourth category, "Frontier" markets, which are small, pre-emergent economies.)

Some managers constrain their algorithms by making direct "macro" decisions on how much to allocate to each of the three global categories, such as 70% US, 20% Developed, and 10% Emerging, then selecting the asset classes within these constraints. Others let their algorithms run with no constraints, choosing whatever asset classes fits their strategy. They then make changes globally by shifting allocations to reach what they subjectively feel to be a more "reasonable" allocation globally. Mathematical models can never

40

capture all the factors in making investment decisions, and few American portfolio managers would put 100% of their funds into emerging markets even if their algorithms said so.

2.1 Data on Returns

Exhibit 1 presents MSCI data on returns from 1995–2014 on 21 emerging markets in USD adjusted for currency changes (DFA, 2015).

These data, compiled by Morgan Stanley for its MSCI, are the only returns data used for this study. The countries are grouped together loosely by color based on geographic proximity, then sorted by average annual stock returns within their geographic area (Peru is the only exception, listed in the first column). The overall average return for all countries is 17%, with an average minimum of -54%, an average standard deviation of 45%, and an average/ standard deviation ratio of .37.

Exhibits 2 and 3 compare returns for US, developed ex US, and emerging markets. It is clear that emerging markets have both the highest and most variable returns among the three global categories. Peru is shown separately. Its average return is above average, and its standard deviation is below the average for all emerging markets. This gives it a better than average chance of capturing the attention of emerging market managers.
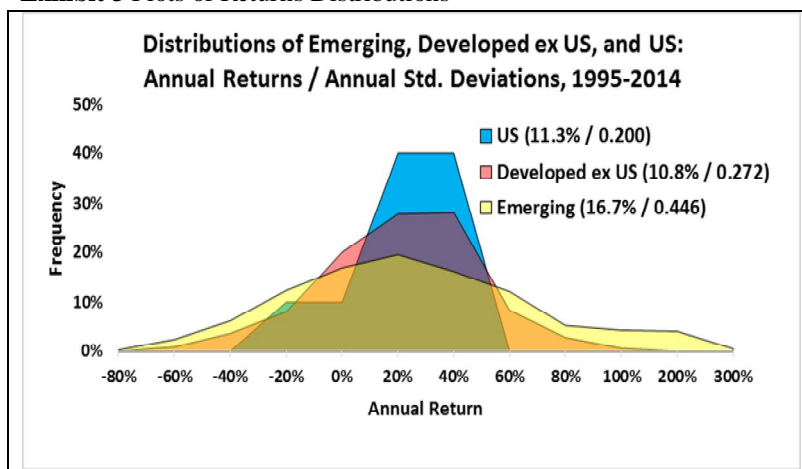
41

Exhibit 1 Emerging Market Returns, 1995–2014

Year	Peru	Colombia	Brazil	Chile	Mexico	Indonesia	Korea	India	Thailand	Malaysia	Philippines	China	Taiwan	Russia	Hungary	Czech Rep	Poland	Turkey	Egypt	Morocco	South Africa	Average
1995	23%	-26%	-19%	-3%	-20%	9%	-3%	-31%	-4%	5%	-12%	-21%	-29%	-27%	-17%	-20%	-3%	-3%	16%	19%	20%	-7%
1996	-1%	11%	43%	-14%	19%	28%	-38%	-2%	-37%	26%	18%	38%	40%	153%	107%	31%	59%	37%	59%	36%	-18%	28%
1997	21%	42%	27%	6%	54%	-74%	-67%	11%	-73%	-68%	-63%	-25%	-6%	112%	95%	-23%	-22%	118%	31%	36%	-8%	6%
1998	-40%	-42%	-40%	-29%	-34%	-32%	141%	-21%	12%	-31%	14%	-42%	-21%	-83%	-8%	1%	-7%	-53%	-27%	25%	-28%	-16%
1999	19%	-14%	67%	39%	80%	94%	92%	87%	47%	114%	3%	13%	53%	247%	12%	5%	32%	252%	88%	-12%	57%	66%
2000	-24%	-39%	-11%	-15%	-21%	-62%	-50%	-22%	-56%	-16%	-45%	-31%	-45%	-30%	-27%	2%	-4%	-46%	-44%	-22%	-17%	-30%
2001	20%	46%	-17%	-3%	19%	-9%	49%	-20%	5%	5%	-19%	-25%	11%	56%	-9%	-2%	-27%	-33%	-41%	-14%	-17%	-1%
2002	31%	25%	-31%	-20%	-13%	43%	9%	8%	28%	-1%	-29%	-14%	-25%	16%	31%	44%	1%	-36%	2%	-8%	28%	4%
2003	94%	67%	115%	84%	33%	78%	36%	78%	145%	27%	43%	88%	43%	76%	32%	66%	36%	126%	92%	49%	46%	69%
2004	3%	133%	37%	29%	48%	52%	23%	19%	-1%	15%	27%	2%	10%	6%	93%	87%	62%	42%	126%	23%	45%	42%
2005	35%	108%	57%	22%	49%	16%	58%	38%	9%	2%	24%	20%	7%	74%	19%	46%	25%	57%	162%	14%	28%	41%
2006	63%	14%	46%	29%	41%	75%	13%	51%	12%	37%	60%	83%	21%	56%	34%	35%	42%	-7%	17%	69%	21%	39%
2007	95%	15%	80%	24%	12%	55%	33%	73%	47%	46%	42%	66%	9%	25%	17%	56%	26%	75%	58%	48%	18%	44%
2008	-40%	-25%	-56%	-35%	-43%	-56%	-55%	-65%	-48%	-41%	-52%	-51%	-46%	-74%	-62%	-43%	-55%	-62%	-52%	-11%	-38%	-48%
2009	72%	84%	129%	87%	57%	128%	72%	103%	77%	52%	68%	63%	80%	105%	78%	28%	43%	99%	40%	-5%	58%	72%
2010	53%	43%	7%	45%	28%	35%	27%	21%	56%	37%	36%	5%	23%	19%	-10%	-2%	16%	21%	12%	15%	34%	25%
2011	-21%	-5%	-22%	-20%	-12%	7%	-12%	-37%	-2%	0%	0%	-18%	-20%	-19%	-34%	-5%	-30%	-35%	-47%	-15%	-14%	-17%
2012	20%	36%	0%	8%	29%	5%	22%	26%	35%	14%	48%	23%	18%	14%	23%	4%	41%	65%	47%	-12%	19%	23%
2013	-30%	-21%	-16%	-21%	0%	-23%	4%	-4%	-14%	8%	-2%	4%	10%	1%	-6%	-8%	4%	-27%	8%	-3%	-6%	1%
2014	11%	-20%	-14%	-12%	-9%	27%	-11%	24%	17%	-11%	26%	8%	10%	-46%	-27%	-2%	-14%	19%	29%	0%	6%	1%
Average	20%	22%	19%	10%	16%	20%	17%	17%	13%	11%	9%	9%	7%	34%	17%	15%	11%	31%	29%	12%	12%	17%
Min	-40%	-42%	-56%	-35%	-43%	-74%	-67%	-65%	-73%	-68%	-63%	-51%	-46%	-83%	-62%	-43%	-55%	-62%	-52%	-22%	-38%	-54%
SD	41%	49%	51%	35%	34%	53%	51%	45%	49%	38%	37%	41%	32%	80%	46%	33%	32%	78%	58%	26%	29%	45%
Avg./SD	0.50	0.44	0.37	0.29	0.47	0.37	0.34	0.38	0.26	0.29	0.25	0.23	0.22	0.43	0.37	0.46	0.35	0.39	0.50	0.45	0.41	0.37

Exhibit 2 Summary Statistics and Frequency Distributions of Returns, 1995–2014

Range*	US	Developed ex US	Emerging	Peru
-80% and below			0.2%	
-60% to -80%		1%	2%	
-40% to -60%		4%	6%	10%
-20% to -40%	10%	8%	12%	15%
0% to -20%	10%	20%	17%	5%
0% to 20%	40%	28%	20%	20%
20% to 40%	40%	28%	16%	25%
40% to 60%		8%	12%	5%
60% to 80%		3%	5%	10%
80% to 100%		1%	4%	10%
100% to 200%			4%	
200% to 300%			0.5%	
Average	11.3%	10.80%	16.7%	20.2%
Std. Dev.	20.0%	27.2%	44.6%	40.5%
Maximum	37.1% (1995)	99.4% (Singapore, 1999)	252.4% (Turkey, 1999)	94.7% (2007)
Minimum	-37.6% (2008)	-68.4% (Austria, 2008)	-83% (Russia, 1998)	-40.2% (1998)

*Range intervals are inclusive at upper end.

Exhibit 3 Plots of Returns Distributions

Distributions of Emerging, Developed ex US, and US:
Annual Returns / Annual Std. Deviations, 1995-2014

US (11.3% / 0.200)
Developed ex US (10.8% / 0.272)
Emerging (16.7% / 0.446)

3. Global Portfolio Manager Strategies

Most global managers utilize one of the following three strategies to achieve goals for their portfolios:

Strategy A – Maximize Risk-Adjusted Return (Sharpe Ratio): This manager follows modern portfolio theory and seeks to build an "efficient" portfolio that recognizes the tradeoff between volatility and return. Operationally, this usually means maximizing the Sharpe Ratio. In this paper, U.S. one-month

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Treasury bills are used as the risk-free rate. (Managers in other countries may use alternative risk-free investments but the focus here is on US managers.)

Strategy B – Maximize Minimum Return: The manager follows the ultra-conservative minimax principle from decision theory and seeks the allocation which will maximize the minimum return the portfolio can achieve. This could be considered a variant of maximizing risk-adjustment return, wherein risk is measured as the worst case rather than as volatility.

Strategy C – Maximize Absolute Return: In this case, the manager is very aggressive, ignoring risk and simply seeks to find the allocation that achieves the highest possible average annual return. The most aggressive managers will use short selling, options, and other sophisticated financial tools to accomplish the task. Risk takes a back seat. Hedge fund managers often employ this strategy – some win big and some fail miserably.

As mentioned in Section 2, even passive portfolio managers also typically include size and growth/value factors when constructing their portfolios. But the focus here is on portfolio managers who are deciding how to select the countries to include in the emerging market portion of their investments. They would then decide on the size and growth/value characteristics within the selected countries.

Mathematical programming was used to simulate the effect of following these strategies with the emerging markets returns in Exhibit 1. Exhibit 4 reveals how much a portfolio manager would allocate to Peru and how much to other emerging markets under each strategy.

Exhibit 4 Allocation to Countries under various strategies

	Strategy A **Maximize Sharpe Ratio**	Strategy B **Maximize Minimum Return**	Strategy C **Maximize Absolute Return**
Peru	9.4%		
Colombia	13.1%		
Korea	16.5%		
Egypt	5.4%		
Russia	13.8%		100.0%
Morocco	41.9%	80.5%	
Czech Rep		19.5%	
All other countries	0.0%	0.0%	0.0%
Total	100.0%	100.0%	100.0%
Performance:			
Annualized Return	16.0%	12.3%	34.0%
Min Return	-36.9%	-17.1%	-83.0%
Stdev of Returns	27.6%	24.3%	79.5%
Sharpe Ratio	0.59	.50	.43

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Peru garners a 9.4% allocation for Strategy A, which achieves an average/ standard deviation ratio of .59. Peru earns this allocation thanks to the ratio of its average return to standard deviation (.50 as shown in Exhibit 1), well above the average for all emerging market countries of .37. This suggests that an improvement in this ratio might bode well for its attractiveness. This will be explored in the section below on sensitivity to changes in returns.

It should be noted in Exhibit 4 that Morocco has the largest allocation for both Strategies A and B (41.9%). This may be somewhat surprising until one examines the relative stability of Morocco's returns. Exhibit 1 reveals that its returns average only 12%, well below the overall overage of 17% for all emerging markets, but its standard deviation is also the lowest at 26% and its minimum the highest at -22%. This stability makes Morocco very attractive to portfolio managers following either Strategy A or B.

Only two countries receive allocations built according to Strategy B. Peru is not one of them. But as we will see in the sensitivity section, Strategy B managers are most susceptible to reductions in the volatility of Peru's returns (where volatility is defined to be best-case and worst-case scenarios).

For portfolio managers following Strategy C, Russia would receive 100% allocation due to the simple fact that it has the highest average return, 34% (see Exhibit 7). This strategy would always select whichever country offers the highest average returns. Peru, at 20%, is in fifth place and would be unlikely to ever show up in Strategy C portfolios.

It should be noted that correlations among the emerging market countries were ignored in the analysis here. Also, the entire analysis is in-sample. That is, all twenty years of data were used to construct the portfolios, so there is no way to tell how well these portfolios would perform in subsequent years. This will be a possibility of further research.

4. Sensitivity to Return Increases versus Moderated Extreme Returns

How much would Peru's market share in emerging market portfolios enlarge if its extreme returns could be moderated? Answering this question requires simulating the effects of simply changing the average level of returns vs. changing their volatility. For this analysis, parameters were changed in increments of 10% (±10%, ±20%, etc.) to determine how Peru's allocation of 9.4% in Exhibit 4 was affected. The sensitivity for each strategy is explored below, using linear programming as featured on Excel's Solver platform to solve for the optimal allocations after each possible change in Peru's returns.

45

4.1 Strategy A – Maximize Sharpe Ratio
Portfolio managers following MPT seek to build efficient portfolios by maximizing the ratio of excess returns above the risk-free return to the standard deviation of these adjusted returns.

4.1.1 Effect of Increases in Returns under Strategy A
Because a 10% increase in all returns for Peru would result in the same 10% increase in its standard deviation, the Sharpe Ratio unchanged. This means that the allocations listed in Exhibit 4 are unaffected by increases in returns as displayed in Exhibit 5. (The minor allocation changes shown in Exhibit 5 are simply reflections of small mathematical aberrations in Excel's Solver package. Minor differences like these are familiar to those who do a lot of empirical research, where theory meets the real world.)

   Although Peru's allocation would not change, the portfolio's returns would increase slightly as Peru's returns increased, and it remained in the portfolio. Countries not shown in Exhibit 5 would receive zero allocations.

Exhibit 5 Allocations if Peru's Average Returns Increased for Portfolio Managers Maximizing Sharpe Ratio (Strategy A)

Country	0%	10%	20%	30%	40%	50%	60%	70%	80%	90%	100%
Peru	9.4%	9.9%	10.2%	10.4%	10.4%	10.3%	10.2%	9.6%	9.6%	9.9%	9.6%
Morocco	41.9%	41.4%	41.0%	40.7%	40.5%	40.4%	40.3%	40.1%	40.1%	40.2%	40.1%
Colombia	13.1%	12.8%	12.6%	12.4%	12.3%	12.2%	12.2%	12.0%	12.0%	12.0%	12.0%
Egypt	5.4%	5.6%	5.8%	5.9%	6.1%	6.2%	6.4%	6.8%	6.8%	6.6%	6.8%
Russia	13.8%	13.7%	13.7%	13.7%	13.8%	13.8%	13.9%	14.0%	14.0%	13.9%	14.0%
Korea	16.5%	16.6%	16.7%	16.8%	16.9%	17.0%	17.1%	17.5%	17.5%	17.3%	17.5%
Total	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Overall Portfolio: Average Return	16.0%	16.2%	16.5%	16.7%	17.0%	17.2%	17.4%	18.2%	18.2%	17.8%	18.2%
Min Return	-36.9%	-37.2%	-37.5%	-37.8%	-38.1%	-38.4%	-38.7%	-40.3%	-40.3%	-39.6%	-40.3%
Stdev of Returns	27.6%	28.0%	28.4%	28.8%	29.2%	29.6%	29.9%	31.1%	31.1%	30.5%	31.1%
Sharpe Ratio	0.58	0.58	0.58	0.58	0.58	0.58	0.58	0.58	0.58	0.58	0.58

4.1.2 Decreases in Volatility
A more impactful policy change would be to reduce the volatility of Peru's returns by mitigating the extremes, i.e. moderating the two highest and two lowest years over the 20-year span. The moderation factors were reductions of 10% and 20%. This would represent a form of "winsorizing" the returns (Tukey, 1962).

   Exhibit 6 ranks returns from highest to lowest from 1995–2014. At the high end, the two best years (2007 and 2003) both had returns above 94% – investors almost doubled their money in one year. At the low end, the two worst years (1998 and 2008) had returns below -40%. Moderating these by 10% and 20% would reduce 2007's best ever return of 94.7% to 85.3% and 75.8% respectively, and 1998's worst ever return of -40.2% to -36.2% and -32.2%. Equivalent reductions follow for 2003 and 2008 (see Exhibit 7).

46

Exhibit 6 Peru's Returns, Best to Worst, 1995–2014

Rank	Return	Year	Rank	Return	Year
1	94.7%	2007	14	3.2%	2004
2	94.3%	2003	15	-0.5%	1996
3	72.1%	2009	16	-21.4%	2011
4	62.6%	2006	17	-23.8%	2000
5	53.3%	2010	18	-29.8%	2013
6	35.0%	2005	19	-40.1%	2008
7	30.5%	2002	20	-40.2%	1998
8	23.3%	1995	Mean	20.2%	
9	20.5%	1997	Median	20.1%	
10	20.2%	2012	Maximum	94.7%	
11	19.9%	2001	Minimum	-40.2%	
12	18.9%	1999	Std. Dev.	0.41	
13	10.5%	2014			

Exhibit 7 Moderated Extreme Returns

Year	Peru	Moderated by -10%	Moderated by -20%
1998	-40.2%	-36.2%	-32.2%
2003	94.3%	84.9%	75.4%
2007	94.7%	85.2%	75.8%
2008	-40.1%	-36.1%	-32.1%

Note again that moderation by multiplying the returns by 90% and 80% does not separate out the impact of returns increases vs. volatility decreases. That would require adding and subtracting rather than multiplying. In this case, it turns out that returns are actually reduced slightly by the 90% and 80% multiplications. That is, before the multiplications, the mean was 20.2% (Exhibit 6). After the multiplications, the mean returns decreased to 19.6% and 19.1% respectively, yet the allocation to Peru rose. This rise appears to be due to the standard deviation decline from 0.41 to 0.38 and 0.36 respectively.

What specifically are the effects on portfolio allocations that could be expected from moderating one or both extremes? That is, if government policy could figure out a way to "cut the tails off" the distribution of returns by 10% (or cut more even more off by 20%), would Peru become more attractive to Strategy A portfolio managers seeking to maximize the Sharpe Ratio?

Six scenarios were tested to answer this question: Scenarios 1 and 2 reduced the top two years (that is, the top 10% out of 20 years) to 90% and 80% of their values; Scenarios 3 and 4 increased the bottom two years by 10% and 20%; Scenarios 5 and 6 did both. Exhibit 8 lists the results. (As before, countries not shown had zero allocations.)

Exhibit 8 Scenarios for Cutting Tails Off Distribution of Returns

Scenario 1	If only the best two years (+94.7% and +94.3%) became 90% of their values.
Scenario 2	If only the best two years (+94.7% and +94.3%) became 80% of their values.
Scenario 3	If only the worst two years (-40.2% and -40.1%) became 90% of their values.
Scenario 4	If only the worst two years (-40.2% and -40.1%) became 80% of their values.
Scenario 5	If only the worst two years (-40.2% and -40.1%) and best two years (+94.7% and +94.3%) became 90% of their values.
Scenario 6	If only the worst two years (-40.2% and -40.1%) and best two years (+94.7% and +94.3%) became 80% of their values.

Scenarios:

Country	1	2	3	4	5	6
Peru	8.0%	15.9%	13.7%	18.3%	12.7%	16.5%
Morocco	42.9%	29.1%	39.1%	36.1%	40.1%	38.1%
Colombia	13.3%	12.8%	11.9%	10.6%	12.0%	10.7%
Egypt	5.3%	9.5%	5.8%	6.4%	5.8%	6.4%
Russia	13.8%	14.2%	13.4%	13.0%	13.3%	12.8%
Korea	16.6%	18.0%	16.1%	15.6%	16.1%	15.5%
	100.0%	99.4%	100.0%	100.0%	100.0%	100.0%
Overall Portfolio:						
Mean	15.8%	17.1%	15.9%	16.1%	16.0%	16.1%
Min	-36.9%	-40.0%	-36.8%	-37.2%	-36.8%	-36.5%
Stdev	27.4%	30.0%	27.7%	28.1%	27.7%	27.6%
Sharpe	0.58	0.57	0.57	0.57	0.58	0.58

Note: Czech Republic allocated 1% under Scenario 2.

The results in Exhibit 8 suggest that moderating the extremes would likely have an impact on Peru's allocations in Strategy A portfolios. All moderations help, but the most helpful would be Scenario 4, increasing just the returns in the worst years by 20%. If this could be achieved, Strategy A portfolios could almost double their allocations from 9.4% to 18.3%.

The problem here is how to formulate asymmetric policies that would improve only the worst years, leaving the others alone. It might be easier to achieve Scenarios 5 and 6, where both extremes are reduced by 10% and 20% respectively. Tax policy on net-operating-losses could be changed to encourage shifting the excesses in earlier good years to mitigate deficiencies in later bad years (more on this later). If successful, such policies would generate overall portfolio returns of 16.0% and 16.1%, equivalent to the current 16.0% return (shown in Exhibit 5) but would increase Peru's allocation from the current 9.4% with no moderations to 12.7% and 16.5% with moderations.

The bottom line here is that if extreme returns could have been moderated by winsorizing the best and worst two years from 1995–2014, portfolio managers following MPT would likely have increased their allocations to Peru by a significant amount, whereas increasing returns with no decrease in volatility would have had no effect. Again, it bears pointing out that this means the effect of lower standard deviations in Exhibit 7 outweighs the effect of lower returns when the outliers are moderated – more investment in Peru in spite of the lower returns.

48

4.2 Strategy B – Maximize Minimum Return

As explained earlier, portfolio managers using this strategy also risk-adjust but they do so by finding the allocation that maximizes the minimum return. Based on the minimax principle, it lifts the worst returns up to the highest possible level.

### 4.2.1 Effect of Increases in Returns under Strategy B

Exhibit 9 provides the sensitivity to increased returns for a portfolio manager following Strategy B. Interestingly, there appears to be threshold phenomena: a 10% increase in returns has no effect on the allocation but a 20% increase jumps it to 40.1%.[1] The return to the overall portfolio would rise from 12.3% to 20.4%. There is also a threshold going from 80% to 90% but such dramatic shifts are likely unrealistic.

Exhibit 9 Allocations if Peru's Returns Increased by X% for Portfolio Managers Maximizing Minimum Returns (Strategy B)

Country	0%	10%	20%	30%	40%	50%	60%	70%	80%	90%	100%
Peru	0.0%	0.0%	40.1%	43.6%	47.4%	56.6%	62.1%	68.6%	62.1%	100.0%	100.0%
Morocco	0.0%	9.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Colombia	19.5%	14.4%	1.5%	1.1%	1.8%	0.1%	0.0%	0.0%	0.0%	0.0%	0.0%
Egypt	80.5%	76.6%	40.7%	43.5%	50.8%	43.4%	37.9%	31.4%	37.9%	0.0%	0.0%
Russia	0.0%	0.0%	16.3%	10.5%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Korea	0.0%	0.0%	1.4%	1.2%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Total	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
Overall Portfolio: Average Return	12.3%	16.2%	20.4%	21.1%	22.5%	26.6%	30.3%	34.7%	48.7%	52.3%	55.9%
Min Return	-17.1%	-37.2%	-22.9%	-20.8%	-17.7%	-16.1%	-14.1%	-11.7%	-8.0%	-4.0%	0.0%
Stdev of Returns	24.3%	28.0%	31.2%	30.9%	32.4%	36.1%	39.2%	43.0%	57.8%	60.2%	62.6%
Sharpe Ratio	0.50	0.58	0.65	0.68	0.69	0.74	0.77	0.81	0.84	0.87	0.89

Exhibit 10 displays a statistically significant regression of the impact on allocations by increases in returns.

Exhibit 10 Y = Allocation to Peru, X = Increase in Peru Return (Strategy B)

49
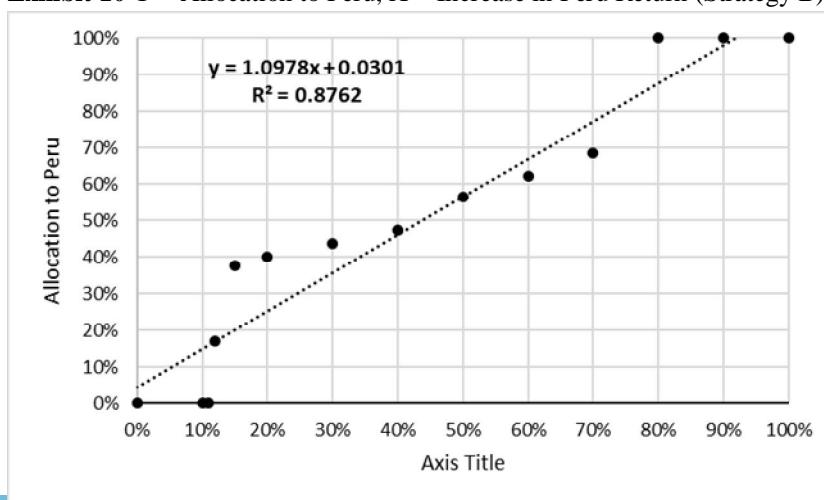
4.2.2 Decreases in Volatility by Moderating Extreme Returns

Although increases in returns would be welcomed by Strategy B portfolio managers, the same problem persists that there is no easy was to increase returns except by lowering corporate tax rates, likely a non-starter with government authorities.

But reducing volatility by moderating extreme returns for Strategy B managers again offers promise. Using the same scenario set, Exhibit 11 reveals the resulting allocations. In this case, Scenarios 4 and 6 have a dramatic impact, increasing allocations in the portfolio to 48.5%. It would also help the performance of Strategy B portfolios, boosting mean predicted return from 12.3%, to 17.6% for Scenario 4. Not quite the 20.4% for Strategy A portfolios, but still a hefty gain.

Exhibit 11 Scenarios for Moderating Distribution of Returns

Scenario 1	If only the best two years (+94.7% and +94.3%) became 90% of their values.
Scenario 2	If only the best two years (+94.7% and +94.3%) became 80% of their values.
Scenario 3	If only the worst two years (-40.2% and -40.1%) became 90% of their values.
Scenario 4	If only the worst two years (-40.2% and -40.1%) became 80% of their values.
Scenario 5	If only the worst two years (-40.2% and -40.1%) and best two years (+94.7% and +94.3%) became 90% of their values.
Scenario 6	If only the worst two years (-40.2% and -40.1%) and best two years (+94.7% and +94.3%) became 80% of their values.

Scenarios:

Country	1	2	3	4	5	6
Peru	0.0%	0.0%	0.0%	48.5%	0.0%	48.5%
Chile	0.0%	0.0%	0.0%	0.9%	0.0%	0.9%
South Africa	0.0%	0.0%	0.0%	0.4%	0.0%	0.4%
Czech Rep	19.5%	19.5%	19.5%	1.9%	19.5%	1.9%
Morocco	80.5%	80.5%	80.5%	33.8%	80.5%	33.8%
Colombia	0.0%	0.0%	0.0%	13.6%	0.0%	13.6%
Poland	0.0%	0.0%	0.0%	0.6%	0.0%	0.6%
Total	100.0%	100.0%	100.0%	99.8%	100.0%	99.8%
Overall Portfolio:						
Average	12.3%	12.3%	12.3%	17.6%	12.3%	16.6%
Min	-17.1%	-17.1%	-17.1%	-24.4%	-17.1%	-24.4%
Stdev	24.3%	24.3%	24.3%	29.4%	24.3%	27.8%
Sharpe	0.51	0.51	0.51	0.60	0.51	0.60

4.3 Strategy C – Maximize Absolute Return

Portfolio managers following this strategy ignore volatility and simply seek to maximize the absolute return. They would invest 100% in Russia (see Exhibit 4). Peru's 20% average puts it in fifth place behind Russia (34%), Turkey (31%), Egypt (29%), and Colombia (22%). Peru would need a 70% increase from its 20.2% average, a very high hurdle. Attracting the attention of portfolio managers following this strategy would be extremely difficult.

Exhibit 12 summarizes the results of the analysis for all three investment strategies examined. Based on returns from 1995–2014, reducing volatility by

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moderating extremes would likely have a greater impact on Peru allocations than increasing returns for two of the three strategies. This is fortunate, because it appears easier to reduce volatility. As described in the next section, altering Peru's tax code regarding net-operating-losses to allow for more liberal carry-back and carry forward provisions similar to those used in the U.S. might achieve this goal and is at least worthy of consideration.

Exhibit 12 Peru Allocations under Various Scenarios

Peru Allocations IF:

Maximization Strategies	Increase Returns By:			Decrease Volatility By:		
	0%	10%	20%	0%	10%	20%
A – Maximize Sharpe Ratio	9.4%	9.9%	10.2%	9.4%	12.7%	16.5%
B – Maximize Minimum Gain	0	0	40.1%	0	0	48.5%
C – Maximize Absolute Return	0	0	0	0	0	0

5. Possible Tax Policy Change to Moderate Returns

Moderating volatility of returns appears to have a salutary effect on making Peru attractive for portfolio managers operating under Strategies A and B. The question is how best to achieve such moderation.

No evidence is offered in this research that changes in the Peruvian tax code would achieve but it is easy to speculate. If Peru's tax code regarding its policy on net operating loss carryforward carryback (NOL) provisions to make it more like the U.S. tax code might achieve the goal. To understand how NOL provisions work, consider the following example.

> NOL in U.S. Tax Code: Assume a U.S. company earns a profit of $100,000 in Year 1 and $200,000 in Year 2. They pay $30,000 and $60,000 in taxes each year respectively (Peru current corporate tax rate is 30%). But in Year 3 the company suffers net operating losses of $700,000. With NOL provisions, they can refile their Year 1 and Year 2 tax returns and get back their $30,000 and $60,000 as a rebate from the government (this is the "carry-back" provision and is limited to two years back in the US tax code). The company can then carry the remaining $400,000 net operating loss forward (for up to 20 years in the US tax code). That means that if they earn $100,000 in Year 4, they would pay no taxes by using their NOL carried forward. If they earned $300,000 in Year 5, they would again pay no taxes by using up the rest of their NOL credit completely. The following years, they would pay their normal taxes. The purpose of this NOL policy stems from the government's recognition that businesses sometimes lose money in bad years of the business cycle but should not be forced into bankruptcy, with the resulting loss of jobs and economic activity. One could quibble with the details, but the concept is sensible.

51

How does this compare to the current Peruvian tax code? According to experts (Menchola and Marchesi, 2017) at PWC, a company that provides worldwide consulting services on taxes in various countries, Peru is much more restrictive, summarized as follows:

> "The Peruvian income tax law entitles domiciled companies to offset (carry forward) their corporate loss recorded in a fiscal year, according to either of the following systems:
> a) System A: By offsetting them against net income obtained within the next 4 fiscal years as from the year in which the loss was generated. The amount that is not offset within such period cannot be offset later; or,
> b) System B: By offsetting them against 50% of the net income obtained in the following fiscal years. Under this system there is no time limit to offset the losses.
> This choice must be exercised with the presentation of the Annual Tax Return. Once the taxpayers have chosen one of the aforementioned systems, they cannot change it until the accumulated tax losses from prior fiscal years are exhausted or expired.
> No carry back is allowed."

Clearly, the Peruvian NOL policy is more restrictive. Loosening these provisions appears justified on the grounds of reducing volatility of its companies' returns, thereby attracting more interest from portfolio managers following either Strategy A or B.

Is corporate behavior sensitive to changes in tax policy? It certainly appears so. In 2003, the corporate tax rate was cut to 27% from 30% for one year. Returns rose to 94.3% in 2003, the second highest in the 1995–2014 span and well above the 20-year mean of 20.2%. When the tax rate returned to its long-term level of 30% (where it remains today), returns dropped back to 3.2%, well below the average. This could be a coincidence, of course, but not likely. There may be other tax code changes besides NOL changes that would provide similar outcomes.

6. Conclusion

Increased returns and decreased volatility will have differing impacts on the allocations Peru could expect from investment portfolio managers, depending on the strategies they use to manage their portfolios. This research suggests that decreasing volatility by moderating outliers in the distribution of annual returns would have the greatest impact for two of the three investment strategies examined.

Future research could investigate whether this phenomenon exists only for Peru or if it would work for other emerging market countries as well. If

52

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so, the question would be how long before other countries began to compete with their own economic policies to regain their share of emerging market portfolios lost to Peru and how effective those steps would be. Clearly, the more successful the policies in achieving their objective – attracting more investments in Peruvian companies – the higher the likelihood that other countries followed suit.

To the extent they could match or beat Peru at reducing their volatility, they could win back the portfolio managers. Peru would then need to find a new round of innovations to add to returns or further reduce volatility relative to the competition.

Other factors of Peru's investment environment not already mentioned in the body of the paper are the fact that inflation gradually declined over the period from 1995 (10.5%) to 2015 (3.2%). This would presumably have a mitigating effect on exchange rate risk that portfolio managers in other countries would consider in making their decisions and likely reduce the net impact of volatility. But this effect was not factored into the analysis.

It must also be reemphasized that these results apply to Peru only. Moderating outliers in other countries might have led to different results. This analysis simply indicated "what" happened in the case of Peru, neither "why" it happened, nor if it would happen in all countries. Further research is warranted by those who are interested in parsing out the effects of returns versus volatility and determining if they apply to all countries. Any research that would help encourage investments in emerging markets should be welcomed to help the people in those countries reach higher levels of prosperity.

It must also be recognized that formulating economic or tax policies so that changes do not lead to unintended consequences is always tricky business as any macro-economist can testify. The effects of any changes in tax policy must be carefully considered. Economies in emerging markets may be especially vulnerable. Other strategies such as strengthening property laws to discourage corruption and promoting a stable currency could have far more dramatic impacts for any emerging market's attractiveness, of course.

Nevertheless, in Peru's case, this research suggests that policies to reduce volatility by moderating extreme levels of returns should be explored by emerging market countries wishing to increase their attractiveness to professional portfolio managers who use sophisticated investing strategies and are looking for emerging market opportunities.

NOTE

1. Increased allocation actually begins to occur when returns increase by 12% and continues to grow, reaching 40.1% at a 20% boost.

REFERENCES

Bernstein, William (2001). *The Intelligent Asset Allocator*. New York: McGraw-Hill.

Bogle, John (1999). *Common Sense on Mutual Funds*. Hoboken, NJ: Wiley.

Cakicia, Nusret, Frank J. Fabozzi, and Sinan Tana (2013). "Size, Value, and Momentum in Emerging Market Stock Returns," *Emerging Markets Review* 16(September): 46–65. https://doi.org/10.1016/j.ememar.2013.03.001

Clyatt, Bob (2005). *Work Less, Live More*. Berekeley, CA: Nolo.

D'Arcangelis, Anna, and Giuseppe Galloppo (2015). "Economic Relevance of Concentration for Emerging Markets Funds Performance," *The Journal of Wealth Management* 18(3): 101–109. https://doi.org/10.3905/jwm.2015.18.3.101

Dimensional Fund Associates (2015). *Matrix Book*. https://my.dimensional.com/tools/matrix_book/207320/. (MSCI cited as source of figures.)

Fama, Eugene, and Kenneth French (1992). "The Cross-Section of Expected Stock Returns," *The Journal of Finance* 47(2): 427–465.

Fama, Eugene, and Kenneth French (2012). "Size, Value, and Momentum in International Stock Returns," *Journal of Financial Economics* 105(3): 457–472. https://doi.org/10.1016/j.jfineco.2012.05.011

Foye, James, Dusan Mramor, and Marko Pahor (2013). "A Respecified Fama French Three-Factor Model for the New European Union Member States," *Journal of International Financial Management & Accounting* 24(1): 3–25. http:// doi/10.1111/jifm.12005/

Griffin, John M. (2002). "Are the Fama and French Factors Global or Country-Specific?" *The Review of Financial Studies* 15(3): 783–803. https://doi.org/10.1093/rfs/15.3.783

Ghysels, Eric, Alberto Palzzi, and Rossen Valkanov (2016). "Why Invest in Emerging Markets? The Role of Conditional Return Asymmetry," *The Journal of Finance* 71(5): 2145–2192. https://doi.org/10.1111/jofi.12420

Huxley, Stephen J., and Brent Burns (2016). "Equity Yield Curves, Time Segmentation, and Portfolio Optimization," *Journal of Financial Planning* 29(11): 54–61.

Index Fund Advisors (2009). Accessed 5/3/2016. https://www.ifa.com/articles/Active_vs_Passive_Investing/

International Investment Funds Association (2016). Accessed 4/23/2017. https://www.iifa.ca/industry_statistics/index.html

International Monetary Fund (2015). *World Economic Outlook: Adjusting to Lower Commodity Prices*. Washington (October), 149–152. Accessed 2/11/18. http://www.imf.org/external/pubs/ft/weo/2015/02/pdf/text.pdf

Li, Ningzhong, Scott A. Richardson, and A. Irem Tuna (2014). "Macro to Micro: Country Exposures, Firm Fundamentals and Stock Returns," *Journal of Accounting & Economics* 58(1): 1–20. https://doi.org/10.1016/j.jacceco.2014.04.005

Maio, Paulo F., and Dennis Philip (2015). "Macro Variables and the Components of Stock Returns," *Journal of Empirical Finance* 33: 287–308. https://doi.org/10.1016/j.jempfin.2015.03.004

Malkiel, Burton G. (1996). *A Random Walk Down Wall Street*. New York: W. W. Norton.

54

Martin, Philippe, and Hèléne Rey (2006). "Globalization and Emerging Markets: With or without Crash?" *American Economic Review* 96(5): 1631–1651. https://doi.org/10.1257/aer.96.5.1631

Maxey, Daisy, and Chris Dieterich (2017). "Indexes Beat Stock Pickers Even Over 15 Years," *Wall Street Journal*, April 13. Accessed 4/15/2017. https://www.wsj.com/articles/indexes-beat-stock-pickersevenover-15-years-1492039859

Menchola T., Gino, and Orlando Marchesi (2017). Partners, Tax & Legal Services, PWC (PriceWaterhouseCooper), response to inquiry, 4/18/2017 (with thanks for generously donating their time and expertise). Accessed 4/23/2017. http://www.pwc.pe/es/acerca-de-nosotros/nuestros-lideres.html

Moody's (2017). "Index Funds to Surpass Active Fund Assets in U.S. by 2024," as reported in Reuters by Trevor Hunnicutt, Feb. 2. Accessed 1/28/2018. https://www.reuters.com/article/us-funds-passive/index-funds-tosurpass-active-fund-assets-in-u-s-by-2024-moodys-idUSKBN15H1PN

Morck, Randall, Wayne Yu, and Bernard Yin Yeung (2000). "The Information Content of Stock Markets: Why Do Emerging Markets Have Synchronous Stock Price Movements?" *Journal of Financial Economics* 58(1/2): 215–260. https://doi.org/10.1016/S0304-405X(00)00071-4

Murray, Gordon S., and Daniel C. Goldie (2011). *The Investment Answer.* Business Plus.

S&P Dow Jones Indices (2017). "SPIVA US Scorecard." Accessed 4/23/2017. https://us.spindices.com/search/?ContentType=SPIVA

Sharpe, William (1994). "The Sharpe Ratio," *The Journal of Portfolio Management* 21(1): 49–58.

Sherden, William A. (1998). *The Fortune Sellers.* Hoboken, NJ: Wiley.

Siegel, Jeremy (2008). *Stocks for the Long Run.* 4th edn. New York: McGraw-Hill Education.

Sinquefield, Rex (1995). "Active vs. Passive Management." Accessed 5/1/2016. http://us.dimensional.com/library/articles/active-vs-passive-management.aspx

Swedroe, Larry E. (1998). *Winning Investment Strategy*. Boston, MA: Dutton.

Swedroe, Larry E. (2000). *What Wall Street Doesn't Want You To Know*. New York: St. Martin's.

Taleb, Nassim (2007). *The Black Swan*. New York: Random House.

Tukey, John W. (1962). "The Future of Data Analysis," *The Annals of Mathematical Statistics* 33(1): 1–67.

Young, Martin (1998). "A Minimax Portfolio Selection Rule with Linear Programming Solution," *Management Science* 44(May): 673–683.

Wagner, Moritz, and Dimitris Margaritis (2017). "All about Fun(ds) in Emerging Markets? The Case of Equity Mutual Funds," *Emerging Markets Review* 33(December): 62–78. https://doi.org/10.1016/j.ememar.2017.08.004

Zask, Ezra (2013). *All about Hedge Funds*. 2nd edn. New York: McGraw-Hill.

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