



Negative screening and performance consequences



How much is too much?



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Leola Ross

Ph.D., CFA, Director, Investment Strategy Research



Miao Ouyang

Ph.D., Research analyst

Negative screening and performance consequences: How much is too much?

Leola Ross, Ph.D., CFA, Director, Investment Strategy Research

Miao Ouyang, Ph.D., Research analyst

From capitalizing on the green energy revolution to carbon-free portfolios or supporting local business to targeting tobacco or weapons producers—investors are increasingly asking the industry to tailor portfolios to their preferences, while anticipating unmeasurable risks. Many investment managers however, are firmly entrenched in avoiding such exclusions in the view that they could damage returns. Meanwhile, others are embracing these preferences and risk concerns to carve out their niche. Still, we are yet to see a thorough explanation of how to build expectations for the range of outcomes exclusions might foster.

In this paper, we introduce a methodology for evaluating the range of outcomes certain exclusions might bring about. We explore the inflection point of excluding ‘too much’ and evaluate the impact of reallocating excluded security weights. We find that minor exclusions, in the range of 1% of a universe, will not induce material monthly deviations. However, the range of outcomes broaden quite a lot when exclusions comprise 2%-5% of the portfolio unless exposures are managed.

Introduction: Understanding the impact of exclusions

Investors may exclude specific securities from their portfolios for a variety of reasons—everything from religious guidelines to industry redundancy. In recent years, an increasing number of investors have formed dual goals—maintain strong investment returns while expressing views on specific industries. To do so, they have actively removed specific industries from their portfolios such as tobacco, carbon emitters or controversial weapons. As a result, investors may expect to deviate from ‘optimal’ portfolios in a material way. In this paper, we discover at what point exclusions may begin to impact portfolios in a material way.

To understand the impact of exclusions, backtests are often performed to show how portfolios ‘would have’ performed without tobacco for example, over a historical period. However, these tests cannot act as a guide for what to expect going forward. Our goal in this analysis is twofold:


1. To develop expectations for the future based on certain exclusions.
2. Understand what role managing unintended exposures may have.

Tracking error

To establish these forward-looking expectations, we create and evaluate a distribution of portfolios with exclusions.¹

We intend to answer the following three questions through our analysis:

1. What is an approximate distribution of outcomes from excluding securities from the portfolio?

 *In this paper, we discover at what point exclusions may begin to impact portfolios in a material way.*

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2. At what point are we excluding so much that the portfolio cannot compete with peers?
 3. How do different methods of compensating for missing securities affect that distribution?

Clearly, we know that there will be a tracking error from restricting portfolios. By performing a general analysis of security exclusions by sector (based on simulations of multiple sectors) investors can understand better what it means to exclude specific industries from a portfolio. We may also observe the importance of considering exposure-risk management once those securities are removed.

From our analysis, we now have a better understanding of when exclusions become material to a portfolio. In the pages below, we outline our methodology and review the results.

Methodology and data

To demonstrate the range of outcomes caused by exclusions, we use bootstrapping to simulate and evaluate the impact of security exclusions on the performance of a portfolio. We examine exclusions from the MSCI World Index. We obtain the monthly holdings and returns data from November 1997 to November 2017. Therefore, we have a total of 20 years of data. To understand how different market environments may impact results, we break the whole sample of the index into two 10-year subperiods (1997–2007 and 2008–2017). We then select the securities to be excluded through bootstrapping at the beginning of each subperiod and evaluate the impact on portfolio performance when the same set of securities are always excluded in each month during this subperiod.

Bootstrapping

At the beginning of each subperiod, we randomly select approximately 1%, 2%, 3%, 4%, and 5%² of securities (measured in beginning-of-period portfolio weight), respectively, from the benchmark index portfolio in the first month of each subperiod. We assume that the chosen securities are always excluded during the whole subperiod.

We run the simulation 6000 times and examine the distribution of performance measures of the newly formed portfolios to assess how exclusions would have affected the original portfolio. By comparing the impact of exclusions at different percentage levels, we can assess at what level the exclusions would start to detract from portfolio performance.

Naïve versus sector-neutral reweighting


When securities have been excluded from the portfolio, we must reweight (or normalize) the portfolio so that the portfolio is fully invested. We simulate two different reweighting schemes and assess how one's approach to reweighting after excluding securities would affect performance outcomes:

Case 1: Naïve reweighting

We randomly exclude securities which initially represent X% of the benchmark portfolio from a specific sector, and reweight all the remaining securities in the portfolio to add up to 100% in all subsequent months during the subperiod. Since there are 8 sectors³ in total, 750 simulations are conducted for each sector (thus a total of 6000 simulations). In the case of the naïve reweighting, sector biases are preserved and new risks are introduced into the portfolio due to the exclusions.

Case 2: Sector-neutral reweighting

We randomly exclude securities which initially represent X% of the benchmark portfolio from a specific sector, and reweight only the remaining securities in this sector. Again, 750 simulations are conducted for each sector (thus a total of 6000 simulations). We are reweighting the portfolio in such a manner that the sector exposure/weights remain the same before and after exclusions. As well, we control, as much possible, for country exposures in the sector-neutral reweighted simulations. In the case of the sector-neutral reweighting, sector biases are managed because active sector bets are not added to the portfolio.



By performing a general analysis of security exclusions by sector (based on simulations of multiple sectors) investors can understand better what it means to exclude specific industries from a portfolio.

In the next section of this paper, we compare the distributions of outcomes with naïve and sector-neutral reweighting schemes to see the impact of managing sector risk on *ex post* distributions of excess returns and tracking errors.

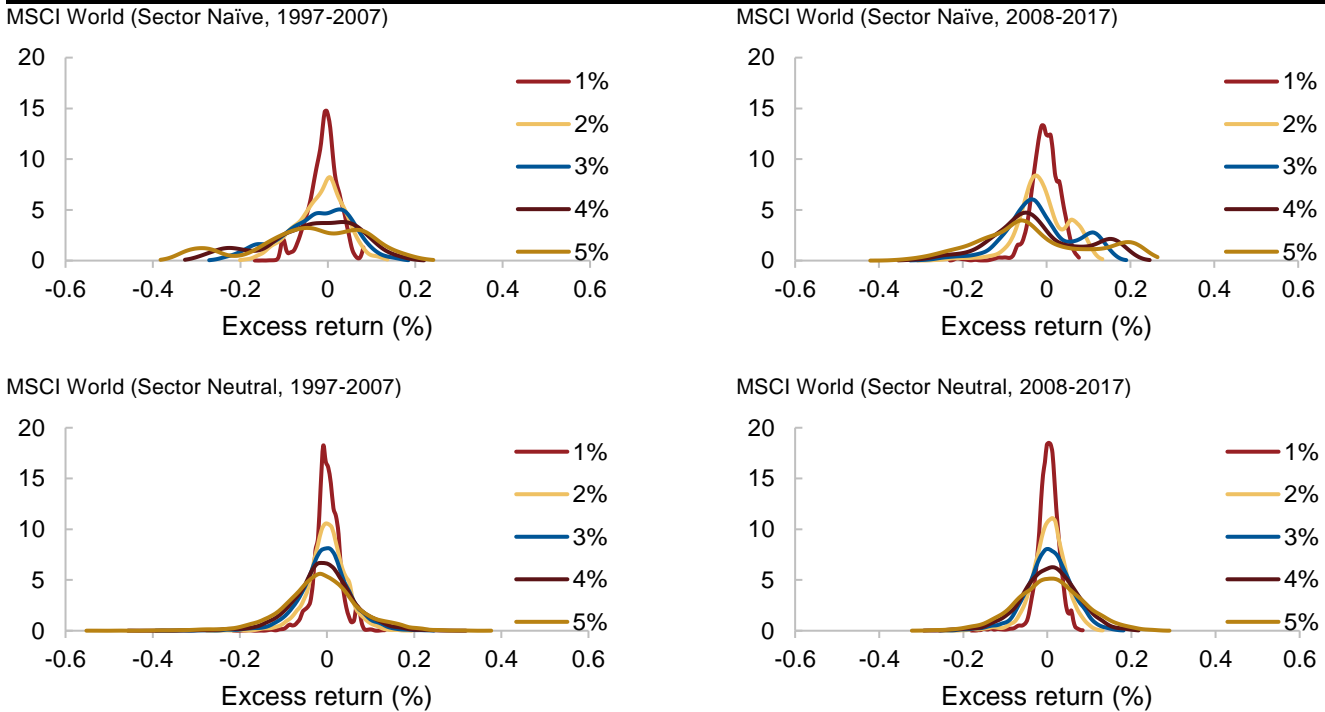
Results

To get a sense of how exclusions may impact portfolio performance, we examine excess-return and tracking-error distributions from our simulations for our two sample periods and the two cases—sector-naïve and sector-neutral reweighting schemes. We exhibit these distributions in graphic form, Exhibits 1 and 3. We first review excess returns and then turn our attention to tracking errors below.

Excess returns

We exhibit annualized excess returns distributions for the sector-naïve reweighting scheme and the sector-neutral reweighting scheme in Exhibit 1. Our first, much expected, observation is that increasing the percentage of security exclusions quite quickly increases the range of excess return outcomes. What is more interesting is how managing exposures, such as sector (and country), can influence how quickly the range of outcomes increases.

Exhibit 1: Distributions of excess returns for both sample periods and multiple exclusion levels



By visually inspecting the distributions in Exhibit 1, we can see quite easily that the sector-neutral distributions are taller, skinnier and more bell-shaped than the sector-naïve distributions which are multi-modal/lumpy and move around quite a lot. To get a more precise view, we exhibit the coordinates of the highest modes from the sector-naïve distributions and the modes of the sector-neutral distributions in Exhibit 2.

Exhibit 2: Mode coordinates of excess returns for both sample periods and multiple exclusion levels

	1997-2007				2008-2017			
	Sector Naïve		Sector Neutral		Sector Naïve		Sector Neutral	
	Mode value	Mode height	Mode value	Mode height	Mode value	Mode height	Mode value	Mode height
1%	-0.01	14.1%	-0.01	18.2%	-0.01	13.2%	-0.00	18.3%
2%	0.01	8.2%	0.00	10.5%	-0.02	8.4%	0.00	11.0%
3%	0.03	5.0%	0.01	8.1%	-0.04	6.0%	-0.00	8.2%
4%	0.04	4.4%	-0.01	6.7%	-0.05	4.6%	-0.01	6.2%
5%	-0.05	3.2%	-0.00	5.4%	-0.05	3.9%	0.02	5.1%

From Exhibit 2, we observe that the mode (or highest mode) values are consistently closer to zero for the sector-neutral simulations. Ultimately, the sector-neutral mode values stay between +/- 0.01 for all exclusion levels up to 5%. By contrast, the sector-naïve mode values jump past that mark after 1% or 2% exclusions.

As well, the modal heights are consistently higher. In the earlier sample period, 1997-2007, the mode height difference is more dramatic at higher exclusion levels of 4% and 5%. Taking the 1997-2007 sample period as an example, the height of the 3% exclusion for sector-naïve (5.0%) is similar to the height of the 5% exclusions for the sector-neutral (5.4%). The same is true for the 2008-2017 sample period where the 3% exclusion exhibits a height of 6.0% for sector-naïve, and the 4% exclusion exhibits a height of 6.2%.

What these numbers tell us is that the range of excess return outcomes increases more when not controlling for sector (and country) effects. On the other hand, we might consider managing such exposures to be a mechanism for including more exclusions without impacting excess return expectations. For a small exclusion from an index, such as tobacco which is less than 1% of a global index, return expectations should not be material. However, for actively managed portfolios, even a tobacco exclusion may represent a higher percentage of the investable universe.

As we move into 5% exclusions and higher (which might be similar to tobacco plus controversial weapons plus relative carbon footprint for an index) we find that simple sector-neutrality is no longer sufficient to manage the widening of the excess return distribution. Therefore, with 5%+ exclusions, additional sophistication in managing exposures will be important for divesting investors.

Ultimately, we confirm that excluding a modest percent of the index from portfolios does not impact return expectations, but that the range of expected outcomes can increase very quickly past the 2% mark, unless exposures are managed. What we haven't reviewed is how those returns deviate from index returns over time. To do that we review the tracking errors of our simulations in the next subsection.

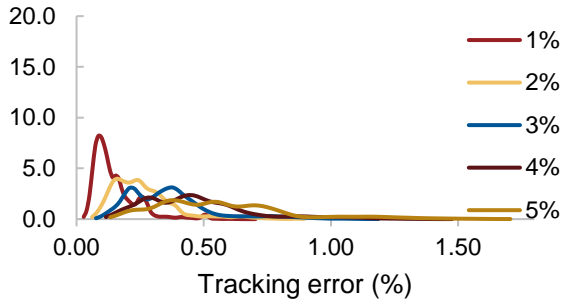
Tracking errors

Long-term return expectations are material considerations for fiduciaries and investors considering portfolio exclusions. However, the reality is that month-to-month return differences can cause anxiety and erode confidence. In this subsection, we review how much deviation one might expect from making a divestment choice.

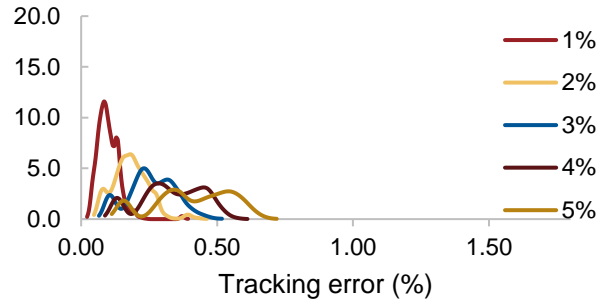
“ We confirm that excluding a modest percent of the index from portfolios does not impact return expectations, but that the range of expected outcomes can increase very quickly past the 2% mark, unless exposures are managed.

Exhibit 3: Distributions of tracking errors for both sample periods and multiple exclusion levels

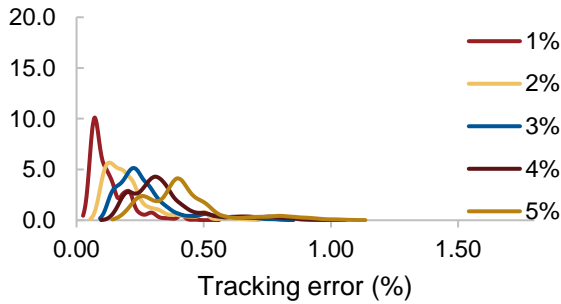
MSCI World (Sector Naïve, 1997-2007)



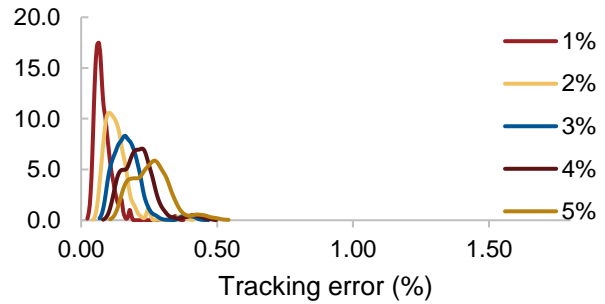
MSCI World (Sector Naïve, 2008-2017)



MSCI World (Sector Neutral, 1997-2007)



MSCI World (Sector Neutral, 2008-2017)



In Exhibit 3 we examine the distribution of tracking error and observe that increasing exclusion-levels, quite expectedly, increases tracking errors for both sample periods. That said, again we start with the high-level visual observation that the sector-neutral distributions are taller, more left, and less lumpy than their sector-naïve counterparts. In other words, tracking errors are smaller when we control for sector exposures.

We exhibit the coordinates for mode values and mode heights for tracking errors from each of our simulations in Exhibit 4. Similar to what we observed in the case of the excess return distributions, the mode values are systematically smaller for sector-naïve distributions than for sector-neutral distributions. For example, in the 1997-2007 sample period we observe a mode of 0.40 for the 3% exclusions sector-naïve—we see a similar mode value of 0.41 at 5% exclusions in the sector-neutral columns. For the later sample period we see the same mode height of 0.22 appear at 3% exclusions for sector-naïve and not until 4% for sector-neutral. Therefore, we see that sector-neutral reweighting softens the disruption of exclusions not only to a portfolio's expected returns, but in how those returns would behave from month-to-month.

“ In other words, tracking errors are smaller when we control for sector exposures.

Exhibit 4: Mode coordinates of tracking errors for both sample periods and multiple exclusion levels

	1997-2007				2008-2017			
	Sector Naïve		Sector Neutral		Sector Naïve		Sector Neutral	
	Mode value	Mode height	Mode value	Mode height	Mode value	Mode height	Mode value	Mode height
1%	0.09	8.2%	0.07	10.1%	0.09	11.2%	0.06	17.3%
2%	0.17	3.9%	0.14	5.5%	0.17	6.3%	0.12	10.2%
3%	0.40	2.9%	0.21	4.9%	0.22	5.0%	0.15	7.9%
4%	0.46	2.3%	0.32	4.2%	0.30	3.4%	0.22	7.0%
5%	0.37	1.9%	0.41	4.0%	0.34	2.9%	0.26	5.8%

The mode heights for the tracking error distributions tell a similar story. In both sample periods, the 2% exclusions with sector-naïve reweighting has a similar modal height to the 5% exclusions under sector-neutral. It seems that managing sector (and country) exposures has a more profound impact on tracking error distributions than on excess return distributions. Given the sensitivities many investors have to tracking error, such a result is important.

Finally, we remind ourselves that indexes are different from active portfolios, where exclusions may represent more material portions of the active universe. In these cases, the ability to manage unintended exposures becomes more critical when accommodating investor-preferred exclusions.

We conclude that simple measures to manage exposures can materially improve portfolio performance when security exclusions are imposed on a portfolio. These simple measures buy the investor an additional 1-3% exclusions before tracking errors become more of an issue. However, in moving past 5% exclusions, tracking error may be difficult to forecast and more sophisticated exposure management may be necessary.

Conclusions

Increasingly, investors express preferences for excluding securities from their portfolios such as those related to tobacco, carbon emissions and controversial weapons. As investment managers, we want to understand the impact of these exclusions. In the past, investment managers utilized backtests to assess how the portfolio “would have” performed with those exclusions over some historical period. However, a backtest does not tell us what to expect going forward. In this paper, we have examined a range of outcomes that moves us closer to building forward-looking expectations for excluding securities from portfolios.

To build these forward-looking expectations, we create a distribution of exclusions and evaluate that distribution. In particular, we use a bootstrapping method to answer a few important questions: First, what is an approximate distribution of outcomes from excluding securities from a portfolio? Second, at what point does the distribution broaden in a way that expectations become less stable? Lastly, how do different methods of compensating for missing securities affect that distribution?

We see clearly from our analysis that small levels of exclusions do not impact return expectations. More importantly, we observe that minor exclusions, in the range of 1% of a universe, will not induce material monthly deviations. However, the range of outcomes broaden quite a lot when exclusions comprise 2%-5% of the portfolio unless exposures are managed. Finally, excluding more than 5% of the portfolio may make deviations more material even with exposure management and impede our ability to form robust performance expectations. The 5% restrictions may be more relevant to active portfolios, where closer attention to unintended exposures becomes more critical to achieving investment performance.

This exercise quantifies our intuition and puts some sensible limits on just how much a portfolio can be restricted. These results are extremely useful to help investors to assess what exclusions mean and their potential impact.

It seems that managing sector (and country) exposures has a more profound impact on tracking error distributions than on excess return distributions.

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- 1 Specifically, we use a bootstrap method for forming our distribution. In the case of a bootstrap, we draw 6000 random portfolios from a known population (in this case, the stocks in the indexes) with specific rules in place (in this case, restricting the sampling from selecting specified industries).
- 2 Note that these percentage levels are only approximate as the weights of a set of securities might not add up to an exact percentage. On account of this possibility, we allow for a small band (20 bps) around these percentage levels.
- 3 These include the following four GICS sectors and four combined GICS sectors: Consumer Discretionary, Consumer Staples, Energy & Utilities, Financials & Real Estate, Health Care, Industrials & Materials, Information Technology & Telecommunication Services, Unassigned.

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