

Testimony to the New York State Senate Standing Committee on Finance

Concerning divestment of the NY State Common Retirement Fund from fossil fuels

By Bob Litterman, April 30, 2019

Divestment and Fiduciary Responsibilities

Divestment of fossil fuel companies is a step that has been taken by many asset owners in order to align their investments with their mission and/or their perceived ethical or moral responsibility to support a sustainable economy. It may be also seen as a step designed to try to negatively impact the valuation of fossil fuel companies or to signal support for government policies designed to reduce emissions. It may also be seen as an opportunity to improve returns.

While I understand and support such motivations, I come at this issue from a different perspective, that of an economist and risk manager with an expertise in quantitative portfolio optimization. I am best known as a co-author, along with Fischer Black, of the Black-Litterman global asset allocation model, a standard portfolio optimization tool in use by investors around the globe. I spent 23 years at Goldman Sachs, in quantitative research, risk management, and investments, becoming a partner and head of firmwide risk management in 1994. I also managed the quantitative investment group in Goldman Sachs Asset Management for 10 years, and for 6 years advised the Singapore's GIC, one of the world's largest and most respected sovereign funds.

It is often argued that investors who manage assets for the benefit of others have a fiduciary responsibility to optimize the expected return per unit of risk in a portfolio, and when acting in such a context should not add constraints, such as divestment of fossil fuels, because those constraints can only harm the risk/return characteristics of the portfolio. Such a conclusion correctly follows if the original portfolio was already optimized. For example, one standard assumption, that the capital markets are assumed to be in a state of equilibrium, implies that the market capitalization weighted portfolio is optimal. In that context eliminating a class of assets such as fossil fuels will definitely lead to a portfolio with inferior risk/return characteristics.

However, more generally if a portfolio is not optimized, or if one changes the assumptions about returns or risks, then of course there is an opportunity to make changes to the portfolio. The Black-Litterman model starts with equilibrium and then adds views that move away from equilibrium. Such a change leads to portfolio changes. In such a situation adding a constraint can improve the risk/return characteristics of a portfolio. One could easily argue that a class of companies, such as fossil fuel companies, are likely in the future to underperform on a risk-adjusted basis. In that context divestment of those assets may improve the portfolio. However, it should be noted that any such action is a rather blunt approach and is not likely to be optimal. In general, one should be explicit about expected returns and risks, and optimize the portfolio subject to any constraints.

Climate Risk

When I retired from Goldman Sachs in 2009 I began to focus on climate risk. In addition to my current position as a partner in a New York City investment firm, Kepos Capital, I serve on many non-profit boards, including a number with an environmental focus such as the World Wildlife Fund, the Global Institute of Sustainability at Arizona State University, the Woods Institute for the Environment at Stanford, and the Climate Leadership Council. The Climate Leadership Council is particularly important today. This is the organization that is sponsoring the Baker-Shultz Carbon Dividend Plan, a bipartisan effort to price carbon emissions, and the leading effort today working to support the creation of a federal carbon tax.

I believe that there will be a more rapid transition to a low-carbon economy than is built into market expectations, and that the appropriate investment policy for the New York Common Retirement Fund should be to take advantage of the economic opportunities available from tilting its portfolio toward investments that are expected to perform well if this scenario occurs. I would also recommend hedging, divesting from, or taking a short position, in stranded assets such as coal, tar sands, and oil exploration from other expensive sources. Such assets will lose value in a rapid transition to a low carbon economy. I would also avoid owning corporations that may be exposed to liability due to either fraudulent behavior associated with attempts to deceive shareholders about climate risk, or funding of deliberate deception designed to minimize public understanding of the risk of climate change or exaggerating the cost of moving to a low-carbon economy. Regulatory and legal pressure on the fossil fuel industry will only increase. I don't believe investors have adequately recognized the danger from these legal challenges, and companies with such liabilities should also be expected to underperform.

Risks created by climate change and the appropriate policy response

There is today a massive risk management failure on the part of governments around the globe. In most countries climate change risks are not being priced at all, or not adequately. On a global aggregate basis, incentives encourage the production and use of fossil fuels rather than to discourage it. This state of affairs simply cannot continue. Dire consequences will follow from this failure to create appropriate incentives to reduce emissions. I have been focused on this problem for about a decade, and I have certainly been disappointed by the lack of real progress on the key issue, which is carbon pricing. Clearly much has been done, for example to develop new low-carbon technologies, but at the end of the day incentives drive behavior and the incentives continue to go the wrong way, and so do emissions. Nonetheless, my view is that very soon, globally, society will confront the full implications of this failure, leading to the creation of strong incentives to reduce emissions, and there will be, although not immediately obvious at first, a phase change in global economic activity. My advice to investors is to prepare for this transition. I am confident that this scenario will play out soon because I understand how damaging and consequential the cost of inaction is, and how powerful incentives are.

My sense is that investors expect climate risk to be addressed slowly over time, as it has been to date. Such an assumption, however, misses the powerful impact of incentives, and the fact that when emissions are priced, the appropriate price path is not a gradual increase, but rather a jump to the appropriate level. The failure to price emissions is actually easy to fix, and it can be structured to make most people better off. It is simply a bug in the tax code. Like bugs in computer code, the changes necessary to price climate risk appropriately through a carbon tax can be implemented quickly and at virtually zero cost. In fact, because this action will create appropriate incentives and remove the perceived uncertainty about future climate policy, it will create demand for investments in the infrastructure and capital of the new, low-carbon economy; it will accelerate the creation of new jobs in

renewable energy; it will unleash the dynamic of the market economy; and most important from an investor perspective, it will force a revaluation of all existing assets. And, if the carbon tax is implemented in this country with a revenue neutral carbon dividend, as envisioned in the bipartisan Baker-Shultz carbon dividend plan that I support, it will make the vast majority of people financially better off. And finally, let me assure you the politics are not as tough as most people seem to feel. Perceptions can, and are, changing very quickly.

In order to illustrate the profound consequences of the current failure to price climate risk, I want to refer to tiny, tenths of a degree centigrade, changes in global average temperature. When I was born in 1951 global average temperatures were approximately 3 tenths of a degree centigrade above the average temperatures that had prevailed in previous centuries. This tiny temperature rise, barely detectable in the context of normal random fluctuations, was driven primarily by the 30 parts per million of excess carbon dioxide that had built up in the atmosphere during the previous one hundred years.

In my lifetime, the excess carbon dioxide has grown to approximately four times as high, 125 parts per million above recent historical levels. And it continues. Carbon dioxide emissions have not slowed down, and average global temperature has risen another 7 tenths of a degree from 3 to 10 during my lifetime. The annual average global temperature is now one full degree centigrade above the level prior to human caused warming, and as the years pass the global average temperature regularly sets a new record.

The impacts are no longer hard to detect. Scientists now regularly attribute extreme weather events such as heat waves, heavy downpours, flooding, droughts, wildfires, and stronger hurricanes to this global warming. In addition, other profound changes to the earth such as rapid melting of glaciers and the polar ice cap, ocean acidification, increasing ocean surface temperatures, and sea level rise are also attributed to the climate changes caused by the excess carbon dioxide and other greenhouse gases in the atmosphere. These changes are currently destroying ecosystems around the globe and are regularly creating catastrophic impacts on human health and well-being, particularly in the developing countries, which are less able to adapt to the changes.

Moreover, the temperature rise will not stop any time soon. Although there is tremendous uncertainty about the future, climate impacts are only expected to continue to accelerate in the decades ahead as temperatures continue to rise. Almost certainly annual climate related damages will reach to the hundreds of billions of dollars in the decades ahead with significant negative impacts on human health and well-being.

Even when we in the United States and all other countries around the globe create aggressive carbon taxes and take the other appropriate steps needed to limit emissions, the sad reality is that because of the inherent lags in the transformation of economies, the time it will take to suck the excess greenhouse gases out of the atmosphere, and the time it will take for the earth's systems to reach equilibrium, average temperatures are expected to continue to rise for roughly half a century. Even if such a very aggressive emissions reduction scenario were to take place immediately, the future temperature increase is expected to be another 8 tenths of a degree leading to a peak temperature increase of about 1.8 degrees which will be reached around 2080 when my grandchildren, currently toddlers, will be my age. There is, of course, considerable uncertainty of what impacts that temperature will have on societal well-being, but there is no doubt that it will be extreme for fragile ecosystems such as arctic tundra, coral reefs and tropical rain forests, which are already suffering from intense stresses. The

worst-case scenarios for the environment, which risk management must take into account, are truly horrifying.

The United Nations Intergovernmental Panel on Climate Change recently issued a special report that detailed many of the potentially catastrophic impacts that differentiate a temperature increase of 1.5 degrees, from those at 2.0 degrees. The report projects, for example, a decline of 70% to 90% in coral reefs at a 1.5 degree increase, but a greater than 99% loss of coral reefs for a 2.0 degree increase. And while no one knows at what temperature a tipping point might be crossed leading to nonlinear feedbacks and irreversible, uncontrollable outcomes, one can be confident that the higher the peak average temperature gets, the greater is the risk.

But the really scary aspect of climate risk is the cost of inaction. Each four years of delay will increase the maximum temperature reached by an additional one tenth of a degree. And we have already baked in a maximum of 1.8 degrees of temperature rise. If we wait until 2023 to start the aggressive global emissions reductions that are necessary, then instead of peaking at 1.8 degrees in 2080, our grandchildren will face a world 1.9 degrees warmer. If we wait until 2027 for this global transformation to begin, we will probably hit 2.0 degrees of warming around 2090. Every four years is another tenth of a degree of temperature rise.

These risks give me confidence that the world will very soon recognize this risk and create the incentives that will drive the required aggressive transition required to reduce emissions. The centerpiece of that effort is likely to be a set of globally harmonized carbon taxes that will create the incentives required to drive the necessary phase change of the global economy. I only hope it will not be too little, too late, for my grandchildren – but whether that is the case depends on what actions we, as a global society, take today. It is a shocking and deeply depressing failure of governance that we have not yet begun to price climate risk. The global incentives still go the wrong way. Had we taken appropriate action as recently as 20 years ago, we would be living today in a different reality with a much safer future. Sadly, we can't turn back the clock. Today it is long past the time when we could start to price emissions at a relatively low level, and increase the price slowly, easing into a smooth transition. Instead the world needs to wake up to the fact that our foot is still on the accelerator, and we now need to slam on the brakes.

The Lessons of Risk Management

Three principles of risk management are helpful in guiding policy and understanding what needs to be done. First, when managing risk, time is a scarce resource. Given enough time we can solve almost any problem. But in most cases, and certainly when managing climate risk, we don't know how much time we have to solve the problem. Thus, we have to start immediately.

Second, the purpose of risk management is not to eliminate all risk, but rather to price risk appropriately. If we price climate risk appropriately then all economic agents; consumers, businesses, investors, entrepreneurs, and asset owners will all face the right incentives and without conscious thought or understanding will be led by the price system and the incentives embedded in it, to take the right actions. If we do not price climate risk, we will all continue to be guided by the existing perverse incentives, emissions will continue to grow, and we will all continue moving in the direction of disaster.

Third, when there is significant uncertainty one has to err on the side of caution. No one knows what price for carbon will adequately speed the transition, and thus we need to err on the side of a higher price. But how high? One useful way to think about the question is to recognize that carbon dioxide that we put into the atmosphere today will almost certainly be required to be removed at some point in

the not so distant future. The magnitude of that task will be enormous and expensive, but nonetheless, if the price is too high today, then society would be made better off by lowering the price, emitting more carbon dioxide today, creating additional damages, and removing it later. The expected discounted present value of the cost of the future carbon dioxide removal, along with the additional damages, thus puts a cap on the appropriate carbon price today. No one, certainly not me, knows what the appropriate price is; but I have spent considerable time studying this issue and I would guess it is around \$100 per ton of carbon dioxide. The appropriate price is determined by the science and economics. There is inherent uncertainty that will be slowly resolved over time, but in the mean time we should err on the side of caution.

Implications for asset owners such as the New York State Common Retirement Fund

Although no one can be sure when climate risk will be priced, I expect that it will be soon. I am also confident that the rest of the world will also act quickly. The Baker-Shultz carbon dividend plan has support from the entire economics profession; from virtually the entire business community including Exxon, Shell, BP and Total, from environmental groups including the World Wildlife Fund, The Nature Conservancy, from student groups, and others. Even the Chamber of Commerce, a longtime supporter of climate denial, has changed its policy. What we need for passage of legislation is for a group of Republicans in the Senate to have the courage to come out in support of allowing market incentives to drive emissions reducing behavior. Is that really so hard?

As the public conversation transitions from whether to price carbon to where it should be priced, investors will focus on the implications. The investment community will anticipate carbon pricing and the rapid transition to a low-carbon global economy. The implications are many. First of all, the long-term demand for fossil fuels will be anticipated to be lower and thus future prices of fossil fuels will be expected to be lower, but this expectation will induce producers to shift production forward, lowering oil prices today. Exploration projects with higher capital costs and production, such as tar sands or deep-sea drilling, will no longer be profitable. The increased expense of emissions will make the burning of coal even more uneconomic than it is today, and it will be rapidly displaced by cheaper natural gas and renewable sources. Internal combustion engines will be replaced by electric motors. Demand for renewable and nuclear energy will increase, as will the demand for energy storage to deal with the intermittent nature of solar and wind energy. These direct implications will also alter the indirect demands for the required inputs and raw materials.

The transition to a low-carbon economy will also alter the nature of the energy infrastructure, for example lowering the demand for pipelines to transport fossil fuel and increasing the demand for a smart electric grid. The transportation system will evolve to increased efficiency and reduced emissions. There will be increased demand for carbon capture and sequestration technologies, for agricultural practices that reduce emissions, for increased coastal resilience, for insurance against extreme weather, and for energy efficient buildings. All of these changes will impact valuations in both obvious and, no doubt, subtle ways.

The bottom line for the New York Common Retirement Fund is the same as that for all long-term investors. It should carefully tilt its portfolio investments towards those investments that will benefit from a rapid transition to a low-carbon economy, and it should join with other asset owners who are exercising appropriate corporate governance responsibility to help engineer this transition as quickly as humanly possible.