

A Model of Sustainable Value Creation

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Abstract

This paper argues that the current paradigm of value creation has led to a number of unacceptable outcomes. Exaggerated by executive compensation incentives that are focused on short-term results, the model of shareholder wealth maximization spurs short-term profits that fail to account for costs externalized to other stakeholders. We argue that the all-inclusive costs of such decisions can be extremely high and that they often offset the short-term gains by a wide margin. The cascading nature of these costs, the growing voice of other stakeholders in support of their interests, the erosion of public trust, and the increasingly dire state of the global environment have accelerated the pace of calls for the adoption of a model of sustainable value creation. We propose that the current model be replaced with one in which shareholders' wealth is maximized subject to the constraint that none of the other stakeholders become worse off. We also argue that markets, education, and regulation represent the three indispensable cornerstones of a sustainable value creation framework.

Keywords: Corporate Finance and Accounting, Ethics, Sustainability, sustainable Finance, Shareholder Model

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1. Introduction

Much like other professionals, finance professors face many challenges in adapting their modus operandi to the digital age. Unlike most others, however, the profession faces the tremendous challenge of not having adequately prepared its students for the many ethical challenges they face among them sustainability considerations in general and corporate social responsibility in particular.¹ Most of today's senior academic staff completed their advanced training at a time when two propositions reigned high and were taught as if they were the words of gospel; (1) that market solutions are always perfect and (2) that a corporation's only responsibility is to its shareholders and maximizing their wealth is the only goal to pursue. This indoctrination led the profession on the path of teaching these propositions with enthusiasm and without questioning. In the meantime, we have routinely dismissed the frequent incidences of market failures, lapses of ethics, and damage to our social and environmental fabric as idiosyncratic and not worthy of systematic examination.²

For many years, the profession was afforded leeway when it ignored the gathering threats. However, the emerging signs of irreversible environmental degradation, the increasing frequency (and severity) of incidences of ethical misconduct and corporate irresponsibility have, in our assessment have now forced this issue to the forefront of the challenges faced by the profession.³ And, while the profession is well

positioned to address the many challenges of the digital age, it is at a clear disadvantage in dealing with the erosion of confidence in how it teaches decision-making in an interdependent world. In this paper we argue that even when considered from a purely self-preservation perspective, the profession owes it to itself to change direction and give due consideration to the interests of other stakeholders.

We provide ample evidence in support of our argument that the contemporary global conditions are characterized by (1) increasing incidences of unethical and self-serving behavior that leads to the erosion of public trust, (2) increasing vocal presence of other stakeholders who demand due consideration of their interests and that of others demanding such a change, and (3) a world stretched to its limits and prone to irreversible degradation. With respect to the last point, we also argue that the profession needs to do a better job of educating the policymakers with regard to the ethical and economical issues involved in assuming relatively high rates of time preference when modeling climate change. The inter-generational choices implicit in such rates are apparently not well understood. We further argue that, when considered over the long term, the interests of shareholders align with those of other stakeholders. As a result, the consideration of other stakeholders' interests would also preserve the shareholders' long-term interests.

In what follows we present examples of unacceptable outcomes that the sole reliance on shareholder wealth maximization as the model for value creation has

produced. We discuss the reasons behind the failure of this traditional model and argue that some of the most vexing problems of our times, rising inequality and climate change included, are the direct consequences of an exclusive reliance on shareholder wealth maximization as the model for value creation. Drawing parallels with the root causes of the most recent financial crisis, we argue that the finance profession needs to treat climate change as a risk management issue with an attendant low-probability catastrophic outcome. Taking a first step toward the development of a robust framework for wealth creation, the paper offers a model of sustainable value creation within which shareholder wealth is maximized subject to the constraint that other stakeholders are left no worse off and one that properly accounts for all incidental costs. We posit that the rapid deterioration of the global social fabric, the alarming rate of environmental degradation and the increasing influence of other stakeholders will leave the decision makers no choice but to abandon the traditional paradigm of shareholder wealth maximization in favor of the sustainable value creation model.⁴

2. Shortcomings of the Traditional Model of Value Creation

The causes and the effects of the 2008 financial crisis have been thoroughly analyzed, investigated, and reported.⁵ The broad consensus among such inquiries is that collateralized debt obligations backed by subprime mortgages triggered the tsunami of events that eventually brought the global financial system to its knees (Morgenson and Rosner, 2011). Mortgages were collected into large pools of assets and sold to wholly owned organizations (SPVs) that were established solely for the

purpose of purchasing these assets and moving them off the banks' balance sheets. These organizations in turn divided their assets into different tranches and sub-tranches, marketed them as safe investments and sold them to investors the world over.⁶ Relying on a key assumption that home prices would not fall in all areas at once, and invoking the principles of rationality (individuals act rationally) and efficiency (markets work perfectly well), rating agencies granted their highest ratings (AAA) to a large portion of these CDOs. Looking back, it is now fairly clear that the financial system had inadvertently ignored a sizeable body of evidence that runs counter to these assumptions, i.e., that investors' rationality is bounded by their emotions and fears, and that bubbles are an integral part of the history of financial markets.⁷ It is also clear that the markets had acted as if they had chosen to concentrate on the expected outcomes and ignore the tail events.

With its focus on sustainability, this paper's main tenet is that when it comes to sustainability issues an oversight of a similar nature may be in the making. However, we argue that this particular oversight is potentially far more consequential. We also argue that continuing business as usual, i.e., ignoring the environmental, social, and governance (ESG) factors, is likely to lead to unacceptable and potentially disastrous outcomes. We further reason that successful value creation requires that these factors be duly and adequately considered. The path ahead, in other words, calls for the abandonment of the standard model of value creation (in which shareholders are the only group of stakeholders to be concerned

with) in favor of a model for sustainable value creation in which the consideration of environmental, social and governance factors play an important role.⁸

In the spirit of Fatemi and Fooladi (2013), value creation can be viewed in the context of a simple present value model.

$$\sum_1^{\infty} (REV - COST)_t / (1 + R)^t, \quad (1)$$

where *REV* and *COST* refer to revenues and costs (including interest and taxes) at time *t*, respectively, and *R* denotes cost of equity capital. Within this model, maximization of shareholders' wealth can be accomplished by either maximizing the cash flows or by minimizing the cost of capital. Starting with the latter and holding the operational risk constant, the firm's ability to reduce its cost of capital is constrained if it operates in a market comprised of well-informed investors.⁹ Given the existence of informational asymmetry between the firm and the suppliers of capital, management may be incited to reduce the asymmetry through additional disclosure. However, extant empirical literature on the valuation effects of additional disclosure does not hold much promise on this front (e.g., see De Villier and van Staden, 2011). The overall evidence that additional disclosure can carry negative valuation consequences suggests that such steps may be interpreted as attempts to manipulate the market rather than bridge the information gap. Indeed, consensus is emerging that "earnings guidance" figures are proving to be unhelpful,

ultimately incenting management to engage in window-dressing and possible manipulation of reported results in order to not disappoint.¹⁰

a. Maximizing Cash Flows

The maximization of the numerator in Equation (1) can be accomplished through socially responsible attempts to maximize revenues or to minimize costs of operations. Theoretically, this requires the consideration of *all* appropriate costs and revenues into infinity. However, driven by the inefficient incentives that are built into executive compensation packages, a dogged pursuit of shareholder wealth maximization can often lead an entity onto a path that would accomplish these goals on a short-term basis but would also create non-sustainable and unacceptable outcomes. Volkswagen's recent problems offer only one example of such outcomes. The carmaker had intentionally programmed diesel engines of an estimated 11 million vehicles to activate emissions controls only during emissions testing. Programmed as such, these vehicles produced only one-fortieth of their normal nitrogen oxide during laboratory testing. Therefore, the emissions standards set by the US Environmental Protection Agency were fraudulently met and the company sold vehicles that it otherwise could not. However, the EPA's issuance of a notice of violation of the Clean Air Act on September 18, 2015 unleashed a chain of events that included the ouster of the car maker's CEO (along with a number of other key executives), the company's decision to set aside \$7.3 billion to rectify the issue, and a more than 38% drop in the company's share price in a matter of ten days. A post-audit of the consequences of the choice to increase revenues in this particular

manner may prove that the decision has had a significantly negative *long-term* effect on the positions of its shareholders both in terms of its effect on the share-price and in terms of lost “goodwill” (i.e., the forgone potential opportunities to create value due to a damaged relationship with other stakeholders: employees, consumers, regulatory agencies, environmentally-focused agencies and interest groups, etc.)

Valeant Pharmaceuticals, still a developing case as of the date of this writing, is yet another example of the pursuit of short-term gains. A strategy consisting of growth through acquisitions, raising prescription drug prices (in one case by 520% of the day of acquiring the rights to the drug), laying off employees to cut expenses, cutting research and development, and increasing financial leverage generated handsome short-term gains for the company’s share price and a huge compensation for its CEO.¹¹ However, since October 21, 2015, when the company received subpoenas from the offices of two US Attorneys in regard to its conduct of business and revelations surfaced that the company was using a specialty pharmacy to store its inventorying while reporting them as sales, more than 90 percent of these gains have disappeared. Unfortunately, Valeant is not the first, nor may it be the last pharmaceutical company that had attempted to maximize its short-term gains. Johnson and Johnson (one of the Fortune 500’s most admired companies) had previously pleaded guilty and paid more than two billion dollars in penalties in conjunction with the deceptive advertising of its Risperdal drug.

The role played by fossil fuel companies in the debate on climate change is yet another example of attempts to maximize own gains, short-term as they may be, at the expense of the long-term societal and environmental interests. Funding groups with the singular objective of undermining the climate change debate, the industry sought, for many years, to divert attention from the gathering threat of climate change in order to maximize its own revenues. Recently uncovered evidence suggests that as early as 1981 Exxon Mobil's own scientists expressed concerns about climate change. Yet the company decided to play down the risk and, in effect, lied to the public.¹²

Without being exhaustive, the financial services industry offers many other examples of short-term nature of value creation process at the expense of long-term sustainable value. The entire process of originating loans to borrowers having been known to lack the necessary means for repayment can be classified in this category. Engagement of banks in the fixing of exchange rates, fixing the LIBOR, money laundering, and running services dedicated to tax avoidance by their wealthy customers can only be placed in this same category. Interestingly, as Figure 1 suggests, these activities have created significant costs for the banks involved.

Please insert Figure 1 here

However, as painful as these fines may have been, it appears that banks have not made any changes to their business models and that the industry still “prizes short-term profits over long-term prudence, today's bonus over tomorrow's relationship”.¹³ Therefore, it can be stated that the financial services industry, like

many other industries, has yet to make a meaningful change to its value creation paradigm from one that emphasizes short-term revenues to one that is oriented toward sustainability and the longer term.¹⁴

b. Minimizing Operating Costs

Maximizing the numerator of Equation (1) can also be accomplished through attempts to minimize costs of operations. Here, too, sustainability is the often-overlooked issue. Costs can always be further reduced. But the important nested questions that are often ignored are “at what cost” and “at whose expense.” Consider, for example, a firm’s attempt to cut costs where the *expected* benefits exceed their *expected* costs, but where costs associated with a *tail event* may be catastrophic.¹⁵ A case in point is BP’s reported attempts to minimize costs associated with the Deep water Horizon drilling in the Gulf of Mexico. As drilling was proceeding on April 20, 2010, a series of events, inadequately planned for, led to the loss of 11 lives among the crew, and the eventual flowing of more than 4.9 million barrels of oil into the Gulf. Subsequently, BP pleaded guilty to 14 criminal charges, paid \$4.5 billion in U.S. federal criminal penalties, and agreed to pay another \$18.7 billion to satisfy federal, state, and local claims against the company, bringing the total price tag to \$54 billion.¹⁶ On September 4, 2014, a U.S. federal judge ruled that BP was “grossly negligent” and acted with “conscious disregard of known risks” and fined it \$18 billion.¹⁷ BP’s subcontractors, Halliburton and Transocean, also suffered from inadequate preparation for this kind of a low-probability tail event. Halliburton pleaded guilty to a criminal charge of destroying

evidence and reached a settlement of \$1.1 billion with victims, and Transocean pleaded guilty to illegal conduct leading to the disaster and was fined \$1.4 billion in 2013.¹⁸

As another example, consider the failure by General Motors to address the safety flaws in its ignition switches that started with a fatal crash in 2005 and culminated in the recall of close to 30 million cars in 2014. Although engineers at GM had uncovered the design problem and had come up with a solution, a decision was made to proceed as if the problem did not exist.¹⁹ By September 2015, the number of deaths linked to the defective ignition had risen to 124 and the company had agreed to a settlement of \$900 million with Federal prosecutors in exchange for not having any of its employees criminally charged.²⁰

In a similar fashion, it can be argued that the outsourcing of a production process when the only variable of concern is the firm's direct costs may amount to non-sustainable value creation. Indeed, it would be so if the effort simply amounts to externalizing the costs that otherwise would have to be borne by the firm. Consider, for example, the transfer of a pollution-generating production process to other locations with non-binding constraints on such discharge. Over a long period of time, such pollution and its costs may ultimately circle back to the shareholders of the firm. However, this possibility can be easily overlooked if management of the firm counts on the presence of an asymmetry in such tradeoffs: that rewards to the

shareholders have no upper bound but that (due to the limited liability feature) their downside risk is bounded.²¹

Nonetheless, a second type of asymmetry may serve as a mitigating factor. As reported by Endrikat (2015), not only does the market react positively to a positive environmental event and negatively to a negative one, there is a much stronger reaction associated with negative events.²² Although this 'long stick and small carrot' may act as a buffer against managerial short-sightedness, the *short-term* focus of compensation packages may incentivize management of the firm to act against the *long-term* interest of their shareholders. Thus, management's temptation to externalize the costs may persist unabated.²³

Consider now the feedback loop of such externalization attempts at the macro level. As discussed in Section 2.e, each year air pollution causes millions of premature deaths in both China and India. The retardation of growth opportunities that these deaths create, the soaring health care costs of its survivors, cleanup costs, and many other indirect costs associated with such pollution are ultimately borne by the same shareholders whose immediate interests start the cycle. This feedback loop may take a long time to run its course, but it would be a folly to assume that it simply terminates at someone else's door. Nonetheless, given that in the short term these costs are borne by the society at large (i.e., are externalities to the firm) and that executive compensation packages are designed based on short-term metrics, managers may choose to ignore this loop and engage in myopic behavior. As a

result, the golden rule that ‘externalizing the costs will not make them go away’ is often overlooked. As discussed in Section 3.c, when markets fail to provide a satisfactory solution, only effective regulation has the potential to mitigate the influence of factors that may lead the decision makers to view the externalizing of costs as an endeavor devoid of costs and promising rewards.

Examples of the feedback loop at the micro level are not difficult to find. Among them are cases of significant setbacks and loss of shareholder value experienced by major retailers (like Walmart and Tesco) attributable to an almost exclusive focus on the “out-of-pocket” cost of sourced merchandise in their choice of suppliers. Consider the following: on November 24, 2012, a fire at a garment factory in Bangladesh killed 112 workers. Documents released on December 5, 2012 revealed that five of the 14 production lines in the factory were devoted to the production of garments for Walmart, including its Faded Glory line. These documents also revealed that Walmart officials played the leading role in blocking efforts that would have helped these factories improve their electrical and fire safety on the grounds that they would have required the firm pay more for its purchased apparel.²⁴ Not long after this accident, on April 24, 2013, another Bangladeshi garment factory, making products for these retailers, collapsed and killed more than 1,100 workers. Beyond their significant societal costs, Walmart and other retailers connected to these accidents suffered significantly from immediate and intermediate demand and a from longer-term hit to their reputation.²⁵

c. Minimizing Labor Costs

Labor costs are sometimes the largest single component of an entity's total costs. The debate about the appropriate level of minimum wage aside, how far should the firm go when attempting to minimize its costs? The typical economist's answer is often stated in terms of the market price of labor: that the firm should pay the market-clearing rate, no more and no less. It follows, therefore, that the firm should find its way around collective bargaining agreements if such pacts require the firm to pay more than the current market rate. We will address the merits of such a strategy in Section 2.d. For now, we return to the closing theme of Section 2.b: the implications of considering just the *local costs* versus the *all-in costs*.²⁶ If an enterprise pays its labor force the current market-clearing rate but that rate is set below the "living-wage" level, the difference is externalized to other parties. In the absence of safety nets, or other forms of social compact, the labor force will be forced into a survival mode, neglecting its less-than-immediate needs. Under such a scenario, it is fairly easy to see that these externalized costs will lead to a deterioration of the long-term growth prospects of the society, and in turn those of the entity employing that workforce.

With safety nets, and other forms of social compact, the difference between the low wages paid by the firm and the living wages required to support sustenance will ultimately be paid by the taxpayers. As such, minimizing wages to levels below the "living wage" simply amount to externalizing a portion of the true cost of labor.

Indeed, a recent study by Jacobs, Perry, and MacGillvary (2015) finds that low wages

paid by employers cost the U.S. more than \$152.8 billion. The study finds that nearly three-quarters of people helped by programs geared for the poor, like food stamps, Medicaid, Temporary Assistance for Needy Families, and the earned-income tax credit, are members of a family headed by a worker. For example, it reports that 52 percent of fast food workers, 48 percent of home health care workers, and 46 percent of child care workers are on public assistance. More astonishing is their findings that a quarter of families of part-time college faculty members rely on public assistance. The study is aptly entitled “The High Public Cost of Low Wages” and the statistics compiled by its authors is a clear indication of a market failure

d. Executive Pay and Rising Inequality

Ironically, efforts to minimize costs appear to come to a halt with one item—the compensation packages of the firm’s executives. When it comes to executive compensation, the discussion turns invariably to a discussion of how to best incentivize the management to perform. And, the answer is usually an ever-growing compensation package supplemented by (short-term) performance-based bonuses. It is no surprise, therefore, that the gap between the compensation of an average worker and that of an executive keeps growing wider. Indeed, according to the Wall Street Journal, CEOs of America’s largest publicly traded companies received 373 times the compensation of the average production and nonsupervisory worker in 2014.²⁷

Indeed, the twin waves of deregulation and union-busting activities that were ushered in beginning with the installation of Reagan administration in the U.S. and the Thatcher government in the UK, removed many of the time-honored restraints on the corporate sector (both in the U.S. and elsewhere). The ensuing period has witnessed a drive by the corporate sector to increase its profits, often at the expense of its employees.²⁸ As a result, the gap between the poor and the rich has widened with the Gini coefficient for the after-tax income in the U.S. rising from about 0.31 in the mid-1970s to about 0.38 by the end of the first decade of the 21st century.²⁹ Of course, the tax system helps mitigate inequality to some extent (by 2010, the Gini coefficient for income before taxes in the U.S. had a value of 0.50). However, a handful of other developed countries (such as Austria, Belgium, Finland, Denmark, and Norway) have had better success in utilizing the tax system to force their Gini coefficient down to 0.25.

It is worthwhile to note that this worsening of income inequality was largely ignored during the period leading to the financial crisis of 2008 as “asset bubbles and cheap credit eased life for everyone. Financiers were growing fabulously wealthy in the early 2000s, but others could also borrow ever more against the value of their home.”³⁰ Public awareness of the problem and the level of attention to the issue changed after the financial crisis as “bank rescues shone a spotlight on the unfairness of a system in which affluent bankers were bailed out whereas ordinary folk lost their houses and jobs.”³¹ Recently, however, inequality has gained attention as an issue of interest for the media and political discussions. For example, in a 2012

survey of 469 experts (from industry, government, academia, and civil society) answering the question of *what global risk is perceived to be most likely to occur over the next 10 years*, placed two forms of threat—“severe income inequality” and “chronic fiscal imbalances” at the top of the list.³² Nonetheless, not much is being done to reduce inequality. Indeed, between 1979 and 2012 real wages for the richest one percent grew by an annual compound rate of 2.8 percent but remained flat for middle-income workers and actually fell for the bottom 20 percent of the population. Allan Greenspan has referred to income inequality as the “most dangerous” problem that we face today.³³

Obviously, income inequality is a moral issue rooted in the debate on social justice. Yet, equally importantly, it has significant business implications. Indeed, a number of studies have shown that inequality has a pronounced negative effect on productivity and growth because it affects the ability of the poor to invest in education.³⁴ Therefore, inequality is more than just a moral issue as it poses a significant threat to the economy’s future health. Indeed, this may have played a role in a decision by Standard and Poor’s to downgrade the United States’ growth prospects for lack of “social cohesion” and “political stability” reasons.

The cumulative effect of the two divergent paths, those of the average worker’s pay and of the average executive, is also evident in the statistics contained in *Forbes* magazine’s global billionaire rankings showing that between 1987 and 2013 the wealth of the very rich grew more than three times as fast as the world economy. A

recent study by Bricker et al. (2014) shows that between 2010 and 2013, the average income for the most affluent rose by 10 percent but it either fell or remained flat for the rest of the population. The most recent report by Occhino (2015) provides further evidence that labor's share of overall income has in recent years fallen to new record lows at the same time that corporate profits have soared. The dramatic divergence has created a condition such that the six heirs to the Walmart fortune are worth more than the bottom 130 million Americans and the 47 wealthiest Americans now own more than the combined wealth of the 160 million less fortunate Americans. As such, inequality appears to be at its worst in the United States (Piketty, 2014).

It is important to keep in mind that absent a concerted effort by the government to mitigate it, income inequality has a self-perpetuating dynamism.³⁵ Financial costs aside, there are also, severe social costs attributed to income inequality. In a recent study of income inequality conducted for the OECD, Osberg (2014) concludes that the last 30-year trend of unbalanced income growth (which is expected to continue in countries such as the U.S., Canada, and Australia) will continue to cause increases in inequality of opportunities and of political influence. Workers and their families will bear the costs of deprivation and transmit them to future generations. These will, in turn, cause further increases in income inequality and feed a perpetual vicious cycle.

Of course, in and of itself, this pattern of increasing inequality is unsettling. Equally undesirable is the fact that this rising inequality creates a cascading effect on the society's health and social problems. As shown by Wilkinson and Pickett (2009), health and social problems are closely associated with inequality. Indeed, they show that the index of health and social problems reaches its highest level in the U.S. where inequality is at its worst, and is at its lowest in Japan where inequality is at its lowest. Sweden and Norway, with their relatively low degree of inequality, are closer to Japan and enjoy lower degrees of health and social problems. At the other end, Portugal and the UK, subject to higher levels of inequality, are closer to the U.S. in suffering from higher degrees of health and social problems.

e. Climate Change

While financial economists have paid some attention to externalized costs of the types discussed above, one major category has received woefully inadequate consideration, i.e., costs of unabated emissions. While the accumulated scientific evidence on climate change has led to a near-unanimous conclusion that the phenomenon is undeniable, there has been little or no movement on the part of governments to address the issue.³⁶ Indeed, driven apparently by the ideological convictions of the governments in charge, policies enacted have sometimes further contributed to a worsening of the situation. For example, consider the U.S. State of Florida. As a state most vulnerable to the risk of coastal submersion in the event of a significant rise in sea levels, prudence calls for its policymakers to evaluate and plan for such an outcome.³⁷ Yet, following the 2010 election of a new governor, its

Department of Environmental Protection adopted a policy that directed its employees to avoid the phrase “global warming” if they are interested in remaining an employee of the Department.

As another example, consider the fate of Australia’s carbon tax. Following the heat wave that baked Australia for much of 2013 and into 2014, five groups of researchers embarked on five separate studies to examine its causes. Using distinct methods, they performed rigorous analyses of the data and all five groups concluded that the heat wave would not have been as severe in the absence of global warming. Astonishingly, and evidence notwithstanding, one of the first steps taken by the new government of Australia when it took office in July 2014 was to repeal the carbon tax that had been in place. Needless to say, emissions quickly shot up, which is likely to worsen the future possible cycles of heat wave.³⁸

The problem is not unique to the developed world. In China, air pollution contributes to 1.6 million premature deaths (nearly 40 percent of the global total) or 17% of all deaths in the nation each year (Rohde and Muller, 2015). Figured another way, China’s toll from pollution is about 4,400 people a day. In India, where each person loses an average of 3.2 years in life expectancy, and where altogether 660 million Indians could lose 2.1 billion years as a result of air pollution, its recently elected government has announced its intention to double the country’s use of coal over the next five years. The stated goal is, of course, economic growth. Ignored in the debate, however, is the negative effect on economic growth due to the

loss of 2.1 billion years of productive life of its citizens.³⁹ By itself, a loss of this magnitude may, indeed, lead to a significant retardation of growth. Further, contributing to a negative influence will be the effect of air pollution on agricultural production. Estimates suggest that the air pollution may reduce agricultural output by up to a third. Indeed, after decades of growth, wheat and rice yields have recently begun to drop or level off. And, most experts have attributed this to the worsening quality of air.⁴⁰

Against this backdrop, on November 2, 2014, the United Nations' Intergovernmental Panel on Climate Control (IPCC) issued its starkest warning to date, indicating that climate change poses as an "immediate threat." It blames climate change for die-offs of forests (e.g., those killed by heat-loving beetles), the melting of land ice everywhere, the accelerating rise of seas leading to increased coastal flooding, and the heat waves that have devastated crops and killed thousands of people.⁴¹ It also takes the position that the failure to reduce emissions could lead to food shortages, refugee crises, flooding of major cities, mass extinction of plants and animals, and the creation of dangerous conditions for working outside during hottest times of year (thus hampering economic activity). It argues that continued emissions will cause further warming, create long-lasting changes in all components of climate system, and pose serious risks to human progress, mainly by its severe negative effects on attempts to reduce poverty.⁴² The report notes that limiting global warming to no more than 2°C (3.6°F) would require emissions to be restricted to one trillion tons of CO₂. At the current rate, this would take about 25 years.

However, energy and coal companies have proven reserves equal to seven times this limit and are spending \$600 billion each year to find more. Furthermore, the IPCC estimates that governments throughout the world are currently spending some \$600 billion to subsidize fossil fuels.⁴³ Ironically, the annual expenditure to reduce emissions is about \$400 billion (or less than one year's worth of revenues of Exxon Mobil). However, according to a recent IMF study when real environmental costs are included, the "true cost" of government energy subsidies is estimated at \$5.3 trillion, a staggering amount that is the equivalent of 6.5 percent of global economic output.⁴⁴

Problems with IPCC's Estimates: For the most part, IPCC relies on Integrated Assessment Models (IAMs) to forecast the effects of climate change. As noted by Pindyck (2013), these IAMs rely on some key assumptions, including the rate of time preference needed for an analysis of the tradeoffs between the costs of abatement (lost current GDP and consumption) and the present value of their benefits (higher future GDP growth). However, it is not clear that the academic profession has done an adequate job of making it clear that such assumptions entail the making of some crucial intergenerational choices.⁴⁵ The higher the assumed rate of time preference, the lower the value placed on future generations' access to resources enjoyed today. It follows then that the greater the desire to leave future generations access to the same resources enjoyed today the lower the rate of time preference should be set.

Equally important is the question of how IPCC studies deal with the question of catastrophic outcomes or tail events. Considering the question of how much temperatures may rise if atmospheric concentrations of CO₂ were to double, IPCC surveys 22 publications on the subject and concludes that the mean value is 2.5°C to 3°C. Based on this, the cost of CO₂ built into IPCC estimates is \$20 per tone (see also Stern, 2013; Weitzman, 2013). Overlooked, however, is that there is a 5 percent probability that the actual value will be more than 7°C, a catastrophic outcome by all estimates. Granted that this 7°C increase has a low probability, its potential economic impact will be extremely high. Therefore, it is clear that the case for abatement will have to be made on the basis of catastrophic outcomes that have low probabilities and not on the basis of expected outcomes. Acknowledging the uncertainty inherent in such analyses, Wagner and Wietzman (2015) propose that the price of carbon be set at a minimum of \$40 a ton, a much higher price than the current “subsidies-inclusive” price of *negative* \$15.

What if Nothing is Done? A recently completed research by a team of social scientists with funding from NASA’s Goddard Space Flight Center has addressed this question. It concludes that the business as usual approach of economic elites has the potential to lead the society to disaster (see Motesharrei, Rivas, and Kalnay, 2014). It reasons that climate change will lead to dangerous levels of stretching of world resources, population growth, and economic stratification of society into elites and masses. The combined forces of these events, the study concludes, can lead to a collapse of civilization.

A study conducted by the U.S. Pentagon and, released in October of 2014, arrives at a similar set of conclusions. It describes climate change as a grave and an *immediate* threat to the US national security because of the increased risk of terrorism, global poverty, and infectious diseases that it engenders.⁴⁶ According to this report, likely future scenarios include the loss of glaciers, which will strain water supplies, as well as destructions and devastations caused by extreme weather patterns, including hurricanes. These developments, it argues, will create instability, droughts, and crop failures that will result in mass migrations. Indeed, Pal and Eltahir (2015) predict that by the end of this century areas of the Persian Gulf will experience extended waves of heat and humidity that would threaten human life. This would turn many cities uninhabitable and create a significant migration problem.

The Immediate Costs: Regardless of which study (among the many of these types) one puts more faith in, absent corrective action, the scenario for the future looks foreboding. However, it is not just the distant future that is at risk. Continuing on the current path has highly significant immediate costs as well. For example, United Nations Environment Program (UNEP) estimates indicate that the annual environmental costs from global human activity were equal to 11 percent of global GDP in 2008 (or \$6.6 trillion). It also estimates the 2008 cost of environmental damage caused by the world's 3,000 largest publicly listed companies at \$2.15 trillion. Evaluated from a risk-management perspective (for an equity portfolio weighted according to the MSCI All Country World Index), more than half of all

company earnings are at risk from environmental costs. Similarly, TruCost estimates suggest that the top 100 environmental externalities cost the global economy around \$4.7 trillion a year (in terms of the economic costs of greenhouse gas emissions, loss of natural resources, loss of nature-based services such as carbon storage by forests, and climate change and air pollution-related health costs).

On the flip side, a number of studies have undertaken to measure the potential benefits of corrective action. A report by the “New Climate Economy” for example concludes that efficient investments needed to reduce emissions will *not* impose net costs but they will instead result in net economic gains. For example, a 2016 study by the World Resource Institute finds that since the turn of the century, 21 countries have reduced their annual greenhouse gases while growing their economies.⁴⁷ Further, a recent World Bank study by Parry, Veung, and Hein (2014) concludes that all top 20 emitters would gain a net boost to their GDP if they tax emissions and use the proceeds to reduce other taxes. In the case of China, for example, they estimate that a tax of \$63 per ton of CO₂ will cut that country’s emissions by 17 percent, reduce the number of emissions-related deaths, and boost GDP by one percent.

3. Sustainable Finance

It is obvious, therefore, that the traditional model of value creation has led to unacceptable outcomes. The exclusive emphasis on shareholders’ wealth, as the criterion for decision-making, coupled with a short-term focus on immediate payoffs

caused by the nature of incentives built into executive compensation schemes, has led to a paradigm that often fails to deliver long-term shareholder value. The shareholder value so generated is often fleeting in nature and not sustainable as it imposes significant costs on other stakeholders. Again, the golden rule that is often overlooked is that, no matter how heroic the effort, attempts to externalize costs of doing business do not make them disappear. Indeed, when externalized, a firm's "local" costs can lead to "global" costs that are often many times larger. And, two factors are responsible for this growth in the size of these costs. First, the firm is intimately familiar with the nature of the costs and its possible remedies. Other stakeholders, on the other hand, are less familiar with these costs and are, therefore, at a disadvantage in dealing with them. Additionally, inevitable delays by other stakeholders in identifying the impact of such externalized costs and searching for a solution, can only lead to a "mushrooming" effect, making them much more expensive to deal with.

Consider, for example, the case of fresh water, one of this world's finite resources. An entity focused strictly on the short-term may focus on the nominal cost of water and engage in its wasteful use. Worse yet, the entity may be tempted to release contaminated or non-treated waste into waterways or choose other "locally" low-cost methods of discharge. Within such a framework, it is easy to see that the "global" costs of setting up monitoring mechanisms and reversing the adverse effects (if reversible) can be many times the sum of the "local" costs and the costs of treatment prior to such release. Therefore, a sustainable approach to this usage is

decidedly less expensive than the alternative. This would be the case even before we consider the issue of limited availability of this resource and its “all-in” cost.

Regarding the latter, let us consider the global availability of the supply of fresh water. As it has been widely documented and researched, the global supply of fresh water is dwindling at a fairly rapid rate.⁴⁸ However, the most alarming evidence is also a most recent: Brazil, a country nicknamed “Saudi Arabia of water” is now experiencing water shortages.⁴⁹

Looking ahead, access to safe water is not the only challenge we face. Like water, many of the world’s resources, including safe, breathable air and various animal and plant species are under severe stress. An objective observer will most likely identify the emphasis on short-term payoffs as the culprit for such unacceptable outcomes. It is, therefore, imperative that we shift away from our current paradigm in favor of one that can lead to a set of desirable outcomes, sustainable in their nature. Thus, a change of paradigm to sustainability is needed to avert catastrophic outcomes. This new paradigm need not require a complete abandonment of the framework presented in Equation (1). As detailed in Section 3.b, and unlike what Jensen (2001) suggests, Equation (1) can be replaced with a social welfare function that includes a set of weights that capture the universal preferences of all stakeholders. Absent such a welfare function, the unacceptable outcomes of the current model can be avoided by imposing the requirement that shareholder value be maximized subject to the constraint that other stakeholders not become worse off. Within such a framework, environmental, social, and governance factors play key roles in the

process of value creation. As such, all incidental effects of a project will need to be evaluated when maximizing revenues and all costs need to be evaluated as “all-in” and on a “global” basis.

a. External Pressure for a Change of Paradigm

The arguments in favor of a sustainable approach to value creation aside, it is also important to note that economic agents choosing to continue with the traditional paradigm (that focuses exclusively on the short-term interests of shareholders and often at the expense of other stakeholders), may find themselves under increasing external pressure to change. Motivated by a variety of factors such as own interests, moral and religious considerations, and societal and cultural factors, a growing number of interest groups have become increasingly vocal in protecting the interests of other stakeholders by monitoring the activities of economic agents, demanding or forcing change where necessary. As an example, consider one particular action in support of the endangered orangutans: Those arriving at the headquarters of Nestlé on March 17, 2010, as well as others within the vicinity of that building, were startled by a giant banner that covered the building and read “Give me a break” and “Nestlé Killer.” Greenpeace had managed to install the banner in its efforts to convince the foods giant to stop buying palm oil from Indonesia’s biggest producer (Sinar Mas Group). Greenpeace’s action was motivated by the destruction of the rainforest and the endangered orangutan’s habitat at the hands of the Indonesian supplier. The group was also behind the distribution of a video titled “Give me a break” that went viral on social media. The video targeted consumers of

Nestle's KitKat candy with a graphically jarring video that implicated those eating the candy in the killing of orangutans. Not long after Greenpeace's actions, Nestlé agreed to alter its sourcing practices and to provide for better protection of the orangutan's habitat.

Of course, the annals of environmental and social activism are replete with many examples of protests by interest groups.⁵⁰ However, the wildfire-like spread of such actions through social media has exponentially increased their potency and effectiveness. This, in turn, has empowered and emboldened activist groups to take action against a wider array of environmental and social causes. As a result, many firms have been forced to alter their ways of doing business and bring them closer to those in conformity with responsible and sustainable practices.

Further contributing to such external pressures are the changing attitudes of the public at large, and in particular those of the millennials. For example, in June 2014 the descendants of the founder of the ExxonMobil oil empire currently in charge of the Rockefeller Foundation made a fateful decision to cut their ties to fossil fuels and by March 2016 they had succeeded in doing so. The decision was taken with one purpose in mind: to fight climate change. The irony is quite clear: a fortune made in oil is now managed by the millennials, who consider fossil fuels a significant threat to the future of mankind. However, the critical element, and one that is not confined to this particular example, is the changing attitudes of the millennials. This new generation is interested in evaluating the *impact* of its investments and not simply

in maximizing the return on that investment (see, for example, Emerson and Norcott, 2014). As such, ESG factors play a prominently significant role in their decision-making framework.

Among ESG factors, the social element, i.e., social justice, has always been a cornerstone of the world's major religions. Of late, however, environmental factors (and governance issues to a lesser extent) have also attracted the attention and the focus of religious leaders the world over. Arguably, nowhere has this emphasis been more pronounced than in the Vatican. Further, it can be argued that no other religious leader's pronouncements hold as much potential as do those of Pope Francis in forcing the issues. Pope Francis' Encyclical was issued in June 2015 but it has already had a global influence on the debate on environmental policy, income inequality and corporate conduct. Further, by bringing into focus the *shortcomings of global capitalism*, or what this paper refers to as the negative consequences of the exclusive emphasis on shareholder wealth maximization in the short run, Pope Francis has established a moral and a religious imperative for addressing these issues.⁵¹

Beyond the influences of interest groups and those arising from moral and religious convictions, a notable number of business leaders have started movements of their own to convince their peers to alter course. A \$50 million grant by George Soros to establish an "Institute for New Economic Thinking" or the involvement of Hank Paulson, the former Goldman Sachs CEO and former U.S. Treasury Secretary, in the

“Risky Business” initiative aimed at mitigating the economic impacts of climate change are two such examples. Paul Polman’s dedication to sustainability issues, Peter Georgescu’s leadership in the debate on income inequality, Howard Schultz’s activism on social issues, and Tom Steyer’s initiatives on climate change are a few other examples of the building pressure from within the business community.

Not surprisingly, such pressure has already forced changes in how many companies do business. For example, up to a few years ago the German car industry was not concerned about the sources of its raw materials, but now it is concerned about conflict minerals. In general, sustainability considerations within the supply chain have gained a significant momentum in many industries. Further, consider that in just four years (2008–2012) the market share of sustainable commodities increased from 15 to 40 percent for coffee and from 2 to 15 percent for palm oil (*Financial Times*, April 21, 2015). McDonald’s decision to rely exclusively on cage-free producers for the eggs it purchases for its restaurants is another example of the effect on the supply chain.

b. The Path Forward

As discussed above, it is apparent that the increasing incidences of unethical and self-serving behavior, inspired by a myopic interpretation of shareholder wealth maximization, have stretched the world too thin with respect to its resources and have made it prone to irreversible degradation. This is, of course, potentially disastrous to the welfare of future generations. However, it is also apparent that one

need not be motivated only by the welfare of future generations to reconsider the wisdom of the traditional approach to value creation. As our examples illustrate, such short-sighted and self-serving behaviors, cloaked under the guise of “shareholder value,” can have ruinous effects on the welfare of the very shareholders they are designed to serve. The total or near-total wipeout of shareholders’ wealth suffered in a broad range of industries and exemplified by Enron, WorldCom, Tyco, Lehman Brothers and many others illustrates the fleeting and non-sustainable nature of such wealth.

Additionally, steps taken by other stakeholders, vocal in their insistence that their interests be considered, have led to the creation of markets in which private profit-seeking behavior can lead to value creation for all stakeholders, shareholders included. In that sense, the long-term interests of shareholders are aligned with those of other stakeholders. As such, the finance profession needs to develop alternative markets-based valuation models that include longer-term objective functions. However, as the examples discussed in this paper illustrate, markets on their own cannot *always* produce solutions that are in society’s best interest. Under the present regulatory environment, agents wishing to maximize their private benefits are often able to do so by externalizing some of their costs. However, as argued herein, externalized costs do not magically disappear; they are simply imposed on other agents or entities. It follows, therefore, that private gains so obtained come at the expense of others, typically the public sector. Consequently, given that the other agents are at a relative disadvantage in identifying and dealing

with these costs and that they will need to incur additional costs in dealing with them, a suboptimal level of societal utility is obtained.

c. Toward a Model of Sustainable Value Creation

In his pioneering work on sustainable finance, Soppe (2004) argues that in order to adequately deal with sustainability issues the discipline of finance must take a “multifaceted approach” rather than the single-dimensional track of risk/return. He arrives at this conclusion through a reexamination of “the underlying assumptions of the financial theory against the background of sustainability” and a comparison of the concept of sustainable finance with the traditional finance and with the behavioral finance. His comparisons are made along four dimensions, the theory of the firm, the assumptions about how the economic agent behaves, the ownership paradigm, and the ethical framework. Following a detailed discussion of all aspects of sustainability, as they relates to financial policy, Soppe describes sustainable finance as “a financial policy that strives for triple-bottom-line performance measurement with human actors that opt for maximizing multi-dimensional preference functions.”

While a multi-dimensional formulation can lead to solutions that avoid many of the problems described in this paper, the practical implementation and the optimization of such a function would require the cooperation and the trust of all stakeholders, each with its own set of interests and utility functions. Acknowledging that the development of a model that simultaneously “optimizes” objective functions of all

stakeholders would not be an easy task, Sophe takes the position that having a multi-dimensional goal “encourages an empirical approach of the market process from which normative human and economic guidelines can be detected.”

Jensen (2001) acknowledges the difficulty of optimizing a multi-lateral objective function and consequently concludes that the maximization of firm value is the best goal as it satisfies the needs of the shareholders, debt-holders, employees, customers, communities and the government. The core of his argument is that value maximization provides the managers a clear objective and that its outcomes are *measurable*. Further, he argues that the ‘stakeholders theory’ and the ‘balanced scoreboard’ do not provide the managers a set of clear objective. As such, they can damage the value of the firm as they obscure the overriding corporate goals. Mainly concerned with relying on an objective function that can clearly measure the firm’s performance and that of its managers, Jensen settles for value maximization as the ideal goal. However, both his arguments in favor of this single-dimension objective function, and his conclusion that value maximization satisfies the requirements of employees, customers and communities, rest on two critical assumptions that the markets work perfectly well and that there remain no unresolved agency problems. Yet, extant empirical literature is replete with evidence that run counter to these assumptions. Further, the examples cited in this paper provide for a contextual relevance of such fractures.

Therefore, it can be concluded that Soppe's approach is superior to that of Jensen. Accordingly, a decision-making framework that is capable of satisfying the concerns of all parties at the same time and that is also capable of yielding a measureable performance criterion will need to be multidimensional. More specifically, what is needed is a multidimensional social welfare function that includes all parties' preferences. However, such a model would require that the utility functions of all stakeholders be included. It also would require a pre-established system that clearly ranks the importance of each of the stakeholders' utility functions and assigns appropriate weights to them. The general form of such a theoretical function would conform to the following form,

$$\text{Maximize } f(U) = f(w_1u_1, w_2u_2, w_3u_3, \dots), \quad (2)$$

where u_1, u_2, u_3, \dots denote utility functions of various stakeholders such as shareholders, employees, debt-holders, customers, etc, and w_1, w_2, w_3, \dots , denote their weights in the social welfare function.

In practice, however, the question of who should determine these weights remains an unanswered question. Under ideal circumstances, cooperative and trusting economic agents would jointly determine these weights. This cannot take place, however, unless all stakeholders are fully informed about the complete range of the consequences of their decisions and that of the others. Utopian in nature, this condition is unlikely to be met. Absent such an agreement, the multidimensional

social welfare function may need to give way to a second-best model that yields a measurable function mindful of all stakeholders' interests.

Toward that end, we posit that the practical path forward takes the form of a constrained optimization: maximizing shareholders' wealth subject to the constraint that other stakeholders' positions not be compromised. Within such a framework, the firm is left alone to maximize the wealth of its shareholders so long as its actions do not harm wellbeing of other stakeholders. To ensure the latter, a set of environmental, social and governance norms and regulations must be installed and the firm's adherence monitored and enforced. As such, appointed by other stakeholders and by the government, these monitoring agencies and regulatory bodies ensure the firm's compliance. This means that, except when a solution motivated by maximizing shareholder' interests is also in the long-term interests of other stakeholders, sustainability would require the firm to be mindful of its constraints. To ensure compliance, a set of monitoring and enforcement mechanisms would need to be designed in order to ensure that corporate decisions do not harm the firm's employees, the society, and the environment.

However, no matter how heroic the effort, monitoring and enforcement efforts can prove fruitless if the agents involved do not subscribe to their merits. Furthermore, no matter how well-intentioned the rules may be, they can prove futile if they are not well-grounded or not scientifically sound. Therefore, in addition to markets and regulation, education would assume a paramount role in solving the riddle. In other

words, we argue that the solutions to the social, economic, and environmental challenges of our time can only be found within a triangle with markets, education, and regulations occupying its three corners.

Motivated by forces of the markets, private profits become aligned with social welfare and with public interest whenever the demand for a product (or service) is met by firms that utilize responsible processes that are mindful of their applicable environmental, social and governance constraints. As such, attempts to maximize shareholders' wealth would either benefit the other stakeholders or leave them no worse off than before. Most businesses fall into the latter category but example abound of the former type firms as well. The high rates of growth experienced by the organic-foods industry (when many conventional grocers experienced negative rates of growth), is just one example. Many other examples can also be cited including the mercurial ascent of the electric-vehicle manufacturers (and Tesla in particular), the phenomenal successes of the gypsum industry in providing an alternative to chemical fertilizers and for soil remediation purposes, the sprouting of 'energy-recapture' as a new industry, the successes of the recycling industry and the advent of what is broadly referred to as the 'sharing industry.' Firms as diverse as Alcoa, Nike, Adobe, General Electric, Novo Nordisk, Chipotle, Unilever, Nokia, Adidas, Starbuck's, Johnson and Johnson, Vivendi, General Mills, Nissan, Henkel, and Patagonia (listed not in any particular order) represent a few examples of entities that have rendered outstanding returns for their shareholders while have earned accolades for their social, environmental and governance excellence.

In this regard, it should be noted that a growing body of literature now provides empirical evidence indicating that market responds positively when businesses initiate or strengthen a commitment to environmental, social and governance factors. Among other benefits, a more mindful approach to the conduct of business yields a lower degree of unique risk (Fatemi et al., 2009), lower cost of borrowing (Goss and Roberts, 2011), higher probability of survival (Fatemi et al., 2015), positive consumer attitude (Kim, 2015), higher valuation of corporate cash holdings (Arouri and Pijourlet, 2015) and access to more trade credit from suppliers (Zhang, 2016).

However, as illustrated by our examples and supported by the empirical evidence outlined by Hashmi and Damanhour (2015), unfettered market solutions are not always the best ones from a societal perspective. Specifically, when an entity chooses to utilize a production process solely on the basis of its “local” cost and ignores its adverse effects on the environment or the society, it chooses to provide short-term benefits to its shareholders at the expense of the long-term interest of the public (that may include its own shareholders). Therefore, for public and private interests to align, a monitoring/enforcement agency needs to intervene and force the entity to internalize the environmental and social costs of its decisions.

Otherwise, in the absence of such regulations (and in the presence of informational asymmetry regarding global costs), a firm may be tempted to outflank its socially

responsible competitors by utilizing production processes that minimize its own local costs.

Within this framework, it is also easy to see that that in order to minimize the dead-weight costs of regulation, education has to play a significant role by raising awareness among all entities of the “all-inclusive” costs of their actions. Indeed, as alluded to earlier, education plays a highly significant dual role. First, it plays a vital role in raising awareness of the issues, the costs of doing business on an all-inclusive basis (both local and global), and the merits of monitoring and enforcement mechanisms devised. Absent such awareness, regulations intended to minimize the costs imposed on other stakeholders will prove ineffective and be skirted by the affected agents. Further, education plays a critical role when it comes to the design of monitoring and enforcement schemes. If regulations are to perform their intended role (of appropriately safeguarding against the adverse consequences of an unconstrained maximization of shareholders’ wealth), they have to be designed in a manner that they would deal with the underlying cause rather the symptoms. This, of course, cannot be achieved unless those charged with such responsibilities are well-versed in the subject and able to distinguish the symptoms from the cause. Otherwise, poorly designed regulations would only inject additional inefficiencies into the system; i.e., they would increase the costs of doing business but fail to prevent the firm from externalizing costs that should otherwise be internalized. Findings of Haney (2015) are of particular relevance to the importance of education and awareness. Her results indicate that if the threat of environmental problems,

their interconnectedness, and their long-term implication are understood and focused on early enough, environmental innovations ensue. Such steps would also prompt the firms' managers to conduct their business by "moral rather than pragmatic or cognitive legitimacy."

Additionally, educators need to help decision-makers, executives, and the younger generations better understand the concept of the all-in costs. We need to be honest and forthright when teaching the concept of value creation. More specifically, our audiences need to be taught that, from a societal perspective, value is created only when benefits exceed *all* costs: the firm's own costs as well as those externalized to others. The profession also needs to make sure that its audiences are well equipped to understand the importance of the environmental, social, and governance issues surrounding such decisions. Further, we need to make sure that costs of activities motivated by self-serving (or short-term) private interests are not conveniently glossed over, even when they are hard to measure. The many examples of firms changing tactics in response to consumer boycotts or activism by consumer advocacy groups illustrate that awareness is a key driver of change. Consumers as a group have shown that the cost factor is often not the only one they consider when making decisions; product safety, conditions under which they are produced (e.g., the use of child labor) and environmental impact, among other factors, tend to play important roles in such decisions. The higher the degree of awareness, the bigger the role played by such factors. However, awareness that is not accompanied by a framework to analyze the information can only have a limited impact. Of course, the

responsibility for providing such a framework resides with educators. Once this responsibility is met and the decision-makers are empowered, profit-seeking businesses will find it advantageous to alter their products or production processes to meet their demand. As such, public and private interests will be aligned.

At a broader level, the discipline needs to consider the development of valuation models that illustrate the *long-term* alignment of public and private interests. Going back to our simple discounted cash flow model of Equation (1), there is a need to show in detail the set of factors that exert a long-term influence on the firm's cash flows and its cost of capital, as it alters its production process and mitigates its risks. Of relevance are the findings of a number of studies showing that firms with higher degrees of commitment to CSR enjoy a lower cost of capital. Among these are the work of Goss and Roberts (2015) who study bank loans to US firms and report that "firms with social responsibility concerns pay between 7 and 18 basis points more than firms that are more responsible." In another study, Sharfman and Fernando (2008) report that responsible corporations have an easier access to debt financing. Also, Chen et al. (2007) report that, compared to non-unionized firms, cost of debt is lower for unionized firms because unions diminish the tendency of shareholders to sequester bondholders.

Such influences need to be formally incorporated into our valuation models.

Further, given that climate change is a material financial risk, the discipline needs to develop better methods for its quantification and management.⁵² More specifically,

there is a need for better modeling of catastrophic tail events associated with climate change. As discussed by Wagner and Weitzman (2015), climate change is a problem of insurance in which the fat tails and the outliers, not the expected values, determine the price of managing the risks. Finally, it is imperative that the highly inefficient schemes currently in place for compensation of executives be redesigned from the ground up in a manner that would reward the management only for the creation of *sustainable* value.

To accomplish these tasks, a close collaboration of scientists, economists, financial analysts, and educators is called for. The same type of collaboration is also needed for devising an effective and efficient regulatory framework. Such a framework would facilitate the adoption of projects that enhance shareholders' wealth but also enhance (or preserve) the public's interest in social and environmental factors.⁵³ It would also result in the adoption of measure to forestall unacceptable outcomes of the kind reviewed above. And, where deterrence proves ineffective, the framework would implement a fair system for the measurement of physical and financial damages to the environment or the society, and for attribution to specific activities and parties involved. Naturally, such collaboration is also needed in setting a pricing mechanism for the consumption of public goods (such as breathable air) so that businesses can consider the "all-in" costs of their planned activities. For example, adopting an inclusive definition of risk management, many firms have taken it upon themselves to reduce their carbon footprint. However, financial markets are at a loss as to how to assign a value to such risk reduction efforts.

4. Conclusions

If public goods were priced correctly, markets worked perfectly well, and all informational asymmetries and agency problems were resolved, the long-term interests of shareholders and those of other stakeholders would become perfectly aligned. However, when one of these conditions are not met, self-serving and myopic conduct can lead to the creation of short-term gains at the expense of long-term *sustainable* value. Such an outcome, i.e., an erosion of shareholders' long-term value accompanied by an adverse effect on the position of other stakeholders, is clearly inferior. Unfortunately, however, the incentives built into short-term focused executive compensation packages increase both the likelihood of such inferior outcomes and the degree of their egregiousness. Often set in a manner that allows the firm to recognize only a subset of its all-in costs, when defining its profits, these incentive structures allow for costs externalized to other parties to be ignored. Of course, the short-term profits created in this manner come at the expense either of other agents or that of the society at large. However, they can also have a negative effect on the *long-term* interests of the same shareholders. Given that externalized costs do not disappear into thin air and that they are paid for by other parties (often ill equipped to deal with them and at significantly higher levels), the negative societal effect can be staggeringly high. Therefore, this feedback loop can ultimately hurt shareholders' interests over the long-term.

This paper argues that such inferior outcomes, the resulting erosion of public trust in businesses, combined with the growing voice of other stakeholders in support of their interests call for a new paradigm of value creation. The increasingly dire state of the environment (a world stretched to its limits and prone to irreversible degradation) has added further fuel to this fire. Therefore, we posit that the traditional model of shareholder wealth maximization should be abandoned in favor of a sustainable value creation model.

In an ideal setting, agents representing all stakeholders of the firm would cooperatively agree on an objective function to be maximized. Absent such an agreement, unacceptable outcomes (of the type discussed in this paper) can be avoided by having the process of value creation defined as a constrained optimization problem within which shareholders' wealth is maximized subject to the constraint that other stakeholders not become worse off. As such, the consideration of environmental, social, and governance factors play a key role in the process of value creation.

We also argue that a sustainable solution to social, economic, environmental, and governance issues is dependent on (1) the stimuli provided by the markets, (2) the educational empowerment of decision makers, and (3) the presence of a smartly-designed monitoring/enforcement/regulatory framework. At the core of this solution lies the requirement that corporate decisions be made in a manner that do not sacrifice the interests of other stakeholders.

Endnotes

¹ This deficiency is not unique to the field of Finance. Indeed, business schools' curricula for management, strategy, marketing, accounting, and operation research typically lack sufficient (and in many cases any) coverage of discussions on ethical dilemmas facing businesses in their day-to-day activities. For example, accounting education has been criticized as being partly responsible for numerous corporate scandals in North America and Europe because it did not incorporate sufficient ethics elements in its curriculum. See, for example, Earley and Kelly (2004) and Madison and Schmidt (2006).

² To its credit, the accounting profession has had a long history of dealing with issues related to ethics and fraud. While such treatments have had either a normative or an empirical focus, a robust theory has not yet emerged.

³ See Zingales (2015) for a clear indication of the urgency of the need to deal with these types of issues. This is exemplified by the results of a survey of the readers of *The Economist*, conducted by Social Science Research Solutions (<http://financialtrustindex.org/>), in which 57 percent disagree with the statement that "financial innovation boosts economic growth." Results of the survey also show that 48 percent of respondents think that the US financial system hurts the US economy and only 34 percent said that it benefits it.

⁴ As explained in Section 3.c, the framework proposed herein is superior to the "Enlightened Value Maximization" model proposed by Jensen (2001).

⁵ See, for example, Bair (2012), Morgensen and Rosner (2011), Rajan (2010), Roberts (2008), Crouhy et al. (2008), and Expert Views from the Rotman School of Management (2008).

⁶ Note that a strong argument can be made that income inequality exacerbated the financial system's fragility as many of those who obtained '2/28' subprime mortgages were those with no-income, no-job (NINJO) who aspired to benefit from the perceived financial bonanzas of buying and selling homes.

⁷ Lulled by a false sense of security about market condition and motivated by greed, major U.S. investment banks significantly raised their leverage in the third millennium. By 2007 debt to equity ratios of Lehman Brothers, Bear Sterns, Merrill Lynch, and Morgan Stanley ranged between 30 to 33 times. This meant that a decline of about 3 percent in asset prices would have wiped out their entire equity base.

⁸ See, for example, Fatemi et al. (2015) who provide evidence in support of the argument that corporate social responsibility need not result in welfare loss to shareholders and can, indeed, enhance their wealth.

⁹ Comparing the 400 companies included in the DS 400 Index with a matching portfolio, Fatemi et al. (2009) report that during the 1990-2006 period, socially responsible firms included in DS 400 had similar return and market risk and significantly lower idiosyncratic risk. This means the portfolio of DS 400 companies must have had a lower cost of equity capital.

¹⁰ See Karageorgiou and Serafeim (2014) for a comprehensive review of the evidence on the costs and benefits of earnings guidance.

¹¹ Ironically, before its current troubles were unearthed, Valeant's CEO pay package was praised as a model (see <http://www.wsj.com/articles/SB125106931496352353>). It was only after the firm fell victim to accounting irregularities that its "outsize" executive compensation package was deemed at fault (see *New York Times*, April 5, 2016, http://www.nytimes.com/2016/04/05/upshot/valeant-is-a-reminder-of-the-peril-of-outsize-executive-pay.html?_r=0).

¹² This prompted the New York Attorney General to open an inquiry and to subpoena the records of Exxon Mobil (see *New York Times*, November 5, 2015). Joined by 14 other states, the inquiry has subsequently focused on whether the company committed fraud on this issue (see *New York Times*, March 30, 2016).

¹³ See Christine Lagarde, "Economic Inclusion and Financial Integrity—an Address to the Conference on Inclusive Capitalism," <https://www.imf.org/external/np/speeches/2014/052714.htm>

¹⁴ See, for example, “Lagarde and Carney let fire at financial sector,” *Financial Times*, May 27, 2014.

¹⁵ Although most airlines (particularly the ones subject to rigorous safety regulations) have seldom engaged in cost-cutting efforts without proper consideration of black swan-type events, the same cannot be said about all firms. This observation, to be revisited later, holds the key to a possible solution. That is, policy solutions have to be introduced where market mechanisms fail to address the issues.

¹⁶ See *New York Times*, July 2, 2015, <http://www.nytimes.com/2015/07/03/us/bp-to-pay-gulf-coast-states-18-7-billion-for-deepwater-horizon-oil-spill.html>

¹⁷ See *Wall Street Journal*, September 4, 2014, <http://www.wsj.com/articles/u-s-judge-finds-bp-grossly-negligent-in-2010-deepwater-horizon-disaster-1409842182>

¹⁸ See *New York Times*, July 25, 2013, <http://www.nytimes.com/2013/07/26/business/halliburton-pleads-guilty-to-destroying-evidence-after-gulf-spill.html>

¹⁹ See *New York Times*, April 11, 2014, <http://www.nytimes.com/reuters/2014/04/11/business/11reuters-gm-recall.html>

²⁰ See http://www.nytimes.com/2015/09/18/business/gm-to-pay-us-900-million-over-ignition-switch-flaw.html?_r=0

²¹ Indeed, some economists argue that since the society grants the shareholders this limited liability privilege they are not the sole owners of the firm. Therefore, given the limited liability feature, all stakeholders have some rights in the firm (see, for example, Boatright, 1999; Soppe, 2004).

²² See also Dhaliwal et al. (2011, 2014).

²³ Consider this example of an entity’s attempt to minimize its own ‘local’ costs and its clumsy efforts to externalize the remaining costs. On September 4, 2013, thousands of dead fish floated along a 19-mile stretch of a river in Hubei Province in central China. Tests of the river’s water revealed ammonia concentrations at 196 milligrams per liter of water, which according to the WHO’s standards was 9,800 times the level considered safe for drinking and 17 times the level normal for surface water.

The fish were of course killed by pollutants emitted by a local chemical plant owned by the Hubei Shuanghuan Science and Technology Company, an apparently repeat offender with regard to these discharges. See *New York Times*, September 4, 2013,

<http://www.nytimes.com/2013/09/05/world/asia/thousands-of-fish-killed-by-waste-from-chinese-plant.html>

²⁴ See *New York Times* December 6, 2012,

<http://www.nytimes.com/2012/12/07/world/asia/bangladesh-fire-exposes-safety-gap-in-supply-chain.html>

²⁵ Ibid.

²⁶ The issues nested under the topic of local versus all-in costs are many and fairly complicated.

These include the role of information asymmetries, social discount rates, full transparency and level playing fields, which lay beyond this paper's scope. (We are indebted to an anonymous referee for this point.)

²⁷ See *Wall Street Journal*, May 13, 2015, <http://blogs.wsj.com/economics/2015/05/13/top-ceos-now-make-373-times-the-average-rank-and-file-worker/>

²⁸ As shown by Piketty (2014), the rise of America's one percent has mainly been driven by executive salaries and bonuses (rather than income from investments or inherited wealth).

²⁹ See *The Economist*, Oct. 13, 2012. The Gini coefficient is the most commonly used measure of inequality. It is defined based on the Lorenz Curve which plots the bottom x percent of the population on the horizontal axis and the income that is cumulatively earned by that population on the vertical axis. As such, it is indicative of income distribution. Perfect income equality is inferred when the resulting plot for various values of x yield a 45-degree line. However, higher levels of income inequality are inferred the further the resulting plot deviates from a 45-degree line. The coefficient itself is calculated as the ratio of the area between the Lorenz Curve and the 45-degree line, over the total area under the 45-degree line. The higher the income inequality, the higher the ratio (Gini coefficient).

³⁰ “For Richer, For Poorer,” *The Economist*, Oct 13, 2012.

³¹ Ibid.

³² World Economic Forum, *Global Risk 2012*, 2012.

³³ See Jillian Tett, “An unequal world is an uncharted economic threat,” *Financial Times*, September 4, 2014.

³⁴ Ibid.

³⁵ Indeed, Atkinson (2015) concluded that government action is needed to reduce inequality and most of his recommendations are aimed at reversing some recent trends. These include bolstering trade unions, more progressive taxation of income, specific steps to eliminate child poverty, providing public sector jobs to those willing to work, reducing monopolies, and encouraging greater competition.

³⁶ The U.S. Congress has frequently and consistently hindered the U.S. Administration’s attempt to move in the direction of environmental stewardship.

³⁷ A recent study by DeConto and Pollard (2016) indicates that the melting of the West Antarctica ice sheet alone has the potential of raising sea levels by more than a meter by the year 2100 and by 15 meters by 2500.

³⁸ It should be noted that climate change is considered to be the greatest threat to Australia and its Great Barrier Reef: see “Great Barrier Reef’s greatest threat is climate change, says new report,” *The Guardian*, August 12, 2014.

³⁹ A recent study finds that prenatal exposure to air pollution is tied to the child’s subsequent intellectual deficit and behavioral problems. Once this toll is also considered, the negative effect on growth will be much more substantial than its mere effect on the current population’s premature deaths.

⁴⁰ See *New York Times*, February 21, 2015.

⁴¹ The toll that California's drought will take on that state's economy is yet to be fully accounted for. However, recent evidence indicates that climate change has contributed to the worsening of the drought by as much 15-20 percent. See *New York Times*, August 20, 2015.

⁴² Ibid.

⁴³ The IMF estimates this to be approximately \$2 trillion.

⁴⁴ See Clements and Gaspar's blog at IMF Direct: <http://blog-imfdirect.imf.org/2015/05/18/act-local-solve-global-the-5-3-trillion-energy-subsidy-problem/>

⁴⁵ The assumption of a 5 percent rate of time preference implies indifference between the consumption of one gallon of drinkable water 25 years from now and only three-tenths as much today (holding its quality constant). Similarly, a 2 percent rate of time preference assumption implies indifference between the next generation's consumption of one unit of clean air 25 years from now and only six-tenths as much of it today.

⁴⁶ The report connects the rise of the radical group ISIS with Syria's severe drought and food shortages that triggered relocation of that country's farmers to cities where youth were more susceptible to joining extremist groups. (This connection between ISIS and drought is also reported in *Proceedings of National Academy of Sciences*, 3/1/2015.) The Pentagon report underscores the importance of water resources to the terrorist group by pointing out how it uses the seizure of scarce water resources to enhance its power and influence. See *New York Times*, October 14, 2014.

⁴⁷ See <http://www.wri.org/blog/2016/04/roads-decoupling-21-countries-are-reducing-carbon-emissions-while-growing-gdp>

⁴⁸ Evidence abounds regarding the dire situation with regard to availability of water in the developing world. However, the problem is not restricted to the developing world as more than one million people in California lack reliable access to clean water. See

<http://america.aljazeera.com/articles/2015/4/6/more-than-1-million-californians-lack-clean-water.html>

⁴⁹ See *New York Times*, February 16, 2015.

⁵⁰ For the sake of brevity we refrain from citing the many other examples in which the actions of one or more activist groups have forced changes in the labor, environmental, and social practices of firms in the footwear industry, textiles, mining and extraction, toys, electronics, soft drinks, tobacco, forestry and a number of other industries.

⁵¹ See for example, “In fiery speeches, Francis excoriates global capitalism,” *New York Times*, July 11, 2015.

⁵² See “Picking the climate winners and losers”, *The Financial Times*, June 22, 2015.

⁵³ For example, inspired by self-cooling mounds of African termites, architect Mick Pearce has built Zimbabwe’s largest office and shopping complex in Harare without reliance on conventional air conditioning systems. This has resulted in significant savings for the builders as well as tenants of the building. These kinds of ecologically sensitive projects are possible when the economic and tax systems create financial motivation for businesses to do well by doing good.

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List of Abbreviations

CDO – collateralized debt obligation

ESG – environmental, social and governance

IAM - Integrated assessment model

IMF – International Monetary Fund

IPCC - United Nations' Intergovernmental Panel on Climate Control

LIBOR – London interbank offered rates

OECD – Organization for Economic Co-operation and Development

SPV – special purpose vehicle

UNEP – United National Environment Programme

WHO – World Health Organization