

Sustainable Finance: *Building a More General Theory of Finance*

Scott T. Fullwiler

Research Scholar, Global Institute for Sustainable Prosperity

James A. Leach Chai in Banking and Monetary Economics, Wartburg College

Adjunct Faculty, Presidio Graduate School

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Sustainable Finance

Building a More General Theory of Finance

Scott T. Fullwiler*

*Research Scholar, Global Institute for Sustainable Prosperity
James A. Leach Chair in Banking and Monetary Economics, Wartburg College
Adjunct Faculty, Presidio Graduate School*

Abstract

Traditional financial theory is driven by a narrow set of values—namely that only financial risk and financial return matter. Quite clearly, investments—whether projects or companies—produce a much broader set of outcomes than this, while investors are in fact people with their own sets of broader concerns. This paper argues that the emerging field of sustainable finance—largely practitioner-driven until recently—provides an opportunity to build a more general theory of finance that incorporates these realities, demonstrating at the same time that traditional financial theory is only a special case of the more general theory. The paper discusses four important current trends contributing to the growth of sustainable finance—“blended value” investing; recognition that sustainability factors can be related to systematic risk; financial innovation to increase sustainability; and building infrastructure for sustainable finance. The paper then turns to a discussion of areas that will require further research—namely risk, diversification, and time, all within the context of sustainability—in order for sustainable finance to help build a more general theory of finance.

Keywords: impact investing, sustainable finance, social finance, ESG, socially responsible investing, ecological economics, ecosystem services, social rate of discount

JEL codes: Q5, D62, G11, G18, O35

Introduction

John Maynard Keynes’s titled his best-known work *The General Theory of Employment, Interest, and Money* because he believed he had developed a *general* theory that could explain macroeconomic cycles while relying upon fewer restrictive assumptions than the Classical economists. He argued that the generally accepted framework developed by the Classics was merely a *special case*—i.e. it was applicable only to a fully-employed macroeconomy—due to

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its simplifying assumptions that essentially assumed away the possibility of aggregate demand-led, prolonged recessions such as the Great Depression.

This paper argues that sustainable finance has the potential to contribute similarly to a more general theory of finance. Traditional financial theory is based upon restrictive assumptions regarding values and investment outcomes, limiting both to financial gains/losses and their risks. Sustainable finance instead recognizes both a greater range of potential values—including financial return, risk aversion, altruism for current and future generations, and concern for ecological resilience—and a larger potential set of returns or losses, both financial and otherwise.

Because the *general theory* framework has fewer restrictive assumptions and broader applicability, it is a more appropriate starting point for analysis. It is counter-productive to use a theory of macroeconomics that largely ignores the possibility of financial crises and large macroeconomic downturns to understand a world in which such events have repeatedly happened. It is similarly backward to begin financial analysis with traditional financial theory when it is known that financial gains and losses are necessarily intertwined with human values beyond financial returns, resilience of ecological systems, and the well-being of others within and beyond the current generation. To that end, this paper discusses several potential components of a new theory of sustainable finance that are building blocks for a more general theory of finance.

I. Sustainable Finance, Blended Values, and Blended Returns

Muhammad Yunus (2008) writes that an important problem with traditional economic theory is its view that individuals are purely self-interested when it is quite evident that an individual in fact is driven by a blend of self-interest and altruism. For more than two decades, Jed Emerson (e.g., Emerson 2003) has preached the concept of “blended value,” which recognizes that no company or organization is purely “good” or “bad,” but rather generates a “blend” of social, environmental, and financial returns (which can be positive or negative). A world in which investors have a blend of altruistic and self-interested values, and where all companies generate blended returns, should not look like the received dichotomy of investing 90 percent of one’s wealth for self-interested financial return, completely divorced from philanthropic, altruistic giving of the other 10 percent. As RSF Social Finance’s Don Schaffer put it,

We’re in the midst of a transition from a very 20th Century mentality—which can be described as a wealth now, philanthropy later way of compartmentalizing the two and getting wealthy before you can get into charitable and philanthropic activities.

What it seems to be transitioning into with younger generations is a blending of those two buckets—investing/wealth and philanthropy. Instead of looking at it in a compartmentalized way, they see it as a spectrum, especially when it comes to rate of return on investment. You could have plus 15 percent on the high-end, and negative 100 percent on the other end—which is to give money away—and a whole range in between with a lot of territory in it (Waggoner 2010).

While not new—“socially responsible investing” (hereafter, SRI) dates back at least to the practice of screening out of South African investments from portfolios in the 1980s due to apartheid—the current momentum for integrating environmental, social, and governance (hereafter, ESG) criteria into investment decisions represents an opportunity to build investment practice *and theory* on the principles of blended values and blended returns.

Instead of the traditional investing/philanthropy dichotomy, Emerson and Freundlich (2012, p. 4) refer to a “unified investor” who invests across three broad categories to align his/her blended values with a blend of investment and impact returns:

1. Capital that is intentionally structured to generate a blend of social and financial returns, requiring a minimum of a market-rate risk-adjusted financial return.
2. Capital that is structured to create a blend of social and financial returns, but accepts financial returns lower than the risk-adjusted market rate in exchange for greater social returns.
3. Capital that generates a core-mission-aligned social return, but no financial return to the investor other than tax deduction value.

Unified portfolios of blended value/blended return investments can incorporate all traditional asset classes—public equities, private equity, fixed income, deposit accounts and CDs, real estate, real assets, hedge funds, philanthropy, and so on (e.g., Bridges Ventures 2010; Emerson and Freundlich 2012; Emerson 2012, p. 8; Humphreys, Solomon, and Electris 2012). Opportunities continue to emerge for still greater alignment with unified investing goals for blended values/returns, for instance, in community food systems, community development, ecotourism, sustainable agriculture in developing economies, water markets, carbon markets and offsets, carbon-reducing projects (e.g., climate bonds), and conservation finance.

Practitioners are already creating new approaches to building portfolios based on blended values of their clients as a result of ESG criteria applied to traditional investments, financial instruments and even asset classes emerging from sustainable finance, ESG-based indexes and benchmarks. Within public equities (and often fixed income), there are two main approaches with several sub-variations:

- The exclusionary or negative screening approach of traditional SRI, where undesirable investments—fossil fuels, tobacco, industrial agriculture, national defense, companies with poor ESG ratings—are omitted either by individual investors or by fund managers (such as TIAA-CREF’s Social Choice fund).
- The positive screening approach, which screens better ESG-performing companies into the portfolio, either to (a) replace lower ESG-performers (e.g., Kiernan 2009; Humphreys *et al.* 2012), often within the same industry in order to maintain desired diversification against a benchmark, or (b) to “tilt” the portfolio to weighting the higher ESG-rated companies higher while lower-rated companies remain but at lower weights, consistent with the view that no company is “all good” or “all bad,” while suggesting there remain diversification benefits to keeping the lower-rated companies in the portfolio (e.g., Herman 2010).

Both groups also engage in investor activism in an attempt to shape behavior of companies and increasingly improve their ESG performance. Blended-value investors (even the negative screeners) may maintain investments in even very low ESG-performing companies in order to file shareholder resolutions or otherwise engage with management as owners. Shareholder resolutions are usually non-binding, but they can impact company policies in various ways, e.g. by generating public attention (even when they lose!) or encouraging management to negotiate to avoid such attention. These strategies further align blended returns of unified portfolios with blended values (e.g., Emerson and Freundlich 2012; Humpreys *et al.* 2012; Digitale 2014).

Considering only financial returns of investments and self-interest of investors is a special case of a more general theory of finance. The more general case of sustainable finance is to build a theory of unified portfolios by recognizing that (1) investors possess blended values and that (2) every investment generates a blend of financial and non-financial returns.

II. Sustainable Finance and Financial Risk

There is growing evidence that risk-adjusted returns from ESG-based investing could outperform traditional diversified portfolios. Mercer (2011), for instance, found that in 30 of 36 studies the relationship between ESG factors and return was neutral or positive. In a much-heralded and comprehensive study published by Deutsche Bank, Fulton, Kahn, and Sharpies (2012) reviewed 58 academic studies evaluating ESG-based portfolios and found that ESG factors were strongly associated with reduced cost of capital and market-based or accounting-based outperformance. Edmans, Li, and Zhang (2014) reported that employee satisfaction is associated with risk-adjusted, abnormally high returns in countries with flexible labor markets. Ghoul, Guedhami, Kwok, and Mishra (2011) also reported that companies with higher ratings for employee relations and environmental responsibility ratings had lower *ex ante* implied costs of equity even after accounting for industry, asset value, market beta, and leverage. Their more recent research found evidence for lower costs of equity among higher ESG-rated firms in manufacturing industries across 30 countries (Ghoul *et al.* 2014). Looking at market indices, Murtha and Hamilton (2012) report that the Dow Jones Sustainability World Total Return Index persistently outperformed the MSCI World Total Return Index during 2001-2010.

There are a few commonly-cited explanations for why ESG investments might outperform. First, managers that manage ESG factors better may in fact be the better managers. It is well known that manager quality is the key driver of business value; ESG performance could be an *ex ante* indicator of higher quality management (e.g., Kiernan 2009; Herman 2010). Second, the risks and opportunities presented by ESG-related issues are seen as the future, if not current, operating environment of business in general (e.g., Lubber 2010; DeBoer and VanBergen 2012). Consequently, ESG factors are now often viewed as material to business value and thus also to company reporting (e.g., Bonner *et al.* 2012; Hespenheide and Koehler 2013). The logical outcome is increasing investor demand for greater ESG transparency and standards for mandatory reporting of ESG-related outcomes and managerial practices.

But if ESG factors that in some cases are already publicly available are related to higher risk-adjusted returns, why has the market not priced these factors in already? Leaving aside the issue of whether capital markets are efficient (in the efficient markets hypothesis sense), from the perspective of a more general theory of finance, it follows that an asset-pricing model in which

ESG factors have systematic properties could in fact be a better model (e.g., Jussa *et al.* 2013). At the same time, the majority view in capital markets (and in academic finance) continues to be that ESG factors are *not* systematic and therefore explicitly integrating them into portfolio building results in a *reduced* reward-to-risk balance (e.g., Kiernan, 2009; Forbes, 2013). In other words, if the true or at least better model is one in which ESG factors reduce risk systematically, and if market participants on average are using an asset pricing model that does not incorporate ESG factors, then there could by definition be alpha (excess risk-free return) associated with ESG-based investing (e.g., Harold, Spitzer, and Emerson 2007).

The doubts of many investors and finance academics notwithstanding, there are many reasons to believe that ESG factors could become essential systematic factors of portfolios of the future (again, if they are not already), such as:

- The future interaction of climate- and biodiversity-related risks/opportunities with new technologies and the extent of policy responses will form the context of investing, risks, and returns, according to Mercer (2012). Strategic allocations among different asset classes, and among higher versus lower ESG-rated within and across these asset classes, will matter in many reasonable scenarios (Mercer 2012).
- Some argue forcefully that even current fossil fuel reserves are “unburnable” given imminent climate legislation, which would mean that existing assets of the respective firms are grossly overvalued already based on cash flows that can reasonably be forecast from these assets (e.g., Leaton 2014).
- Some newer ESG-related asset classes—such as sustainable agriculture or social impact bonds—could have low correlations with traditional investments and thus could provide benefits to diversification (e.g., Barby & Pedersen 2014; McGrath & Lai 2014).
- ESG ratings have been found to be related to lower cost of debt among publicly held corporations (e.g., Principles for Responsible Investment 2013), while anecdotal evidence suggests that ESG ratings for municipal bonds may predict state and local government defaults (Gerlach *et al.* 2013).

Of course, this is not to suggest that ESG investments will always outperform “traditional” investments. Even those publishing such studies find the favorable results tend to be related to specific characteristics of portfolios or firms. For instance, the results of Fulton *et al.* (2012) were most strongly associated with the “G” or governance part of ESG and with portfolios built from positive rather than negative screens typical of traditional SRI investing. Krosinsky (2014) reminds that a portfolio constructed from Sustainalytics’ “10 Companies to Watch in 2014” would have been “an unmitigated short-term disaster, dramatically underperforming benchmarks”; he warns that while Sustainalytics’ evaluations are likely correct and in general represent high quality of analysis and detail, ESG factors become material only if companies are held accountable by policy, markets, or both. Referring to his own research, Krosinsky confirms the Fulton, et al. result that positive screens can be associated with outperformance, while negative screens rarely are. The question, of course, is which positive screens are appropriate. There are too many approaches to discuss or even name here for aligning ESG ratings and financial return, but the overarching themes tend to be building portfolios of companies that are (a) best at managing the opportunities and risks of environmental factors in their own operations, in their supply chains, and in terms of potential regulatory changes, and (b) best at managing a

range of stakeholders from employees to communities to customers. (See, for instance, the various chapters in Krosinsky (2012) or Jussa *et al.* (2013) for examples and discussions of ESG portfolio-building, many of which blend ESG analysis with traditional financial and competitive advantage analysis).

For building a more general theory of finance, the growing evidence of how financial risk, financial return, and ESG factors are related suggests that traditional single or even multi-factor models of the risk/return relationship are overly simplistic. Instead, sustainable finance provides the impetus to do analysis that more explicitly integrates context—that is, a company’s sustainability policy, employee relations, community relations, board diversity, exposure to regulatory risks, ESG disclosure, and so on, is economically significant for determining materiality and systematic risks. A theory of finance that omits or otherwise downplays this context is a special case, not a general one.

III. Sustainable Finance and Financial Innovation

Through the deliberate blend of altruism and self-interest, traditional financial tools are used to build financial innovations to solve social and environmental problems where blended returns can be aligned with blended values. One of the most notable characteristics of sustainable finance to this point is the large amount of financial innovation it has catalyzed. At least five of these innovations are now well-known:

- Microfinance proved that the very poor in developing countries can be very good credit risks. A key innovation was “community collateral” in which loans are made and paid back by groups of people in the community (usually women).
- Carbon rights trading markets (and earlier sulfur dioxide trading markets) enable the internalizing of one of the most important environmental externalities.
- Social impact bonds allow financial return to be explicitly tied to impact thresholds.
- Crowdfunding platforms enable direct, often (but not necessarily) very small donations or investments for small businesses, non-profits, and impact-related projects to be pooled together.
- Payments for ecosystem services enable internalizing externalities—this time positive externalities provided from protecting ecological systems—while also providing payments to investors and/or inhabitants or owners who often happen to be poor in developing countries.

None of these has been without difficulties—legal, press-related, development of necessary infrastructure, etc.—but they each show the potential for a more general approach to finance that integrates blended returns and blended values to integrate traditional tools of finance with social and environmental impact.

All five examples have also directly or indirectly encouraged even more innovation. Investment carbon funds, for example, raise public or private capital to purchase carbon credits in primary markets in bulk earned by emissions-reducing projects, conservation, community development, etc., and sell the credits into retail secondary markets at a spread above the bulk price. Microfinance and crowdfunding platforms are blended together by Kiva, Vittana, and others for

traditional financing of small business loans and education loans in developing countries; crowdfunding also serves as a platform used by SparkFund to finance low-cost energy efficiency improvements in communities across the U.S. Social impact bonds—already being attempted in public healthcare, education, and anti-recidivism initiatives—have the potential to serve as a model for environmental impact bonds (Nicola 2013) and development impact bonds, and could further expand beyond the public sector as an initiator into more traditional grant-making foundations that have impact-driven missions like the public sector. Finally, ecosystem services payments can be integrated with numerous other financial instruments and markets, such as carbon markets via carbon offsets, water markets, and conservation finance.

Microfinance loans, sales of agricultural goods by developing nation farmers, and sharing economy assets are each now legitimate collateral for asset-backed financing. Based themselves on “community collateral,” microfinance loans have proven to be securitizable in a way similar to loans from banks and credit cards. They can thereby serve as sources of ongoing, growing financial resources for microfinance institutions (Emerson and Spitzer 2006; Jayadev and Rao 2012). Root Capital—which lends to farmers and small businesses that are generally too large for microfinance and too small for traditional banks (the so-called “missing middle”)—utilizes the purchase orders received by its borrowers as collateral for loans it makes; the buyers of the goods then pay Root Capital directly and Root Capital then sends the payment net of principal and interest to the borrower (Milder 2010). Though also not without challenges, residential solar power leases (e.g., Solarcity) and Zipcar fleets have likewise proven to be securitizable assets. Some think negawatts (a unit measuring electricity *saved*) might have properties consistent with marketable securities issued for solar and wind power purchase agreements (Equilibrium Capital 2010). A Seattle utility and investors in energy efficiency upgrades are now testing the negawatt model; utilities in New York, California, and other states may follow (Bank 2014).

Capital structure innovations can similarly enhance and embed a sustainability mission. For instance:

- Venture philanthropy fund Acumen’s approach yields deals that establish below-market returns in investments in entrepreneurs with a possibility of making significant, replicable impact in education, healthcare, or sanitation in the developing world. Acumen has labeled its approach “patient capital”; it might also be referred to as purchasing a long-term, European call option on impact, where—unlike traditional venture capital—entrepreneurs have flexibility and time to make mistakes and adjust business models in search of one that might solve social problems in a replicable and/or scalable way.
- When Good Capital invested in Better World Books (BWB), there was concern that BWB’s practice of regular donations to its literacy partners as a percent of profits (originally a percent of sales, but then changed) might not survive if the company were purchased. The solution was ultimately to vest the literacy partners with ownership in BWB, providing them with the opportunity to take a substantial payday in an acquisition or own a percent of the profits as it was doing prior to vesting (Jones 2009). Good Capital also dealt with a typical difficulty of private impact investing—exits—in its BWB deal by creating a put option with a strike at a pre-agreed multiple of sales that was exercisable after a period of years; the effect was to enable Good Capital to exit whether

or not a liquidity event occurred, allowing BWB the choice of using cash, issuing equity, or issuing debt to pay for the put if it were exercised (Jones 2009).

Though this section has only scratched the surface of ongoing innovations in sustainable finance, the fact that innovation *has* had such a significant role within sustainable finance is unsurprising. Blended values and blended returns are *themselves* innovative ideas from a traditional finance view; combining business models and finance where motivations for both go beyond traditional financial returns almost by definition should result in new forms of capital structure, financial asset classes, market infrastructure, and so forth. This is precisely why a more general theory of finance is necessary—the appropriate, more general framework for innovation that helps build a sustainable, equitable economy is one that considers blended values and blended returns from the outset.

IV. Infrastructure for Sustainable Finance

The ability to develop scale ESG-based investing—whether from approaches based on blended values, competitive returns, or outperformance of benchmarks—requires a financial infrastructure that enables this. If anything, this infrastructure is more important to creating financial innovations in sustainable finance. In a more general sense, building the infrastructure for sustainable finance illustrates the inherent embeddedness of the financial system within a broader socio-ecological context. In other words, markets—financial markets as much as any—are necessarily social constructs, as are market prices.

One could argue that there are few things that have been more important to the evolution of business and finance than double-entry accounting (e.g., Sombart 1924; Most 1972; Previts and Merino 1998). Whereas traditional accounting evolved over centuries, growing concern that ESG-related factors are material and the increasing demand by investors for ESG reporting mean that the era of accounting and financial reporting for a world of blended values and blended returns is already here. The ability to further scale ESG investing and ESG-based financial innovations relies crucially on the ability to create transparency in the ESG factors for evaluating and valuing risks and returns required for price discovery (Chen 2011). In turn, transparency requires agreed-upon approaches to measuring/accounting and reporting standards.

While at an early stage, the infrastructure in accounting, measuring, standards, ratings, and reporting for sustainable finance is emerging, including the following examples from equities, fixed income, natural and human resources:

- The Global Reporting Initiative (GRI) and the Sustainability Accounting Standards Board (SASB) are developing standardized approaches to ESG reporting for public companies. The Global Impact Investing Network (GIIN) is doing the same for privately-held companies. Carbon Disclosure Project (CDP), Sustainalytics, Trucost, HIP Investor, CSR Hub, CERES, and many others provide ratings of companies' ESG practices to investors. Bloomberg and others provide platforms for obtaining ESG-based data and ratings on companies and funds much like, say, Morningstar provides for traditional investors. MSCI, Dow Jones, and Standard and Poors have developed numerous sustainability-related indexes.

- CERES, the World Bank, and the Climate Bond Initiative have developed voluntary standards for green bonds. KPMG provides third-party assurance for climate bonds (Murphy, 2014), while Barclays and MSCI have developed a green bond index to go with several existing indices for ESG-related fixed income products. HIP Investor rates over 4,000 government and non-government entities issuing municipal bonds on ESG criteria.
- The Natural Capital Project and others are developing methods for valuing natural capital for financial statement accounting based on a blend of previous and newer research on valuing ecosystem services. Puma recently began publishing its much-celebrated environmental profit and loss statement. Numerous companies, particularly in India (such as Infosys, NTPC, and BHEL, as discussed in Kashive 2012), report human capital resources in their financial statements. These reports are based largely on previous theoretical research (such as Lev and Schwartz 1971).

Sustainable finance infrastructure also is necessary for liquidity, which is itself required for scaling via primary market placements, secondary markets, and exits, and in aiding price discovery. Mehrling (2011) explains in detail how traditional financial theory has essentially ignored liquidity in asset pricing theory by *assuming* liquidity is forthcoming when violation of no-arbitrage conditions occurs. His description of the role of the hierarchy of creating, backstopping, and restricting liquidity in the financial system, and its role in financial fragility and instability (based on the work of Hyman Minsky) is beyond the scope of this paper, but the relevant point is that liquidity is *created* in markets deliberately. Liquidity does not magically appear because there is a mispricing; rather, liquidity is an integral part of a price in the first place. The difficult work, for instance, of (a) building liquid carbon markets; (b) building primary markets for green bonds and social impacts bonds (much less secondary markets); (c) clearing and settling alternative investments like Calvert Foundation’s Community Investment Note (a payments systems used by advisors, trusts, and brokers); and (d) developing methods for exiting social ventures without compromising their missions, all speak to the necessary role of infrastructure for scaling sustainable finance.

A public infrastructure of sustainable finance exists alongside the private infrastructure. Voluntary reporting requirements are useful—and in many ways have been successful—but there is a reason why investors concerned with ESG factors continuously write letters to the Securities Exchange Commission (SEC). From the perspective of traditional finance and economics, public sector regulation, subsidies, taxes, and restrictions are “interventions” in “pure” markets. But “pure” markets do not exist. Any real-world market is necessarily the product of the existing infrastructure of legal liabilities and rights of business, legal forms of incorporation, subsidies, taxes, regulations, and so forth. There is no such thing as a government *not* choosing among competing interests in society or the natural environment in regard to these. For instance, traditional fossil fuel industries have been characterized by expanded drilling and mining rights, subsidies (multiple times greater than those for renewable energy; see, for instance, Vorrath (2014), Makhijani (2014), Koplow (2012), and Pfund & Healey (2011)), the historical absence of laws or regulations requiring that carbon emissions be priced while a similar combination of laws, regulations, subsidies, and so forth exists for related industries like agriculture, automobiles, and electric utilities.

Rather than seeing these as “interventions” into “free” markets, a more general theory of finance recognizes that public financial infrastructure heavily influences the ability of investors to trust the stability of a market, build an asset class, and develop financial innovations. Chen (2011) refers to this as “consistency” in markets and public policy, which is a requirement, in his view, for creating and scaling sustainable finance. The challenges of creating financial tools for community-based investing (e.g. direct public offerings or community mutual funds) can be gleaned from the detailed laws and regulations regarding non-accredited investors. One then also sees how something like the JOBS Act can potentially help scale these tools via improved “consistency.” One could draw a similar analogy with benefit corporation legislation. Some of this is not new—the research of Ronald Coase in the 1960s was significant in recognizing that trading allowances could be assigned in order to develop cap and trade markets for carbon, water rights, and land development rights to protect biodiversity. Still earlier, in the first decades of the 20th century, John R. Commons explained how markets were necessarily socially embedded given the particular—and unavoidable—allocation of rights, duties, liabilities, and requirements inherent in markets and prices in capitalist systems. The uneven development of carbon markets to date is an illustrative example of the importance of “consistency” in building and scaling social finance, and of building a more general theory of finance inclusive of the work of Coase, Commons, and others who recognized the socio-ecological context of markets and market prices.

Overall, the development and scaling of sustainable finance requires its own deliberately constructed public and private infrastructure of rights, rules, regulations, accounting/measurement/reporting standards, primary markets, secondary markets, and payments systems. Markets, prices, and financial returns are not “natural”—they emerge from an interaction of businesses, consumers, and investors within this infrastructure. A more general theory of finance that recognizes this also recognizes the context of public and private infrastructure as a prerequisite for sustainable finance.

V. What’s Next for Sustainable Finance?

All progress and success to date notwithstanding, there is more to be done for a more general theory of finance to be possible. This section discusses three cornerstones of traditional financial theory—risk, diversification, and time—with respect to their implications for sustainable finance.

1. Risk and Diversification

Emerson (2012) presents hypothesized relationships between financial return, financial risk, and impact in three dimensions. Figure 1 shows the traditional “efficient frontier” from finance textbooks with a positive relationship between financial return and financial risk. Figure 2 shows the three-dimensional “efficient frontier” relationship between financial return, financial risk, and impact in Emerson (p. 11) as a three-axis graph. Emerson’s point was to demonstrate how impact investing could be viewed holistically, and it is probably a helpful representation in that sense. However, there are a few important problems with the figure. The financial return and impact axes drawn as dotted lines farther down the financial risk axis are added from Emerson’s original. These clearly show that the assumed relationship in Emerson’s figure between financial return and impact is negative—that is, more impact reduces financial return.

Also clear from Figure 2 is the relationship between impact and financial risk as positive—that is, more impact raises financial risk. Both of these are counter to some of the evidence presented earlier suggesting that ESG factors appear to be able to contribute positively to return and might also possess alpha-like qualities, particularly if they are sources of systematic risk. Indeed, it is inconsistent with several of Emerson’s own writings on ESG investing. To be clear, though, there is no suggestion in Emerson’s paper that the graph is intended to be the result of careful theoretical analysis. As such, the reproduction and discussion here is not intended as criticism but rather as a demonstration of the need for investigating the relationships he presents more rigorously both empirically and theoretically.

Figure 1: Traditional Efficient Frontier Relationship between Financial Return & Financial Risk

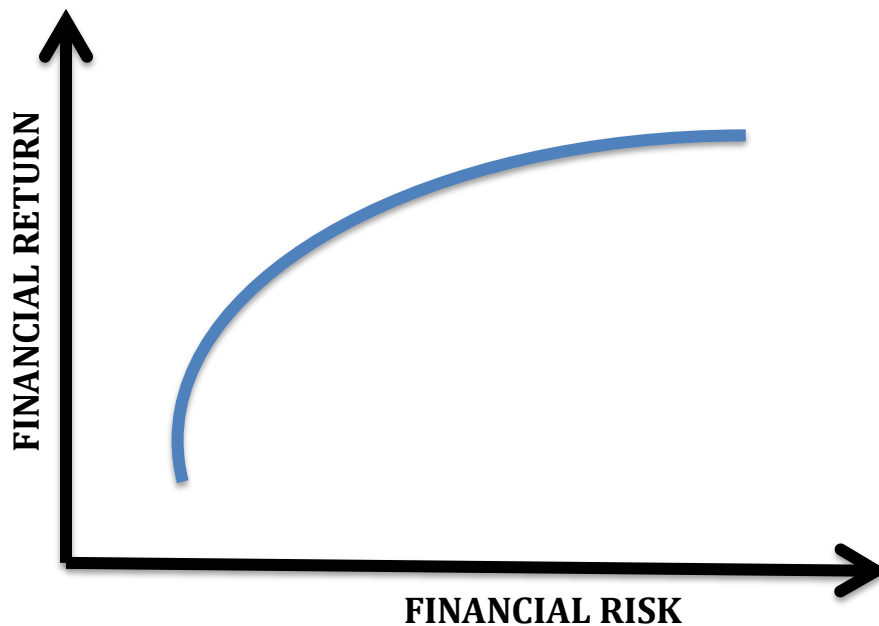
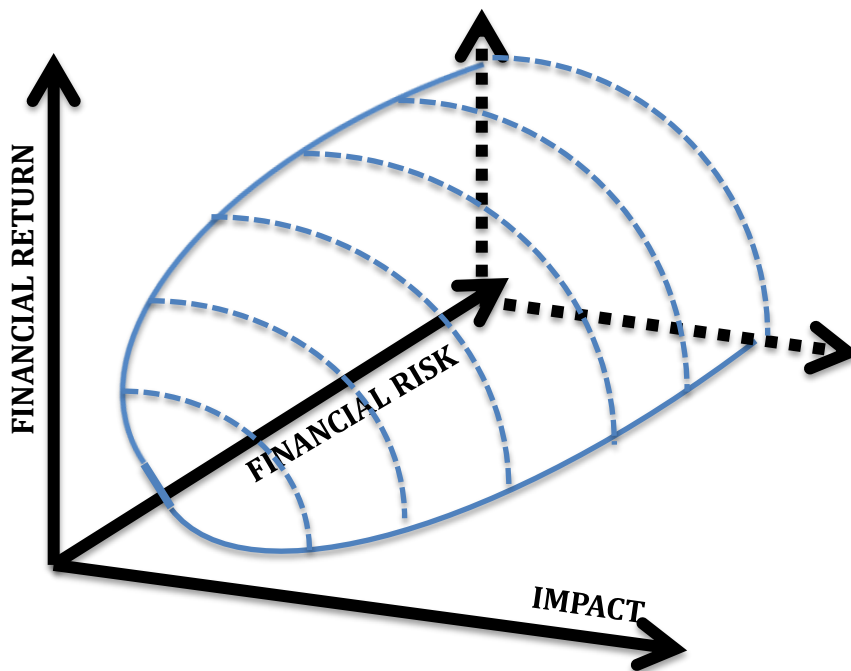


Figure 2: Three-Dimensional Efficient Frontier of Financial Return, Financial Risk, and Impact



Additionally, while various approaches to measuring non-financial impacts and returns are available, most do not consider the risks of these impacts or how these risks might be valued or otherwise evaluated. Consider the following hypothetical scenarios:

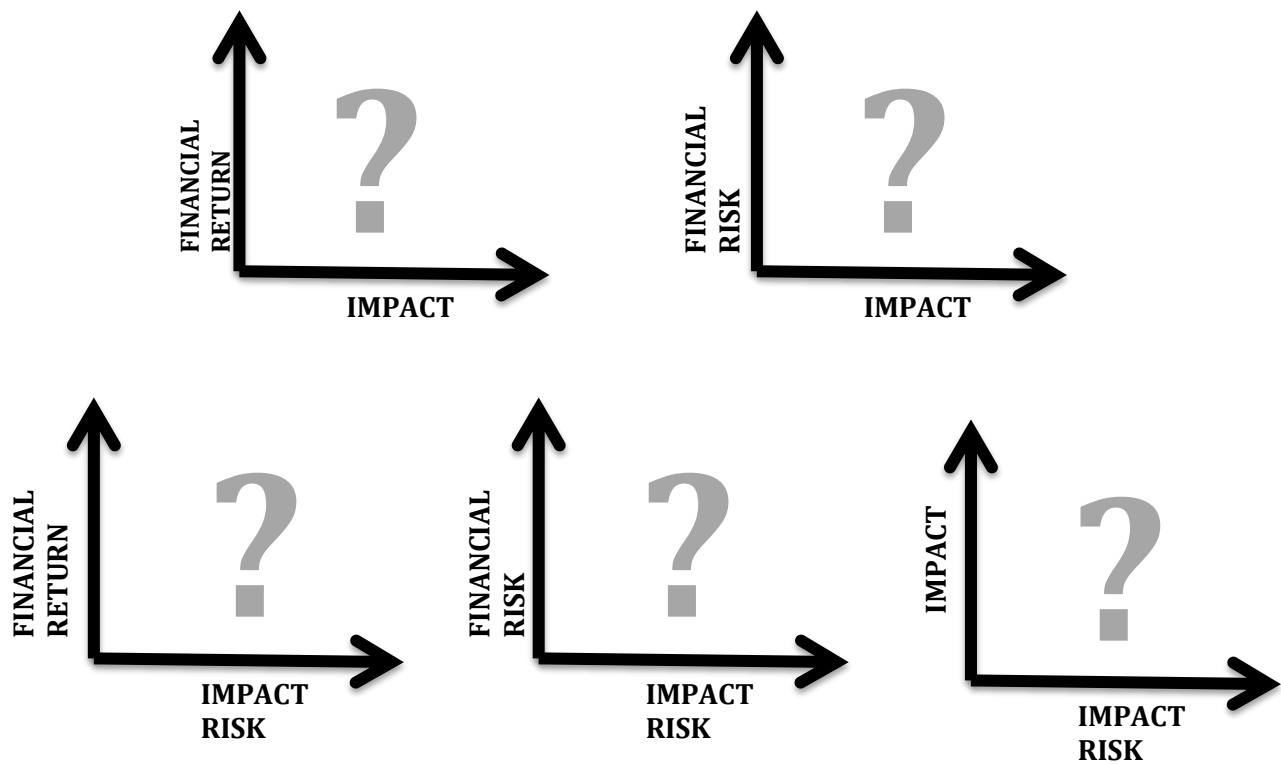
- Two electric utilities with carbon emission reduction records that are better than their industry average, but with one company consistency reducing at a stable, regular pace and the other reducing at a highly variable pace, even increasing carbon emissions for several years at a time.
- Two large retail score above average with respect to community impact, employee satisfaction, or some other index or ranking of social responsibility. Both consistently score in the top 30 percent but one remains constant while another “swings” with the ups and downs of the economy at large.
- Two non-profit organizations, one with a tested business model producing consistent impact in community job creation and poverty reduction, and a second with an innovative business model that could have a truly paradigm-changing effect on poverty if successfully scaled, or no effect at all if the model fails.

One would think that blended value investors would in each case view the two companies differently, with the second being a riskier bet on impact. From an asset pricing perspective, if ESG factors are material and/or sources of systematic risk, the second company in each case should face a higher cost of capital and/or have a lower valuation, all else being equal. This suggests risk to impact or to ESG factors is a fourth factor to integrate. A four-dimensional graph is obviously not possible, but Figure 3 presents the pairs of relationships not yet integrated

into a more general theory of finance—financial return/impact, financial risk/impact, financial return/impact risk, financial risk/impact risk, and impact/impact risk. Again, the point is not to criticize Emerson’s figure (Figure 2) per se, but rather to illustrate and reiterate the importance of more fully theoretically and empirically understanding the relationships in question.

For a more general approach to finance, there are closely related theoretical and empirical questions to answer with regard to diversification. In building portfolios, where there are benefits to diversification, financial risk of an individual asset is less important than the financial risk to the portfolio; the benefits of diversification arise from imperfect correlations among assets in the portfolio, which if low enough can significantly reduce portfolio risk and push out the efficient frontier. While many point to the potential benefits of the financial return/financial risk tradeoff of building stock portfolios that account positively for ESG factors, is there any reason to desire imperfect correlation among these factors in order to reduce the risk to the portfolio’s financial return? Or is the highest ESG score across all assets more desirable, as most reports published by the impact investing community implicitly assume?

Figure 3: Five Relationships to Understand Theoretically and Empirically



Additionally, what about the relationship of impact to the risk of impact? Are there benefits to diversification of impacts across assets or of diversification across investments with less correlation for a specific impact? In other words, is there any ability to take advantage of imperfect impact correlations among assets within a portfolio and significantly reduce the risk that desired impact(s) occur?

Finally, what are the potential correlative patterns for impact in the first place? For instance, it may be easier for companies to sustain greater impact or ESG ratings when the broader economy is also doing well, which could suggest a macroeconomic-based systematic component to ESG factors; if so, how valuable is it in terms of a portfolio's financial risk and its impact risk to diversify the portfolio by including investments that have less or even negative correlation with the systematic component? Perhaps there are some ESG factors for which high correlation across individual assets is desired (for instance, reduced carbon exposure or more board diversity) while for others lower correlation might be desirable.

Developing an understanding of multiple sources and forms of risk for a new, blended value financial system will clearly not be easy—compared to financial risk there are few if any standards for measuring and evaluating impact risks, while investors' preferences in the face of risks to a blend of returns or impacts are obviously not as simple as the standard financial risk and financial return tradeoff of modern financial theory. But standard approaches to portfolio building and valuation rely on an analysis of financial risk and diversification. Without an understanding of the relationships in Figure 3 and of diversification of both financial returns and impacts, a generally agreed-upon approach to portfolio-building and valuation, will remain incomplete for a world of blended returns and blended values.

2. Time

Time is fundamental to ecology *and* finance. Ecological systems have their own patterns of time sequences for interactions among parts, abilities to absorb inputs, or produce more resources (Hayden 1993). Socioeconomic systems also have *their* own time sequences. In both cases, traditional financial analysis—particularly discounted cash flow or cost/benefit valuation—assumes time is the enemy. The discount rate used in financial analysis is a measure of just how much an “enemy” time is: a higher discount rate means future reductions in the effects of climate change or improvements in biological diversity are worth exponentially less today, providing incentive to not integrate the differing ecological and social/financial time sequences. Overcoming this lack of integration is an important part of building a more general theory of finance.

Even within finance and economics, there is no consensus on the appropriate discount rate to use.

Economic opinion is divided on a number of fundamental aspects, including what is the appropriate value of an uncertain future “marginal product of capital,” what are the relevant efficiency distortions and how are they possibly magnified by public-sector projects, how should large, long-term public investments be placed within the framework of the capital asset pricing model, how are we to view intergenerational transfers when future generations are not presently represented, how do we account for equity and other distributional effects in aggregating costs, benefits, and discount rates over individuals or across countries over time—and so forth, and so on (Weitzman 2001, 260).

There are essentially two competing views on the discount rate for ecological costs and benefits. The positivist position, also called the descriptive or opportunity cost view (P/D/O) is that the

appropriate rate is the corresponding market rate that matches the maturity and the risk of the project, regulation, or ecosystem services under consideration. As Nordhaus (2014) puts it, “the discount rate should depend primarily on the actual returns that societies can get on alternative investments” (p. 187); to use any other rate would be to misallocate scarce financial capital among all potential investments that will affect future generations. In terms of a number, Nordhaus suggests that the risk-free real rate of interest has averaged 3 percent in the U.S., while the private sector rate has been 7 percent (p. 188-189). Gollier (2013) provides estimates of risk-free rates that are markedly lower than Nordhaus’—a 10-year Treasury real return of 1.9 percent—though he does have a similar private sector real return of 6.6 percent (p. 553).

The second position—known as the “ethicist” position, also called the prescriptive or philosophical view (E/P/P)—argues that the choice of discount rate for valuation or cost-benefit analysis should derive from the transfer of wealth inherent in the investment from current to future generations. Rather than grounding analysis in real-world market rates, E/P/P supporters often use the Ramsey equation of the rate of “social welfare discounting,” $r = \eta g + \rho$, where r is the social rate of discount, η is a measure of diminishing marginal social benefits (i.e., larger values imply greater undesirability of wealth transfers to future generations), g is the growth rate of consumption per capita (i.e., how much wealthier future generations will be), and ρ is the pure rate of time preference (i.e., how much more the current generation’s welfare should be weighted relative to the future generation’s). Stern (2006) famously argued that the context of future environmental challenges required $r = 1.4$ percent via his assumptions of $\eta = 1$, $g = 1.3$ percent, and $\rho = 0.1$ percent, or $1(1.3) + .01 = 1.4$. In other words, Stern assumed that economic growth (g) would slow from that of the 20th century (that is, the growth rate of a world with climate change is lower than a world without it) while the welfare of future generations was worth nearly the same as that of current generations ($\rho = 0.1$ percent, or nearly 0).

In a sustainability context, setting $\rho = 0$ (or nearly 0, as Stern did) is common among those invoking the Ramsey equation (e.g., Posner and Weisbach 2010; Gowdy, Howarth, and Tisdell 2010; Gollier 2013). Setting g at less than historical levels is less widespread, though not necessarily uncommon, and derives from the inclusion of natural capital as another form of capital required for sustaining per capita consumption; some even set $g < 0$ for this reason (Gowdy *et al.* 2010, 266-267). Gollier further argues that g should be reduced if future economic growth becomes more uncertain (i.e., if it becomes less certain that future generations will be wealthier), while some claim that the discount rate should decline as the discounting horizon increases (Gowdy *et al.* 2010; Goulder and Williams 2012; Gollier 2013)—in fact, the British Treasury has applied declining discount rates to ecological project evaluations (HM Treasury 1997). This is, of course, largely at odds with the P/D/O view since an increasing term structure of interest rates is what is most commonly seen in financial markets.

Some believe that the two positions can be reconciled. Goulder and Williams (2012) argue that “neither [approach] dominates the other: the choice between them is between an approach that is more comprehensive [i.e., E/P/P] and one that might involve less subjectivity [i.e., P/D/O]” (p. 16).

Analysts who implicitly concentrate on [the E/P/P approach], focusing on ethical considerations, tend to call for a relatively low discount rate. This leads them to argue for more aggressive abatement efforts. Analysts who implicitly focus on

[the P/D/O approach], drawing attention to the (relatively high) opportunity cost of capital, tend to call for a higher rate. This leads them to support less aggressive action. The two views are not incompatible [...]. Whether a given level of policy stringency is justified will depend on which of the two important evaluation criteria is being employed (p. 17).

Additionally, Gollier (2013) argues that even the P/D/O position cannot avoid being influenced by the E/P/P perspective:

Notice that we don't observe the return of assets whose risk free cash flows mature in time horizons exceeding 30 years. The [P/D/O] approach fails to provide any clear answer to the determination of the arbitrage-free discount rate for those horizons. The arbitrage argument entails a reinvestment risk in that case. If we consider a project yielding risk free cash flows in 60 years, the natural arbitrage strategy would be to invest in a bond yielding a risk free return in 30 years, and then to reinvest in another 30-year bond at that time. The problem is that we don't know today what will be the risk free rate in 30 years[...]. The bottom line is that even the [P/D/O supporter] needs to rely on ethical principles when prices are not observable or when markets are incomplete (p. 553).

From the view of a more general theory of finance, Goulder and Kennedy's reference to criteria and context is key. Private companies have market-based costs of capital that set the opportunity cost of their activities. Governments below the national level likewise borrow at market rates of interest. But risk-free rates are better understood as policy variables for currency-issuing national governments operating under flexible exchange rates issuing debt in their own currencies (e.g., Fullwiler 2007; De Grauwe, 2012; Krugman 2013). Rather than being set by "market forces," monetary authorities in these countries manipulate risk-free short-term and long-term rates (the latter more indirectly since shortly after the World War II era, though recent quantitative easing efforts moved a bit closer to more direct targeting) based upon the state of the macroeconomy relative to macroeconomic policy goals. The "market" risk-free rates Nordhaus prefers do, in fact, ultimately rest on both policy and values.

While discount rates for private businesses or non-currency-issuing governments *are* set in private markets, these are also not value-free. Even in traditional financial theory, these rates are markups over the risk-free rates set by policy makers. Further, discount rates for private or public projects with negative ESG impacts should not have the same discount rates as similar projects with significantly better expected ESG impacts if markets are pricing based on blended returns and blended values. If, as suggested earlier, ESG risks are systematic—perhaps generating *negative* betas with respect to ESG factors—then a lower-rated ESG project (or company) should have a higher cost of capital in an efficient capital market, all else being equal. Another concern is that at all levels of public spending on the environment, the opportunity cost for an economy below full capacity utilization could be *greater* unemployment of human resources and *less* private capital investment. Using a market rate of discount as a "hurdle" rate for a project (perhaps even one set as a policy variable) may be inconsistent with this macroeconomic context. Mazzucato (2013) additionally claims that early-stage government projects are among the most important catalysts for future innovation and growth, while Porter

(1991) famously argues similarly for environmental regulations, providing several examples of how national competitive advantage can emerge as a result (see also Porter and van der Linde (1995) and Ambec *et al.* 2011).

While as noted there is some evidence that markets are beginning to incorporate ESG factors into private costs of capital and ESG rated municipal bonds, there is no agreed-upon theory or generally accepted practice (as with, say, ratings agencies for traditional fixed income investments) even within the P/D/O literature as of yet for how these should affect market discount rates. For the E/P/P perspective, the Ramsey equation is based on the neoclassical economic theory of physical capital returns that has been criticized as being inapplicable to a modern monetary economy by Keynes (1937), numerous others during the “capital controversies” of the 1960s (e. g., Cohen & Harcourt 2003), and by contemporary economists from the Post Keynesian school (e.g., Felipe & McCombie 2010). Sustainable finance brings (or maybe even requires) an opportunity for interaction between those with different approaches to time and discounting, similar to the overlap that has emerged in some contexts among ecological and neoclassical environmental economists (regularly seen, for instance, in the journal *Ecological Economics*).

All of this notwithstanding, thinking still more generally about financial theory and sustainability, the “value” or significance of flows of ecosystem services to sustaining resilient socio-ecological systems depends on the timing, magnitude, and growth of these flows relative to the existing sufficiency of the relevant stocks of natural capital. That is, the “‘natural’ time value” of these flows is high, low, decreasing, or increasing not because of a particular discount rate but rather because of its contribution to or subtraction from the resilience of a socio-ecological system. How consistent a discount rate for financial flows of financial capital is or is not relative to the resilience of time sequences of ecosystem services flows is not altogether clear from neither D/P/O nor E/P/P approach. Discount rates are obviously used in countless settings for determining the time value of flows of ecosystem services from natural capital, and the inclusion of ecosystem services in these valuations provides greater opportunities to protect natural capital and ecosystem resilience than would occur without their inclusion. Nevertheless, as Gowdy *et al.* (2010) put it,

The bottom line is that characterizing responsibilities to future generations by a ‘discount rate’ does not do justice to the nuances of human cultures, the heterogeneous nature of the many contributors to well-being, or the pure uncertainty as to the future of *Homo Sapiens* [sic] on planet Earth (p. 277).

To close by way of returning to the analogy of monetary policy, economists call “natural” the rate of interest that is consistent with full employment and price stability. As noted, the rate itself is not as important as the policy goals; no economist uses the interest rate as the criteria for how much unemployment must be accepted in order to reduce inflation by some percentage. Likewise, investors and policy makers implicitly or explicitly decide how much climate change, biodiversity loss, and altered states of ecological resilience they are willing to live with, which in fact (at least implicitly) drives their choice of discount rates, not vice versa. To suggest otherwise is to confuse policy *goals* and related evaluative *criteria* with the *levers* that policy makers use to implement policies. Sustainable finance needs a more general theory of a

“natural” rate of interest that recognizes this and thereby reconciles the traditional practice of discounting timed sequences of financial flows with criteria for evaluating blended returns related to the “natural time value” of the resilience of ecosystem services, natural capital preservation, and socioeconomic well-being.

Concluding Remarks

In the end, what is *more general* about sustainable finance? In short, it recognizes (a) more values; (b) more types of returns; (c) ESG as a risk class; (d) financial innovations that encourage greater sustainability; (e) the accompanying financial and non-financial accounting to these first four; (f) that finance, economics, and markets are socially and environmentally embedded creations for social provisioning; (g) risks to impact or non-financial returns, non-financial correlations, and potential for diversification on non-financial grounds; and (h) time’s effect on financial analysis needs to be socially and environmentally embedded. By comparison, in every instance above, traditional finance is a *special case*, accounting for only a narrow subset of values, returns, risks, correlations, market constructions, and time preferences.

Keynes wrote that “in the long-run we are all dead” in 1923, thirteen years before *The General Theory*. Less well known is the sentence that followed, where he wrote that “economists set themselves too easy, too useless a task if in tempestuous seasons they can only tell us that when the storm is past the ocean is flat again” (p. 80), warning of the dangers of a theory covering only special cases. More recently, Mazzucato (2013) argues that a more sustainable economy “can’t develop on its own in part because of the failure of markets to value sustainability or punish pollution” (p. 119). The core premise of this paper is that sustainable finance can aid the development of a more general theory of finance, providing the starting point for analysis of projects, portfolio management, company valuation, management/shareholder interactions, and public sector policy analysis that incorporates the socio-ecologically embedded nature of finance. When a more general theory of finance “values sustainability and punishes pollution,” markets will have the analytical tools to do so, too.

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