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Water Risk Exposure and Financial Performance: Can Market Signals Drive Corporate Behavior?

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It is no secret that good corporate environmental practices have marketing value. Data from capital markets indicate that environmental performance impacts financial performance and asset risk pricing as well.

Since 2006, the use of largely non-financial ESG (Environmental, Social and Governance) data, including water use information, for valuation of equity, real estate, and fixed-income investments, has been on the rise. This is predominantly due to the rapid growth of an investment mandate referred to as 'Responsible Investment (RI)'. RI seeks to integrate ESG data in investment decisions and portfolio allocations. In 2014, the total RI-rated assets under management are estimated at \$ 45 trn.

The main challenge for RI is that these data are non-financial, and correlations between environmental and financial performance tend to be spurious.

Without improved understanding of causation, the economic benefit and financial asset valuation of companies operating in basins such as the Great Lakes cannot be ascertained.

Since 2010, the types of data collected in support of ESG-based investing have become more granular. Earlier this summer, a series of articles in the Financial Times on corporate water risk made front-page business news, in part because of the statements from corporate chiefs that water risk may be a more urgent risk than climate change. The article cited Global Water Intelligence, a market analysis firm, to indicate that firms committed \$84 bn. to conserve, manage or obtain water over the last three years.

Importantly, risk assessor Moody's pronounced that water scarcity has credit-negative implications in the mining industry, thus further stirring debate on embedded risk of water in global markets. These data are only the latest in the discourse on water risk in ESG investor risk decisions. Indeed, voluntary corporate water risk disclosures are growing faster than carbon disclosures across all industry sectors, based on data from CDP, a non-profit focused on providing corporate environmental risk metrics for investors.

Typically, physical and regulatory water risk assessments employ basin and/or corporate risk tools, such as the World Resources Institute's (WRI) Aqueduct tool, the Water Risk Filter developed by the World Wildlife Fund (WWF), and water footprint tools based on life cycle assessment principles. Even though it is unclear how these data are – or indeed should be – used by investors, the focus on the operations side presents challenges to understand whether and how water impacts risk pricing of stocks and thus asset valuation.

The imperfect information flow between physical and financial risk resulting from the lack of a liberalized and transparent water market is well known. To address this deficit, so-called 'conservation rate'-based water pricing policies at the utility or plant level have attempted to incentivize corporate investment in water risk management strategies, with mixed results.

The problem is that the opportunity for water pricing is well below the trigger point to incentivize major corporate investments in water risk mitigation.

As a result, the discourse at financial water risk meetings is slowly shifting beyond water pricing, and towards asset risk and stock volatility impacts. The case for stranded assets due to water is increasingly part of the conversation, given that the valuation of opportunity cost is orders of magnitude higher than that of water price alone.

To address opportunity cost impacting the firm, a corporate CFO needs flexibility and will tend to resort to short-term market-based risk management tools before investing in long-term capital asset allocations to mitigate supply risk. That is, unless top-down policies compel decisions otherwise. The toolbox available to the financial office differs between industry sectors, depending on whether the impact is direct or indirect, and the extent of the firm's dependency on commodity markets. Thus, hedging strategies, conservation strategies and forward-looking water efficiency management strategies may be deployed, given on the magnitude and temporal nature of the risk.

A key challenge for policy makers, corporate, and capital markets actors is that they have different objectives, and will optimize accordingly.

Since the type of business water risk, a company's decision what to do about it, and pricing of risks and actions in the markets, are linked, financial risk assessment needs to be layered on top of ESG risk metrics.

One approach, as advocated by Equarius Risk Analytics, a Michigan-based financial risk firm with offices in Ann Arbor and New York, centers on structuring financial risk metrics for water risk-exposed companies. The metrics are based on validated fundamental corporate financials, economic firm productivity theory and asset risk pricing theory. It starts with stock volatility risk, in finance terms often described by Value-at-Risk (VaR) metrics.

Since VaR quantifies the overall stock volatility, the company takes a 'big data' approach to statistically tease out a 'signal' that is correlated to specific weather, drought, flood or other water-based events, whether regulatory or physical.

This signal is the basis for the waterVaR metric, which represents the valuation of stock volatility due to water risk exposures, after correction for risk sensitivity. The correction, called a waterBeta, is necessary because not all companies are equally sensitive to external risk factors. The difference lies in the exposed revenue, the productivity of fixed assets, and in the price elasticity of the stock ('financial beta'). Hence, different industry sectors and companies within an industry (e.g. electric utilities, mining, food and beverage) exhibit variable sensitivities to how water risk exposures impact their operations or brand, and thus their stock.

With waterVaR values accounting for up to 18% of VaR, water-related volatility risk is financially material, and will impact future portfolio allocations of water-exposed stocks.

The Great Lakes are a major strategic resource for the State. Monetizing this resource through economic development needs to be tied into quantifying and articulating the financial and asset valuation benefits for companies locating in this region.



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