The value of risk... explicit pricing of risks can help

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Mark Carney, the former Governor of the Bank of England, warned financial institutions that if climate change continued unchecked, it would threaten the world's financial stability resulting in what he termed the "tragedy of the horizon."

This term was coined to describe the disincentive of the current generation to invest in resilience and adaption features to cost-effectively protect existing and future assets, which ultimately transfers the burden of alleviating the impact of worsening climate (e.g., extreme precipitation, extended drought, bigger storms, sea-level rise) to future generations at higher costs.

Although the reluctance to invest in protective measures today that could reduce future damage can be traced to a number of factors, the continued use of arcane valuation methods is considered the main contributor leading to short-sighted decisions to forego resilience measures.

These valuation methods – for instance, the discounted cash flow (DCF) – are based on an ad-hoc simple recipe: forecast future cash flows and select an "appropriate" risk-adjusted discount rate to calculate the net present value of the investment.

Yet, there is a fundamental conceptual flaw behind this simplicity: the method attempts to capture two completely disparate effects – the time value of money and the uncertainty of the forecasted cash flows – in a single factor (the discount rate).

To make matters worse, the DCF method creates a pernicious and artificial time-bias effect because it magnifies the importance of the present while downplaying the importance of the future, resulting in severe economic distortions and perverse incentives that can lead to short-term investment decisions. Worse yet, the DCF analysis is extremely sensitive to the discount rate selected.

Unfortunately, the deceptive simplicity of the discount-rate concept to evaluate investments has contributed to the DCF proliferation. Investors have grown accustomed to comparatively assessing (gut feeling) investment risks, then selecting (guessing) the "appropriate" rate to discount forecasted cash flows.

Investment opportunities with "similar" risk profiles (whatever that means) are evaluated using the same discount rate. Investments that are perceived as riskier are evaluated using higher discount rates to reduce the value of the cash flows. Needless to say, DCF is dominated by semantics and focuses on the risk preferences of investors rather than the cash-flow intrinsic risks.

Thus, rather than hoping to correctly guess the appropriate discount rate, investors would be better served if the information used to forecast the yearly distribution of cash flows was also used to evaluate the downside risk. For that, all that is needed is to treat each risk as a cost to the project.

The concept of treating investment risks as costs dates back to some of the earliest civilizations. For instance, by 1750 BC, Babylonian merchants routinely borrowed an amount sufficient to fund their shipments plus a nonrefundable premium above the allowed lending rate

for the right to cancel the loan should the shipment be stolen or lost at sea. Because merchants were mostly poor, these loans resembled modern venture capital investments with the premiums collected are the investor's reward for assuming the risks.

Fast forward 3,700 years – estimating the cost of risk became a well-established practice in many business areas. For instance, commercial building owners in seismically active areas typically buy earthquake insurance. Likewise, farmers routinely buy insurance to protect their crops against natural disasters or a price drop.

All these cases share a common element: once risks are identified, the cost of risk is expressed in monetary terms allowing investors to better understand the magnitude of risk exposure. Thus, investors can make an informed decision to either transfer all or a portion of the risks to third parties (e.g., insurance providers) or to assume all or a portion of said risks.

However, the advent of modern portfolio theory in 1952 spawned the risk-adjusted discount-rate concept followed by the DCF notion. Since then, the risk-as-a-cost concept was relegated to risks insured by third-party entities and risks assumed by investors were lumped into a discount rate, dislodging the natural connection between financial risks and losses and limiting investors' ability to learn from their successes and, more importantly, their mistakes.

The long-term financial impact of this seemingly innocuous technique is not trivial, especially now as we try to promote vital investments in resilience and adaption and accelerate the transition to green energy. Consistent with loss-averse nature of investors, cash-flow downside risks can be framed as failure to meet expectations (i.e., obtaining lower revenues or incurring higher expenses than expected).

The cost of risk can be viewed as the price to be paid to obtain downside protection. This concept is hardly new (e.g., at-the-money put options represent the downside risk for traded securities).

The same concept can be extended to assess other downside risks. There are abundant examples of infrastructure downside risks (e.g., lower market prices, unplanned temporary or permanent shutdowns due to a climate-change related impacts, early termination of subsidies, higher operating or capital expenditures than expected arising from compliance of new regulations).

These downside risks could be consistently and transparently estimated by using market data for commodity prices, developing loss functions to assess the impact of a physical risk on an asset, researching data bases or listening to experts' opinions to develop revenue distribution curves. Because the downside risks are accounted for by the estimated cost of risks, the resulting risk-adjusted cash flows can be discounted by the risk-free rate.

The framework that uses the risk-as-a-cost concept and discounts risk-adjusted cash flows using the risk-free rate already exists: it is the decoupled net present value (DNPV).

Considering risks as costs to projects is a natural progression from well-established business and personal practices of buying insurance products for specific insurable risks and self-insuring others. For instance, most consumers reject store insurance plans if repair costs are considered unlikely during the coverage period and if paying any potential repair cost out of pocket would not cause undue financial hardship. But, when it comes to bigger ticket items (e.g., cars, homes), most consumers will purchase insurance. Thus, consumers will self-insure if premiums are too high and the consequence are small, but they will buy insurance otherwise.

In the risk-as-a-cost concept, investors are likened to insurance companies in the sense that, like ancient Babylonian investors, they need to calculate the required premium that would be considered appropriate compensation for bearing the identified cash-flow downside risks. Risk has a price whether we pay for it or not.

Assessing monetary values to all identified risks (e.g., market, physical, technical, political) will allow investors to reconnect with the sources or risk, evaluate their effect on cash flows, select appropriate risk management measures, and more importantly, allocate capital more efficiently. DNPV requires more analytical work to estimate the multiple costs of risks affecting forecasted cash flows.

The reward of investors is that they acquire a greater understanding of the risks affecting the project cash flows, which results in better pricing, more realistic expectations of returns, and better-informed investment decisions.

DNPV eliminates the valuation distortions stemming from the DCF practice of comingling risk with time value of money in a single factor forcing investors to assess in monetary terms all relevant risks affecting the project.

The adoption of the risk-as-a-cost concept to value investments in infrastructures with demonstrated long-term paybacks can help recent worldwide private-sector led efforts to promote actions aimed at building a network of assets with climate resilience and adaptation features with a relatively minimal investment. Such efforts can help minimize future financial disasters, a necessary step towards alleviating the

tragedy of the horizon.

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