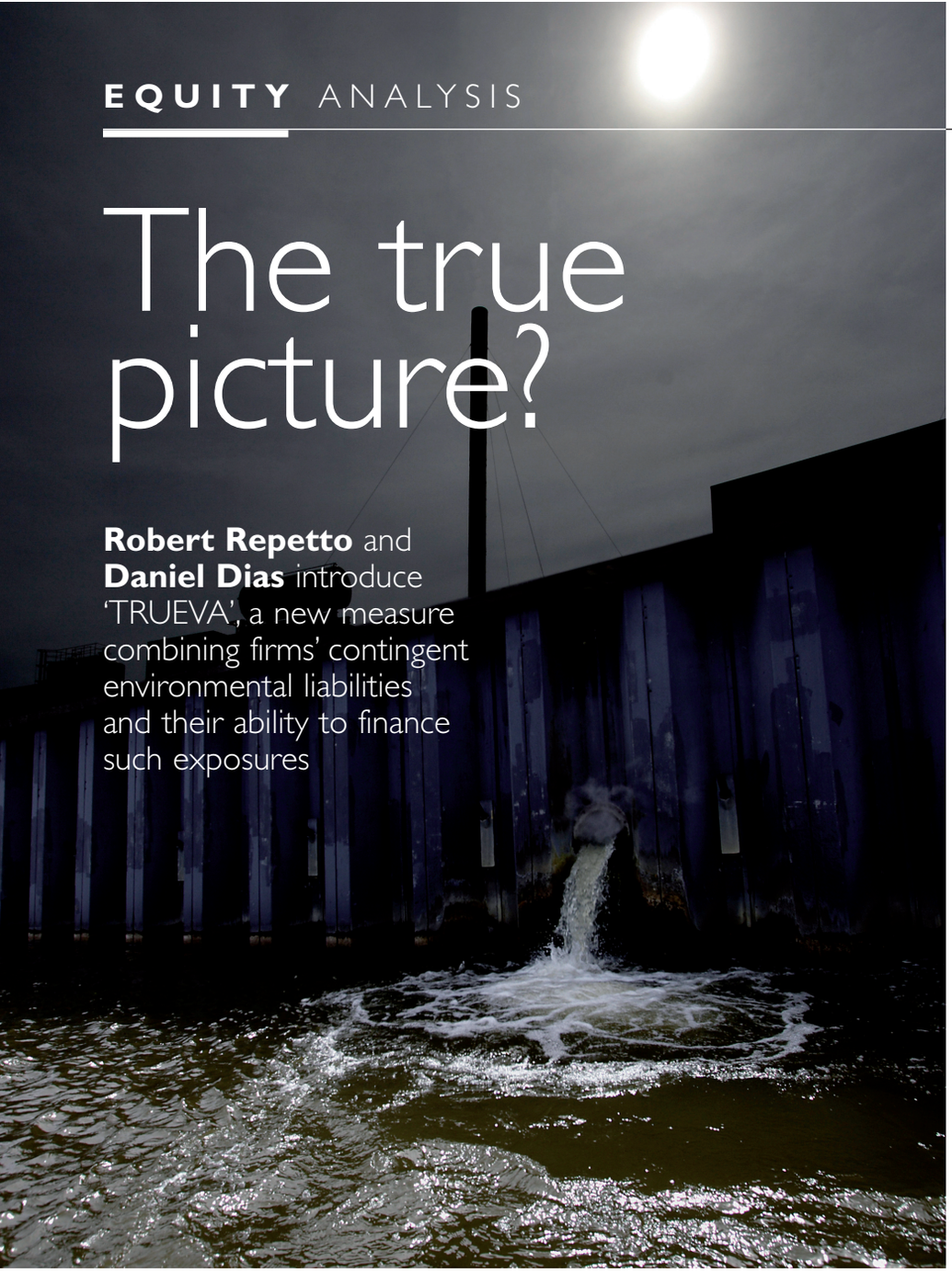
The true picture?

Robert Repetto and **Daniel Dias** introduce 'TRUEVA', a new measure combining firms' contingent environmental liabilities and their ability to finance such exposures



An 'environmental externality' - for now

Industrial companies generate wastes that must be disposed of on land or discharged into the air or water, polluting the natural environment and imposing health and other damages on households. Economists call these damages 'externalities' because their costs typically fall not on the firms that discharge the wastes but on victims of pollution. Few such costs have market prices because the benefits of pollution abatement cannot be parcelled out and sold to those willing to pay, but instead benefit all who suffer pollution damages, whether they pay or not. Neither can one pollution source's emissions always be segregated from another's. Consequently, accounting systems don't ascribe these costs to their sources or even record them systematically.

However, these external costs represent a real, off-the-books liability for the firms that release their wastes. Governments can and do force firms to clean up toxic wastes released to land and pay compensation for damages to natural resources. Systematic or accidental releases may be and have been the cause of successful lawsuits brought by injured parties seeking to recover damages. Routine releases of effluents and emissions to water and air are the subject of increasingly stringent government regulation.

In industries that generate and release large volumes of wastes, such off-the-books liabilities and exposures can eventually result in highly significant financial costs. Furthermore, the financial impacts of proposed or pending environmental regulations are highly differentiated among firms within the same sectors but represent a significant off-the-books liability for the most exposed firms.

Economic studies have shown that, despite the environmental regulations and remediation requirements already in place, the remaining externality costs are still large. UK-based environmental research firm Trucost has drawn on such studies and created databases estimating these externality costs for many of the world's largest corporations. It estimates the firm's annual emissions and wastes by using the firm's own information sources or others, then assigns each category of emissions a monetary value by multiplying its physical quantity by a notional price based on economic estimates of the marginal damages of an additional ton of emissions. Aggregated over all the firm's business units and emissions, the result is an estimate of the direct external environmental cost imposed on the rest of the economy by the firm.

Investors should be informed about these off-the-books contingent liabilities, whether they are interested in environmental matters *per se* or interested solely in the potential financial risks and returns to the assets they hold. Unanticipated environmental risks and exposures have led to financial debacles, including bankruptcies, with severe harm to investors, when such risks have been fulfilled. Companies' financial reports and disclosures rarely provide sufficient information to allow investors to understand adequately the range and magnitude of financial risks stemming from these environmental exposures.

Moreover, such risks are far from transparent and are difficult for investors or financial analysts, however assiduous, to fathom by themselves. Information on the externality costs a firm generates can serve as a measure of a company's environmental exposure and the financial risk originating in its environmental performance. Over time, the trend is clearly that firms are increasingly being forced to internalise these environmental costs, either through stricter regulations or through liability for damages caused to others.

The approach we have developed – called TRUEVA, or 'True Economic Value Added' – combines within a single measure the financial magnitude of a company's environmental exposures from ongoing operations and its financial ability to cover those exposures from operating surpluses without impairing its ability to attract and retain capital. It is obvious that a company with off-the-books environmental exposures of a financial magnitude exceeding its economic surplus is a more risky proposition than one in which such exposures are small relative to its ongoing flow of economic value added. Investors might well demand a higher return to compensate them for bearing such risks.

Although most investors hold securities in diversified portfolios, diversification is rarely an adequate response to a lack of information. Most diversified portfolios include many companies with significant off-the-books environmental liabilities that, in the aggregate, represent large, unquantified externality costs that affect the risk/return profile of the entire portfolio. Environmental exposures may be correlated across companies to an undetermined extent, for example, among companies in various sectors that buy or sell electricity or fossil fuels.

Such risks are not captured by conventional measures of volatility, such as 'beta', but with better information about the off-the-books liabilities of individual companies, it is possible to reduce risks by holding portfolios with the same sector weights and other characteristics but with significantly lower externality costs.

Moreover, very large portfolios that include

the liabilities of firms from virtually all economic sectors substantially internalise the firm's externalities within the portfolio. Universal investors, such as large pension funds, have invested in all sectors of the economy, so that their returns depend on the progress of the economy as a whole. For example, if some of their holdings release pollutants that result in health damages, the results are felt in labour supply, insurance costs, and medical expenses. The interest of such universal investors is to reduce the externality costs generated by their investment universe as a whole.

Complementing this effort to quantify environmental exposures in financial terms, the consulting firm Stern Stewart has popularised a measure of value added – EVA or 'economic value added' – that incorporates the firm's cost of capital. This measure subtracts from the company's net operating profits after taxes an estimate of the cost of its capital stock, recognising that equity capital, as well as debt and long-term leases, has an economic cost. EVA uses the concept of the 'weighted average cost of capital', dependent on the firm's asset structure and riskiness. EVA measures a company's financial surplus net of the costs of the capital it has used in its operations.

The authors have combined this with Trucost estimates to produce the TRUEVA measure, which subtracts from the firm's operating surplus not only its costs of capital, but also the environmental damages it imposes elsewhere in the economy. True value added recognises that a company produces not only useful products for which customers are willing to pay, but also wastes and emissions that victims would rather avoid.

This measure, TRUEVA, is the first, to our knowledge, that estimates the net contribution of industry on a company-by-company basis. Company-level specificity is useful not only because investors are interested in the financial exposures of individual firms, but also because true value added varies substantially across firms even within narrowly defined industrial sectors.

We illustrate the results with a sample of large US electricity companies. Environmental damage costs have been estimated conservatively. Only air emissions of carbon dioxide, sulphur oxides and nitrogen oxides have been included, though power plants also emit large quantities of harmful particulates and trace elements of mercury and other toxic substances. Damages per ton for sulphur and nitrogen oxides have been estimated conservatively from the economic research literature and brought up to date to 2004 with price level adjustments.[1] Damages from carbon dioxide are estimated at $14 per ton.

For each company, the first column of data shows net operating profits after taxes (NOPAT) in millions of dollars in 2004. The next column shows Stern Stewart's estimate of economic value added, EVA, which subtracts the cost of the firm's capital stock from NOPAT. A few companies in 2004 were not earning their cost of capital and generated negative economic value added.

Value added – US electric power companies, 2004

Company	*NOPAT*	*EVA*	*TRUEVA*	*ROC*	*TRU ROC*
	$m	*$m*	*$m*	*%*	*%*
Allegheny Energy	341.716	–13.456	–1,525.960	4.137	–14.175
Alliant Energy	323.209	18.815	–449.540	4.831	–2.170
Ameren	790.415	97.185	–1,458.370	5.496	–5.320
American Electric Power	1,429.582	134.994	–4,853.359	4.958	–12.343
Centerpoint Energy	617.131	–159.328	–1,162.770	3.386	–2.119
Cinergy	568.262	11.156	–1,987.005	4.825	–12.140
Consolidated Edison	763.240	–42.136	–101.309	4.539	4.187
DPL	218.166	53.555	–429.240	6.256	–7.588
DTE Energy	652.383	–90.258	–1,139.762	3.953	–2.406
Duquesne Light Holdings	106.029	9.424	9.424	5.235	5.235
Edison International	1,511.968	403.366	–882.726	5.919	0.884
Entergy	1,093.428	114.785	–634.187	5.307	1.672
Exelon	2,285.552	542.397	224.534	6.162	5.305
Firstenergy	1,620.799	309.470	–882.234	5.513	1.459
FPL Group	991.320	–15.767	–1,140.436	4.636	–0.624
Great Plains Energy	217.207	95.052	–394.450	8.624	–10.811
Hawaiian Electric Inds	240.720	28.594	–119.725	5.084	1.951
Idacorp	57.129	–42.048	–182.196	2.667	–3.876
Northeast Utilities	267.471	–125.714	–306.197	2.952	0.960
Nstar	336.382	60.106	58.717	5.564	5.541
Pepco Holdings	537.856	92.083	–206.956	5.345	2.373
PG&E	1,501.360	507.895	497.362	6.725	6.678
Pinnacle West Capital	348.573	–56.742	–368.069	3.956	0.423
PNM Resources	103.676	–62.713	–226.831	2.810	–1.638
PPL	893.759	247.623	–660.077	6.391	–0.100
Progress Energy	953.079	–34.062	–1,567.562	4.451	–2.711
Reliant Energy	125.587	–419.521	–1,316.605	1.000	–6.142
Sierra Pacific Resources	250.582	5.849	–143.835	4.362	1.756
Southern	1,779.665	410.977	–3,353.323	6.319	–7.047
Teco Energy	210.150	–140.033	–466.863	2.653	–1.473
Unisource Energy	157.418	59.932	–204.959	6.927	–4.730
Westar Energy	203.152	48.226	–641.954	5.809	–13.926
Xcel Energy	680.189	–135.492	–2,231.211	3.711	–7.723

The third column shows true value added, once the environmental damage costs created by the companies' emissions are subtracted. Remarkably, by this measure few electric power companies were adding value to the economy. The damages they imposed exceeded their surpluses, often by a large margin. American Electric Power and the Southern Company, two very large, coal-based power generators, imposed net costs of $4.8 billion and $3.3 billion respectively in 2004.

The fourth column represents each company's NOPAT divided by its capital stock, providing a measure of the return on capital. For comparison, the final column shows each company's true return on capital, which, in some cases, is very negative. These companies must be regarded as quite exposed to future restrictions on greenhouse gas emissions and tighter air quality restrictions.

Not all electric utilities are exposed equally, as TRUEVA makes clear. Environmental exposures differ across companies much more widely than profitability. The differentiation across companies within the electric utility industry is much greater for TRUEVA than for EVA. The true return on capital estimated in the last column of the table below has a coefficient of variation[2] that is more than seven times larger than that of the return on capital in the fourth column, associated with EVA.

This new measure shows that risks to companies and across companies within the same sector are significantly underestimated by conventional financial metrics. Moreover, the correlation between EVA and TRUEVA is virtually nil – only 0.03 – demonstrating that conventional measures are a poor proxy for broader measures of value added, taking environmental exposures into account.

TRUEVA provides useful guidance both for management and for investors. It enables management to track progress in environmental management in a practical, dollars-and-cents format. The overall goal is to improve true value added, reducing potentially costly environmental exposures without unduly burdening profits. TRUEVA incorporates both in a single environmental measure. For investors, it provides insight into the financial magnitude of environmental risks and exposures that appear nowhere in companies' financial records and enables investors to screen for environmental and economic performance with an integrated financial benchmark. TRUEVA deserves wide attention from both managers and investors. EF

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1 Estimates for sulphur and nitrogen oxides are $1,602 and $1,398 respectively. See Robert Repetto *et al*, *Has Environmental Protection Really Reduced Productivity Growth*, World Resources Institute, Washington, DC, 1996.

2 The coefficient of variation is the standard deviation of the set of numbers, divided by the mean.