O. Jager – The optimal capital structure for TenneT

Abstract
Choice of capital structure (debt-equity financing mix) may impact the value of the firm and hence constitutes a relevant management dilemma for privately-organised firms like TenneT, the Dutch/German electricity transmission company. In an effort to determine which debt-equity mix, if any, maximises TenneT’s firm value, today’s leading capital structure theories are identified first. In addition to Modigliani & Miller’s capital structure irrelevance theory, which assumes perfect and complete capital markets, two others theories emerge: the trade-off theory and the pecking order theory. The trade-off theory asserts that, as more debt is taken on by a firm, the increasing tax benefit is offset by rising costs of financial distress. At some stage the latter will start to outpace the former, which means an optimal debt-equity mix can be determined. The pecking order theory on the other hand is predicated on a preference for internal financing sources over external sources, and does not result in an optimal financing mix. Although none of the identified capital structure theories enjoys significantly more empirical support than any of the others, only the trade-off theory has practical applicability within the context of our objective to determine an optimal debt-equity mix for TenneT. Two models are constructed to establish this optimum: one based on minimisation of the weighted average cost of capital, the other one on maximisation of the net cash flow representing the value of tax benefits less costs of financial distress. Historical market data is used to estimate required model parameters, such as the cost of debt, the cost of equity, the effective tax rate and probabilities of default. The cost of capital model predicts an optimal debt-to-capital ratio for TenneT of 42.5%, whereas the cash flow model forecasts 62.5%. This difference is caused by the fact that, as the debt-to-capital ratio increases, the implicit costs of financial distress in the cost of capital model (reflected in projected interest rates) increase more rapidly than the explicit projected costs of financial distress in the cash flow model. The optimal debt-equity mix in the cost of capital model appears to be most sensitive to changes in the assumed cost of debt, credit spreads and the effective corporate tax rate. The outcome of the cash flow model on the other hand, demonstrates sensitivity to a decrease in assumed cumulative default probabilities or loss given default, but not to other model parameters.

Keywords: TenneT, optimal capital structure, trade-off theory, pecking order theory, quantitative analysis