Financial Engineering 101

How derivative contracts impact cash flow

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It may sound esoteric, but the concept behind financial engineering actually is quite simple: With the aid of derivative contracts, companies can transform cash flow exposures from an original set of cash flows to an alternative set of cash flows.

Sometimes these transformations are readily understandable, and sometimes less so. For instance, firms with variable interest rate debt might prefer to convert their variable cash flows to fixed interest payments. Alternatively, a company that buys internationally, paying in an assortment of foreign currencies, might choose to limit the cost of these purchases in U.S. dollars.

If these objectives sound like hedging objectives, that is understandable, as hedging objectives frequently motivate financial engineering solutions. In other cases, financial engineering may be employed in an effort to meet or overcome some regulatory or tax consideration.

Both of the starting examples represent hedging applications, where the company identified an exposure and sought to mitigate its associated risk. In the first example, the objective would have been realized by entering into a plain vanilla interest rate swap. It is a bit less clear what the derivative solution would be in the second example. This case would clearly involve some kind of an option contract, but a variety of alternative contract designs and/or different coverage might be considered.

Conceptually, the idea of financial engineering is demonstrated in the following exhibit. We assume some transacted business that gives rise to one or more future cash flow obligations from A to B, depicted by Arrow 1. Either at inception of that obligation or subsequently, Entity A could enter into a derivative contract in an effort to transform its expected cash outflows.

In our first example, Party B would be a lending institution or a bond holder, and Arrow 1 would be the set of repayments (i.e., variable interest expenses) scheduled to occur over the life of the debt. In the second example, B would be the foreign suppliers, and Arrow 1 would be the non-USD payments associated with the Party A's foreign purchases.

In a perfect world, when constructing the associated derivative contract between Party A and the derivatives dealer, the cash flows of Arrow 2 would perfectly offset the cash flows of Arrow 1. Thus, the derivative allows Party A to cancel out the original cash flow obligation and replace it with those represented by Arrow 3.

In the general case, the derivative (i.e., reflected by Arrows 2 and 3) could be a forward contract, a swap, an option, or any number of other, more exotic structures. All that would be required for this derivative contract to be fairly priced would be that the present value of all of Arrow 2 cash flows would have to be equal to the present value of all of Arrow 3 cash flows. (In practice, however, it is likely that the present value of Arrow 2 would be incrementally higher than that of Arrow 3, with the difference reflecting the Derivative Dealer's profit margin.)

While the exhibit shown above reflects the case of Party A bearing a starting cash outflow that it sought to transform, in fact, it should be understood that financial engineering can be applied from the alternative starting point, as well, where the undesirable cash flow might be a cash inflow. In that case, the direction of each of the arrows would be reversed.

Financial engineering need not be complicated or nefarious. Hopefully, this discussion serves to simplify the underlying concepts and thereby make them more accessible.

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