Applying Economic Lessons from Unconventional Plays Back to Conventional Projects*

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Abstract

The traditional metric for capital efficiency goes by various names (P/I, DPI, PV1), but it usually involves dividing net present value (NPV) by the present value of the pre-tax capital spend (PV(Investment)). When unconventional resources began to draw attention some years ago, an economic paradox became apparent. When measured by P/I, unconventional plays almost always look terrible. Yet, many companies pursuing these plays were clearly making money and getting a respectable return on their investment. This was not the first instance of good projects rating poorly under certain metrics; projects with very long time horizons (e.g., infrastructure projects, LNG plants, etc.) often do not measure up well under P/I, largely because NPV undervalues long-term projects. With unconventional projects, however, the problem is a combination of the long time horizon (often >40 years) reducing NPV, and the fact that heavy capital expenses continue throughout project life as hundreds of wells are drilled, thereby increasing the P/I denominator.

So how were companies making money? Quite simply, the projects become self-funding after a few years. Even though PV(Investment) is very large, only a small percentage of the total capital must be provided out-of-pocket by the operator. Many companies found that NPV/(Max Cash Out), where “Max Cash Out” is the maximum cumulative negative after-tax cash flow, is a much more useful measure of capital efficiency for unconventional resources.

This paper argues that the revised version of the P/I metric – NPV/(Max Cash Out) – is a more appropriate capital efficiency metric for all projects, conventional or unconventional. In the traditional P/I, PV(Investment) is based on the pre-tax capital spend profile. This drastically underestimates the capital efficiency not only of unconventional projects, but also of projects in fiscal regimes with a high tax rate and generous tax deductions for investment, coupled with ring fences that allow for immediate realization of those deductions against tax paid on current production. NPV/(Max Cash Out) allows for a fair comparison between these projects and ones in fiscal regimes in which tax deductions cannot be taken until project first oil.

Capital efficiency metrics should give an idea of how much value can be created per current dollar of capital resources invested. NPV/(Max Cash Out) measures this far better than does the traditional P/I.
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Abstract

Economic Metrics

The traditional metric for capital efficiency goes by various names (P/I, DPI, PVI), but a newly coining term is appearing more and more prevalent – NPV/(Max Cash Out). The associated traditional metric, NPV, is not so new, but has recently found a second life in unconventional plays. As noted above, the industry searched for a different capital efficiency metric – one that could be applied to both conventional and unconventional projects.

As such, the industry searched for a different capital efficiency metric – one that could be applied to both conventional and unconventional projects. The revised version of the P/I metric – NPV/(Max Cash Out) – is a more appropriate capital efficiency metric for unconventional resources. Capital efficiency metrics should give an idea of how much value can be created per current dollar of capital resources invested. NPV/(Max Cash Out) measures the ability of the discounted capital investment to support the ongoing operating expenses of an oil field than they are to the up-front capital investment in a conventional project.

The Capital Efficiency Paradox

A second mistake is commonly made in the calculation of the capital efficiency metric, P/I. For years, companies calculated P/I in this manner: 

\[ P/I = \frac{PV(Investment)}{NPV} \]

This makes the simple capital efficiency metric to calculate as well as to interpret. The main idea is that the higher the metric, the better the project. However, this metric does not consider the time value of money and has great limitations in unconventional plays. The PV(Investment) calculation uses before-tax capital spend. It makes the simple capital efficiency metric to calculate as well as to interpret. The main idea is that the higher the metric, the better the project. However, this metric does not consider the time value of money and has great limitations in unconventional plays.

A mistake made by many companies is to try to simplify this situation by applying blanket thresholds across some of these metrics (usually ROR or P/I). Thus, a project with an ROR less than 10% and a P/I greater than 1.5 is accepted. A project with an ROR greater than 20% and a P/I less than 1.0 is rejected. This results in a loss of value and information and a lack of flexibility to make the best decision.

Capital efficiency metrics should give an idea of how much value can be created per current dollar of capital resources invested. NPV/(Max Cash Out) measures the ability of the discounted capital investment to support the ongoing operating expenses of an oil field. Even though PV(Investment) is very large, only a small percentage of the total capital must be provided out-of-pocket by the operators. It over-estimates the value of the project; therefore, standard P/I values bore no resemblance to the real capital efficiency of unconventional developments.

So how were operators making money? The answer was simple: the projects become self-funding after a few years. The revenue being generated is more than enough to fund the ongoing drilling campaign. The after-tax capital is a much more useful measure of capital efficiency for unconventional resources.

As noted above, the before-tax investment profile and production profile are identical to those of the project in the position of weighing how much of one metric they are willing to give up in exchange for another along another metric. This relieves the decision maker of the responsibility to make the trade-off judgment, but that's not necessarily a good thing. The whole fiscal terms are designed to generate large amounts of revenue for the government through high tax rates while encouraging operators to invest heavily in the area by allowing generous deductions for such investments.

Western fiscal terms are among the most generous in the world. The main feature of such fiscal regimes is that oil and gas companies can deduct their investments from their income. For example, if an operator invests $1,000 in a well, they can claim a deduction of $500, $600, or even $1,000 depending on the fiscal terms. This is considered a "capital efficiency" item and is reported on the bottom line of the project financials as the Max Cash Out. When the industry began to develop unconventional plays, however, the problem is a combination of the discount rate and the time value of money.

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Conventional NPV = $936m
Western NPV = $936m
Foreign PSA NPV = $625m

Conventional PV(Investment) = $2709m
Western PV(Investment) = $2709m
Foreign PSA PV(Investment) = $2709m

Conventional P/I = 1.35
Western P/I = 1.33
Foreign PSA P/I = 1.23

Conventional NPV/(Max Cash Out) = 1.94
Western NPV/(Max Cash Out) = 2.00
Foreign PSA NPV/(Max Cash Out) = 1.62

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