VALUATION

Does The Implied Private Company Pricing Line Make Sense?

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When the first presentations of the Implied Private Company Pricing Line[1] (IPCPL) were published, I eagerly read the papers and reviewed the blogs. But I quickly began harboring the fear that I was simply not as smart as Messrs. Bob Dohmeyer, Pete Butler, and Rod Burkert (probably still true)—I just did not get it. However, I hoped that if I just persisted in following the literature and studying the concepts presented, one day the light bulb would illuminate. It has been several years now, yet, I must confess I am, like the subjects in Erasmus' fabled Kingdom, still standing in the dark.

ISSUE ONE: THE METHODOLOGY

My difficulty with the proposed methodology is very basic and relates to two rudimentary issues. The first is, in order to accept that the IPCPL will prove useful in approximating the pre-tax cost of unlevered equity for a small private company, one must believe that there is a strong and reliable association between firm revenues and cost of equity. The IPCPL is founded on the proposition that a private firm with higher revenues will incur a lower pre-tax cost of equity and, conversely, a firm with lower revenues has a higher pre-tax cost of equity. Tacitly, the theory relies upon an implied (but unproven) relationship between firm revenues and its market capitalization. For private firms, the IPCPL argues, the inverse relationship between market cap size and risk rate occurs for reasons not exclusively related to the 'size effect.' The IPCPL claims to codify all private firm pre-tax cost of equity based on firm revenue. The terminal ends of the IPCPL curve are anchored, at one end, by an aggregation of a large number of historic private transactions and, at the other, by the metrics of the publicly-traded iShares 'IWC' Micro-Cap ETF. It is important to recognize, however, that only the two terminal end points are derived from empirical data—the curve that connects the two is entirely theoretical.

Practically, one might speculate there is a general but very tenuous relationship between a firm's equity value and its revenues. After all, a company with only ten million dollars in current revenues is rarely found to have a market cap of $500 million (notwithstanding some infamous dot-com examples at the turn of the century) and conversely, a firm with $100 million in revenues will usually have a market cap of much more than just ten million dollars.[2] So by extension, if you believe there is an inverse relation between a private firm's equity value (private market cap) and its cost of equity, then it might be understandable that you would accept there also is an inverse relationship between revenues and cost of equity.

Intuitively, however, it just does not make sense that one could expect *revenues* to be a reliable predictor or determinant

1 Bob Dohmeyer and Peter Butler (2012), The Implied Private Company Pricing Line: Empirically Observing the Cost of Capital COC = FCFF/P + G. Business Valuation Review: Spring 2012, Vol. 31, No. 1, pp. 35-47.
doi: http://dx.doi.org/10.5791/BVR-D-12-00006R1.1

2 However, there are a number of very stable publicly listed firms that consistently report a 0.10 Price/Sales ratio. Their operating margins are low, but this additional risk is usually mitigated by low operating leverage.

of the cost of equity. Amongst even the very small firms, we can be sure they are going to have vastly different operating margins, tax exposures, earnings stability, capital structures, macroeconomic sensitivities, and capital requirements. It is more reasonable to believe the firm's perceived ability to generate future net free cash flows will have a much more profound impact on the entrepreneur's assessment of an adequate rate of return.[3] For example, two firms, both with a history of consistently generating five million dollars in revenues each year, could not possibly be expected to rate the same cost of equity if one firm only requires one million dollars in fixed assets and the other requires ten million. Without conducting any further investigation into the comparability between these two firms, can't we already conclude their risk profiles will be markedly different? Doesn't the fact that they both generate the same amount of annual revenues become largely irrelevant?

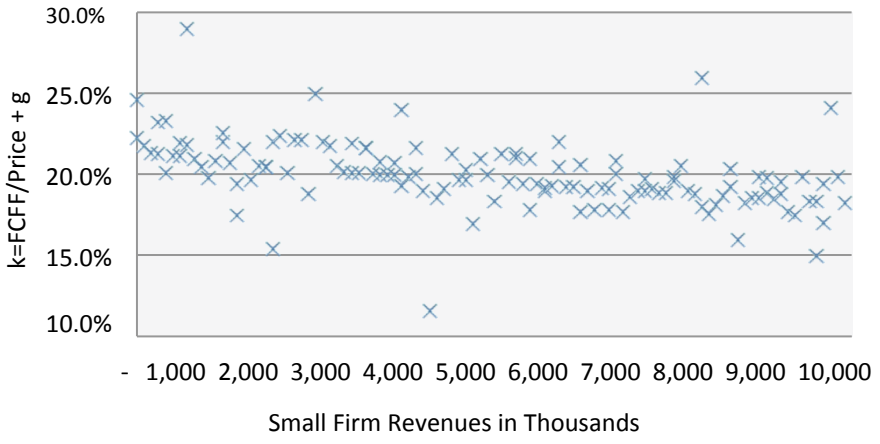
When the IPCPL hypothesis was first presented in the 2012 paper "The Implied Private Company Pricing Line: Empirically Observing the Cost of Capital COC = FCFF/P + G (Free Cash Flow to the Firm)"[4] every impression was given that the fundamental building block of the theory is founded upon Professor Myron Gordon's well known Growth Formula: Price = $D_1/(r - g)$, where "D_1" are the expected dividends in the next period, "r" (or "k" as IPCPL prefers) is the cost of equity, and "g" is the long-term expected growth rate for that individual firm. Dohmeyer et al., make some concessions and assume Operating Income is an acceptable substitute for D_1. Further concessions are made such that it is assumed the annual amount of sustaining capital required by the sample private firms will equate to the annual amount of book depreciation. The purpose of this compromise is so it can now be said that pre-tax Operating Income = pre-tax FCFF.[5] Dohmeyer et al., apply additional econometric techniques to their raw data in order to:

1) approximate the required "g" growth rate; and
2) adjust for the fact that the private firms used in the sample are taken from over a very wide expanse of time (and, ergo, must have been subject to a variety of macroeconomic conditions when each private transaction was executed); and
3) adjust for seller financing to simulate an all-cash transaction price; and
4) adjust for excess owner's compensation.

Just exactly how or why the IPCPL model shifts to using small firm revenues as the independent variable is not entirely clear.

Frankly, had Dohmeyer et al., provided visual confirmation that cost of equity for small private firms performed in the manner the IPCPL hypothesized, this would have gone a long way to quell my rising skepticism. For example, once all the aforementioned adjustments had been made to their initial sample of 830 transactions from the Pratt's Stats and BIZCOMPS databases, using the rearranged Gordon Growth formula of: k = ((FCFF or Operating Income)/ Price) + g, it should have been entirely possible to show a scatter-graph similar to:

FIGURE 1 - HYPOTHESIZED SHAPE OF IPCPL



3 Assuming, of course, the entrepreneur is risk-averse.

4 Bob Dohmeyer and Peter Butler (2012) The Implied Private Company Pricing Line: Empirically Observing the Cost of Capital COC = FCFF/P + G. Business Valuation Review: Spring 2012, Vol. 31, No. 1, pp. 35-47.

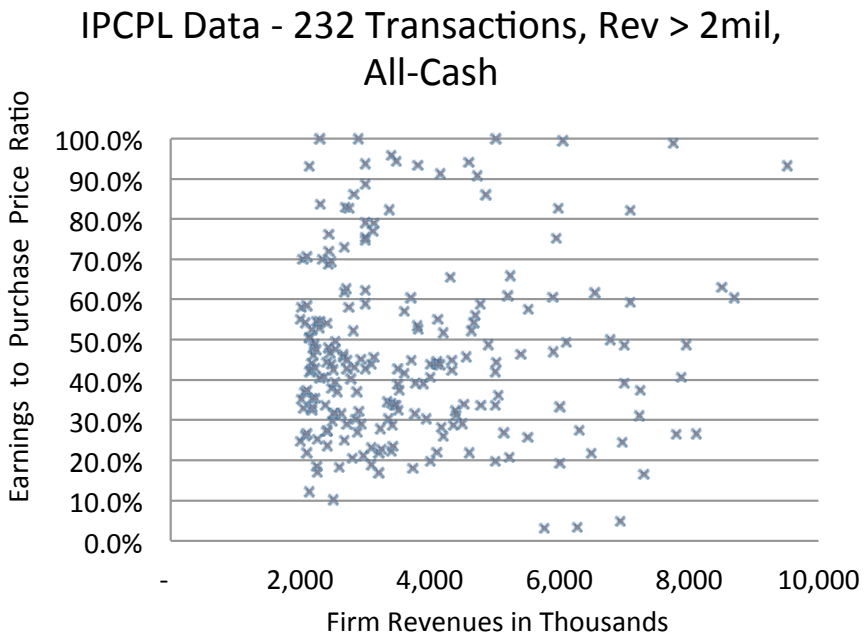
5 Critics of the IPCPL may have just cause to be very concerned over such a simplification. Even in very small firms, a company that is 'capital intensive' is unlikely to incur cash capital expenditures evenly or at the same rate as relatively low capital firms. In the ten million dollar fixed asset firm example, it is likely that reinvestment required to sustain the fixed asset base is going to be 'lumpy' and timing and variability of these expected cash injections is undoubtedly going to have a profound impact on the entrepreneur's overall assessment of business risk.

While the data in Figure 1 has just been invented from my imagination, without even turning on a calculator or reluctantly resorting to a number of sophisticated curve-fitting techniques, even I can see the formation of a negatively-sloped double-Lehman curve in the above hypothetical data. Such a presentation would have at least provided corroborating evidence that small firm cost of capital is negatively correlated to revenues, and that correlation is roughly approximated by the double-Lehman curve.[6]

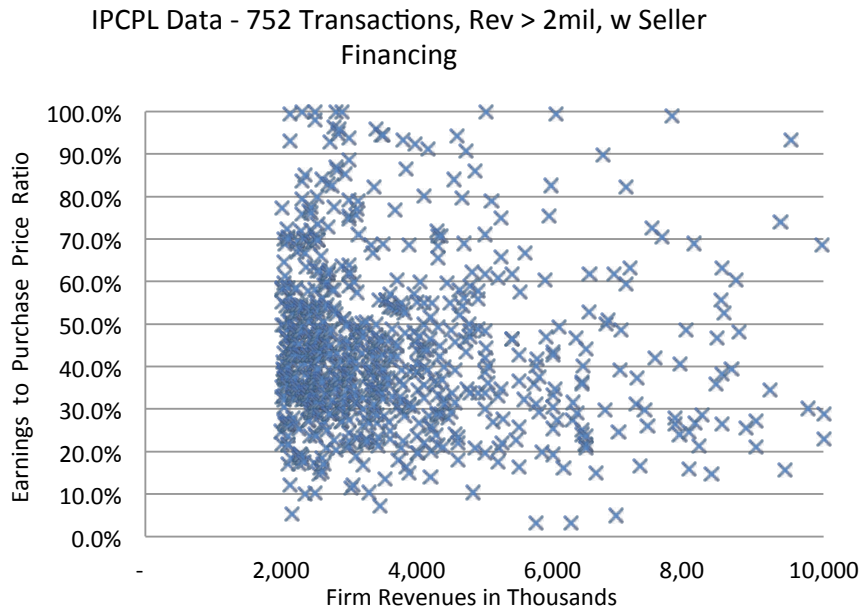
SOME EMPIRICAL DATA

At some time early after the introduction of the IPCPL, Dohmeyer et al., published a companion Excel® workbook intended to exemplify the mechanics of the model. Included in that data was a page of some 752 actual private transactions (which have annual revenues greater than two million dollars as required by Dohmeyer et al.); 232 of which were all-cash deals.[7] Seller's Discretionary Earnings (SDE) were also reported along with the final Purchase Price for each transaction, as was annual Gross Sales Revenues. For those analysts who believe the P/E (Price-to-Earnings) statistic provides some meaningful risk information (and, hence, the inverse, or E/P ratio represents the cap rate), it should be instructive to see a graphical representation of the cap rate plotted against revenues:

FIGURE 2[8]



Panel A – All Cash Deals



Panel B – All Cash and Seller Financing[9]

6 The Lehman Curve has traditionally been employed as a means for investment bankers to calculate the amount of commission fees due on the floatation of small-cap shares. The fee is a function of the equity dollars raised—it has never had any association with firm revenues.

7 Source: http://www.biz-app-solutions.com

8 IBID.

9 The IPCPL adjusts 'Seller-Financed' transactions to simulate an all-cash price. However, the mechanics of those adjustments are not disclosed, and therefore Panel B simply reflects the unadjusted sales price.

Visually, as demonstrated in Figure 2, there is no indication of any kind of a systematic, non-random relationship between revenues and the E/P ratio. Indeed, any attempt to fit a line or curve to either panel consistently resulted in R-Squared statistics of less than one percent.[10] This confirms that the sample cap rates are virtually uncorrelated to firm revenues (i.e., revenues are a poor explanatory variable for cap rates). A Spearman's Rank test was performed on the underlying data resulting in a reported Spearman's Coefficient of -0.095 (this value squared is consistent with the previous R-Squared observations of less than 0.01).[11] Again, this comparatively low value supports the previous observation that revenues and cap rates are only very poorly correlated at best.

I conducted an additional experiment with small-firm publicly-traded information primarily for the convenience that a large sample of 'single-point-in-time' data may be collected quickly and the FCFF/Price ratio was readily available for most firms in the sample. All of the U.S. and Canadian exchanges were included; the only exclusion criteria applied was that firm market cap must be less than $100 million and the currently reported P/E must be greater than zero (as a means of eliminating negative earnings from the sample). This resulted in an initial selection of 695 firms, but only 238 of these reported current positive FCFF/Price ratios.[12] As Dohmeyer et al., have claimed, the formula: k = (FCFF/Price) + g should provide a way of estimating a "k" (after-tax, in this case, as the FCFF reported by the data-providers is after-tax) for each of the 238 firms.[13] And, if there is some kind of systematic monotonic relationship between the 238 "k's" and revenues, this association should be revealed.

Of course, *if* the 238 firms were private, the resultant "k" cost of equity would be different for each. However, the fact that public company data is being examined here should not invalidate the applicability of these observations. Dohmeyer et al., have postulated that the primary differences between small private firms and small public firms are:

1. Illiquidity: private firms are more illiquid than public
2. Transaction Costs: cost of marketing the firm, due diligence, and brokerage are much higher for private firms (offset, somewhat, by higher reporting and compliance costs for public firms)

Therefore, as long as the sample of public firms is selected from a relatively homogeneous range of market capitalization, it is highly unlikely that either of the two factors listed above could be impacting revenue correlation in the public data set but be absent in the private (or vice versa). In other words, if samples selected out of the public data show a high degree of correlation between revenues and cost of equity, one would naturally expect the same relationship to exist in the private world. The effects of illiquidity and transaction costs may distort the degree of correlation between Private Firm Revenues and Private Cost of Equity but, we would still expect the underlying relationship to exist. Conversely, if the public data is examined and it is observed that there is no discernable correlation between Public Revenues and Public Cost of Equity, we would not expect the additional factors

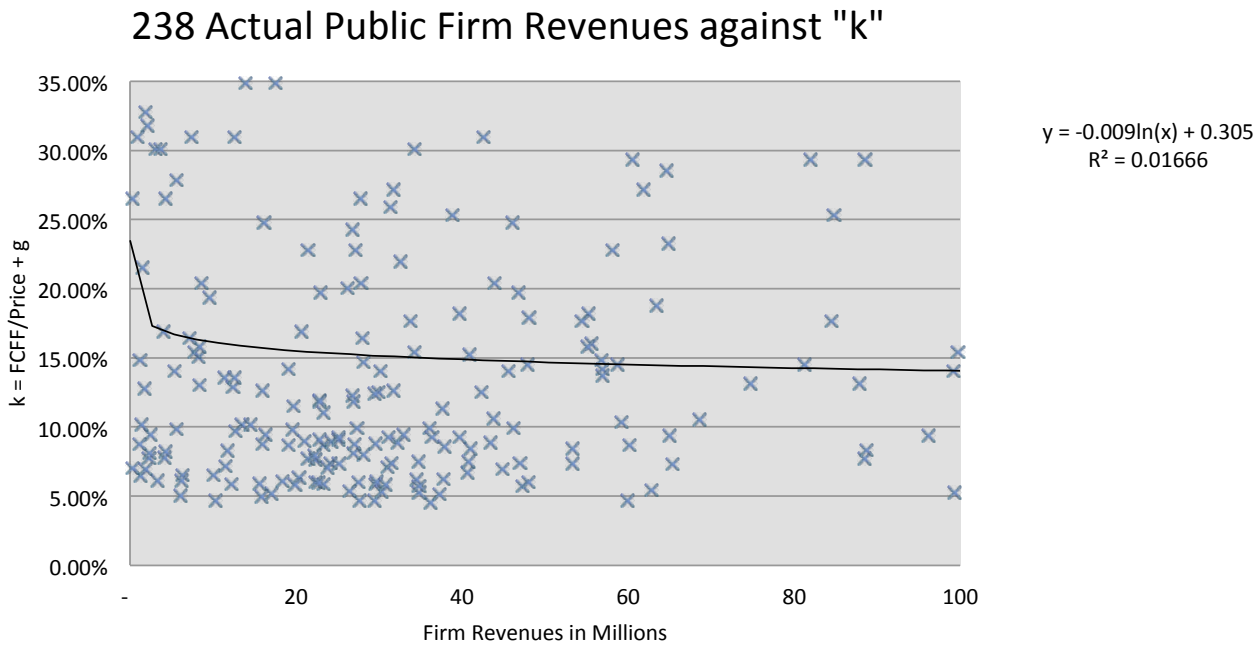
10 R-Squared, or, the 'coefficient of correlation', is the ratio of how much variability the fit line or curve has explained vs. the total amount of variability—therefore, an R-Squared of 0.01 means the change in revenues has only managed to explain one percent of the total change in the cap rate. Also note, the 'present day adjustment' of (ERP0 – $ERP_{15yravg}$)/2 that the Authors' recommend will not alter the R-Squared, because it is a constant for each observation in the sample.

11 The Spearman's Rank Test is an excellent test of monotonicity even when the expected relationship between the two variables is non-linear and the data is non-parametric (i.e., not normally distributed). A coefficient close to 1.0 is an indication of a strong direct correlation and close to -1.0 is an indication of strong inverse correlation. Values close to zero indicate a lack of correlation.

12 The average market cap of the 238 firms was $46.9 million and the median was $47.0 million.

13 As disclosed in the second IPCPL Paper, the method's sensitivity to the long-term growth rate "g" is relatively low and can be generally expected to equate to long-term real growth in the economy. As the Authors recommend, the "g" used here is derived from the current difference between the twenty-year U.S. Bond Rate and the twenty-year T.I.P.S. rate.

FIGURE 3[14]



of illiquidity and transaction costs to somehow systematically correlate Private Revenues to Private Cost of Equity.

Graphically, the results are shown on Figure 3, which gives every impression that the relationship between revenues and "k" is entirely random. Nonetheless, a number of line/curve-fitting exercises were attempted. The curve that best fit the observed data was logarithmic: y = -0.009ln(x) + 30.5%, note however, that the R-Squared, again, was less than two percent at only 0.0167. Notwithstanding the statistical unreliability of the curve, it is worth noting that these are after-tax results. A pre-tax curve would report significantly higher risk rates.[15] The Spearman's Rank Coefficient of this data is -0.016—extremely low.

I made additional tests with large-cap firms (market cap > ten billion dollars) wherein the cost of equity was derived using both the CAPM and then again with the Fama-French 3 Factor models. In no instance, however, were the results materially different than the examples graphically depicted in Figure 3.

None of the data examined would lead one to conclude that cost of equity is reliably correlated to company revenues. At best, revenues are only very poorly correlated to cost of equity.

ISSUE TWO: THE DOUBLE-LEHMAN CURVE

This article started out stating my confusion over the IPCPL was twofold. Obviously, the first concern is expressed at length above: it is just not logical that revenues and cost of equity could be reliably correlated. The second has been alluded to: the assertion of the double-Lehman curve appears to be entirely artificial. There has not been any empirical evidence to show that small firm entrepreneurs actually price risk in this manner. Instead, the IPCPL determines a point on the small-cap private end of the transaction data (based on an approximate four million dollars in revenues), then another point using the IWC Micro-Cap ETF (based on a hypothetical $150 million in revenues), and superimposes the Lehman curve in between. We are, apparently, just expected to accept the Lehman curve on faith.

14 Source: QuoteMedia.

15 The data reported here is after-tax, and therefore, also after interest cash flows. The occurrence and extent of debt in the sample was moderate: thirty-five percent of the firms had no debt, and another twenty percent had book debt-to-equity ratios less than twenty-five percent. Note that the effects of debt would be 'self-levering' given that both the numerator and denominator of the (FCFF/Price) ratio would reflect the presence of debt.

I cannot understand the purpose of the IPCPL Lehman curve when it would be far simpler and much more direct to simply use the underlying Prat's Stats and BIZCOMPS transactional data to construct a large portfolio of proxy firms meant to simulate the target firm's cost of equity. If, as Dohmeyer et al., suggest, k = (Operating Income/Price) + g is a valid means of determining the pre-tax cost of equity, why not simply collect 830 examples of transactions where the adjusted operating income approximately agrees with that of the target firm?[16] Aggregate the data and then determine what the combined pre-tax cost of equity ("k") is. The result will have all of the large-sample noise-elimination benefits that the IPCPL touts and offer the added advantage of giving a representative cost of equity for the average private firm *at that level of operating income*. It would not be necessary to rely upon the target's revenue position on the IPCPL curve. Of course, the consolidated results would be exactly that—a very broad-based amalgamation of 830 (or the largest sample available within the databases) different risk profiles representing the combined average of all. In no way could it be individualized to the unique risk characteristics of the target firm; but this is true of the IPCPL results as well. An apt analogy would be the S&P 500: any broad-based index such as the S&P 500 comes to synthesize the general nature and financial well-being of all its constituent firms. But, the post hoc volatility and return of the S&P 500 is unique onto the index itself and is not representative of any individual member except by random chance.

16 Operating income and price would need to be adjusted for changes in macroeconomic conditions over time if sufficient transactions cannot be found at or around the valuation date—similar to the 'present day adjustment' that the IPCPL uses.

CONCLUSIONS

The IPCPL has been tendered to the valuation profession as an alternative means of approximating cost of equity for small private enterprises. Valuation models are substantially different from models designed for use in the investment industry—where the goal is to derive the very best predictor of future events (assuming that is even humanly possible). For valuation models, it is not relevant how well they ultimately prove to predict actual post-acquisition events; the important feature is how well they can be said to be representative of what a reasonable, well-informed, hypothetical, willing buyer and seller would *believe* is the appropriate assessment of all the knowable risk variables at the valuation date. The profession is not about predicting what assets are actually worth but rather about what buyers and sellers perceive them to be worth. It is a study into human behavior and how investors assess risk and the laws of probability at a specific point in time given an uncertain knowledge of the future. In this regard, investigations using historical data can only be useful in the context that we believe 'what has happened in the past represents a reasonable approximation for what is most likely to happen again in the future'.

So, what becomes even more important than whether the adjusted Pratt's Stats/BIZCOMPS post hoc data provides evidence of a double-Lehman curve correlated to revenues, is the question: 'Would the risk-averse, self-interested hypothetical entrepreneur *expect* there to be a systematic and predictable relationship between revenues and risk?' If the intuitive answer is: 'No', then the utility of the IPCPL is largely diminished.

I think it is important to say that I greatly admire the tenacity of Messrs. Dohmeyer, Butler, and Burkert in their continued quest to find a defensible means of quantifying private equity risk. It is entirely possible that someday financial researchers (indeed, perhaps these three very same authors) will uncover a private-equity risk model that will revolutionize the closely-held valuation profession in the same way the Black-Scholes risk-neutral option pricing methodology changed the course of modern finance. But, the IPCPL appears to have been born more out of the desire to invent a black box wherein the "appraiser need not worry about highly theoretical issues of cost of capital (COC) and modern portfolio theory (MPT)". However, these highly theoretical subjects of risk-quantification and cost of capital lie right at the very heart of any valuation. It seems to me, those practitioners who hope to issue business valuation opinions based upon a methodology they themselves cannot clearly explain, do so entirely at their own peril. VE

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