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P/E AND P/B MULTIPLES AND COMPANY'S FINANCIAL STRUCTURE

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Abstract

Multiples play an important role in valuation. P/E and P/B multiples are in negative relation with the cost of equity, which in turn is influenced by risk and interest rate. The P/E multiple is mainly driven by future earnings growth, whereas the major drivers of the P/B multiple are future return on common equity (ROCE) and growth in book value of equity. For P/E multiple is also important the return on invested capital (ROIC). In the real world, financing decisions lead to the modification of both equity valuation multiples and entity valuation multiples. In spite of the fact that the former multiples category is theoretically more affected, the empirical studies reveal a greater performance of the valuations based on these multiples. The relation between market-to-book ratio and leverage ratio is not monotonic and is positive for most firms.

Key words: multiple, P/E, P/B, financial structure, equity valuation
JEL classification: G12, G32, G11, G39, M41

1. Introduction

Multiples play a particularly important role in assessing the value of firms. The multiples valuation method knows a large use. In this sense, Damodaran presents the results of a study conducted on 550 research reports carried out by investment banks in the United States, London and Asia in the first half of 2001 where the ratio of relative valuations (by multiples) and discounted valuations (1) is nearly 10 to 1 [Damodaran, 2006, Chapter 7, 2]. Furthermore, Bonadurer notices the conclusion of a report of Morgan Stanley Dean Witter published in 1999 that only 20% of the equity analysis focuses on discounted cash flow method, while a much higher percentage uses for equity valuation different multiples based on profits [Bonadurer, 2003, 7]. The presentation that Fernandez makes for the most widespread methods used by analysts at Morgan Stanley Dean Witter for European companies shows that the assessment by multiples occupies three places in the first four (1.P/E, 2.EV/EBIT, 4.EV/EG) while discounted cash flow valuation is only the fifth [Fernandez, 2001, 2].

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2. Multiples – a general presentation

Multiples play a particularly important role in assessing the value of firms. The multiples valuation method knows a large use. In this sense, Damodaran presents the results of a study conducted on 550 research reports carried out by investment banks in the United States, London and Asia in the first half of 2001 where the ratio of relative valuations (by multiples) and discounted valuations (1) is nearly 10 to 1 [Damodaran, 2006, Chapter 7, 2]. Furthermore, Bonadurer notices the conclusion of a report of Morgan Stanley Dean Witter published in 1999 that only 20% of the equity analysis focuses on discounted cash flow method, while a much higher percentage uses for equity valuation different multiples based on profits [Bonadurer, 2003, 7]. The presentation that Fernandez makes for the most widespread methods used by analysts at Morgan Stanley Dean Witter for European companies shows that the assessment by multiples occupies three places in the first four (1.P/E, 2.EV/EBIT, 4.EV/EG) while discounted cash flow valuation is only the fifth [Fernandez, 2001, 2].

Multiples valuation is realized in four stages [Shreiner, 2007, 49 – 53]. The first two stages involve the selection of a relevant value driver and identification of comparable companies, the peer group. A multiple is calculated as the ratio of market prices and a value driver. The third stage is devoted to multiples aggregation at the level of each group of comparable companies with the calculation of a synthetic multiple. Finally, to determine the value of the analyzed company, the synthetic multiples for comparable groups are multiplied with the corresponding value drivers of the valued companies.

Popularity of multiples valuation is due to the following reasons [Damodaran, 2006, Chapter 7, 3-4] (2): 1) consumes less time and resources than discounted cash flow valuation; 2) it is easier to be sold; 3) it is easier to be defended; and 4) reflects the current state of the market. However it must be noted that in theory the preferred valuation method is discounted cash flow method. (3) Fernandez claims that multiples are used in a second stage of evaluation: after valuation by other methods, a comparison with multiples of comparable companies allows the assessment of the realized valuation and the identification of the differences between the assessed company and the companies with which it is compared [Fernandez, 2001, 2]. According to Goedhart, Koller and Wessels (2005) a careful analysis conducted by comparing the multiples of a company with those of other companies may be useful in achieving the necessary forecasts for discounted cash flow valuation and, implicitly, it may increase the accuracy of such valuations. Executed properly, such analysis can help a company to conduct stress tests (4) for its forecasts regarding the cash flows, to understand the differences between its performance and those of its competitors and to evaluate whether a company's strategic positioning enables the creation of more value than other players in the industry. An analysis of multiples can also generate the understanding of the key factors that create value in an industry [Goedhart, 2005, 7]. At the same time it deserves a place in any set of valuation tools [Goedhart, 2005, 11]. The same idea is supported by Damodaran who believes that the relative assessment has a role to play which is separate and distinct from the discounted cash flow valuation [Damodaran, 2006, Chapter 7, 3].

According to Penman (2005), (market) multiples are defined as the ratio between a market price (such as the price of the shares, market capitalization or the entire value of the company) and a value driver of the company (which may be made up of earnings, income or

employment). Therefore multiples are synthetic measures that provide information on the market value of a company compared with those of competitors.

From the diversity of the multiples that can be computed, P/E and P/B are distinguished by a considerable popularity. Among the most common methods used by analysts from Morgan Stanley Dean Witter to evaluate European companies presented by Fernandez (2001), the P/E method occupies the first place, being used by over 50% of analysts while the P/B method is on the sixth place being used by over 15% of analysts. Observing the high accuracy of valuation with data from the United States compared with those of the valuation made with European data, accuracy based on the use of four multiples (i.e., trailing P/E, one-year forward-looking P/E, the two-year forward-looking P/E and P/B multiple), Schreiner and Spremann remark the popularity of P/E and P/B multiples among participants on the capital market in the United States that has an impact on the market prices level US stocks [Schreiner, 2007, 19].

2. Value drivers that affects P/E and P/B multiples

Derivation intrinsic multiples from the fundamental valuation models for stocks based on dividends, (free) cash flows and (abnormal) earnings, which involves the calculating of the discounted values of future expected inflows (5), allows the identification of multiples value drivers. In the case of P/E, the equation obtained (6) shows a positive relationship with future growth (of earnings) and a negative one with the risk, measured by the cost of equity. In the case of P/B multiple, the obtained equation (7) shows that the multiple is a function of the expected profitability, as measured by ROCE, of its risk, measured by the cost of equity, and its growth (of book value of equity).

$$\frac{v_t^{equity}}{NI_t} = \frac{PR \times \left(1 + g^{NI}\right)}{r^{equity} - g^{NI}} \tag{1}$$

$$\frac{v_t^{equity}}{B_t} = 1 + \frac{\left(ROCE_{t+1} - r^{equity}\right)}{\left(r_{equity} - g^{B}\right) \times \left(1 + r^{equity}\right)} \tag{2}$$

where v_t^{equity} = intrinsic equity value of a company, NI_t = net income in year t, PR = dividend payout ratio, g^{NI} = growth rate of net income, r^{equity} = risk adjusted expected rate of return, B_t = book-value of equity in year t, $ROCE_t$ = common shares return in year t, equal to the NI_t / B_{t-1} ratio and g^B = growth rate of book value of equity.

From the above equations defining the intrinsic value of P/E and P/B multiples is observed that the expected rate of return is in negative relationship with both multiples. In turn, this relationship suggests a negative relationship with risk and interest rates, the two components of the expected returns.

3. P/E multiple and the financial structure

Chadda, McNish and Rehm points out that the growth rate and P/E multiples does not necessarily evolve in the same sense and with the same magnitude. High multiples may be

the result of high returns of capital for businesses with average or little growth, as may be the result from high growth. Growth accompanied by a low return on capital will not lead to a high P/E multiple, because it does not create value for shareholders [Chadda, 2004, 12].

In addition to the positive relationship between P/E multiples and the future growth of earnings and the negative relationship between them and interest rates and risk (8), literature also take into consideration the impact of financial structure on the value of P/E multiple. Goedhart, Koller and Wessels observe the improper application of multiples in the valuation based on P/E multiples calculated as the average of industries in which valuated companies are part (synthetic multiples that then are multiplied with the corresponding value driver, i.e. net income in this case) because the companies within industries are characterized by values quite different of expected growth rates, of invested capital returns and of the capital structure [Goedhart, 2005, 7]. Alford identifies literature that suggests that could be useful the control for the leverage differences among comparable firms if these differences are large (9), but the results of the realized test (10) strongly indicates that the leverage adjustment is not effective [Alford, 1992, 104].

In theory, the level of debt (more precisely the structure of capital) can cause problems that decrease the accuracy of valuations based on equity valuation multiples. Goedhart, Koller and Wessels notes the systematic effect on P/E multiples of the capital structure, this being one of the major shortcomings of P/E multiples [Goedhart, 2005, 9-10]. This deficiency causes them to list among the basic principles that can help companies to properly apply multiples, using of entity valuation multiples (for example of EV/EBIT multiple instead of P/E multiple). Schreiner illustrates the systematic relationship between financial structure and P/E multiple in a real Modigliani and Miller (1958) world, without taxes, costs of financial distress and other agency costs, deriving the equation below (11) [Schreiner, 2007, 60].

$$\frac{v_t^{equity}}{NI_t} = \frac{\frac{v_u^{equity}}{NI_u} - \frac{1}{r^{net\ debt}}}{1 - \frac{v_u^{equity}}{NI_u} \times leverage \times r^{net\ debt}} + \frac{1}{r^{net\ debt}} \qquad (3)$$

where v_u^{equity} = equity value of the unleveraged company, NI_u = net income of the unleveraged company, equal to EBIT of the levered company, $r^{net\ debt}$ = cost of debt and leverage = net debt / entity value ratio.

Equation (3) highlights three scenarios in which managers can manipulate the P/E multiples with decisions on financial structure. In the case of companies with unleveraged P/E (multiple that they would have had if it would be financed entirely by equity) greater than the reciprocal of the cost of debt, P/E multiples increase with the leverage. In this way, a company with an unleveraged P/E multiple relatively high can artificially increase the P/E multiple by increasing leverage. Conversely, many companies with unleveraged P/E less than the reciprocal of the cost of debt, shows a decrease in P/E multiple as leverage increases. If unleveraged P/E multiple is equal to reciprocal of the cost of debt, leverage has no effect on P/E multiple.

In the real world there are taxes, costs of financial distress and agency costs that affect tradeoffs between debt and equity and make the financial structure relevant. Modgliani and Miller (1963) shows that because of taxes, using debt instead of equity decreases the payments of taxes and, therefore, creates value for shareholders because the laws on tax allow companies to deduct expenses with interest but no payments of dividends. Tax benefits of a higher leverage are opposed to a higher likelihood of inability to pay the

expected costs and higher expected costs of financial distress. As compensation for the increased risk and decreased flexibility, shareholders claim a higher cost of equity and value decreases. The agency costs generally favor the use of debt instead of equity. If the capital structure matters, as happens in reality, the financing decision affects the value of the company and, thus, indirectly affects both equity valuation multiples and entity valuation multiples (12). Entity valuation multiples are less affected because they are defined at the firm level (13). However, Schreiner and Spremann test the hypothesis, which ultimately is confirmed by the results of the study, that equity valuation multiples are performing better than entity valuation multiples (14) because first category compensate in practice that theoretically are more affected by capital structure with the possibility of direct observation of market capitalization from the numerator of the multiples ratio with the help of market prices. Thus the numerator is not affected by uncertainty out of control. In addition, it is taken into consideration the fact that firms in an industry tend to operate with similar levels of debt [Schreiner, 2007, 7].

4. P/B multiple and the financial structure

As with P/E multiple, in addition to the positive relationship between the P/B multiples and future growth of book value of equity and the negative one between them and interest rates and risk, literature is studying also the impact of the financial structure on the value of P//B multiple. Chen and Zhao (2006) consider that the negative relationship between the market-to-book value ratio (15) (equivalent (16) at the entity level of P/B multiple), regarded as a measure of growth opportunities, and leverage represents one of the most documented rules of empirical literature on capital structure. Most studies considered the negative relationship as given and are confined to debate economic interpretation of it. For example, following agency theory of Myers (1977) (17), many economists argue that this negative relationship confirms that firms with higher growth rates have optimum financial leverage lower. Others, in contrast, believe that the relationship is due to the active pursuit of the market (18) and the lack of target leverage ratio (19) [Chen, 2006, 2].

Chen and Zhao show that the empirical base of the debate on the negative relationship between market-to-book value ratio and the leverage is not robust. They turn to a sample of 72,084 firm-year observations from the period 1972-2002. The sample is divided into three equal groups depending on the market-to-book value ratio. Companies with higher market-to-book value ratios are on average more profitable (20) and benefit from lower costs for credits (21), suggesting that in their case the use of debt is beneficial. The authors found that financing through debt increased when the market-to-book value ratio increases from low to medium and decreases when the ratio increase continues from medium level to high one. This non-monotonic relationship suggests that the widely documented negative relationship between the market-to-book value ratio and debt financing can be determined by companies with high market-to-book value ratios. Nonparametric and parametric methods applied by Chen and Zhao suggests a non-monotonic relationship between the market-to-book value ratio and the leverage and multivariate regression analysis shows that for most companies (more than 88% of firms in the COMPUSTAT database and more than 95% of market capitalization) market-to-book value ratio is significant positive relationship with the leverage [Chen, 2006, 2].

The non-monotonic relationship presented above can be explained by changing preference for sources of funding generated by the higher importance of new debts

contracting for firms with low and medium market-to-book value ratios and by the priority that firms with high market-to-book value ratios, which have larger reserves (i.e., they are more profitable), accords to the issuance of shares. Another interpretation of the analyzed relationship is provided from the perspective of the tradeoff theory. For companies with low and medium market-to-book value, the benefits of leverage are higher than those resulting from the issuance of shares and companies take the best decisions by borrowing more, while companies with high market-to-book value ratios have high growth opportunities and maintaining low target ratios is a major concern for them [Chen, 2006, 7].

5. Conclusions

Financial structure of a company affects both P/E multiple and P/B multiple. Its influence on value is reflected both on equity valuation multiples and on entity valuation multiples, the former being theoretically more affected. However there is noticed a superior performance of equity valuation multiples explained by eliminating the uncertainty caused by multiple numerator of the multiple formula using the market capitalization. The relationship between the market-to-book ratio and leverage is non-monotonic, being positive for multiples with low and medium values and negative for those with high value.

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Notes

1) The discounted cash flow valuation method associates the value of an asset with the discounted value of the cash flows generated by it.
2) However these strengths also means, according to the same author, weaknesses: a) the rapidity of the method may lead to inconsistent value, which may not take into account the key variables such as risk, growth or potential cash flow; b) the fact that this type of valuation reflects the state of the market leads to overvaluation when the market over valuates comparable companies and to undervaluation in the converse situation; c) lack of transparency with regard to assumptions made multiples vulnerable to manipulation.
3) Managers consider it the most accurate and flexible method for valuating projects, companies and divisions [Goedhart, 2005, 7].
4) Stress analysis is a set of techniques for estimating losses under extremely unfavorable combination of events and scenarios.
5) The fundamental valuation models are: Discounted Dividend Model, Discounted Cash Flow and Residual Income Valuation Model.
6) equation (3.16) [Schreiner, 2007, 33].
7) equation (3.29) [Schreiner, 2007, 37].
8) The empirical investigations on the determinants of P/E multiples have found these relationships as being weak according to Thomas, J.K., Zhang, H., „Another look at P / E ratios", preliminary study, 2004.
9) It is referring to Lokey, O.K., Braun, R.S., Cephalic, S.L., „Business Valuations in Litigation Services Handbook: The Role of the Accountant as Expert Witness", Wiley, New York, 1990 and the study Pratt, S.P., „Valuing a Business: The Analysis and Appraisal of closely-held companies", Dow Jones-Irwin, New York, 1989.
10) The test was conducted on a set of firms listed on the NYSE, ASE and OTC: 221 in 1978, 248 in 1982 and 191 in 1986.
11) Derivation of the relationship between P/E multiple and leverage is taken by Schreiner (2007) from Koller, T. M., Goedhart, M., Wessels, D., „*Valuation: Measuring and Managing the Value of Companies*", Wiley & Sons, Hoboken, New Jersey, 2005.
12) Coenenberg, A.G., Schultze, W., „The Multiplikator-procedure in the Unternehmensbewertung: Konzeptionen und Kritik", *Finanz Betrieb*, 12, 2002.
13) Damodaran (2006) and Suozzo, P., Cooper, S., Sutherland, G., Deng, Z., „Valuation multiples: A Primer", UBS Investment Bank, 2001.
14) Evidence that supports this hypothesis has been also found by Alford (1992) and Liu, Nissim and Thomas (2002).
15) The authors define the market-to-book value as the ratio between the market value of total assets and the book value of total assets. The market value of total assets is equal to (Price x Number of shares outstanding) + Short-term debt + Long-term debt + Preferred shares - Deferred tax.
16) Another equivalent of P/B multiple at the entity level, which appears in the classification presented by Schreiner (2007), is the multiple EV/TA (Enterprise Value / Total Assets), where EV is equal to the sum of market value common shares and the carrying value of net debt. Net debts are taken into account equal to the carrying value of total debt minus cash and equivalents plus the value of preferred shares.

17) Myers, S.C., „Determinants of corporate borrowing", *Journal of Financial Economics*, 5, 1977.
18) Baker, M., Wurgler, J., „Market timing and capital structure", *Journal of Finance*, 57, 2002.
19) Welch, I., „Capital structure and stock returns", *Journal of Political Economy*, 112, 2004.
20) operating profit before depreciation increased from 11.28% for the group with the low market-to-book value ratio to 15.21% for the group with high market-to-book value ratio.
21) Chen and Zhao (2006) shows that the credit spread (difference between corporate bonds yields and those of U.S. Treasury bonds with similar maturity), as a measure of corporate borrowing costs beyond the Treasury risk-free rates, are in a significant negative relationship with market-to-book value ratio.