A Model to Identify the Potential Target for Leveraged Buyout

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Abstract

This study aims to find a model based on agency theory to identify the target firms of leveraged buyout (LBO) transactions one year ahead. The likelihood of a firm being a target in an LBO transaction is estimated using logistic regression. The dependent variable is defined as one for the LBO target and zeroes otherwise. The independent variables are a firm's financial characteristics related to agency problems: leverage, tangible assets, free cash flow, market-to-book value ratio, profitability, and revenue growth. The sample is public-to-private LBO transactions in the United States from 2009 to 2019. We find that a firm with high leverage and free cash flow is more likely to become an LBO target. The findings are consistent with the agency theory. The management uses firm high free cash flow to gain more debt to pursue their benefits which is detrimental to shareholders' interest. Contrary to previous research, the firm's tangible asset does not increase the likelihood of becoming an LBO target.

Keywords	: Agency theory; financial characteristics; leverage buyout; Merger and Acquisition
JEL Classification	: G30, G34

1. INTRODUCTION

The number of publicly traded firms in the United States has decreased over the past few years. There were 7.322 public firms in 1996 and 3,473 public in 2019 in the United States (Mauboussin and Callahan, 2020). One of the reasons for this phenomenon is the growing number of delisting firms through mergers and acquisitions (M&A) (Rosenbaum and Pearl, 2013; Loveland, Mulherin, and Okoeguale, 2021). Strategic buyers aim for operational synergies or diversification purposes. Financial buyers mainly are Private Equity (P.E.) firms. The PE firm seeks to improve the acquired firm performance within the five to ten-year periods.

Based on the source of financing, M&A deals may be financed mainly through debt. The M&A deal was then known as a Leveraged Buyout (LBO). The average LBO

transaction value has increased from only under USD one billion before 2005 to over USD 25 billion in 2019 (Mauboussin and Callahan, 2020). Dasilas and Grose (2018) find that target firm shareholders gain significant capital gain on the LBO announcement date. The significant capital gain is caused by investor optimism regarding the prospect of higher firm future performance.

Jensen (1986) and Ha (2019) found that firms always experience agency problems. However, there are firms with serious agency problems. The main issue of agency problems is the firm's free cash flows. Since LBO involves substantial debt financing, the management will be forced to increase firm performance and, at the same time, retire the debt. Hence, LBO transactions will directly solve the central issue of the agency problem.

Since LBO shareholders gain significant capital gain, there is a constant need for a model to identify a firm that may become an LBO target. The model may involve analyst subjective assessment of the firm financial characteristics. In this paper, we are interested in exploring further the firm's financial characteristics as the primary input to identify a firm that may become an LBO target. The financial characteristics are widely available and cheap.

Opler and Titman (1993) explored the financial characteristics of LBO targets. Dasilas and Grose (2018) find that the country's effective corporate governance mechanism contributes to the magnitude of the positive wealth effects of LBO. They find two main factors that affect the likelihood of being LBO targets, incentive realignment between management and shareholders and financial distress costs. Incentive realignment is done by reducing the source of the agency problems, i.e., free cash flow. Additional debt burden from the LBO transaction will force the management to reduce the debt through higher profitability. Lower debt will reduce firm financial distress costs. The combination of higher business profitability and lower financial distress cost will provide P.E. firms with a substantial capital gain. The reverse is also true. If the management fails to increase business profitability, the financial distress cost increases, and the P.E. firm will experience substantial capital loss.

Several studies relate firm financial characteristics with the likelihood of a firm becoming an LBO target. Martin and Schrum (2008) find that larger size and growth rate harm the firm's likelihood of being an LBO target. Mehran and Peristiani (2010) and Billet, Jiang, and Lie (2010) find that higher free cash flow and leverage increase the likelihood of becoming an LBO target. Dasilas and Grose (2018) find that mature firms with lower free cash flow volatility are more likely to become an LBO target. Evans, Poa, and Rath (2005), Sudarsanam, Wright, and Huang (2011), Sannajust, Arouri, and Teulon (2015), and Tunyi and Ntim (2016) also find the negative effect of higher leverage on the firm to become an LBO target. Chiarella and Ostinelli (2020) and Mittoo, Ng, and Yan (2020) find the capital market conditions, i.e., debt market liquidity and stock market valuation, that directly affect the LBO transactions financing structure.

The above research is being done with an old sample. In the past, firms preferred tangible assets investments, i.e., land and building, to expand the business. Higher tangible assets provide the collateral necessary to source additional debt financing. However, in the past ten years, the firm has had higher tendencies to invest in intangible assets instead of tangible assets (Cremers, Nair, & John, 2009; Tunyi & Ntim 2016; Thum-Thysen, Voigt, Bilbao-Osorio, Maier, & Ognyanova, 2019).

We calculate the relative weight of tangible and intangible assets to total assets in the research sample and S&P 500. In figure 1, 1999-2007, our research sample shows that LBO targets had a more significant proportion of tangible assets to total assets with an average of 28.55% relative to a proportion of intangible assets to total assets of only 15.27%. However, between 2008 and 2019, the average proportion of the firm's intangible assets was 26.54%, more significant than the average proportion of tangible assets 19.72%.
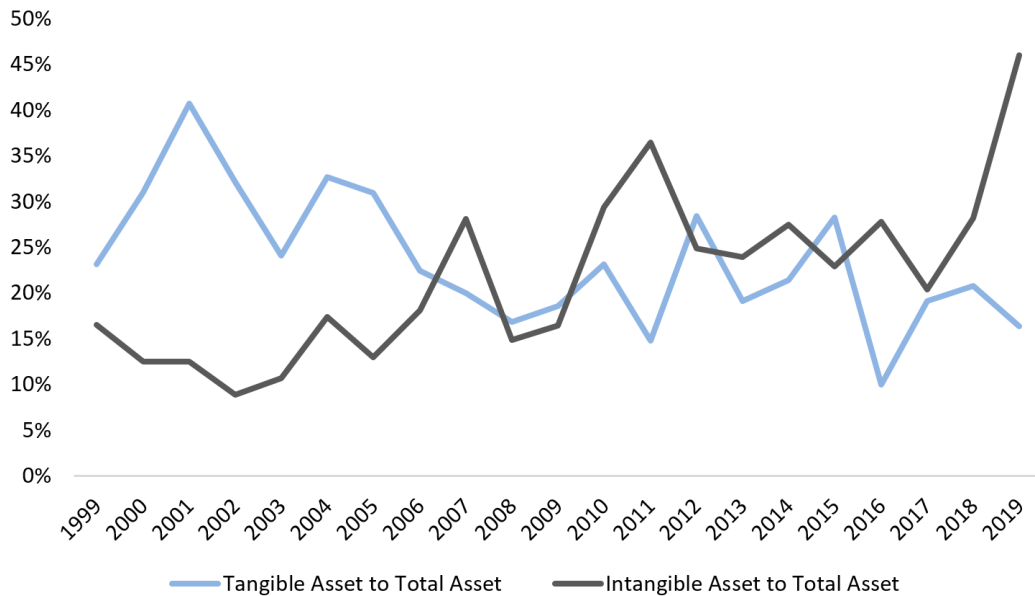

Figure 1. Changes in Tangible and Intangible proportions, 1999 - 2019
Source: Author calculation.

The same trend can be found in other firms in the United States, particularly those included in the S&P 500 index. Table 1 shows that 406 of the 500 firms in the S&P 500 index had low tangible asset intensity as of 2019, which equals 16.5%. As a result, most of the firm's assets are intangible assets. One rationale for this is the increased number of mergers and acquisitions activities in the United States, resulting in intangible assets such as goodwill.

Table 1. Sector Tangible Assets Intensity of U.S. Firms in 2019

Sectors	Number of firms	Tangible Assets Amount (in billion USD)	Enterprise Value (in billion USD)	Tangible Assets Intensity
Information Technology	74	201.85	6,672.71	3.02%
Health Care	63	252.39	4,364.42	5.78%
Consumer Staples	32	282.67	2,684.52	10.53%
Consumer Discretionary	62	513.05	3,610.51	14.21%
Communication Services	22	556.19	3,659.08	15.20%

Sectors	Number of firms	Tangible Assets Amount (in billion USD)	Enterprise Value (in billion USD)	Tangible Assets Intensity
Industrials	74	644.31	3,149.88	20.45%
Materials	28	292.22	922.17	31.69%
Energy	23	923.02	1,495.78	61.71%
Utilities	28	1,032.76	1,488.04	69.40%
Total	**406**	**4,698.46**	**28,047.11**	**16.75%**

Source: Author calculations.

The findings in figure 1 and table 1 suggest that the previous research findings on the importance of tangible assets in an LBO transaction may not hold. The novelty of the research is that we shed light on the new effect of variables on the likelihood of a firm becoming an LBO target after accommodating the recent changes in firm investments preferences. In this study, the author chooses sample firms from 2009 through 2019. The paper's research question is "Do firm financial characteristics predict firm likelihood to become an LBO target?" We use logistic regression to estimate the model of a potential target for LBO. The dependent variable is defined as one for an LBO target and zeroes otherwise. The financial characteristics will be defined as the independent variable. The relevant financial characteristics are leverage, tangible assets, free cash flows, market-to-book value ratio, profitability, and revenue growth.

Our research has two findings. First, we find that leverage and free cash flow have high contributions to the likelihood of becoming an LBO target. Firms with high free cash flows should not have high leverage. Firm cash flow is sufficient to fund business operations and support business expansions. The findings imply that firms as an LBO target experience serious agency problems. The management uses firm high free cash flow to support more extensive than necessary leverage. The leverage provides additional cash flows for the management alongside the free cash flow. The extra liquidity enables management to pursue business expansion that is not necessarily beneficial to the shareholders. Second, we find that firm tangibility is statistically not significant.

The paper contributes to the LBO target literature by providing new findings on the relations stable ability of leverage and free cash flow and the diminishing ability of tangible assets in predicting an LBO target. The research limitation is that the model has a relatively low McFadden R^2. The McFadden R^2 should be at the range of 0.2-0.4 to be considered an excellent logistic regression model (McFadden, 1979).

2. REVIEW OF LITERATURE AND HYPOTHESES DEVELOPMENT

Acquirers have different motives to carry out merger and acquisition (M&A) transactions. The first motive is the synergy resulting from mergers and acquisitions transactions. This synergy may be generated by achieving operating economics of scales, cash flow stabilization, efficiency improvement, and increased market power to reduce competition (Eaton, Guo, Liu, & Officer, 2021; Katz, 2021). The second motive is to acquire

undervalued firms (Nguyen, Yung, & Sun, 2012; Mittoo et al., 2020). Furthermore, Amihud and Lev (1981) find that the motive for M&A is to diversify the business to decrease the firm-specific risk. Fourth, M&A transactions are carried out to replace low-performance management (Tichy, 2001, Mueller & Sirower, 2003) with higher-performance management with more substantial cultural alignment (Zhao, 2021). Fifth, Kitching (1967) and Levinson (1970) proposed management psychology as the strategic motive. The management is concerned that the firm is not growing fast enough. M&A is one method for instant growth. Sixth, Katz (2021) and Li, Ang, Wu, and Yang (2021) find significant change to M&A motive from acquiring business to technology synergy. Seven, M&A occur to gain from correcting agency problems (Jensen & Meckling, 1976). In the free cash flow hypothesis, Jensen (1986) suggests that firms with high free cash flows have the potential for agency problems. The agency problem is discussed in agency theory developed by Ross (1973), Mitnick (1975), and Jensen and Meckling (1976). The agency problem arises when the management, as an agent, may inappropriately expropriate shareholder value as a principal. The firm may invest in more beneficial projects to the management than shareholders. A recent study by Yang, Zhang, Zhao, and Wang (2022) shows that the agency problem also permeates outside the firm through agent involvement in political corruption. The study also shows that the positive wealth effect is lower in more corrupt districts.

Jensen and Meckling (1976) suggest that to overcome the agency problem of high free cash flow, the firm should get rid of accumulated free cash flow and increase debt. Cash from accumulated free cash flow and extra cash from new debt is distributed to the shareholder. The distribution vehicles are special dividends or share repurchases. The distribution eliminates the source of the agency problem. As the firm is financially constrained and faces higher bankruptcy risk, the manager has to work harder to increase business profitability to avert bankruptcy risk.

However, increasing debt and putting the firm at a higher risk of financial distress will face opposition from the management and the public shareholders. Hence, an LBO transaction is a viable mechanism to correct agency problems from the high free cash flow firms.

The firm with serious agency problems can be detected from firm financial characteristics, i.e., leverage, tangibility, free cash flows, market-to-book ratio, profitability, and revenue growth. Martin and Schrum (2008) examined LBO transactions in the United States. They found that firm size and growth rate lower the likelihood of becoming a target for LBO. Small firms are easier to target because the debt financing required is also small relative to the acquirer size. Furthermore, the firm's low growth rate shows that the firm does not yet have the expertise to grow, indicating room for improvement. Mature firms with modest growth rates are especially appealing as LBO targets since they have many tangible assets that could become acceptable collateral and have stable business and cash flows.

Billet, Jiang, and Lie (2010) and Fuest, Hugger, Sultan, and Xing (2019) find firms with low profitability, high levels of free cash flow, high debt level, small firm size, low market-to-book ratio increase the likelihood of becoming an LBO target. Dasilas and Grose (2018) discovered that firms with high levels of free cash flow were more likely to be takeover targets, supporting Jensen's free cash flow hypothesis. Bharath and Dittmar (2010), Mehran and Peristiani (2010), Du, He, and Yuen (2013), Belkhir, Boubaker, Rouatbi (2013), and Sannajust, Arouri, and Teulon (2015) and Yeo (2018) find firms with high levels of free cash

flow are more prone for agency problems. Hence, a firm with a high free cash flow is more likely to become an LBO target.

Le Nadant dan Perdreau (2006) finds debt-tax-saving provides value for an LBO transaction. The government provides tax subsidies for a firm that uses more debt financing (Modigliani & Miller, 1958, Modigliani & Miller, 1963; Teja, 2021). Firms with large amounts of financial assets are more likely to be the target of LBO since the financial asset can be divested after LBO. Another research conducted by Dasilas and Grose (2018) discovered that companies with high levels of free cash flow were more likely to be takeover targets, supporting Jensen's free cash flow hypothesis.

Sudarsanam, Wright, and Huang's (2011) study in the U.K. finds that higher bankruptcy risk, lower debt level, and lower number of analysts following increase the likelihood of a firm becoming an LBO target. Li, Lu, and Lo (2019) find that analyst following is essential to reduce information asymmetry and contribute to a stock price adjustment to their fair value. In general, the closer a firm to bankruptcy, i.e., defined as a firm that can only survive for less than a year before bankruptcy, the higher the likelihood of becoming an LBO target. Lower debt levels are also favorable since they indicate increasing debt. Lower analyst following indicate a higher probability that the firm is undervalued. Lower analyst following indicate the potential of higher asymmetric information between investors and the firm stock price. Higher asymmetric information will be perceived as a higher risk valuation error. Hence, investors increase the expected return for the stock by lowering the stock price and making the stock undervalued.

Based on the above discussion, the hypothesis offered are as follows:

H1 Debt level contributes to the likelihood of a firm becoming an LBO target.
H2 Tangible assets contribute to the likelihood of a firm becoming an LBO target.
H3 Free cash flow contributes to the likelihood of a firm becoming an LBO target.
H4 Market-to-Book value ratio contributes to the likelihood of a firm becoming an LBO target.
H5 Firm profitability contributes to the likelihood of a firm becoming an LBO target.
H6 Firm revenue growth contributes to the likelihood of a firm becoming an LBO target.

3.   Data and Research Method

Data

We collect samples from S&P Capital I.Q. The screening criteria are as follows: (1) public firms which became private through acquisition and the securities acquired were common stock, (2) located in the United States of America, (3) the LBO transaction had been completed from 2009-2019, (4) non-financial, non-property, and non-utility firms, and (5) firms which provide full disclosure on financial data from 2007-2017. We did not include the year 2020 in our sample on considerations of the covid-19 pandemic. The event radically changes the economics and business activities, including Leverage Buyout negotiation and transaction. The economic lockdown prohibits face-to-face due diligence and deal-making, exposed new firm weakness, and consequently lowers firm value (Green, A; Oxman, A; Seghers, 2020).

The research objective is to estimate the likelihood of the firm becoming an LBO target. Hence, we also collect data on similar firms that are not LBO targets. Similar firms are defined as (1) firms operating within the same sectors by four-digit standard industry classification (SIC) codes, and (2) have relatively similar market capitalization as LBO firms.

We exclude firms operating in the financial, utilities, and property sectors. The sectors, as mentioned earlier, already have relatively high leverage that may not be suitable for an LBO transaction.

Research Method

We use logistic regression to estimate a model to identify the likelihood of becoming an LBO target one year ahead. The dependent variable is the likelihood of a firm becoming an LBO target one year ahead. It uses binary numbers, firm that becoming LBO target equals one and zero otherwise. The independent variables are firm financial characteristics, such as debt, tangible assets, free cash flow, market-to-book ratio, profitability level, and three-year average revenue growth before LBO transactions. The variable definition and formula are as follows:

Table 2. Operationalization of Variables

Variable	Notation	Formula	Notes
Dependent Variable – Current Year			
LBO	Y	$ln(\frac{p}{1-p})$	Firm becoming an LBO as one and zero otherwise.
Independent Variables – Prior Year			
Debt to Equity Ratio	Lev	$Lev_{t-1} = \frac{Total\ Debt_{t-1}}{Total\ Equity_{t-1}}$	Acquirer leverage.
Tangibility	TanA	$TanA_{t-1} = \frac{(Inventory+Net\ PPE)_{t-1}}{Total\ Assets_{t-1}}$	Acquirer tangible assets.
Free Cash Flow	FCF	$FCF_{t-1} = \frac{EBITDA_{t-1}}{Total\ Assets_{t-1}}$	Acquirer free cash flow
Market-to-Book Value Ratio	PBV	$PBV_{t-1} = \frac{Market\ Capitalization_{t-1}}{Total\ Equity_{t-1}}$	Acquirer valuation
Profitability	ROE	$ROE_{t-1} = \frac{Net\ Income_{t-1}}{Total\ Equity_{t-1}}$	Acquirer profitability
Revenue growth	AvgRevGrowth	$RevGrowth_{t-1} = \frac{Revenue_{t-1}-Revenue_t}{Revenue_t}$ $RevGrowth_{t-2} = \frac{Revenue_{t-2}-Revenue_{t-1}}{Revenue_{t-1}}$ $RevGrowth_{t-3} = \frac{Revenue_{t-3}-Revenue_{t-2}}{Revenue_{t-2}}$ $AvgRevGrowth_{t-1} = \frac{RevGrowth_{t-1}+RevGrowth_{t-2}+RevGrowth_{t-3}}{3}$	Three-year arithmetic average of revenue growth

We present the logistic regression model in equations 1-7.

$$ln(\tfrac{p}{1-p})_i = \beta_0 + \beta_1 Lev_i + \varepsilon_i \tag{1}$$

$$ln(\tfrac{p}{1-p})_i = \beta_0 + \beta_1 TanA_i + \varepsilon_i \tag{2}$$

$$ln(\tfrac{p}{1-p})_i = \beta_0 + \beta_1 FCF_i + \varepsilon_i \tag{3}$$

$$ln(\tfrac{p}{1-p})_i = \beta_0 + \beta_1 PBV_i + \varepsilon_i \tag{4}$$

$$ln(\tfrac{p}{1-p})_i = \beta_0 + \beta_1 ROE_i + \varepsilon_i \tag{5}$$

$$ln(\frac{p}{1-p})_i = \beta_0 + \beta_1 RevGrowth_i + \varepsilon_i \qquad (6)$$

$$ln(\frac{p}{1-p})_i = \beta_0 + \beta_1 Lev_i + \beta_2 TanA_i + \beta_3 FCF_i + \beta_4 PBV_i + \beta_5 ROE_i + \beta_6 AvgRevGrowth_i + \varepsilon_i$$
$$(7)$$

In this study, the authors conduct two tests, partial and simultaneous tests. A partial test consists of a non-parametric test using the Wilcoxon rank-sum test or Mann-Whitney U test. Mann-Whitney U test is used to see if there is a significant difference between the financial characteristics of LBO firms and non-target LBO firms. Meanwhile, logistic regression is used to conduct parametric and simultaneous tests. Logistic regression attempts to see the contributions of financial characteristics on the likelihood of a firm becoming an LBOs target.

4. RESULTS

Descriptive Statistics

Table 3 provides information on the screening results of LBO and non-LBO firms. We chose a similar firm based on the four-digit SIC code and the nearest market capitalization. We obtained 174 LBO firms and 174 non-LBO firms for 348 observations.

Table 3. Selection Criteria on Sample Data

Criteria	LBO	Non-LBO
Public-to-private transaction and acquisition of common stock	1,700	
Located in the United States of America	833	8,769
The transaction that had been completed from 2009 - to 2019	294	6,633
Non-financial, non-property, and non-utility firms	277	4,173
Firms that provide full disclosure on financial data	174	174

Source: S&P Capital IQ

We performed the Wilcoxon rank-sum test or Mann-Whitney U test to examine whether LBO firms' market capitalization and non-LBO firms are similar. We found z-statistics -0.747 and not significant at alpha 10%. There are no significant differences between LBO firms and non-target LBO firms' market capitalization. Therefore, the chosen samples of non-target LBO firms are similar to LBO firms.

Furthermore, we then compare descriptive statistics of LBO firms and non-LBO firms in Table 4.

Table 4. Descriptive Statistics

Independent Variables	LBO		Non-LBO		Mann-Whitney U Test
	Mean	Std Deviation	Mean	Std Deviation	Z-Statistics
Lev	0.247	1.480	0.030	0.862	-3.923***
TanA	0.224	0.257	0.219	0.240	-0.871
FCF	0.108	0.112	0.088	0.622	-2.115**
PBV	1.632	6.042	1.919	7.290	1.275
ROE	0.038	0.695	0.063	0.567	1.127
AvgRevGrowth	0.062	0.147	0.087	0.511	1.153

Notes: ***, **, * means significant at alpha 1%, 5%, and 10% respectively.
Source: Capital I.Q., Processed.

Table 4 shows that LBO firms have mean leverage of almost eight times that of non-LBO firms. LBO firms' leverage is 0.247 instead of 0.030 of the non-LBO firms. LBO firms' tangible assets mean 0.224 and 0.219 for non-LBO firms. LBO firms' free cash flows mean 0.108 is more significant than non-LBO firms' 0.088. The descriptive statistics provide early evidence that LBO firms have more severe agency problems than non-LBO firms.

From the valuation perspective, LBO firms have a 14.96% lower market-to-book value ratio than non-LBO firms. Price-to-Book Value LBO firms are 1.632 lower than 1.919 non-LBO firms. The lower valuation is due to lower revenue growth and lower return on equity. Leverage does not contribute to a higher return on equity of LBO firms. However, the differences are not significant at alpha 10%.

Logistics Regression Results

We perform partial and simultaneous logistic regression. We present the results in table 5.

Table 5. Partial and Simultaneous Logistic Regression Results

Variables	Partial Regression	Simultaneous Regression
Constant		-0.161
z-Statistic		(-0.72)
Lev	0.236**	0.296***
z-Statistic	(2.34)	(2.76)
TanA	0.349	-0.087
z-Statistic	(0.81)	(-0.19)
FCF	1.976**	3.128**
z-Statistic	(2.37)	(2.37)
PBV	-0.013	-0.039*
z-Statistic	(-0.82)	(-1.71)
ROE	-0.342*	-0.974***
z-Statistic	(-1.71)	(-2.61)
AvgRevGrowth	-1.077**	-1.061**
z-Statistic	(-2.35)	(-2.13)
N	348	348
McFadden R^2		0.066
Chi-square		31.715***

Note: ***, **, * means significant at alpha 1%, 5%, and 10% respectively.

Partial Logistic Regression Results

Referring to Table 5, the leverage (Lev) has a positive effect on the likelihood of being a target for LBO, in line with the research of Mehran and Peristiani (2010) and Billet, Jiang, dan Lie (2010). Furthermore, Cai, Balachandran, and Dempsey (2011), Bena and Li (2014), and Wu and Chung (2019) also found that Lev has a positive effect on the firm's likelihood of being a takeover target.

The tangible assets level (TanA) has no significant effect on the likelihood of being a target for LBO. This result contradicts Bharath and Dittmar (2010) and Cai, Balachandran, and Dempsey (2011), who find that tangible asset level positively affects the likelihood of being a takeover target. Eisenthal-berkovitz, Feldhütter, and Vig (2020) find that creditors demand a higher yield to compensate the LBO target with lower covenants value.

Free cash flow level (FCF) positively affects the likelihood of becoming a target for LBO. The findings are in line with findings from Mehran and Peristiani (2010), Billet, Jiang, and Lie (2010), Bharath and Dittmar (2010), Du, He, and Yuen (2013), Belkhir, Boubaker, and Rouatbi (2013), Sannajust, Arouri, and Teulon (2015), Dasilas and Grose (2018), and Mittoo et al. (2020).

The Market-to-book ratio (PBV) has no significant effect on the likelihood of becoming a target for LBO. This result is contrary to the previous research. Cai, Balachandran, dan Dempsey (2011), Bena dan Li (2014), Sannajust, Arouri, and Teulon (2015), Adut, Holder, and Robin (2016), Tunyi and Ntim (2016), and Chiarella and Ostinelli (2020) find market-to-book ratio on firms reduce the likelihood of firm becoming a takeover target.

The firm's return on equity (ROE) also negatively affects the likelihood of becoming a target of LBO. This result is in line with the previous findings on the firm's ROE negative effect on its likelihood of becoming a takeover target from Cudd and Duggal (2000), Cremers, Nair, and John (2009), and Meghouar and Ibrahimi (2021).

Lastly, a firm's revenue growth (AvgRevGrowth) hurts the likelihood of becoming a target for LBO. The findings are in line with Adut, Holder, and Robin (2016), Wu and Chung (2019), Tunyi, Ntim, and Danbolt (2019), which also found that the firm's revenue growth hurts its likelihood of becoming a takeover target.

Simultaneous Logistic Regression Results

Table 5 shows that five independent variables are significant and only one insignificant. The debt level (Lev) has a positive coefficient of 0.296 and is significant at alpha 1%. The tangible assets level (TanA) has no significant effect on a firm's likelihood of becoming a target for LBO. The free cash flow level (FCF) has a positive coefficient of 3.128 and is significant at alpha 5%. The market-to-book ratio (PBV) shows a negative coefficient of -0.039 and is significant at alpha 10%. A firm's return on equity (ROE) has a negative coefficient of -0.974 and is significant at alpha 1%. Also, a firm's revenue growth has a negative coefficient of -1.061 and is significant at alpha 5%.

The model has a positive Chi-square value of 31.715, which is significant at an alpha of 10%. However, McFadden's R^2 value is 0.066 below the suggested value for an excellent logistic regression model 0.2-0.4.

5.   DISCUSSION

Management has three strategies to fund new investments: (1) reduce or remove dividend payments, (2) issuing new shares, and (3) using debt financings. The first and second strategies usually meet opposition from the shareholders. The third strategy does not need shareholder approval. The management will fund the new investment by issuing more debt. Since the motive of the new investment is primarily for the benefit of the management, the investment results do not contribute significantly to revenue growth and profitability. High investment, lower revenue growth, and lower profitability result in lower stock value.

A firm with high free cash flow and serious agency problems will have a higher debt level. These primary characteristics attract acquirers to acquire the firm using debt financing or an LBO transaction. The firm's value is created through value creation investment, higher revenue growth, higher profitability, and lower debt. Higher firm profitability and lower financial distress cost will increase stock valuation.

The firm tangible assets (TanA) have no significant effect on the firm's likelihood of becoming the target of LBO transactions. As the proportion of firm tangible assets relative to the firms' total assets is getting small, the acquirer cannot consider firm tangible assets as a source of cash flow to reduce debt after the LBO transactions.

6.   CONCLUSION, LIMITATIONS, AND SUGGESTIONS

Conclusion

We find that the agency theory-related financial characteristics can predict an LBO target one year before the event occurs. The financial characteristics are leverage, free cash flow, market-to-book value ratio, profitability, and three-year average revenue growth. All the variable is statistically significant.

Firm reduce tangible asset investment and increase intangible asset investment. The acquirer's ability to reduce debt by selling tangible assets is limited. Hence, the firm tangible asset is not considered an essential determinant for the LBO transactions.

The agency problem is a classic problem that is still relevant today. LBO target firm shows serious agency problems. The firm uses high free cash flow to obtain more debt financing to pursue new investments. However, the new investment does not contribute to higher revenue growth and profitability. The investors penalize the value-destroying investment in a lower market-to-book value ratio.

Limitation and suggestions

Even though the model is applicable, the model can be improved further. Our model McFadden R2 is significantly below the suggested McFadden R2 value 0.2-0.4. Relatively low McFadden R2 may be due to not considering the sector and the year of the LBO transactions. Hence, future research may consider the sector effects. We also have not yet considered LBO target debt maturity, i.e., the proportions of short relative to long-term debt maturity. The research questions should be "*Do debt maturity matter in the acquirer decision for an LBO transaction?*".

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