Current Liabilities and Current Assets in Domestic Companies with Bankruptcy Status

ABSTRACT

The United States Courts reported a 16.8% rise in total bankruptcy filings in December 2023 compared to December of the previous year, with a 40.4% increase in business filings (2024). This paper uses 1999-2018 panel data from American public companies to explore if higher current liabilities are associated with lower current assets in failed domestic companies. The primary analysis using a simple linear regression reveals a significant positive relationship, where every $1000 increase in current liabilities is associated with $471.47 increase in the expected current assets, explaining 32% of the variation. Further analyses including control variables such as earnings before interest, taxes, depreciation, and amortization (EBITDA), total long-term debt, and net sales significantly enhance the model's ability to explain the variation to 60.3%, highlighting the possibility of additional control variables impacting current assets.

I. INTRODUCTION

The objective of this paper is to explore potential trends or indications of bankruptcy within domestic companies' financial statements, specifically investigating the relationship between current liabilities and current assets. Current assets and current liabilities can be used to calculate current ratio which is an element that provides insight into a company's financial health. Current ratio is often regarded as a method to offer short-term resolutions to financial distress a firm is undergoing and a firm's capability to settle debt. Financial distress describes a situation where a firm has difficulty meeting its obligations, specifically where the company's total costs and is experiencing losses cannot be covered by its revenue (Suherman & Solikin, 2020). Considering the significance of current ratio in bankruptcy prediction, the question this paper will target will be: are higher current liabilities associated with lower current assets in domestic companies with bankruptcy filings? Since current liabilities exceeding current assets reflect the firm's incapability to fulfill short-term obligations, increasing the bankruptcy risk (Nishihara & Shibata, 2021). Hence, a positive relationship with coefficient less than one can be anticipated between current liabilities and current assets.

The paper inspects the relationship between current liabilities, current assets, and other factors such as net sales, total long-term debt, etc. A panel data from 1999 to 2018 containing observations of public domestic companies listed on the New York Stock Exchange and NASDAQ is examined and used to report empirical models and results of the relationship between current liabilities and current assets of failed company observations. The results of the analysis will be discussed and concluded to further solidify the relationship of current liabilities, the main independent variable, and current assets, the dependent variable. The simple linear regression model presented indicates 32% of the variation in current assets explained by current

liabilities with company-level and time fixed-effects. The paper concludes that for every $1000 increase in current liabilities is held by $471.47 increase in the expected current assets, depicting a positive relationship with coefficient less than one. Additionally, a linear regression including control variables earnings before interest, tax, depreciation, and amortization (EBITDA), total long-term debt, and net sales along with current liabilities had a considerably higher explanation of the variance sheds light on the possibility of omitted variables affecting the current assets.

II. LITERATURE REVIEW

For decades, researchers have been seeking an accurate model to predict corporate bankruptcy. Financial ratio analysis has been introduced as a powerful mechanism that utilizes crude financial statements and emphasizes the predictive ability of the financial information itself. Financial ratios may not be the sole predictor or a company's failure, but it provides a valuable insight to whether the company will be facing certain events that may lead to bankruptcy (Beaver, 1966).

Subsequent published studies included current ratios, the amount of current assets owned divided by the amount of current liabilities to repay. In other words, the current ratio serves as an indicator of credit-worthiness as it reveals the firm's performance in satisfying its obligations within the given time period, and a high current ratio makes lures investors to buy more shares to raise the company's stock price (Purba et al., 2021).

Research conducted in the United States indicates that the financial ratios of firms that eventually failed were consistently lower than the average of the industry and showed a decreasing trend for years prior to their failure. Thus, ratios can be a huge resource for predicting imminent financial distress. Out of 28 firms the study tracked from 1958 to 1960, 20 firms (71.4%) had a current ratio of one or lower in the year before bankruptcy, while only 8 firms

(27.6%) had a ratio over one. This describes that firms with such ratios are more likely to fail than the others (Tamari, 1966). As this specific analysis also considers the ratio of equity capital combined with reserves divided by total liabilities in percentage, the value of production squared and divided by inventory, sales divided by receivables, and the value of production divided by working capital, it would indicate that further accurate analysis for bankruptcy potential may require considering various omitted variables from this paper in future analysis.

III. DATA DESCRIPTION

The data set of this paper is panel data from 1999 to 2018 with 78,682 instances of the 8,262 unique American public firms indexed on New York Stock Exchange and NASDAQ major domestic stock markets. The data was extracted from the markets as comma-separated values. The observations measure companies anonymously in the given time frame and track the status of the company, either failed or alive along with various financial information (see Table 1). The main independent variable selected for analysis is X1, current assets (in $1,000's), and the dependent variable is X14, current liabilities (in $1,000's). A qualitative variable, status_label, The variable used to create an interaction term with the main independent variable is X8, market value of the asset (in $1,000's). There are three additional independent variables included in the analysis to account for any omitted variable biases. The control variables (in $1.000's) are: X4, EBITA; X9, net sales; X11, total long-term debt.

See next page for Table 1

Table 1: Variable Description

Variable	Label	Description
status_label	Bankruptcy status	1 if alive, 0 if failed (bankrupt)
X1	Current assets (in $1.000's)	Total assets of a company that are expected to be sold or used as a result of standard
X4	EBITDA (in $1000's)	Earnings before interest, taxes, depreciation, and amortization
X8	Market value (in $1,000's)	The price of an asset in a marketplace (market capitalization)
X9	Net sales (in $1,000's)	The sum of a company's gross sales minus its returns, allowances, and discounts
X11	Total long-term debt (in $1,000's)	Company's loans and other liabilities that are due at least after a year
X14	Total current liabilities (in $1,000's)	The sum of accounts payable, accrued liabilities, and taxes (e.g. bonds)

Table 2: Summary Statistics

	(1)	(2)	(3)	(4)	(5)
VARIABLES	N	mean	sd	min	max
Current Assets	5,219	397.7	1,141	0.001	16,548
EBITDA	5,219	137.5	515.5	-5,062	6,136
Market Value	5,219	855.6	3,393	0.002	139,093
Net Sales	5,219	1,181	3,562	0.001	53,012
ttl_longtermdebt	5,219	609.5	2,078	0	21,586
Current Liabilities	5,219	339.3	1,116	0.005	17,331

IV. EMPIRICAL MODEL

The estimated model is constructed from the data set represent the log of current assets as a function of current liabilities using company-level and time fixed-effects:

$$X1_{it} = \beta_0 + \beta_1 X14_{it} + u_{it}$$

While company and year are being held constant, X1 represents the dependent variable, current liabilities, in company *i* and year *t.* The main independent variable is X14, current liabilities of the company. Given that both the dependent and independent variables are expressed in logarithmic form, the relationship can be interpreted in terms of elasticity, a measure of responsiveness. A positive relationship between current assets and current liabilities is expected, which aligns with financial management practices where companies use liabilities to finance asset acquisition. The inclusion of company-level and time fixed-effects in the model ensures that the estimated relationship is not confounded by intrinsic company differences or broader economic trends over the observed time frame, and isolates the interaction between a company's liabilities and its assets.

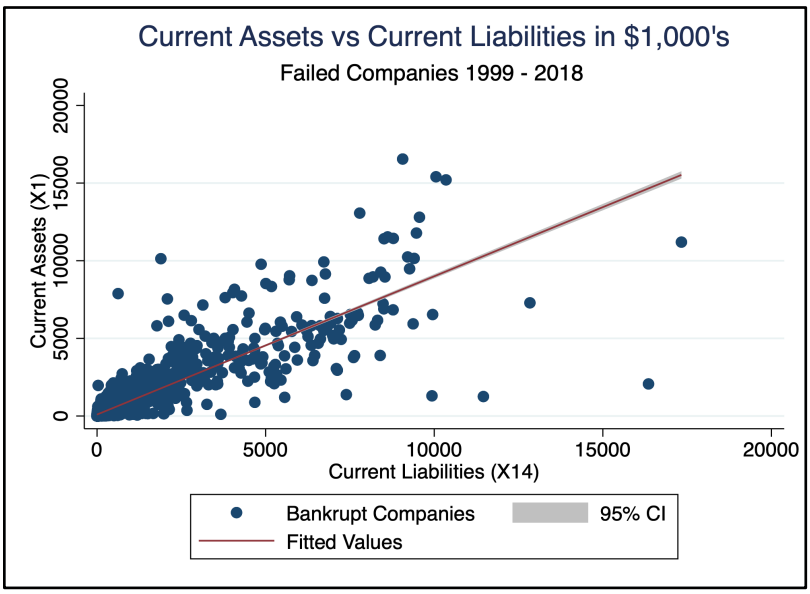
Aside from the main independent variable, several control variables were included in the analysis to account for omitted variable biases. Variable X8, was included in the interaction analysis to investigate the effect of the price of an asset in a marketplace, specifically market capitalization as the companies were publicly traded in domestic stock markets. Considering market capitalization in the analysis helps differentiate the impact of company size and financial scale on the relationship between current liabilities and current assets. This control is informative, especially in a bankruptcy context, as it allows the analysis to isolate the effects of financial management practices from the confounding influence of company size. Variables EBITA (X4), net sales (X9), and total long-term debt (X11) were included in the further analysis

to observe any biases there may be when these variables were omitted. EBITDA provides an intuition of a firm's potential to manage and survive financial distress by reflecting its operational viability without the misinterpretation from tax, interest, or depreciation strategies. Net sales is a type of an asset which reflects whether the firm has sufficient ongoing business to support its financial obligations, which may be an important indicator of a company's financial sustainability. Considering total long-term debt while structuring a relationship between current liabilities and current assets in bankrupt firms is crucial as it offers a broad view of the firm's financial burden ahead of the present scope. The scale of long-term obligations is essential for evaluating the firm's ability to restructure successfully, which are pivotal when assessing its potential to continue operations and meet the long-term financial duties.

Before running complex regressions and including other variables as control in the analysis, a simple linear regression with using unaltered main variables was completed with company-level and time fixed effects. The coefficient is statistically significant at 1% level and positive with value 0.47147, indicating that $1000 increase in current liabilities is associated with $471.47 increase in the expected current assets. Although the relationship is positive, the coefficient is smaller than one, indicating that current assets grow at a slower rate than current liabilities. The adjusted R-square of this model was 0.3204 which means that approximately 32% of the variance of current assets in terms of current liabilities can be explained by this simple linear regression model. Based on this linear regression, a two-way scatter plot is created to visualize the relationship and identify the fit of the model.

See next page for Figure 1

Figure 1: Two-way Scatter Plot of Current Assets and Current Liabilities in $1,000's, Failed Companies 1999 - 2018



V. RESULTS

Regression Results

VARIABLES	(1) Current Assets	(2) Current Assets	(3) log_currentassets	(4) log_currentassets	(5) Current Assets	(6) Current Assets	(7) Current Assets
year = 2000	26.25*	42.56*	0.0960**	0.00939	30.54*	31.39**	6.592
	(15.56)	(23.79)	(0.0391)	(0.0343)	(16.65)	(15.06)	(13.98)
year = 2001	30.34	30.69	-0.0224	-0.110***	27.35	49.04***	-5.184
	(18.98)	(22.32)	(0.0440)	(0.0371)	(18.12)	(17.95)	(13.29)
year = 2002	11.56	13.75	-0.117**	-0.175***	7.509	37.50**	16.73
	(18.61)	(22.99)	(0.0482)	(0.0397)	(17.78)	(15.28)	(21.85)
year = 2003	16.48	-5.022	-0.0766	-0.157***	13.88	39.01**	11.59
	(17.45)	(21.88)	(0.0554)	(0.0451)	(16.84)	(15.36)	(17.50)
year = 2004	27.04	4.994	0.0150	-0.112**	21.37	49.45***	16.95
	(17.93)	(24.52)	(0.0642)	(0.0539)	(16.49)	(15.93)	(17.69)
year = 2005	31.11	25.18	0.1000	-0.0888	21.66	51.10***	13.61
	(23.77)	(30.09)	(0.0705)	(0.0565)	(22.73)	(19.24)	(20.25)
year = 2006	51.00**	29.37	0.234***	-0.0296	38.55*	68.32***	13.00
	(24.70)	(33.87)	(0.0734)	(0.0564)	(23.26)	(24.41)	(16.00)
year = 2007	56.56**	24.29	0.293***	-0.0523	40.92*	78.39***	15.65
	(27.53)	(37.25)	(0.0846)	(0.0644)	(24.35)	(26.56)	(17.99)
year = 2008	18.92	12.19	0.277***	-0.126*	-5.855	55.42*	-12.74
	(38.27)	(44.82)	(0.0955)	(0.0740)	(31.78)	(30.24)	(22.20)
year = 2009	73.11*	36.82	0.272***	-0.116	55.12*	97.15***	45.43**

	(38.13)	(48.24)	(0.0979)	(0.0704)	(29.50)	(37.00)	(21.51)
year = 2010	79.33*	52.31	0.354***	-0.0592	56.11*	104.4**	32.22
	(41.70)	(52.09)	(0.103)	(0.0771)	(31.31)	(41.07)	(20.34)
year = 2011	99.22**	84.53	0.449***	0.00662	70.49**	126.6***	16.98
	(49.06)	(56.71)	(0.107)	(0.0809)	(34.47)	(45.73)	(22.06)
year = 2012	94.34	92.34	0.381***	-0.144*	56.18	123.9**	14.31
	(58.78)	(67.47)	(0.114)	(0.0835)	(41.49)	(55.09)	(24.53)
year = 2013	82.94	84.60	0.425***	-0.122	42.96	112.9**	5.904
	(61.38)	(69.71)	(0.112)	(0.0847)	(44.37)	(56.66)	(24.06)
year = 2014	65.18	62.08	0.475***	-0.0807	18.08	96.49	-37.42
	(73.73)	(81.37)	(0.121)	(0.0887)	(57.39)	(68.48)	(32.33)
year = 2015	-5.307	77.25	0.285**	-0.272**	-77.68	40.91	-11.08
	(123.7)	(115.3)	(0.134)	(0.111)	(108.2)	(114.0)	(70.38)
year = 2016	-66.74	-52.77	0.0888	-0.446***	-115.4	-36.08	-107.3**
	(91.55)	(97.50)	(0.158)	(0.137)	(79.16)	(87.75)	(46.50)
year = 2017	-276.6	-158.8	0.176	-0.450***	-309.9*	-215.6	-217.5***
	(170.2)	(140.0)	(0.160)	(0.123)	(165.7)	(156.8)	(80.39)
year = 2018	-293.2*	-102.0	0.125	-0.576***	-359.7**	-221.2*	-244.0**
	(153.8)	(85.49)	(0.199)	(0.153)	(150.7)	(128.4)	(98.08)
Current Liabilities	0.471***		0.000166***		0.694***	0.413***	0.212***
	(0.122)		(4.00e-05)		(0.173)	(0.115)	(0.0664)
log_currliab		105.0***		0.519***			
		(22.31)		(0.0324)			
X14_sq					-1.83e-05		
					(1.37e-05)		
Market Value						0.00105	
						(0.0246)	
X14_X8						6.67e-06*	
						(3.79e-06)	
EBITDA							0.0246
							(0.102)
Net Sales							0.189***
							(0.0330)
ttl_longtermdbt							0.0718**
							(0.0286)
Constant	206.6***	-22.14	3.901***	2.254***	170.5***	188.2***	52.04
	(36.24)	(82.30)	(0.0579)	(0.120)	(44.27)	(49.44)	(36.04)
Observations	5,219	5,219	5,219	5,219	5,219	5,219	5,219
company_id count	609	609	609	609	609	609	609
Adjusted R-squared	0.320	0.041	0.054	0.288	0.338	0.402	0.603

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

The initial simple linear regression model underscored a statistically significant positive correlation between current liabilities and assets, with a coefficient of 0.471 indicating that every $1,000 increase in liabilities correlates with a $471.47 increase in assets. Despite this positive relationship, the coefficient size suggests that assets grow at a slower rate than liabilities, which might lead to a current ratio of less than one, signaling potential bankruptcy risks. This model demonstrated substantial explanatory power with an adjusted R-squared value of 0.320.

In the process of further analysis, The linear-log regression model using the log of current liabilities to estimate current assets with element and time fixed-effects has a statistically significant at 1% level and positive coefficient of 104.9978, which can be recited as 1% increase in current liabilities is associated with a $1049.98 increase in the expected current assets. However, the adjusted R-squared value reported to be 0.0409, showing that this model is not the best fit to explain the relationship between two variables as only about 4.1% of the variation can be explained by this model.

Variables current liabilities and the log of current assets were selected to generate the log-linear regression model with element and time fixed-effects. The coefficient was statistically significant at 1% level and was positive with value 0.00017: a $1,000 increase in current liabilities is associated with a 0.017% increase in the expected current assets. The adjusted R-square value of this model is relatively low with 0.0538, indicating that this model does not represent the relationship between current assets and current liabilities.

The log-log regression model utilizing the log of current assets and the log of current liabilities had a coefficient of 0.5190 which is positive and statistically significant at 1% level. It is interpreted as an elastic relationship where 1% increase in current liabilities is associated with 0.52% increase in the expected current assets. Although the adjusted R-squared value of this

model is lower with 0.2883 compared to 0.3203 of the simple linear regression model, one important factor to consider is that in practical economical perspective, the elastic relationship or a measure of responsiveness may be a more precise predictor of the relationship between current assets and current liabilities than a simple linear regression where change is measured in units.

By generating an interaction term of current liabilities and market value, the paper develops the regression model of current assets on current liabilities, market value, and the interaction term of two independent variables. The coefficient of current liabilities, market value, and the interaction term was 0.4127, 0.0011, and 6.67e-06. However, only the coefficient of current liabilities was statistically significant at 1% level, while the coefficient of market value was statistically insignificant and the coefficient of the interaction term was statistically significant at 10% level. In other words, the relationship between current liabilities and current assets is strong and reliable, while market value's direct relationship with current assets may be limited and the lower level of significance (compared to the 1% level for current liabilities) suggests that the combined effect of current liabilities and market value on current assets is less robust and more variable. The adjusted R-squared of this value is 0.4016, which explains more variation of the expected current assets than the simple linear regression.

After generating a variable X14_sq which represents current liabilities squared, the regression was executed to generate a quadratic model with current liabilities and current liabilities squared as two dependent variables. The coefficient of current liabilities was positive and statistically significant at 1% level with 0.6942, but the coefficient of of current liabilities squared was statistically insignificant, implying that the This indicates that the quadratic component does not provide additional explanatory power to the relationship between current assets and current liabilities, and it is statistically indistinguishable from zero. This model

explains 33.8% of variation in the current assets. Running another regression with the log of current assets in respect to current liabilities and current liabilities squared, it is revealed that both coefficients for current liabilities and current liabilities squared are statistically significant and positive with .0005348 and -3.03e-08, but the low adjusted R-squared value of .06981 also indicates that this model is not the most appropriate model to explain the true relationship of our main variables.

The regression model considering EBITDA, net sales, and total long-term debt in the relationship between current assets and current liabilities depicts that although all the coefficients are positive, only the coefficients of current liabilities (0.2120) and net sales (0.1888) is statistically significant at 1% level, while the coefficient of total debt (0.0718) is statistically significant at 5% level and the coefficient of EBITDA (0.0246) is statistically insignificant. This indicates that current liabilities and net sales significantly influence current assets with their positive coefficients significant at the 1% level, suggesting they are key drivers of asset management. In contrast, while total long-term debt also positively affects current assets, its impact is less significant at the 5% level. EBITDA, however, shows no significant effect, indicating a minimal role in influencing current assets in this context.

VI. CONCLUSION

The analysis reveals a consistently positive yet less than proportional relationship between current assets and current l across multiple regression models. Notably, the coefficients for current liabilities are less than one in all significant models, indicating that while current assets increase with rising current liabilities, they do so at a slower rate. This has implications for a notable current ratio, as such a growth pattern may lead to a current ratio of less than one, a common indicator of potential bankruptcy risk. The log-log model provided valuable insights

into the elasticity of current assets in response to changes in current liabilities, demonstrating a responsive relationship. However, the adjusted R-squared values, particularly in models involving interaction terms and additional financial metrics like market value and net sales, show that while current liabilities remain a significant predictor, other factors like market value have limited influence on current assets. These findings suggest that in bankrupt firms, careful management of the balance between assets and liabilities is crucial. As liabilities tend to grow faster than assets, the risk of a deteriorating current ratio increases, potentially heightening bankruptcy risk. This underscores the importance of monitoring financial stability and managing liabilities to mitigate further financial distress.

VII. LIMITATIONS AND FUTURE RESEARCH

The analysis provided in this study, while comprehensive in utilizing accounting data from American public companies listed on major stock exchanges, with company-level and time fixed effects held constant, still faces limitations. The reliance primarily on historical accounting figures might not capture the complete financial health of a company. Key qualitative factors such as management quality, industry-specific dynamics, or broader economic conditions that might influence bankruptcy outcomes are not considered.

Given the dataset's scope, the research could be extended by incorporating variables that capture a broader spectrum of financial health indicators, such as the average delay of accounts receivable or specific bankruptcy types (Chapter 7 vs. Chapter 11). Additionally, incorporating categorical variables indicating industry sectors or whether a firm is private or public could provide deeper insights into how different environments impact financial stability.

Further studies could also benefit from integrating quantitative variables related to company size, such as the number of employees or employment survival rates, which might offer

additional insights into a company's operational viability. Such extensions would allow for a more nuanced analysis of the factors leading to bankruptcy and could help in developing more targeted strategies for financial management and risk assessment.

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