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Round after round: Understanding dry powder as a determinant of spread in leveraged loans

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Abstract

Given the rise in private equity companies' dry powder reserves, as well as the increased prevalence of covenant-lite loans pointing to a change in the overall dynamic of leveraged loan dealmaking, this paper aims to determine whether dry powder is a significant determinant of leveraged loan spreads. This paper uses a sample of loan level contract variables, borrower characteristics, and macroeconomic conditions from DealScan, Compustat, Pitchbook, and the Federal Reserve Economic Data. My findings are consistent with the hypothesis that availability of funds, measured in dry powder, is a good determinant of spread. As leveraged loans are a necessary component of leveraged buyouts, when dry powder reserves are high, investor sentiment is positive and the market is friendly to credit investors. This means that bank and nonbank lenders are more likely to capitalize on the active leveraged loan market, which potentially means giving out riskier loans and charging higher premiums for these said loans. Therefore, I hypothesize that dry powder and spread have a positive and significant relationship. These findings were statistically significant when tested during the black swan years in the given sample period, controlling for robust standard errors, and including broad sector fixed effects. Finally, when tested across different tranche types, different characteristics became more significant to spread.

I. Introduction

In recent years, private equity firms have raised round after round of capital through limited partners, leading to a peak of 532 rounds of funding in the United States in 2018. The increasing trend of raising more capital concurrently leads to an increase in dry powder, or the reserves of committed but unallocated capital a firm has on hand. With more leveraged buyout ("LBO") investing taking place and therefore, more leveraged loans employed in the making of these deals, it is natural to wonder whether there is a relationship between the amount of dry powder and spread.

This paper explores the impact of dry powder on spread using other economic measures, namely the 10-year Treasury rate, loan level data, including number of financial covenants, and firm-specific measures, such as firm size, debt to EBITDA ratio, and return on assets as control variables. I expand upon prior research by incorporating macroeconomic measures, analyzing loan level, and firm specific data to test which variables have the most impact on determining leveraged loan spreads.

A 2019 Federal Reserve Bank of Kansas City primer found that premiums charged to leveraged borrowers have fallen across all loan types since 2016. Term loan spreads have fallen continuously after the 2008 Global Financial Crisis, while revolving loan spreads have been more stable in their decline from the post-crisis era. One reason for this is that the typical behavior for the lenders of revolving term loans has varied in the post crisis era (Lee, Liu, and Stebunovs 2017). Since banks are the typical providers of credit in revolving loans, they are more able to withstand the liquidity risk these credit lines entail. Compared to banks, nonbank finance companies are more likely to make secured loans, take on riskier loans, and lend to riskier borrowers (Carey, Post and Sharpe 1998).

This trend of falling spreads across all loan types is a testament to the change in control, makeup and role that lenders play, especially when coupled with the increasing number of covenant lite loans ("cov-lite") that are issued as part of LBO deal packages. In 1997, the typical loan had about three financial covenants, but by 2016, this number had dropped to a little less than two covenants per loan, with much greater headroom (Griffin, Nini and Smith 2018). While Griffin, Nini and Smith (2018) acknowledge that the increasing number of cov-lite loans has risen in step with the increased participation by non-bank institutions in corporate lending, from 8% in 2001 to 23% in 2016, they conclude that the decline in contract restrictiveness extends beyond institutional loans to tranches held primarily by banks, indicating that increased institutional participation cannot be the whole explanation to the phenomenon. Their findings are challenged by Ivashina and Vallee (2020), where they find that larger nonbank participation is conducive to weaker contractual terms.

The weakness in contractual terms brought about by larger nonbank participation is echoed by a recent study by Portfolio Management Data (PMD) and Standard & Poor's (S&P) The New Bargain: Leveraged Bank Loans (Miller, Rushmore and Van de Castle 1998). They showed empirical evidence for two trends that have long been suspected. First, the institutional term loan market is becoming more efficient from a credit-spread perspective. Second, investors are trading off credit spread for liquidity, akin to the use of loan markets to "reach for yield" in response to low interest rates.

In fact, Ivashina and Vallee (2020) find using the J. Crew example, where company value was transferred from lenders towards shareholders, that weakened loan contracts typically appear when banks retain a smaller share of the loan, giving way for institutional investors, such as collateralized loans obligations and mutual finds. Furthermore, they also point out the possibility

that private equity firms who have large debt expertise have an incentive to help portfolio firms navigate crisis despite high levels of leverage, thereby potentially distorting usual signals from the credit market and facilitating value extraction from creditors.

One may find it counterintuitive that a decline in spread is accompanied by a decline in monitoring capacity and risk mitigation in the form of cov-lite loans. Studies have found that higher quality borrowers signal creditworthiness through offering more collateral, and there is a positive relationship between collateral and borrower credit worthiness (Besanko and Thakor 1987). However, the design of different tranches that have become increasingly more complex and with different risk-return profiles might be responsible for this reduction in loan spreads (Alves et al. 2021).

While companies are seemingly off the hook from a term loan covenant perspective, most are still subject to line of credit maintenance covenants, typically by a bank lender, thereby creating split control rights (Berlin, Nini and Yu 2020). They also find that banks retain their role as monitoring borrower firms, while contracts have evolved to facilitate the banks' new role as monitors, mitigating bargaining frictions that arise with the entry of non-bank lenders. The findings in Berlin et al. (2020) come in contrast to prior literature which suggests that cov-lite loans serve to minimize ex-post conflicts of interest between syndicate members by removing banks from their role as monitors (Billet et al. 2016). Since this phenomenon of lower spread and increased cov-lite loans seems increasingly commonplace in loans issued in the near five years or so, we can turn back towards exploring the characteristics that might have a direct link to determining spread.

Alves et al. (2021) find that that aside from firm characteristics, the financial system structure and legal system all affect loan pricing. They find that targeting firms' characteristics, namely profitability and asset tangibility affects LBO deals' cost of debt. Additionally, laws

including creditor rights, institutions, and efficiency of contractual enforcement all affect LBO loan spreads especially in market-based systems, such as the United States.

Lenders can also augment loan yield spreads with additional fees for syndication, commitment fees and cancellation risks (Angbazo, Mei, and Sauders 1998). These variables are commonplace for syndicated loans in highly leveraged transactions as in sponsor-backed private equity deals.

Another strand of research shows that aside from borrower characteristics, more influential in terms of credit spreads are lender characteristics and prevailing broader economic conditions. In terms of lender characteristics, researchers find that regulatory capital adequacy is associated with the strictness of financial covenants included in loan contracts (Demerjian, Owens and Sokolowski 2021). They find that lenders with lower regulatory capital issue loans with lower financial covenant strictness. Financial covenant efficiency is maximized when a technical default occurs only when there is a material increase in risk of the borrower from the lender's perspective. With this in mind, Demerjian et al. (2021) find that lenders with lower regulatory capital set covenant terms that reduce the likelihood of covenant violation. Banks with lower Tier 1 regulatory capital issue loans with lower financial covenant strictness, consistent with lenders viewing technical defaults as costlier when regulatory capital is lower. Their paper confirms that covenant strictness is not only a function of the proportion of investors being bank or non-bank, but that lender capital management incentives play a role in the rise of cov-lite loans. Hubbard, Kuttner and Palia (2002) show that lender financial health is also an important determinant of spreads, given that poorly capitalized banks tend to charge higher rates than well-capitalized banks. The observation that poorly capitalized banks charge higher rates makes sense given the findings in

Demerjian et al. (2021) that low-capital banks are more willing to issue loans with lower financial covenant strictness.

Taking a macroeconomic perspective on linking uncertainty and debt covenants is Demerjian (2017). The paper found that the borrower's future performance, which determines creditworthiness and ability to repay the loan is a function of both the borrower's actions and the future state of nature. For example, he found that financial covenant use increased without a clear corresponding increase in agency conflicts after September 11, 2001. The paper measured financial covenant intensity as the number of financial covenants used in each loan package. His results showed that on loan level regressions, there was a significant association between financial covenant use and the borrower and industry level measures, but not those measured at the economy level. Demerjian (2017) implies that one must test for both firm-specific and macroeconomic factors that might affect spread.

Prior literature discussed above encompasses a broad range of testable characteristics, from lender data to borrower data to loan specific attributes, the relationship of lender and borrower, and the macroeconomy. The inclusion of every single one of them would be impossible to focus on in a semester long thesis project. My paper explores the impact on spread of economic measures, namely dry powder with control variables being the 10-year Treasury rate, loan level data, including number of financial covenants, and firm-specific measures, such as firm size, debt to EBITDA ratio, and return on assets. I expand upon prior research by incorporating macroeconomic measures, analyzing loan level data, and firm specific data to test which variables have the most impact on determining leveraged loan spreads. Furthermore, I present regression data segmented by tranche of debt in order to explore whether the variables which are most significant for the

overall dataset hold true when compared among revolving credit, term loans, and all other debt issued.

II. Research design and sample selection

Research design

To examine the relationship between spread and various economic, loan level, and firm-specific characteristics, I estimate the following model using OLS:

$$spread_{i,t} = \alpha + \beta_1 QDrypowder/QGDP_t + \beta_2\, number\ of\ financial\ covenants + \beta_3 rate_t + \beta_4\, firm\ size_{i,t} + \beta_5\, debt\ to\ EBITDA_{i,t} + \beta_6\, return\ on\ assets_{i,t} + \varepsilon$$

The dependent variable, spread, is a measure of loan pricing and is expressed in basis points. The total rate of a given loan is LIBOR + spread for the sample set.

The main independent variable is dry powder, calculated on a quarterly basis and representative of how much in reserves of committed but unallocated capital private equity companies are sitting on at any given moment. The regression variable is QDrypowder/QGDP, which signifies a shrunken quarterly dry powder as a ratio of U.S. quarterly GDP. This method of expressing dry powder is useful as it attempts to strip away the effects of inflation and growth in GDP from the raw dry powder number. Dry powder is a proxy for investor sentiment given that an increased pool of capital raised from private equity companies' limited partners signifies investors piling into private equity funds in search of higher returns. Of course, dry powder reserves could also be a sign of private equity companies delaying investments when there is a shortage of prime LBO candidates in the investable pool of companies. However, I took dry powder to signify investor sentiment since dry powder would not naturally increase by itself if private equity firms simply stop allocating capital. Dry powder needs constant replenishing, and its consistent growth rate is evidence that there is growing demand from the limited partners' side for private equity returns and an increase in dry powder signifies investor sentiment. Given this assumption of dry powder signifying investor demand, it is worthwhile to explore the relationship

of investor sentiment and loan spreads, or the price at which loans are trending for bank and nonbank loans.

Another important variable that is significant as part of loan characteristics is the number of financial covenants a given loan entails. Traditionally, the greater the number of financial covenants, the less risk the investment entails for a lender and the lower the spread, since lenders will be able to dictate the interest coverage ratio and leverage a borrower must maintain or cannot incur after lending. However, as mentioned above, the increasing trend of cov-lite loans and reaching for yield has lowered both the prevalence of covenants and rates altogether. It is interesting to see whether there is still significance in the number of financial covenants in each loan as it pertains to the effect on loan spreads.

Given that 10-year Treasury rates are widely considered a proxy for investor sentiment, it is included as an independent variable to determine whether rising yields mean higher spreads since investors are driven to prefer higher yielding and riskier investments.

Finally, the firm characteristics explored include firm size, measured by total assets, debt/EBITDA, as well as return on assets. These metrics were chosen since firm size is typically a significant marker of a firm's exposure to debt and creditworthiness, while debt/EBITDA is a common creditor metric to determine how highly levered a company is and therefore, their associated risk profile, and return on assets shows investors how efficient a company is at churning capital investments into profit.

Sample selection

The sample of 760 observations used in this paper is based on all loans issued between 2000 and 2021 obtained through Dealscan and merged by gvkey and calendar year and quarter

with firm-level financial statement data through Compustat using the WRDS Dealscan-Compustat linking table. Compustat data is lagged back one quarter when matching to Dealscan data past, not current performance would inform the terms set in place by lenders for a given company. Many observations were cut out during matching Dealscan and Compustat data due to restricting the sample to only U.S. companies through availability of a ticker. Because the original Dealscan dataset was at a loan level dataset, many observations were further removed upon limiting each deal to one of each tranche in order to avoid repetition of key characteristics that hold true in each loan in each deal, including number of financial covenants and spreads in each tranche of debt.

This dataset was then merged in with Pitchbook data containing quarterly dry powder measures from 2000-2021. Dry powder was also lagged a quarter since past availability of funds would inform characteristics of deal making in the present day. Finally, I linked U.S. 10-year Treasury data from FRED as a variable in my regression since commercial and leveraged loan prevailing rates are typically highly affected by the central bank's rates.

All regressions are done without years considered as "black swan" in the analysis, that means the removal of 2009 and 2020 from the regression dataset. Since the effects of the 2008 crisis did not materialize in 2008, but in 2009, that was the year omitted from the dataset used in the regressions. The market had a quicker response time in 2020 on the other hand, as the crisis occurred earlier in the year and caused immediate shutdowns. Furthermore, QDrypowder/QGDP and Debt/EBITDA were Winsorized at 1% to keep them within reasonable bounds.

III. Data

Descriptive statistics

Descriptive Statistics

	Spread	Qdrypowder/QGDP	Num of Fin Covs	Rate	Firm Size	Debt/EBITDA	ROA
N	760	760	760	760	760	760	760
Missing	0	0	0	0	0	0	0
Mean	267.19	0.04	1.09	3.55	8066.54	7.17	0.0104
Std. error mean	5.76	5.96 e-4	0.04	0.05	507.23	0.5	0.0012
Median	250.00	0.04	1.00	3.66	3326	3.86	0.0100
Standard deviation	158.74	0.02	1.18	1.24	13983.25	13.75	0.0324
Variance	25198.36	2.70 e-4	1.39	1.55	1.96 e+8	188.99	0.0011
Range	960.00	0.07	5.00	5.53	96273	108.03	0.5300
Minimum	0.00	0.01	0.00	0.65	79	0	-0.3900
Maximum	960.00	0.08	5.00	6.18	96352	108.03	0.1400
25th percentile	150.00	0.03	0.00	2.64	1272.25	1.29	0.0000
50th percentile	250.00	0.04	1.00	3.66	3326	3.86	0.0100
75th percentile	325.00	0.05	2.00	4.60	7807	8.14	0.0200

Table 1 – Descriptive Statistics

The mean spread is 268 bps. This spread is shared by revolvers, term loans, and other types of debt issuances and is an average of the whole sample size. Quarterly dry powder is on average about 4% of U.S. quarterly GDP and, as shown in Figure 1, is rising over time even when held as a proportion of quarterly GDP. Table 2 and 3 give more detailed breakdowns of the number of financial covenants broken down in a frequency table as well as segmented by tranche.

Number of Financial Covenants Frequency Table

Levels	Counts	% of Total	Cumulative %
0	360	47.37	47.37
1	78	10.26	57.63
2	248	32.63	90.26
3	49	6.45	96.71
4	21	2.76	99.47
5	4	0.53	100

Table 2 – Number of financial covenants frequency table

tranche_first	Number of Fin Covs
364	1.15
Acquisition	5
Bridge	0.295
Delay	1.66
Other	0
Revolver	1.29
Term	1.18

Table 3 – Number of financial covenants by tranche

Number of financial covenants by tranche

Table 2 shows that the majority of my dataset, 360 out of 760 loans, have no covenants. This corroborates the growing trend of cov-lite loans. 90% of my data have between zero and two financial covenants in total. Table 3 shows us that majority of the number of financial covenants comes from delay draw term loans and revolvers, classified as "Other" in the tranche-specific regression run. This again confirms what prior literature posited about split control rights whereby although borrowers are not constrained by financial covenants in their typical term loans as much as they used to, revolvers and other types of loans they take on can still constrain them, thereby creating the split control.

Rate

Still on Table 1, the average 10-year Treasury in sample was about 3.5%, reaching as low as 2.6% and high as 4.6% in the 25th and 75th percentiles respectively. Typical Debt/EBITDA ratio was 7x, which is unsurprising and in line with the average leverage ratios of large LBOs. Given

that our sample set is restricted to loans funding LBOs for public companies, most of these loans are funding purchase prices in the billions.

Loans and sample set

A more detailed depiction of the number of loans, number of deals, the average loan size and average deal size can be found in Table 4. The average loan size varied from year to year but that each loan was typically a little more than half a million and reached several billion. The number of LBO deals for public companies was even less, ranging from five in 2009 and 2020 to 28 in 2007. Again, since these years were anomalies, 2009 and 2020 were taken out of the main and by-tranche regressions run.

Correlation matrix

In terms of looking at the possible correlation between variables, Table 5 shows the correlation matrix run of all the variables. Most significant are the high negative correlations between number of financial covenants and dry powder as well as rate and dry powder and the high positive correlation between rate and number of financial covenants. It is then unsurprising that when we move on to the OLS results, all three variables are not concurrently significant for any given regression. The negative correlation between financial covenants and dry powder could point to investor response to market signals. When financial covenants are higher, this signifies the market's reluctance to make deals happen smoother, therefore investors pull back and do not allocate capital to supply dry powder. Tying into this explanation is the rationale for the negative relationship between rate and dry powder. The lower rates are, the more investors try to reach for returns in alternative forms of riskier investments. Finally, the positive relationship between rate

and number of financial covenants reflect market sentiment when rates are higher. Lenders benefit from the increase in rates, but since borrowers are less willing to borrow and the credit market slows, lenders must protect downside risk more through increased use of financial covenants, especially for revolving credit, which as we saw earlier drove the use of number of financial covenants.

cyr	Number of Loans	Avg. Loan Size (in millions)	Number of Deals	Avg. Deal Size (in millions)
2000	35	1.4e+03	14	3.84e+03
2001	30	1.5e+03	16	3.9e+03
2002	24	535	13	1.66e+03
2003	19	462	13	1.15e+03
2004	40	1.11e+03	18	3.45e+03
2005	41	1.23e+03	20	3.03e+03
2006	59	2.6e+03	27	8.32e+03
2007	74	3.94e+03	28	2.08e+04
2008	49	4.26e+03	23	2.96e+04
2009	8	923	5	1.76e+03
2010	38	1.5e+03	17	5.96e+03
2011	39	2.89e+03	21	5.91e+03
2012	32	1.72e+03	17	4.42e+03
2013	61	3.27e+03	27	1.03e+04
2014	46	6.37e+03	17	2.63e+04
2015	22	3.48e+03	14	1e+04
2016	20	5.4e+03	12	1.31e+04
2017	34	2.85e+03	20	5.61e+03
2018	43	6.64e+03	17	3.05e+04
2019	18	7.58e+03	12	1.53e+04
2020	14	9.14e+03	5	2.88e+04
2021	14	2.6e+03	9	4.79e+03

Table 4 – Loan and deal characteristics

	Spread	QDrypowder/QGDP	Num of Fin Covs	Rate	Firm Size	Debt/EBITDA	ROA
Spread	1.00	0.16	-0.12	-0.16	-0.19	0.07	-0.23
QDrypowder/QGDP	0.16	1.00	-0.53	-0.77	0.30	0.12	-0.03
Num of Fin Covs	-0.12	-0.53	1.00	0.50	-0.21	-0.04	-0.03
Rate	-0.16	-0.77	0.50	1.00	-0.27	-0.07	0.09
Firm Size	-0.19	0.30	-0.21	-0.27	1.00	0.09	-0.01
Debt/EBITDA	0.07	0.12	-0.04	-0.07	0.09	1.00	-0.13

Table 5 – Variable correlation matrix

Finally, we look at the trend of the main independent variable, dry powder (Figure 1), and the dependent variable, spread (Figure 2). Dry powder has seen an upward trend since 2000, with varying growth rates but with an upward trend overall. By 2021, raw dry powder had grown over 8-10x where it started in 2000, and it has increased from 1% to 8% of quarterly GDP. Spread has seen a sharp increase before 2010 but has been decreasing since 2016 which underscores the 2019 Federal Reserve Bank of Kansas primer report's findings as well as Griffin et. al (2018).

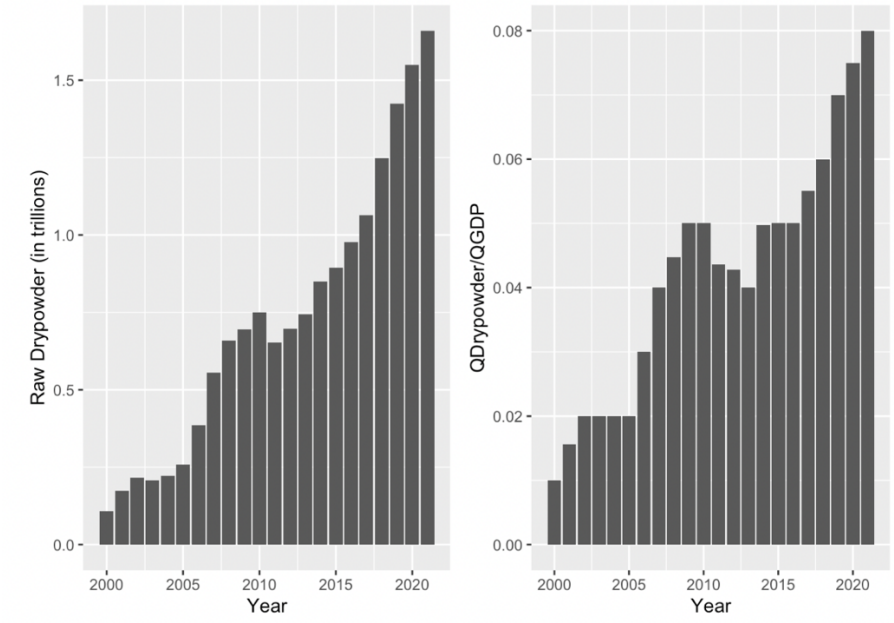

Figure 1 – Proportion of dry powder as a fraction of U.S. GDP

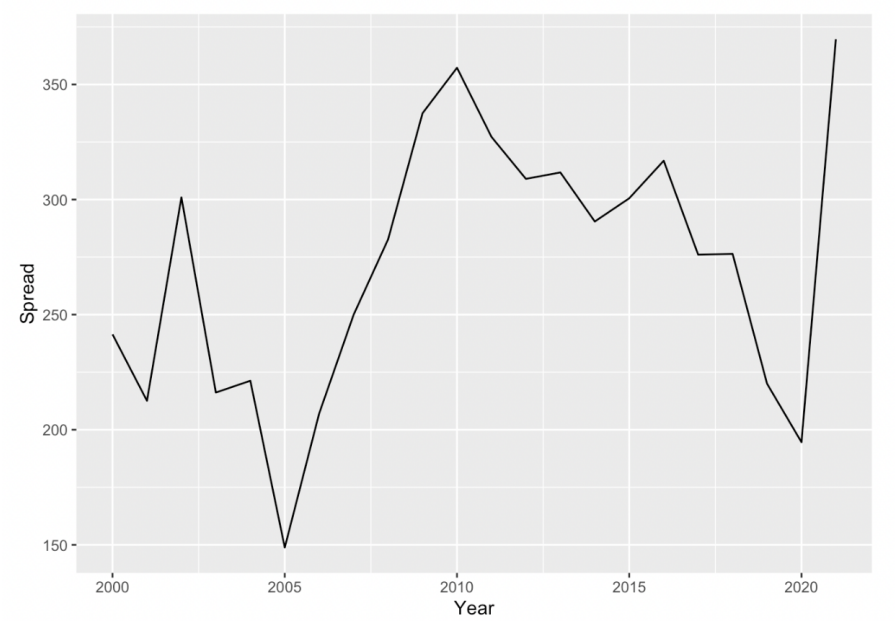

Figure 2 – Spread over time

IV. Empirical findings

As discussed in section II, a key supposition underlying this study is the effect that macroeconomic, loan-level, and firm specific variables have on spread. Thus, I run the following regression in Figure 3:

$$spread_{i,t} = \alpha + \beta_1 QDrypowder/QGDP_t + \beta_2\, number\ of\ financial\ covenants + \beta_3 rate_t + \beta_4\, firm\ size_{i,t} + \beta_5\, debt\ to\ EBITDA_{i,t} + \beta_6\, return\ on\ assets_{i,t} + \varepsilon$$

Regressions 1 through 3 add upon what I initially hypothesized to be the three most explanatory variables, regression 4 explores the impact of only firm-specific metrics, and regression 5 puts it all together. Regression 6 includes an interaction variable with a dummy variable for deals before 2011 and quarterly dry powder / quarterly GDP. The interaction variable that is pre-2011 aims to explain any difference in variable impact of the first half (pre-2011) to the second half (post-2011) of my data.

These results are robust to sector fixed effects, broadly defined as Corporates, Media/Communications, Bank, Non-bank financials, and Utilities. Regression results confirm that the three hypothesized main variables are indeed correlated since not all three end up having significant explanatory power once all three are added in. Once again, I use a shrunken quarterly dry powder measure to express it in terms of quarterly GDP in order to minimize its potential growth as affected by inflation or growth in GDP. The dry powder measure seems to have the most explanatory power, as it was significant to at least 99% and even 99.9% on all but one regression where only the dry powder measure, number of financial covenants, and rate were included. Unsurprisingly, firm size and return on assets were very negatively significant to spread since

larger firms as well as those who have a better track record of return on assets can supposedly command lower priced loans and thus, lower spreads.

Main results

Turning to our Figure 3 results, by itself, the dry powder measure is significant at 99.9%. Looking at regression 1, a one standard deviation move in the dry powder measure could signify a change in spread of about 352 basis points. This supports the positive correlation that we saw in the correlation matrix. When investors pile money into dry powder reserves, more capital is allocated for deal making, and this naturally occurs when, the credit markets are free-flowing so the spreads reflect this.

As previously mentioned, due to the significant correlation between the dry powder measure, the number of financial covenants, and the rate, when all three are added in, dry powder loses its explanatory power and instead only rate is negatively significant at 95% confidence. A standard deviation move in rate constitutes an opposite reaction in spread of up to 6 basis points.

When only firm-specific metrics are regressed on spread, firm size and return on assets are most negatively significant. This is unsurprising since larger firms and firms with better track record of return on assets are also better candidates for investment and can thus command lower spreads. These findings for firm-specific metrics hold true even after adding in the three main independent variables suggesting that firm-specific variables are important factors to determining spreads.

	(1)	(2)	(3)	(4)	(5)	(6)
QDrypowder/QGDP	**1951.667 *** **	**1689.579 *** **	889.180		**1466.439 ** **	**1447.302 * **
	(352.577)	**(444.489)**	(567.896)		**(556.707)**	**(638.387)**
Num of Fin Covs		-6.635	-4.223		-9.366	-9.373
		(5.574)	(5.651)		(5.412)	(5.404)
Rate			**-15.858 * **		**-13.449 * **	-13.843
			(6.905)		**(6.747)**	(8.840)
Firm size				**-0.002 *** **	**-0.003 *** **	**-0.003 *** **
				(0.000)	**(0.000)**	**(0.000)**
Debt/EBITDA				0.843	0.461	0.465
				(0.441)	(0.423)	(0.432)
ROA				**-1059.199 *** **	**-1003.129 *** **	**-1002.417 *** **
				(202.466)	**(197.415)**	**(198.738)**
pre-2011						2.152
						(28.067)
N. obs.	738	738	738	738	738	738
R squared	0.051	0.053	0.059	0.099	0.167	0.167
F statistic	7.942	6.843	6.581	11.413	14.566	13.224
P value	0.000	0.000	0.000	0.000	0.000	0.000
Sector Fixed Effects?	Yes	Yes	Yes	Yes	Yes	Yes

Figure 3 – OLS regressions

Data with and without black swan years

Since the number of loans issued and deals conducted in 2009 and 2020 were so drastically different from other years in the sample, all regressions run except for those in Figure 4 exclude these two years, deemed as black swan years. Results from Figure 4 confirm that the significance in dry powder is statistically significant even when controlling for black swan anomalies. The

significance in rate and number of financial covenants chance between the dataset including black swan years and those that do not include them. Rate is more significant for normal times, while the number of financial covenants has a negative and significant impact on spread when including black swan years. This is unsurprising since during times of crisis, lenders would be more likely to strategize ways to minimize risk when lending to borrowers, and this constitutes the number of financial covenants placed upon each loan.

	Without black swans	With black swans
QDrypowder/QGDP	**1466.439 ****	**1273.808 ***
	(556.707)	**(548.688)**
Num of Fin Covs	-9.366	**-11.934 ***
	(5.412)	**(5.343)**
Rate	**-13.449 ***	-10.720
	(6.747)	(6.725)
Firm size	**-0.003 *****	**-0.003 *****
	(0.000)	**(0.000)**
Debt/EBITDA	0.461	0.479
	(0.423)	(0.375)
ROA	**-1003.129 *****	**-1011.422 *****
	(197.415)	**(195.600)**
N. obs.	738	760
R squared	0.167	0.160
F statistic	14.566	14.261
P value	0.000	0.000
Sector Fixed Effects?	Yes	Yes

Figure 4 – OLS regression with and without observations from black swan years

Tranche level data

It is also extremely useful to look at tranche-level data when determining the effects of each of the different variables. As we can see from Figure 5, revolving credit lines, term loans, and all other types of debt not only behave differently, but each of these tranche spreads are also determined by different variables. Since majority of our dataset, 342 observations, are term loans, it behaves the most similarly to our results in the overall OLS regression in Figure 3. Other interesting observations of this tranche separated data confirms what one knows to be typical aspects of each loan tranche. Revolvers are bank debt and often asset-backed and paid off annually with a smaller running balance. Firm size is the only significant determinant of spread for revolvers. Term loans, on the other hand are positively affected by the dry powder measure used, negatively affected by firm size and ROA, and these significant variables are similar to the outcome of the overall regressions run in Figure 3. The All else category is composed of delay draw term loans, bridge loans, CAPEX facilities, and others. This category has the fewest amount of loans and the variables significant to these other loans illustrate the increased risk that lenders take on when providing capital through these unique debt types to these borrowers. As such, the most significant variables to other loans not including revolvers or term loans, include loan-level data, the number of financial covenants, as well as firm-specific characteristics including firm size and return on assets.

	Revolvers	Term Loans	All else
QDrypowder/QGDP	977.685	**2399.882 ** **	859.699
	(711.764)	**(743.469)**	(1404.226)
Num of Fin Covs	12.562	-10.018	**-46.227 ** **
	(6.693)	(6.667)	**(16.808)**
Rate	-16.581	7.863	-34.466
	(8.638)	(8.721)	(20.850)
Firm size	**-0.004 ** **	**-0.004 *** **	**-0.004 *** **
	(0.001)	**(0.001)**	**(0.001)**
Debt/EBITDA	0.305	0.072	2.394
	(0.379)	(0.611)	(2.337)
ROA	-481.757	**-971.051 *** **	**-2968.181 *** **
	(281.199)	**(262.285)**	**(654.056)**
N. obs.	223	342	173
R squared	0.160	0.193	0.310
F statistic	4.521	8.849	7.285
P value	0.000	0.000	0.000
Sector Fixed Effects?	Yes	Yes	Yes

Figure 5 – Tranche level OLS regressions

Summary

In summary, my results show that dry powder is a good predictor of spread with a positive relationship among the two. These results showing dry powder's significance on spread holds in both datasets, including with black swan and without black swan events and is robust to sector fixed effects. My data also confirmed that lenders who take on increased risk are compensated through higher spreads. These lenders are also able to decrease their risk through the imposition of an increase in the number of financial covenants. Tranche level data also shows that lenders

adapt to what is material and significant depending on the characteristics of the loan issued and their risk profile depending on the tranche level issued. I recognize that the lower than desirable R-squared potentially means these variables chosen are not the most impactful to the ultimate determination of spread. However, as mentioned earlier, there have been many factors explored that could impact spread and the goal of this paper was to explore whether dry powder was meaningful and significant. To this end, the paper has achieved this goal.

V. Conclusion

With the backdrop of private equity funds raising fund after fund, the main goal of this paper is to explore the effect of dry powder on one of the most significant price credit terms, spread. The increase in dry powder is material, from a raw numbers perspective as well as when shrunken as a proportion of quarterly GDP. The dataset I have runs from 2000 through 2021, and within this time period, quarterly dry powder has grown from approximately 1% to 8% of U.S. quarterly GDP.

I hypothesize that an increase in dry powder signifies the strength of the credit market, increased demand for loans, and therefore, an increase in spread. Since investors are logically seeking higher returns from alternative investments, which rely heavily upon deal-making through leveraged loans, the positive correlation between dry powder and spread is posited. The results of this paper show that there is indeed a positive correlation between dry powder and spread. The impact of one on the other is positive and significant, even with control variables relevant to the macroeconomy, loan characteristics, and firm-specific characteristics are present. Dry powder's significance on spread holds true even when a dataset including black swan events such as the 2008 Global Financial Crisis and the 2020 COVID-19 pandemic are included in the regression test. Additionally, when the dataset was segmented into tranche-level data, we find that the relationship of dry powder on spread is strongest on term loans. Revolvers are most impacted by firm size and other types of debt, presumably riskier, are more impacted by number of financial covenants, firm size, and return on assets.

Overall, we find that dry powder is a statistically significant measure on spread, given the other important control variables and low R-squared withstanding. QDrypowder/QGDP as a variable meant to capture dry powder scaled to GDP came up significant to between 95% and 99%

confidence on most regressions in the main regression, black swan event included regression, as well as term loans in tranche-level separated data.

It is also noteworthy that the whole dataset being studied from 2000 through 2021 exists in a low-rate environment that is about to change drastically in the coming year with the Fed giving guidance on upcoming rate hikes. A potential impact this might have is that 10-year Treasury rates become an even stronger variable of predicting spread than it otherwise would have been. High-rate environments are not private equity investor friendly as private equity deal returns are harder to come by with higher leveraged loan spreads. To underscore this point, since dry powder has a strong negative correlation with spread, this also means that the higher rates go, the less likely investors will pile their money in on new private equity funds. Since spread moves in positive correlation to dry powder, and less deals will now be made in the hostile private equity investor market, so spread will potentially also adjust downward to adequately capture market demand. For future studies, a larger and longer dataset incorporating both high and low rate environments, with more control variables that account for number of lenders, borrower-lender past relationship, and other pertinent firm-specific information would be most enriching to the various explanatory variables that could point to the explanation of how leverage loan spreads move.

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