THE EFFECT OF CONSOLIDATION FOR THE INTERPLAY BETWEEN RISK AND DOUBLE LEVERAGE INSIDE BANK HOLDING COMPANIES

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ABSTRACT

We show that double leverage has a positive and significant impact on the risk undertaken by consolidated bank holding companies (BHCs). In contrast, for unconsolidated BHCs this effect is not relevant. Based on these outcomes, we claim that consolidation is one important factor to be considered for explaining the implication of double leverage for corporate risk. These findings are important for policy makers as well as academics, who until now have not studied the topic of double leverage exhaustively. Therefore, we suggest casting attention on consolidation rules, and exploring more deeply the hypothesis that double leverage allows arbitrages of consolidated capital requirements that ultimately encourage the risk-taking of BHCs (Bressan, 2018a).

INTRODUCTION TO "*DOUBLE LEVERAGE*" INSIDE BANK HOLDING COMPANIES

According to the Board of Governors of the Federal Reserve System (2016), "*double leverage*" denotes the circumstance where "*debt is issued by the parent company and the proceeds are invested in subsidiaries as equity*." The Office of the Comptroller of the Currency (2009) suggests to assess the double leverage of banking groups on the base of the so-called "*double leverage ratio*," i.e. dividing the parent holdings of subsidiaries over parent stand- alone capital. The bank is claimed as double levered when the double leverage ratio is above 100%. This means that the parent stand-alone capital is lower than the equity held inside subsidiaries, implying that the parent solo capital could not be sufficient to offset very huge shortfalls suffered by subsidiaries. In fact, the Joint Forum on Financial Conglomerates (2001) affirms that when double leverage arises, it means that "*the same capital is used simultaneously in two or more legal entities*."

There is a gap in the academic literature about double leverage. While policy makers express the concern that double leverage could introduce frictions to financial corporations, we lack of exhaustive research activity that helps to interpret the phenomenon. The articles of Holland (1975), Pozdena (1986), and Wall (1987) briefly mention this aspect. More recently, Bressan (2018a) provides evidence that double leverage leads bank holding companies (BHCs) to undertake substantial risk. The author argues that the empirical outcomes reflect arbitrages of consolidated regulatory capital, because consolidated capital ratios are not able to capture the risk incentive due to double leverage, as suggested by Dierick (2004), and Yoo (2010). Further results in Bressan (2018b) display that the effect of double leverage for the risk of BHCs is more evident when the technique is used to fund the equity of banking subsidiaries rather than non-banking subsidiaries (as investment or insurance subsidiaries). This article digs deeper into the

interplay between double leverage and risk of BHCs, by analysing United States BHCs and asking to what extent consolidation plays a role for this relationship. The next sections present data and empirical results, deducing implications for policy making.

METHODOLOGY

We obtain data from SNL Financial LC. We focus on the firms from the United States classified as Bank Holding Company (BHC), namely multi-firm organizations regulated according to the Bank Holding Company Act of 1956 (12 U.S.C. x 1841, et seq.). Our data-provider sources information form the FR Y9-C/LC/SM and FFIEC 031/041 reports submitted to the Federal Reserve System The sample spans the period 2003q1-2010q4, and we analyze the total number. The sample spans the period 2003q1-2010q4, and we analyze the total number of 6,442 bank-quarter observations. We follow instructions from the Office of the Comptroller of the Currency (2009) and assess the double leverage of our BHCs by computing the double leverage ratio (DLR), namely the ratio of the parent investment in the equity of subsidiaries over the parent stand-alone equity capital.

Table 1 displays descriptive statistics for the variables employed in the analysis. DLR is on average 109%, revealing that within our sample the level of double leverage is above the critical 100% threshold. In fact, when DLR is above 100%, the stand-alone capital of the parent would not be sufficiently large to buffer huge losses that erode the entire participation in the subsidiaries. The database classifies a small group of BHCs as "*unconsolidated United States regulatory filer.*"

These are corporations where the parent does not report on a consolidated basis, therefore the accounting statements that are available in the database reflect only the activity of the bank itself, while not the group-wide activities. In contrast, the accounts for consolidated filers reflect the information for the parent and all the consolidated subsidiaries. To continue with the regression analysis, we create a dichotomous variable (CONSOLIDATED FILER) that distinguishes between the two sub-samples, i.e. it takes value one for consolidated BHCs, while it takes value zero for unconsolidated BHCs. Based on this variable, Table 2 summarizes descriptive statistics for unconsolidated filers. Clearly, unconsolidated filers have much smaller assets than consolidated BHCs. Instead, for the remaining variables we do not notice that consolidated BHCs are strikingly different than the rest of the sample.

Table 1					
SUMMARY STATISTICS OF VARIABLES FOR BANK HOLDING COMPANIES					
Variables	Mean	Standard deviation	Min	Max	N
DLR (%)	109.30	0.161	34.40	167.70	6,865
RISK WEIGHTED CAPITAL (%)	13.74	2.68	5.82	27.14	6,865
RISK WEIGHTED ASSETS (%)	74.03	10.94	38.44	95.52	6,865
NPA (%)	1.27	1.80	0.000	16.58	6,435
SIZE (total assets 000$)	29,000,000	157,000,000	121,067	1,940,000,000	6,865
ROA (%)	0.74	16.84	-4.00	20.12	6,757

Table 2					
SUMMARY STATISTICS OF VARIABLES FOR BANK HOLDING COMPANIES WHICH DO NOT FILE CONSOLIDATED STATEMENTS					
Variables	Mean	Standard deviation	Min	Max	N
DLR (%)	109.10	0.153	78.80	167.20	948
RISK WEIGHTED CAPITAL (%)	14.43	3.35	7.73	26.04	948

Table 2 SUMMARY STATISTICS OF VARIABLES FOR BANK HOLDING COMPANIES WHICH DO NOT FILE CONSOLIDATED STATEMENTS					
RISK WEIGHTED ASSETS (%)	73.34	11.06	38.44	95.15	948
NPA (%)	1.83	2.66	0.00	15.74	628
SIZE (total assets 000$)	416,966	178,242	121,067	1,283,025	948
ROA (%)	0.73	14.20	-3.31	2.61	918

We conduct regression analyses to verify whether the interplay between double leverage and risk-taking differs depending on whether the BHC files consolidated *vs.* not consolidated accounting statements. Table 3 estimates linear regression models for proxies of risk, including the total risk-weighted capital ratio (RISK WEIGHTED CAPITAL), the amount of risk-weighted assets over total assets (RISK WEIGTED ASSETS), and the amount of not-performing assets to total assets (NPA). Risk weights and capital levels are defined according to the Basel II rules for the determination of capital standards. All the regressions control for size effects, as measured by the logarithm of total assets (SIZE), and for profitability, as measured by the return-on-assets (ROA). We capture both time and firm fixed effects by including a set of dummies for each quarter and BHC of the sample.

RESULTS

The main result of Table 3 is that double leverage correlates significantly with the risk of consolidated BHCs. In fact, a marginal change in the double leverage ratio increases the risk-weighted assets and the not-performing assets of consolidated filers. At the same time, risk-weighted capital ratios decrease, suggesting that consolidated BHCs become unstable. The coefficients estimated on the interactions between DLR and the dummy identifying consolidated filers (i.e. f CONSOLIDATED FILER takes value equal to one) are significant at the net of residual size and profitability effects; beside other potential unobservable time and company factors that we control for in the equations. In contrast, we cannot see a similar pattern inside unconsolidated filers, where instead the effect of double leverage is not statistically significant on capital ratios or risk-weighted assets. Not-performing assets are negatively associated to DLR, therefore the sign is opposite than inside consolidated BHCs.

Based on these outcomes, we obtain the insight that consolidation should be one important element to consider when we want to explain the empirical relationship between double leverage and risk. We can connect our evidence to the discussion in Bressan (2018a). The author claims that double leverage allows BHCs to arbitrage their consolidated risk-based capital, so that the firms can take on excessive risk. In addition, she also shows with explanatory figures that the risk of BHCs increases with double leverage, while the consolidated capital ratios do not change. The conclusion is that consolidated capital ratios are flawed, because they are not able to incorporate the additional risk arising with the assumption of double leverage. Our results do not disconfirm this view, as they point to consolidation to be one important and informative factor for interpreting the frictions between double leverage and risk.

Table 3 THE EFFECT FROM DOUBLE LEVERAGE ON THE RISK OF BANK HOLDING COMPANIES: CONSOLIDATED VERSUS UNCONSOLIDATED FILERS				
Robust Standard Errors in Parentheses				
		(1)	(2)	(3)
Variables		RISK WEIGHTED	RISK WEIGHTED	NPA
		CAPITAL	ASSETS	

Table 3
THE EFFECT FROM DOUBLE LEVERAGE ON THE RISK OF BANK HOLDING COMPANIES:
CONSOLIDATED VERSUS UNCONSOLIDATED FILERS

DLR × (CONSOLIDATED FILER=1)	-6.696*** (0.260)	5.285*** (0.620)	1.474*** (0.151)
DLR × (CONSOLIDATED FILER=0)	-1.381 (0.800)	-3.337 (1.907)	-2.704*** (0.612)
SIZE	0.103 (0.136)	-6.253*** (0.324)	0.0313 (0.0796)
ROA	0.000889*** (0.000155)	-0.000765* (0.000370)	-0.00206*** (0.0000903)
Constant	18.53*** (2.023)	162.5*** (4.824)	-0.112 (1.195)
BHC Dummies	Yes	Yes	Yes
Time Dummies	Yes	Yes	Yes
R-squared	0.237	0.273	0.572
Observations	6825	6825	6406

* $p<0.05$, ** $p<0.01$, *** $p<0.001$

CONCLUSIONS

We show that the interplay between risk and double leverage is statistically relevant only for consolidated BHCs rather than unconsolidated BHCs. The outcomes do not disconfirm the hypothesis advanced by Bressan (2018a) that consolidated BHCs have stronger incentives than unconsolidated filers to make use of double leverage in order to arbitrage their consolidated capital requirements and undertake severe risk. The topic of double leverage is of primary importance for policy makers, as the interaction between double leverage and risk could lead banking corporations to be financially unstable. For this reason, we exhort financial authorities as well academics to spend effort in understanding to what extent double leverage interferes with risk. So far, the research activity on this topic is scarce and is primarily empirical (for example, see Bressan, 2016; Bressan, 2017; and Bressan et al., 2018) while we still lack of theoretical research that gives foundations to the existing evidence. We leave this task to future research.

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