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Mountain or molehill? Downward biases in the conglomerate discount measure ☆

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ABSTRACT

The Berger and Ofek (1995) excess value measure, comparing a conglomerate's actual market value to an imputed value based on standalones, has become the standard method to determine value effects of diversification. In this paper, we address a significant bias in this procedure stemming from the difference in cash holdings between diversified and standalone firms. Excess values are based on firm values, including corporate cash positions. As standalones hold significantly more cash, the imputed cash value is higher than the conglomerate's actual cash value, resulting in a downward biased excess value. We thus propose to calculate excess values based on enterprise values, replacing total debt by net debt. Based on an extensive US sample, we show that there is significantly less evidence of a diversification discount when adjusting for the cash bias. In terms of average dollar losses, the firm value-based models overestimate the conglomerate discount by at least 25%. Apart from removing the cash bias, we propose a second modification to the excess value measure, arguing that standalone industry multipliers should be calculated using geometric mean aggregation instead of median aggregation.

1. Introduction

The question of whether diversification creates or destroys corporate value has been the subject of a long-lasting and heated academic debate. Berger and Ofek (1995) were among the first US-based studies to show that conglomerates, on average, trade at a discount compared to standalone firms. Their excess value model has become the standard method for studying the value implications of diversification. Excess value is defined as the natural logarithm of the ratio of a conglomerate's actual market value to an imputed value based on a matched portfolio of standalones; a negative conglomerate excess value indicates that diversification reduces value, and vice versa. Many other researchers adopted their 'chop-shop' valuation approach, confirming a diversification discount for a variety of other data sets and periods Servaes, 1996; Burch and Nanda, 2003; Ahn and Denis, 2004). Studies going beyond US borders, however, have shown that the discount is far from being an overarching phenomenon. In contrast, they suggest the value of diversification to be dependent on countries' economic and regulatory settings (Lins and Servaes, 1999; Khanna and Palepu, 2000; Fauver et al., 2003).

The debate has additionally been fueled by scholars addressing methodological concerns. Some argue that the link between diversification and value is not causal, but rather driven by endogenous firm choices (Campa and Kedia, 2002; Graham et al., 2002; Villalonga, 2004). Others claim the discount to be biased by measurement error. For example, Mansi and Reeb (2002) and Glaser and Müller (2010) find the excess value model to overestimate the conglomerate discount. Excess value is based on firm values, defined as the sum of the market value of equity and book value of debt. Given that diversification leads to lower firm risk, book value of debt is a more downward biased proxy of the market value of debt for diversified firms than for standalones. Adjusting for this bias by replacing the book value of debt with market value estimates based on the Merton (1974) bond pricing model, Glaser and Müller (2010) show that the discount is reduced in terms of both size and significance. For their German sample, the authors observe a drop by 1 percentage point from 7.7% to 6.7% (13% in relative terms); significance decreases from the 5% to the 10% level.

In this paper, we address another aspect of the excess value method, leading to a systematic undervaluation of diversified firms. We argue that the discount is biased by differences in corporate cash holdings between diversified and standalone firms. According to Duchin (2010) and Subramaniam et al. (2011), conglomerates hold significantly less cash; not accounting for these different cash positions in the excess value measure may significantly underestimate their performance. In order to avoid this cash distortion, we suggest using excess values on an enterprise value

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basis (market value of equity plus net debt). Apart from that, we propose a second modification to the measure with regard to industry multiplier aggregation. Previous studies rely on median aggregated standalone multipliers to compute a conglomerate's imputed value. However, findings by Dittmann and Maug (2006) suggest that only geometric mean averaged industry multipliers reliably result in aggregated standalone excess values of zero, providing an undistorted benchmark for the calculation of the diversification discount.

Based on a sample of 21,501 US firm-years from 1998 to 2009, we analyze the impact of diversification on four different excess value definitions. We contrast firm value-based excess value models with enterprise value-based ones, and models using median multiplier aggregation with models relying on the geometric mean. Our empirical analysis provides evidence in support of our view that the cash bias is a relevant driver of the diversification discount. In our sample, more than 80% of conglomerate excess values are downward biased, thus, they are lower based on the firm value than enterprise value; thereof, roughly 6% exhibit a switch in signs, i.e. they show negative excess values on a firm value basis but positive excess values on an enterprise value basis. Performing fixed effects panel regressions, we find that, on a two-digit SIC level, the firm value/median model (1) exhibits a discount of 7.3%, significant at a 1% level, whereas the enterprise value/median model (2) shows a discount being 15% lower at 6.2%, significant at a 5% level only. The firm value/geometric mean model (3) exhibits a discount of 7.3%, decreasing by 16% to 6.1% in the enterprise value/geometric mean model (4). These results are significant not just statistically but also economically. In terms of average dollar losses, the firm value-based models overestimate the conglomerate discount by 25% (67.7 million US$) and 27% (72.2 million US$), respectively. With regard to multiplier aggregation, we document a constantly higher model power, measured by adjusted R^2, when relying on the geometric mean. Our findings are robust to self-selection, different time periods and industry definitions.

We contribute to the literature in several ways. First, our study suggests that the cash bias plays an important role in explaining the size of the conglomerate discount when based on the traditional excess value measure. We show that the cash-adjusted discount is more than 15% lower compared to the one estimated on firm value basis. Since most studies on the topic follow the Berger and Ofek (1995) methodology, their results are exposed to the same systematic measurement bias. Second, we suggest using excess values based on enterprise values and geometric mean aggregated standalone multipliers, thus providing recommendations for a more accurate computation of the conglomerate discount.

The paper is organized as follows. In Section 2, we review the excess value measure as suggested by Berger and Ofek (1995) and discuss the problems of cash distortion and multiplier aggregation. Section 3 describes the sample selection process and presents key sample characteristics. In Section 4, we analyze the impact of diversification on different excess value definitions. Section 5 concludes.

2. The Berger and Ofek (1995) methodology: biases in the excess value measure

The excess value model pioneered by Berger and Ofek (1995) compares a diversified firm's actual value against the value of a matched portfolio of standalone firms, the so-called imputed value.

The authors start by forming peer groups of standalones in different industries, requiring at least five observations per industry-year; industry classification is based on SIC codes. By relating firm values to different accounting items such as sales, assets, and earnings, multipliers for every standalone firm j in period t are calculated (1).

$$M_{j,t}^{FV/Sales} = \frac{FV_{j,t}}{Sales_{j,t}} \tag{1}$$

Based on these individual multipliers, median aggregated firm value to sales multipliers of all standalone firms $j = 1,\ldots,J$ operating in the same industry k in a certain period t are built (2).

$$IndM(Median)_{k,t}^{FV/Sales} = inf\left(\frac{M_{j,t}^{FV/Sales}}{F(M_{j,t}^{FV/Sales})} \geqslant \frac{1}{2}\right) \tag{2}$$

For each segment $k = 1,\ldots,n$ of firm i (diversified or standalone firm) in period t, an imputed value is calculated by multiplying the segment's accounting item with the respective industry multiplier. The imputed value of firm i is the sum of the imputed values of the firm's segments (3).

$$IFV_{i,t} = \sum_{k=1}^{n} Sales_{k,t} \times IndM_{k,t}^{FV/Sales} \tag{3}$$

Berger and Ofek (1995) finally calculate excess values as the natural logarithm of the ratio of a firm's actual value to its imputed value (4).

$$EFV_{i,t} = \ln\frac{FV_{i,t}}{IFV_{i,t}} \tag{4}$$

A positive conglomerate excess value indicates that the value of the diversified firm is higher than that of the benchmark portfolio of standalones. A negative excess value indicates the opposite.

2.1. The problem of cash distortion

Previous studies by Mansi and Reeb (2002) and Glaser and Müller (2010) provide evidence that the use of book values of debt in the computation of excess values underestimates the corporate value of diversified firms when compared to standalones, as diversification leads to lower firm risk. In this paper, we address another aspect of the excess value measure, potentially biasing conglomerates' performance downward. As the Berger and Ofek (1995) model relies on firm values, it allows for a distortion of excess values caused by different cash positions of conglomerates and standalones. Firm value is defined as the sum of the market value of equity and total debt, and thus contains corporate cash and securities holdings. Duchin (2010) and Subramaniam et al. (2011), two US-based studies on the relation between corporate diversification and cash positions, provide empirical evidence that conglomerates hold significantly less cash than standalone firms, because they are diversified in their investment opportunities and have smaller financing gaps. As the aggregated firm value to sales multipliers, used to derive a conglomerate's imputed value, are based on standalone firms, it contains a comparably higher cash position than the conglomerate's actual firm value. Hence, relating conglomerate firm values with imputed standalone-based ones causes a cash-related downward bias of a conglomerate's excess value. In case of a large enough difference in cash holdings between diversified and standalone firms, an actual conglomerate premium might even falsely turn into a discount. Schwetzler and Reimund (2003) were the first to call attention to this cash bias.[1]

[1] While our paper adopts the idea of a cash distortion from Schwetzler and Reimund (2003), it provides much deeper empirical evidence for its economic relevance. First, for substantiating the argument of a bias in the diversification discount measure, a discount has to exist in the first place. Our analysis focuses on the US, a country with a widely accepted and robust conglomerate discount; in contrast, the study by Schwetzler and Reimund (2003) is based on a German sample, thus a country for which empirical evidence of a discount is rather weak and ambiguous (e.g. Lins and Servaes (1999) and Glaser and Müller (2010)). Second, our analysis is based on a larger data set. The sample of Schwetzler and Reimund (2003) comprises 1,048 firm-years only, whereas our sample includes 21,501 observations. Third, in contrast to Schwetzler and Reimund (2003) we perform various tests that ensure the robustness of our results.