

Implications of ASC 842 on the Calculation of Managerial Ability: Research Note

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Abstract

ASC 842 changed the accounting for operating leases, requiring firms to report the capitalized value of operating leases on the balance sheet as a *right-of-use asset*. This change has potential implications for the calculation of managerial ability as calculated in Demerjian, Lev, and McVay (2012), including inducing measurement error. In this research note, I examine the measurement error using a subsample of firm-years where the right-of-use asset value can be calculated precisely. Examining alternative specifications to address potential measurement error, I conclude that, despite the change in lease accounting, the original method described in Demerjian et al. performs sufficiently well as to not justify costly modification.

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1 Introduction and overview

The managerial ability (MA) score of Demerjian, Lev, and McVay (DLM: 2012) is calculated in two stages. In the first stage, data envelopment analysis is used to calculate firm-level efficiency. In the second stage, regression is used to purge the first-stage efficiency of firm-level factors that either help or hinder efficient operations. The residual from this second stage is the portion of firm efficiency attributable to the management team.

The first stage in DLM uses a single output – sales revenue – and seven inputs: net property, plant, and equipment; cost of goods sold; selling, general, and administrative cost; capitalized R&D; capitalized operating leases; goodwill; and other intangible assets. Historically, the capitalized operating lease figure was computed using the future operating lease payments reported in Compustat; these payments were discounted at a 10% annual rate and summed to capture an approximate capitalized value of operating leases. This calculation was used in the original DLM manuscript, and in subsequent generations of the MA Score, up to and including the 2020 version.

ASC 842 changed operating lease accounting in US GAAP. Prior to this standard, SFAS 13 required leases to be sorted into capital and operating lease categories. The standard set four criteria to determine the lease type, with capital leases being similar to purchase (i.e., the lessee was essentially purchasing the asset through the lease contract) and operating leases being more purely rental agreements. Whereas assets acquired under capital leases were reported as assets and liabilities, assets under operating lease were not reported on the balance sheet; the payments were reported as rent expense on the income statement. Lessees were required to report expected future operating lease payments in the notes accompanying the financial statements.

With the adoption of ASC 842, which was effective for public companies for year-ends after January 1, 2019, operating leases could no longer avoid recognition on the balance sheet.

Like capital leases, the value of the assets acquired under operating leases, representing the discounted value of future payments with several adjustments, is reported as an asset. This asset, termed a *right-of-use* asset, is offset with a lease liability. Capital leases, which are called *finance leases* under ASC 842, have the similar treatment as under the prior standard.

2 Implications for MA Score calculation

As noted above, the MA Score has been calculated using capitalized operating leases as an input to the first-stage efficiency calculation. The new standard presents potential changes to the calculation. First, the original calculation of capitalized operating leases was, as acknowledged in DLM, a rough approximation of the actual leased asset value.¹ The introduction of ASC 842 allows for a more precise measurement of capitalized operating leases, i.e., right-of-use assets.²

The implementation of these more precise capitalized operating lease figures relies on the data being available. Unfortunately, right-of-use asset values are not reported as a separate line item in the Compustat North America file, the source of accounting data used in DLM (and subsequent runs of the score). The problem is actually more severe than the data not being available. As with assets acquired under capital / finance leases, right-of-use asset values are reported as part of property, plant, and equipment. This means, lacking the right-of-use asset values as separately reported variables, the measure of net property, plant, and equipment in the first-stage input variable set is also potentially distorted.

¹ For example, the calculation was constrained to only the next five years' lease payments and a "thereafter" figure (due to data availability) and used a discount rate of 10% for all lessees due to lack of data on individual firm borrowing costs.

² Nissim (2022) provides evidence that right-of-use assets can be accurately estimated using footnote disclosure data, using a similar but more sophisticated method than Demerjian et al. (2012). It is notable that an important variable in this calculation, MRCTA, is only widely available from about 2000 onward.

There are three possible ways to address this lack of data. First, we could continue calculating firm efficiency as prior to the change in lease standards, i.e., use the reported value of net property, plant, and equipment and calculate the capitalized operating lease value using the future lease payments. This is likely to overstate the asset value of firms that use larger amounts of leased asset, leading to an understatement of first-stage firm efficiency. Second, we could exclude capitalized operating leases as an input. This would essentially force the implicit weight on net property, plant, and equipment and capitalized operating leases to be the same, which could potentially distort both. Third, we could calculate right-of-use asset values as we have using capitalized operating leases in the past, and subtract this figure from net property, plant, and equipment. Then, this adjusted property, plant, and equipment figure can be used in first-stage calculation of firm efficiency, along with the estimated value of the right-of-use asset. The issue with this method is that any measurement error in right-of-use asset will be included twice in the calculation.

3 Assessing the significance of measurement error

In the prior section I identify three possible methods to address the lack of precise right-of-use asset values in the first-stage calculation for MA Score. Determining the best method to use – the one that results in the minimal amount of measurement error – requires a benchmark of correct measurement. For this benchmark, I collect right-of-use asset values from SeekEdgar. SeekEdgar is a subscription service that allows for custom searching and parsing of SEC filings (any filing available on Edgar).

To determine the correct search terms to identify right-of-use assets, I examined a random set of 10-K filings of firms that report operating leases. This search allowed for a set of related

terms that firms use for right-of-use assets.³ I then used SeekEdgar to search on these terms in 10-K filings for the 2021 fiscal year end. SeekEdgar generated a list with CIK, firm name, filing date, filing URL, operating lease account name, and amount. This search yielded 2,294 observations.

I then verified and cleaned the data. Using the URLs provided by the search, I verified that the figures reported on the list were accurate. I also verified that each line item was in fact an operating lease right-of-use asset; I deleted any observations that were not related to operating leases.⁴ After making these deletions, the sample has 1,461 observations.

I matched this “clean” list to the Compustat data used to generate firm efficiency (including sale revenue as the output and all seven inputs, including the calculated capitalized operating lease figure used in prior version of the MA Score). Because firm efficiency is calculated using the lagged value of inputs (e.g., firm efficiency for 2017 uses inputs from year-end 2016, to capture starting values for 2017), the 2021 right-of-use asset data from SeekEdgar is used to calculate firm efficiency for 2022. There are a total of 4,449 firm-year observations in 2022 with sufficient data to calculate the MA Score. Merging this with the SeekEdgar right-of-use asset data yields a sample of 914 observations, forming the sample used to benchmark different methods for adjusting for right-of-use assets.⁵

I present descriptive statistics on the values of precise right-of-use assets (from SeekEdgar) and calculated capitalized operating leases (from the original MA Score formulation) in Table 1, Panel A. These statistics include raw values plus values scaled by total assets. Right-of-use assets

³ The account name is generally a variant on *right of use asset*; common examples include “operating lease right of use asset”, “lease right of use asset”, “operating lease ROU asset”, and “operating lease assets”.

⁴ The most common error in the list, a wide margin, was finance lease assets being included as right-of-use assets.

⁵ An alternative method would be to use *all* Compustat observations and assume that any observations without a value from SeekEdgar did not report right-of-use assets. I did not use this method for two reasons. First, a scan of 10-K filings yielded several instances where a firm reported right-of-use assets, but which SeekEdgar failed to detect. Second, focusing on observations where right-of-use assets were available provides the sharpest test of measurement error in this context.

are higher on average than capitalized operating leases, with raw value of \$265.6M versus \$164.7M, a significant difference in statistical terms (t-statistic: 4.55). This suggests that, on average, the calculation used in DLM understates the level of capitalized operating leases, potentially overstating the efficiency of firms with high levels of operating leases.⁶ The average scaled value of right-of-use assets (0.054) is higher than the scaled capitalized operating lease value (0.042), a difference that is also statistically significant (t-statistic: 10.95).

In Table 1, Panel B, I present correlations between right-of-use assets and capitalized operating leases. For the raw figures, the correlation is very high, at 0.97. Some portion of this, however, might be due to size effects. The scaled correlation is lower but still quite high at 0.92, suggesting size only explains a small portion of the covariance between these variables. As an initial analysis, this suggests that the capitalized operating lease calculation from DLM was closely linked to the true, unobserved right-of-use asset value and may not introduce excessive measurement error.

To assess the different approaches to mitigate measurement error, I produce four versions of the MA Score using this sample of 914 observations: (1) the *precise* version using the right-of-use asset values from SeekEdgar, with this amount subtracted from net property, plant, and equipment; (2) the *original* version, as in DLM; (3) the *lease excluding* version, where capitalized operating leases are excluded as an input and net property, plant, and equipment is not adjusted; and (4) the *lease adjusted* version, where capitalized operating leases are included as an input, with the value subtracted from net property, plant, and equipment.

⁶ It is important to note, however, that this is not necessarily the case for every year, and may reflect something particular about reported lease values in 2021. As such, I caution against extrapolating to draw conclusions about use of capitalized operating leases as an input in prior years' MA Score calculations.

I report descriptive statistics for each of these versions of the MA Score in Table 2, Panel A. The mean value for each is zero (by design) and the range of values is quite similar. In Table 2, Panel B, I present the correlations between the four scores, with Pearson correlations in the upper triangle and Spearman (rank) correlations in the lower. There are two main conclusions that can be drawn from the correlation table. First, each of the alternative scores for are highly correlated with the precise score calculated with the right-of-use asset values. Second, among the three, the original, unadjusted formulation of the DEA Score has the highest correlation with the precise score (though the correlations among all three hardly differ). This suggests that measurement error due to changes in lease accounting are unlikely to have a substantive effect on inferences using the MA Score, even if there is no adjustment made for leases.

I conclude, from this analysis, that despite the changes in operating lease accounting, the original first-stage formulation of MA Score described in Demerjian, Lev, and McVay (2012) performs well and does not deviate from the more precise measurement using SeekEdgar data. This suggests that, rather than researchers making costly adjustments, the original formulation of the MA Score does not introduce sufficient measurement error to justify making changes.

Table 1 – Right-of-Use vs. Capitalized Operating Leases*Panel A – Descriptive Statistics*

Variable	Obs	Mean	StdDev	P1	P25	Median	P75	P99
Right-of-use asset	914	265.6	1342.8	0.0	4.1	26.5	110.8	4537.0
Capitalized operating leases	914	164.7	720.9	0.1	4.2	21.2	84.2	2730.0
Right-of-use asset (scaled)	914	0.054	0.079	0.000	0.014	0.028	0.061	0.412
Capitalized operating leases (scaled)	914	0.042	0.057	0.001	0.012	0.024	0.050	0.284

Panel B – Correlations

	[1]	[2]	[3]	[4]
[1] Right-of-use asset		0.97	0.16	0.09
[2] Capitalized operating leases	0.94		0.15	0.10
[3] Right-of-use asset (scaled)	0.46	0.38		0.93
[4] Capitalized operating leases (scaled)	0.27	0.31	0.89	

Notes: *Right-of-use asset* is the operating lease asset as collected from financial statements using SeekEdgar. *Capitalized operating leases* is the calculated operating lease asset using the formula in Demerjian et al. (2012). The scaled version of each is the raw value divided by total assets.

Table 2 – Alternative Score Comparisons*Panel A – Descriptive Statistics*

MA Score Version	Obs	Mean	StdDev	P1	P25	Median	P75	P99
Precise	914	0.000	0.235	-0.367	-0.183	-0.051	0.140	0.549
Original	914	0.000	0.237	-0.358	-0.178	-0.057	0.139	0.571
Lease Excluding	914	0.000	0.217	-0.329	-0.155	-0.046	0.091	0.613
Lease Adjusted	914	0.000	0.241	-0.368	-0.188	-0.055	0.159	0.542

Panel B – Correlations

	[1]	[2]	[3]	[4]
[1] Precise		0.93	0.91	0.91
[2] Original	0.94		0.90	0.97
[3] Lease Excluding	0.92	0.92		0.89
[4] Lease Adjusted	0.94	0.98	0.91	

Notes: The table presents data on four different versions of the MA Score. *Precise* uses right-of-use assets directly from financial statements and subtracts this amount from net property, plant, and equipment. *Original* is the formulation from Demerjian et al. (2012), including calculated capitalized operating leases. *Lease Excluding* following Demerjian et al. but excludes capitalized operating leases as an asset. *Lease Adjusted* includes capitalized operating leases as an input, and subtracts this value from net property, plant, and equipment.

References

Demerjian, P., B. Lev, and S. McVay. 2012. Quantifying managerial ability: A new measure and validity tests. *Management Science* 58(7): 1229-1248.

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