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Deflating profitability ☆

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ABSTRACT

Gross profit scaled by book value of total assets predicts the cross section of average returns. Novy-Marx (2013) concludes that it outperforms other measures of profitability such as bottom line net income, cash flows, and dividends. One potential explanation for the measure's predictive ability is that its numerator (gross profit) is a cleaner measure of economic profitability. An alternative explanation lies in the measure's deflator. We find that net income equals gross profit in predictive power when they have consistent deflators. Deflating profit by the book value of total assets results in a variable that is the product of profitability and the ratio of the market value of equity to the book value of total assets, which is priced. We then construct an alternative measure of profitability, operating profitability, which better matches current expenses with current revenue. This measure exhibits a far stronger link with expected returns than either net income or gross profit. It predicts returns as far as ten years ahead, seemingly inconsistent with irrational pricing explanations.

1. Introduction

Ball and Brown (1968) show that earnings, defined as bottom line net income excluding extraordinary items, predict the cross section of average returns. Subsequent research indicates that earnings add little incremental information over size and book-to-market (e.g., Fama and French, 1996, 2008b). Novy-Marx (2013), however, finds that a different earnings variable—gross profitability, defined as gross profit (revenue minus cost of goods sold) deflated by the book value of total assets—predicts the cross section of expected returns as well as book-to-market, has greater predictive power than net income, and is negatively correlated with the value premium. He interprets these results as showing that gross profit is a cleaner measure of economic profitability. These findings have attracted considerable attention, ranging from an endorsement by a market commentator (Forbes, 2013) to the investigation of profitability as a potential factor in asset pricing models (Fama and French, 2014). Moreover, investment managers such as Dimensional Fund Advisors and AQR have modified their trading strategies to incorporate measures similar to gross profitability (CFA Institute Magazine, 2014).

We reevaluate whether gross profitability has greater predictive power than net income and then investigate the predictive power of operating profitability (revenue less cost of goods sold and selling, general, and administrative expenses, but not expenditures on research and development). Our analysis, therefore, proceeds in two stages.

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In the first stage we show that differences in deflators fully explain why gross profitability predicts future returns better than net income. When comparing the two measures, Novy-Marx (2013) deflates gross profit by the book value of total assets but deflates net income by the book value of equity. We find that the two profit variables have similar ability to predict average returns, provided they are deflated consistently. Any superiority is due to choosing different deflators.

The increased explanatory power that arises from deflating a profit variable by the book value of assets (or the book value of equity) arises from a mismatch between the profit measure's deflator and the deflator used for the dependent variable. Relative to consistently deflating the dependent and independent variables by the market value of equity, deflating gross profit by the book value of total assets creates an explanatory variable that is the product of gross profit deflated by the market value of equity times the ratio of market value of equity to total assets (GP/AT = GP/ME × ME/AT). Fama and French (1992) find that the ratio of the market value of equity to total assets (ME/AT) is priced. Interacting gross profit with the ratio of the market value of equity to total assets can, therefore, increase explanatory power. However, GP/AT could also predict returns because it is a proxy for its individual components (GP/ME and ME/AT). We find that among All-but-microcaps all of the explanatory power is due to the product between these terms. Price-deflated gross profit and the ratio of the market value of equity to total assets have no independent predictive power. Among Microcaps, however, we find that the explanatory power is due to both the product and the ratio of the market value of equity to the book value of total assets.

The similar predictive power of net income and gross profit when they are consistently deflated is puzzling for two reasons. First, shareholders do not have a claim on gross profit. Their cash flow rights are determined after accounting for all components of net income, not merely cost of goods sold. Second, prior research finds that some of the items between gross profit and net income, such as selling, general, and administrative expenses and expenditures on research, and development, predict returns (e.g., Chan, Lakonishok, and Sougiannis, 2001; Eisfeldt and Papanikolaou, 2013).

Consequently, in the second stage we address the puzzlingly similar predictive power of the two measures. To do so, we build on the Novy-Marx (2013) intuition that gross profit is the cleanest accounting measure of economic profitability because items lower down the income statement are polluted. This interpretation is difficult to reconcile with the finding that gross profit and net income have similar predictive power over the cross section of average returns. Pollution would suggest that net income has less predictive power. We find that the items farther down the income statement are not pure noise. In multivariate return regressions, they have slopes with different magnitudes and signs, due to differences in the accounting rules that govern their measurement.

Gross profit takes into account only revenue and cost of goods sold. However, selling, general, and administrative expenses, the next item after cost of goods sold on the income statement, also represent to a large extent expenses incurred to generate the current period's revenue. Moreover, the allocation of expenses between cost of goods sold and selling, general, and administrative expenses is not determined by Generally Accepted Accounting Principles and is largely at the discretion of firms (Weil, Schipper, and Francis, 2014). If these two items are economically similar and firms allocate expenses somewhat arbitrarily between them, a profitability measure that subtracts both expenses from revenue would be expected to outperform gross profitability in asset pricing tests. Surprisingly, the data at a first glance disagree. Gross profitability has similar predictive power compared with an operating profitability measure that subtracts both cost of goods sold and selling, general, and administrative expenses from revenue. This finding could point toward the uncomfortable conclusion that the correlation between future returns and gross profitability is spurious. That is, if gross profitability predicts returns because it more cleanly allocates current expenses against current revenue, then this measure should become stronger as we account for selling, general, and administrative expenses, but it does not.

Why do these two economically similar expenses (cost of goods sold and selling, general, and administrative expenses) appear to have different relations with future returns? A potential reason lies in the treatment of Compustat data. To facilitate comparability across firms, Standard & Poor's combines and adjusts several income statement items reported in firms' public filings. In particular, it defines selling, general, and administrative expenses (Compustat item XSGA) as the sum of firms' actual reported selling, general, and administrative expenses and research and development expenditures (Compustat item XRD). Conservative accounting rules expense research and development expenditures as they are incurred, even though they are incurred largely to generate future, not current, revenues. The accounting treatment of research and development expenditures suggests that undoing Compustat's adjustment to selling, general, and administrative expenses would improve the measure of operating profit.

When we undo the Compustat adjustment, we find that cost of goods sold and selling, general, and administrative expenses have similar covariances with future returns. Mor eover, a refined profitability measure, operating profitability, that deducts from revenue both cost of goods sold and selling, general, and administrative expenses (excluding expenditures on research and development) is a significantly better predictor of future returns than gross profitability. In Fama and MacBeth (1973) regressions, the t-values for gross profitability are 5.46 for All-but-microcaps and 6.57 for Microcaps. These t-values significantly increase to 8.92 and 6.96 for our operating profitability measure. Similarly, the three-factor model alphas for strategies that purchase the stocks in the top decile and finance this purchase by selling the stocks in the bottom decile increase from 55 basis points per month (t-value = 4.18) for gross profitability to 74 basis points per month (t-value = 6.25) for operating profitability. That is, the profitability strategy's Sharpe ratio increases by over 50%. Furthermore, operating profitability is significantly informative about expected returns for horizons as long as ten years.

The rest of the paper is organized as follows. Section 2 introduces the data. Section 3 quantifies the importance of deflators in horse races between gross profit and net income using Fama and MacBeth (1973) regressions. Section 4 compares gross profit and net income using portfolio sorts. Section 5 discusses mismatched deflators and empirically explores the deflator effects. Section 6 discusses Standard &