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.
In the first stage we show that differences in deflaters 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 deflaters.

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 \( \frac{GP}{ME/AT} \). Fama and French (1992) find that the ratio of the market value of equity to total assets \( \frac{ME}{AT} \) is priced. Interacting gross profit with the ratio of the market value of equity to total assets can, therefore, increase explanatory power. However, \( \frac{GP}{AT} \) could also predict returns because it is a proxy for its individual components \( \frac{GP}{ME \times ME/AT} \). 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; Eiffeldt 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 \( t \)-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 \( (t\text{-value} = 4.18) \) for gross profitability to 74 basis points per month \( (t\text{-value} = 6.25) \) 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 deflaters 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 deflaters and empirically explores the deflator effects. Section 6 discusses Standard &
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