DISCUSSION PAPER SERIES

DP17251

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FINANCIAL ECONOMICS

ISSN 0265-8003

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Discussion Paper DP17251
Published 25 April 2022
Submitted 22 April 2022

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JEL Classification: G11, G12

Keywords: Profitability factor, Investment Factor, Asset Pricing, Net-Present Value, Wealth Creation

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1 Introduction

A long literature in finance has established a negative relation between corporate investments and average stock returns.[1] To account for this effect, Fama and French (2015) and Hou, Xue, and Zhang (2015) develop new asset pricing models that explicitly allow for an investment factor. In these models, firms with higher expected investment are predicted to pay lower stock returns.

However, modeling investment as a negative predictor of stock returns stands in sharp contrast to simple corporate finance principles claiming that investment enhances firm value as long as it generates profit rates above the cost of capital—a view which is commonly adopted by practitioners when valuing companies (see, e.g., Koller, Goedhart, Wessels, et al., 2010). Keeping the value of the firm fixed, this logic implies that firms investing in value creating projects have higher discount rates, i.e., they will have higher stock returns on average. This paper unifies these views within a simple valuation framework and argues that the sign of the empirical relation between investment and expected stock returns is affected by the level of firm profitability.

To motivate our analysis, we start from the same discounted cash flow model that Fama and French (2006, 2015), use to introduce the investment and profitability factors. These authors argue that the relation between investment and expected returns is negative, keeping other firm characteristics constant, because the cost of the investment reduces the cash flows that shareholders receive. Conversely, keeping other characteristics constant, profitability is positively related to the payoffs that shareholders receive, which explains the positive relation between profitability and expected stock returns found in the literature (e.g., Haugen and Baker, 1996; Novy-Marx, 2013).

We depart from these conclusions by emphasizing the role of a positive interaction between expected profitability and investment in explaining the cross section of stock returns,

[1] See Fairfield, Whisenant, and Yohn (2003); Titman, Wei, and Xie (2004); Fama and French (2006, 2008, 2015, 2016); Cooper, Gulen, and Schill (2008); Polk and Sapienza (2008); Xing (2008); Hou, Xue, and Zhang (2015, 2019, 2020); Hou, Mo, Xue, and Zhang (2021).

which has surprisingly been neglected in previous literature. After simple manipulations of the discounted cash flow model, it becomes evident that these variables jointly affect the present value of future cash flows. Specifically, growing the asset base increases the value of the firm when the returns on investment exceed the cost of capital. In this case, investment is positively related to expected stock returns, keeping firm valuation constant. On the other hand, unprofitable firms that invest destroy shareholder value. Thus, their expected returns should be lower, ceteris paribus.

We label the joint role that investment and profitability play in determining firm value the *wealth creation effect*. Based on these premises, we argue that an accurate description of the cross section of stock returns should explicitly allow for the wealth creation effect. The empirical analysis in the paper supports this view. We find that a wealth creation factor earns about 24bps per month. Including this factor, increases the magnitude of the Sharpe Ratio of the tangency portfolio by up to 8% relative to the five-factor model of Fama and French (2015). Overall, we conclude that wealth creation is a significant asset pricing effect, supported by basic valuation principles, which was not explored in prior literature.

Following the same logic as in Fama and French (2015), we note that the links between expected returns, profitability, and investment stem out of an identity. Thus, they hold irrespective of whether these pricing relations originate from rational risk-based valuations as opposed to inefficient processing of the available information. This paper, therefore, does not take a stand on the sources of the explanatory power of the wealth creation effect.

To test the logic emerging from the valuation model, we start our empirical analysis by regressing stock returns on lagged investment, lagged profitability, and their interaction. In keeping with the model, we define profitability as return on equity and investment as the growth in book equity. We confirm a positive profitability effect and a negative investment effect in Fama and MacBeth (1973) regressions using monthly return data and quarterly accounting variables between 1976 and 2020. Importantly, we find a positive and statistically significant slope on the interaction between the two variables, consistent with the theoretical prediction. The interactive effect is present among both large and small stocks, as defined by the median of the size distribution for NYSE stocks. The effect becomes even more significant when we control for known return predictors such as one-month and one-year returns, book-to-market, size, and accruals. The magnitude of the effect of interest is sizeable as it is comparable to that of one-year momentum.

Next, we turn to a portfolio approach, which allows us to verify whether the wealth creation effect is explained by the existing asset pricing models. We double-sort stocks along the investment and profitability dimensions using annual Compustat data, define the cutoffs at the 30^{th} and 70^{th} percentiles for NYSE stocks, and form a three-by-three matrix of portfolio returns ranging between July 1963 and December 2020. A positive interaction between these two variables is confirmed by the fact that the investment sort generates steeper declines in average returns for low-profitability than for high-profitability stocks. Another way to state this finding is that the profitability sort generates faster increases in returns for high-investment than for low-investment firms.

To highlight this interaction, we create a value-weighted wealth creation factor that goes long one dollar in the high-high and low-low investment and profitability portfolios, and short one dollar in the high-low and low-high portfolios. This factor earns a positive and significant premium of about 24bps per month. Importantly, the factor displays significant alphas of the same magnitude relative to popular factor models, including the five-factor models of Fama and French (2015) and Hou, Mo, Xue, and Zhang (2019, 2021). The alphas are quantitatively similar using equally-weighted portfolios.

For robustness, we redefine profitability as cash-based operating profitability, which Ball, Gerakos, Linnainmaa, and Nikolaev (2016) have found to outperform other measures of profitability that do not exclude accruals. Moreover, we compute investment as the growth in total assets, consistent with Fama and French (2006, 2015). Using double-sorted portfolios along these two variables, we confirm the previous results in magnitude and significance.

In a rolling-window framework, we find that the premium of the wealth-creation factor is consistently positive throughout the sample period. Its significance peaks in the early part of the sample as well as in the 1990s and the 2000s.

To assess the investment value of the new factor, we compute the in-sample maximum Sharpe ratios that can be achieved by combining the wealth creation factor with the factors in traditional asset pricing models. Relative to the one-factor market model, introducing the wealth creation factor, with an optimal weight of 60% in the tangency portfolio, leads to a 27% increase in the magnitude of the Sharpe ratio. The improvements are 14%, 7%, and 4% relative to the three-, five-, and six-factor models (Fama and French, 1993, 2015, 2018), respectively, with an optimal weight that is never below 11%. The improvements are smaller, but still non-negligible, up to 5% and 2.5%, relative to the q and q^5 models of Hou, Xue, and Zhang (2015) and Hou, Mo, Xue, and Zhang (2019, 2021), respectively, with an optimal weight that reaches 14% with the q model.

We conclude our analysis by investigating whether the wealth creation effect is reflected in the predictability of earnings growth. Firms that invest in a profitable way should be able to generate higher cash flows in the future. To test this conjecture, we regress the annual change in earnings, normalized by book value at the beginning of the period, on current profitability, investments, and their interaction. We find that earnings are mean reverting, consistent with prior studies (e.g., Fama and French, 2006). However, the decline in earnings is less strong for firms that invest at a higher level of profits. For at least five years into the future, the interaction between current profitability and investment predicts positively annual earnings growth. Showing the robustness of the result, the interaction of profitability and investment has positive predictive power also when earnings growth is defined as the change in gross profits (defined as in Novy-Marx, 2013) divided by total assets at the beginning of the year. These findings corroborate the view that the wealth creation effect that we identify in stock returns is supported by a corresponding effect in the underlying cash flows of the firm.

Prior literature has highlighted that the relation between expected investment and expected returns can be positive in some circumstances, but it has not drawn its full implications in terms of the cross section of stock returns. A weakly positive relation between the two variables is documented in Fama and French (2006), but the authors do not explore the explanatory power of the interaction of investment and profitability.

Most closely related to us, Hou, Mo, Xue, and Zhang (2019, 2021) show theoretically that expected growth in book equity is positively related to expected stock returns if the expected market-to-book ratio is above one, a sign of positive growth options. This result supports the authors' construction of an expected investment growth factor. However, the expected growth factor does not build on the interaction between profitability and investment. Consequently, the wealth creation factor is not spanned by the expected growth factor. This discussion is developed further in our section devoted to empirical predictions.

Similarly, within a linearized present value identity, Cho, Kremens, Lee, and Polk (2021) show that growth in the scale of the firm is positively related to firm valuation when the price-to-book ratio exceeds one, an effect which they label *investment value added (iva)*. The authors find that sorting stocks along the *iva* dimension produces a positive stock return spread. Different from this work, we explicitly draw the implications of the interaction between profitability and investment as an explanatory variable in the cross section of stock returns.

More recently, Li and Chen (2021) find that investment is positively related to stock returns in the Chinese stock market. The authors argue that the positive sign of the relation depends on the existence of increasing returns to scale in China. While the authors make their argument starting from the same present value identity that we use in this paper, they do not explicitly study the pricing implications of the interaction of profitability and investment.

The paper proceeds as follows. Section 2 describes the wealth creation effect and derives the testable predictions. Section 3 describes the data. Section 4 provides evidence of a wealth creation effect in the cross section of stock returns. Section 5 studies the predictability of future earnings growth using the interaction of profits and investments. Section 6 concludes.

2 The Wealth Creation Effect

To illustrate the wealth creation effect, we follow Fama and French (2006, 2015) and start from a discounted-cash-flow tautology that implicitly defines the internal rate of return of the firm (see Campbell and Shiller, 1988)

$$M_t = \sum_{i=1}^{\infty} \frac{E_t\left(D_{t+i}\right)}{\left(1+r\right)^i}, \tag{1}$$

where D_t is the dividend and r is the internal rate of return, which approximates the average discount rate.

Under clean-surplus accounting, we can express dividends as a function of net income (NI_t) and the book value of equity (B_t)

$$M_t = \sum_{i=1}^{\infty} \frac{E_t\left(NI_{t+i} + B_{t+i-1} - B_{t+i}\right)}{\left(1+r\right)^i}. \tag{2}$$

After some manipulations detailed in Appendix Section A.1, Equation (2) yields the Residual Income model

$$M_t = B_t + \sum_{i=1}^{\infty} \frac{E_t\left(NI_{t+i} - rB_{t+i-1}\right)}{\left(1+r\right)^i}. \tag{3}$$

Next, we can express Equation (3) in terms of the difference between profitability and the cost of capital, which we label economic margin as a shorthand

$$\begin{aligned} M_t &= B_t + \sum_{i=1}^{\infty} \frac{E_t\left(\left(\frac{NI_{t+i}}{B_{t+i-1}} - r\right) B_{t+i-1}\right)}{\left(1+r\right)^i} \\ &= B_t + \sum_{i=1}^{\infty} \frac{E_t\left(\left(ROE_{t+i} - r\right) B_{t+i-1}\right)}{\left(1+r\right)^i}. \end{aligned} \tag{4}$$

We can further manipulate Equation (4) dividing by B_t to have book-to-market on the left, as in Fama and French's (2015) DCF-based equation

$$\begin{aligned}\frac{M_t}{B_t} &= 1 + \sum_{i=1}^{\infty} \frac{E_t\left((ROE_{t+i} - r)\,\frac{B_{t+i-1}}{B_t}\right)}{(1+r)^i} \\ &= 1 + \sum_{i=1}^{\infty} \frac{E_t\left((ROE_{t+i} - r)\,(1 + I_{t+i-1})\right)}{(1+r)^i},\end{aligned} \tag{5}$$

where $I_{t+i-1} = \frac{B_{t+i-1} - B_t}{B_t}$ is the growth rate of capital between t and $t+i-1$.

From Equation (4), we note that investment increases the value of the company in case $ROE > r$, that is, when the economic margin is positive. We label the interaction between economic margin and investment the *wealth creation effect*.

The interactive effect of investment and economic margin has not been emphasized in the literature. For example, Fama and French (2006, 2015), focusing on a version of Equation (2) normalized by book value in period t, argue that investment is negatively related to firm value, keeping ROE and expected return r constant. This conclusion conceals the fact that firms with a return on equity that exceeds their cost of capital increase shareholder value when they invest, as evident from Equation (5).

While Equation (5) is obtained starting from a discounted-cash-flow tautology, similar conclusions can be reached with different methodological approaches. Cho et al. (2021) derive a linearalized present value identity in which the value of the firm is a function of investment in equity capital, where the relationship is positive to the extent that the market-to-book ratio exceeds one. In their derivation, as well as in our Equation (5), a *sufficient* condition for the market-to-book ratio to exceed one is that the return on equity exceeds the cost of capital in all periods.

Finally, Hou et al. (2021) supplement the q-model of Hou et al. (2015) with an expected investment factor and obtain a q^5-model. Within an optimizing investment framework, the rationale for the expected investment growth factor is that firms with high expected growth in investment have higher expected cash flows in future periods. These higher cash flows would lead to higher investment in the current period, unless the firm has a higher discount rate today. This logic relates to the wealth creation effect in that it also derives a positive link between future cash flow growth and expected returns. However, that paper does not explicitly derive a condition in which the sign of the relationship between investment and expected returns depends on the sign of the difference between return on equity and the cost of capital.

2.1 Empirical Predictions

A direct test of Equation (5) requires specifying the cost of capital for each firm, which, in turn, depends on assuming an asset pricing model.

However, one can circumvent specifying a model for the cost of capital, and still validate the prediction in Equation (5), by relying on the positive interaction between investment and profitability. Specifically, the wealth creation effect predicts that, keeping everything else constant, the interaction between higher investment and higher profitability correlates with higher expected stock returns. This prediction can be tested in cross-sectional regressions where the left-hand side variable is stock returns and the predictors are profitability, investment, and their interaction. The wealth creation effect implies a positive sign for the slope on the interaction.

Another way to test the wealth creation effect is within a portfolio framework. Specifically, we can sort firms independently along the profitability and investment dimensions and obtain portfolios from the intersection of the two sorts. The wealth creation effect implies that the investment sort leads to a slower decline in average stock returns at higher levels of profitability. Conversely, the profitability sort corresponds to a steeper rise in average returns at higher levels of investment.

To illustrate, we construct a three-by-three matrix, where the first dimension corresponds to the profitability sort and the second one to the investment sort. We then obtain the following nine portfolio returns

		Investment		
		Low		High
	Low	R_{11}	R_{12}	R_{13}
Profitability		R_{21}	R_{22}	R_{23}
	High	R_{31}	R_{32}	R_{33}

The positive interaction between profitability and investment implies that an increase in investment has more positive (or less negative) correlation with returns for high levels of profitability. Using the portfolio returns in the matrix above, we can formulate the prediction as

$$R_{33} - R_{31} > R_{13} - R_{11}. \tag{6}$$

The inequality in Equation (6) can be re-arranged to obtain

$$R_{33} - R_{13} > R_{31} - R_{11}, \tag{7}$$

which expresses an equivalent statement of the interaction between profitability and investment. Specifically, an increase in profitability correlates more positively with returns at higher levels of investment.

To test these predictions explicitly, we can construct a wealth creation factor as a self-financing portfolio investing one dollar in the long leg and one dollar in the short leg

$$R_{WC} = \frac{1}{2}\left(R_{33} - R_{13}\right) - \frac{1}{2}\left(R_{31} - R_{11}\right), \tag{8}$$

which after re-arranging becomes

$$R_{WC} = \frac{1}{2}\left(R_{33} + R_{11}\right) - \frac{1}{2}\left(R_{13} + R_{31}\right). \tag{9}$$

The wealth creation portfolio is predicted to have a positive expected return and a positive alpha relative to existing factor models.

Importantly, the wealth creation effect is not subsumed by the existing factor models that postulate a profitability and an investment factor, e.g. the five-factor model by Fama and French (2015), the q-model of Hou et al. (2015), and the q^5-model of Hou et al. (2021). Therefore, portfolios of profitable and growing stocks, such as the portfolio [3,3] in our example, are predicted to have a component of returns that is left unexplained by such models and that will manifest itself as a positive alpha.

3 Data

In constructing the sample for the analysis, we follow Novy-Marx (2013) and Ball, Gerakos, Linnainmaa, and Nikolaev (2016). Monthly stock returns for ordinary shares of stocks traded on NYSE, Amex, and Nasdaq come from the Center for Research in Security Prices (CRSP). For delisting returns, we use the value reported in CRSP, when available; if it is missing, we use the procedure in Shumway (1997) and impute a value of -30% for performance-related delistings. We exclude financial firms, which are defined as firms with one-digit Standard Industrial Classification codes of six. This choice is made for consistency with prior literature, but it does not impact our main results.

Accounting data is from Compustat. We use quarterly data for the cross-sectional return regressions in Section 4.1 and annual data for the sorting variables in the portfolio analysis in Section 4.2, as well as for the predictive regressions of Section 5. Table 1 reports summary statistics for the variables that are used in the analysis.

When matching quarterly accounting data to monthly returns, we follow the approach in Hou et al. (2020). In particular, at the beginning of each month, we use accounting data from the fiscal quarter ending at least four months before. Thus, e.g., for a firm with fiscal-year end in December, the monthly returns in January are associated with quarterly accounting data from June of the prior year. For sufficient data coverage, we let the quarterly accounting data start in January 1976. The sample of returns ends in December 2020. For the portfolio analysis, we match returns with annual accounting data using the standard procedure from Fama and French (1993). Specifically, we form portfolios at the end of June of each year t using accounting data for the fiscal year ending in calendar year $t-1$. The annual sample ranges between July 1963 and December 2020.

In our main analysis, we construct profitability and investment to reflect their definitions in Section 2, that is, return on equity and book equity growth, respectively. As in Hou et al. (2019), return on equity is income before extraordinary items (Compustat annual item IB) divided by one-year lagged book equity. Book equity is shareholders equity, plus balance sheet deferred taxes and investment tax credit (item TXDITC) if available, minus the book value of preferred stock (item PSTK). Depending on availability, we use stockholders equity (item SE), or common equity (item CE) plus the book value of preferred stock, or total assets (item AT) minus total liabilities (item LT) in that order as shareholders equity. When using quarterly data, we refer to the corresponding quarterly items in Compustat for constructing the variables. Investment at the annual frequency is the annual change in book equity divided by prior-year book equity. Following Hou et al. (2015), investment at the quarterly frequency is defined at the change in book equity relative to four quarters before divided by book equity four quarter ago. We only keep observations for which book equity is positive.

For robustness, in the portfolio analysis, we also use other definitions of profitability and investment that are found in the literature. Specifically, as in Ball et al. (2016), we construct the profitability ratio from Compustat annual data as cash-based operating profits divided by lagged total assets. We measure cash-based operating profits as total revenue (item REVT) minus cost of goods sold (item COGS), minus selling, general, and administrative expenses (item XSGA), plus research and development expenditures (item XRD, zero if missing), minus change in accounts receivable (item RECT), minus change in inventory (item INVT), plus change in deferred revenue (item DRC plus item DRLT), and plus change in trade accounts payable (item AP). All changes are annual changes in balance sheet items and we set changes to zero if they are missing. As an alternative definition of investments, we follow Fama and French (2006) and define investments as the annual change in total assets divided by total assets in the prior year.

For the regression analysis in Section 4.1, we use additional variables constructed using quarterly accounting data from at least four months before the beginning of the month in which returns are measured. For book-to-market, we divide book equity from quarterly accounting data by market equity at the beginning of the month. Based on Sloan (1996) and Ball et al. (2016), we define accruals from quarterly data as the change in current Assets (item ACTQ) minus the change in cash (item CHQ) minus the change in Current Liabilities (item LCTQ) plus the change Debt in Current Liabilities (item DLCQ) plus the change in Income Taxes Payable (item TXPQ) minus Depreciation (item DPQ).[2] We also compute CAPM betas using five-year rolling-window regressions on monthly data with at least two years of available returns. For this part of the analysis, we trim all the explanatory variables at the 1^{st} and 99^{th} percentiles to avoid the influence of outliers.

4 The Cross Section of Stock Returns

In this section, we test the empirical predictions that we have developed in Section 2.1. First, using cross-sectional regressions, we ask whether the interaction between profitability and investment is a positive predictor of monthly stock returns. Second, we conduct a portfolio analysis and measure the returns of the wealth creation factor. We also study the investment value of the wealth creation factor by assessing the gains in ex-post Sharpe ratio from adding it to the most popular factor models.

4.1 Regression Analysis

The wealth creation effect implies a positive slope on the interaction between profitability and investment in predicting returns. As argued in Section 2, the logic behind this prediction is that firms whose return on investment exceeds the cost of capital increase shareholder

[2]Accruals in Section 5 are computed in the same way using annual Compustat items.

value. Thus, all else equal, firms that combine higher investment with higher profitability are expected to earn higher stock returns.

We test this conjecture using Fama and MacBeth (1973) regressions. In particular, we regress monthly stock returns on lagged return on equity (ROE), lagged book equity growth (Investment), and the product of these two variables. For this analysis, we use quarterly accounting data because prior research has shown the higher predictive power of financial variables at this frequency (Hou et al., 2020).

Table 2 reports the estimates. In columns (1)-(2), the sample includes the universe of firms in our sample. We also report results for firms with market capitalization above the median computed for NYSE stocks in each month, columns (3)-(4), and below the median, columns (5)-(6). In column (1), we find that profitability and investment have positive and negative signs in predicting stock returns, confirming established facts in the literature. Moreover, the magnitude of these effects is comparable to previous studies (see, e.g., Ball et al., 2016; Hou et al., 2020; Lewellen and Resutek, 2016).

Importantly, in column (1), we find a positive and significant slope on the interaction between the two variables, consistent with the conjecture of a wealth creation effect. The significance of this effect remains in column (2) after we control for other variables that are expected to correlate with stock returns, that is, the stock's market beta, short-term reversals, one-year momentum, (the logarithm of) book-to-market, (the logarithm of) the market-value of equity, and accruals. Incidentally, the sign and significance of these controls reflects prior literature findings (see,e.g., Ball et al., 2016; Novy-Marx, 2013). Moreover, the wealth creation effect is present in both the sample of large and small firms.

To assess the economic importance of the slope on the interaction, we standardize all the explanatory variables by subtracting the mean and dividing by the standard deviation in the cross section. We can interpret the slope on the interaction as the effect of a one-standard deviation increase in profitability (or investment) when investment (or profitability) is one-standard-deviation away from its mean. The estimates are in the Appendix Table A.4. The size of the coefficient on the interaction is comparable in magnitude to the effect of one-year momentum and the log of book-to-market. We conclude, therefore, that the wealth creation effect is economically sizeable.

Overall, this first set of tests provides corroboration for the conjecture that the wealth creation effect exists in the cross section of stock returns. In what follows, we study the wealth creation effect within a portfolio framework. This analysis, while providing additional tests of the conjecture, will also allow us to quantify more precisely the effect.

4.2 Portfolio Analysis

4.2.1 First Evidence from Portfolios

For the next analysis, we adhere closely to the description of the portfolio approach in Section 2.1. In more detail, in June of each year, we sort stocks independently along the profitability and investment dimensions based on annual accounting variables from the prior year. For each variable, we form three groups using the 30^{th} and 70^{th} percentiles of the distribution for NYSE stocks. Then, from the intersection of the two dimensions, we obtain nine portfolios. We report average monthly returns for both market-capitalization-weighted and equally-weighted portfolios. The average count of stocks, market capitalization, profitability, and investment for each portfolio are given in Appendix Table A.1.

Mirroring the hypothesis development in Section 2, we start from defining investment and profitability as return on equity and book equity growth, respectively. We emphasize that we match an equity-based profitability measure with an equity-based investment measure to make sure that both quantities refer to the same side of the capital structure, i.e., shareholders' equity.

Table 3 reports the excess returns and Fama and French (2015) five-factor alphas for the nine ROE and equity investment portfolios. In this part of the analysis, we use the five-factor model for risk adjustment because it explicitly includes the profitability and investment factors, which are meant to capture the spread in returns for these portfolios.

Focusing on excess returns in Panel A, we confirm the known regularities in asset prices as returns tend to be higher for highly profitable firms and lower for firms that rank high by investment, on average. At a closer inspection, however, the investment effect is stronger for low-profitability than for high-profitability firms (-0.509% vs. -0.085%), while the profitability effect is larger for high-investment than for low-investment stocks (0.520% vs. 0.096%). This evidence validates the predictions expressed in Equations (6) and (7) and, therefore, it supports the conjecture of a wealth creation effect. Similar results are obtained with equally-weighted portfolios in Panel B.[3]

Risk-adjusting returns with the five-factor model does not change the inference. The negative relation between investment and returns is weaker for more profitable firms; vice versa, the positive relation between profitability and returns is stronger at high levels of investment. Thus, we conclude that the investment and profitability factors, separately taken, are not sufficient to explain the wealth creation effect, which originates from the interaction of the two factors.

Next, we test the robustness of these findings using different measures of profitability and investment as sorting variables. As in the previous case, we are loyal to the principle of using sorting variables that pertain to the same item in the balance sheet. In particular, we define profitability as cash-based operating profits divided by lagged total assets (Ball et al., 2016) and investment as total assets growth (Fama and French, 2006). Moreover, defining investment as asset growth mirrors the construction of the investment factor in the Fama and French (2015) five-factor model. Thus, one would expect a better pricing performance of the model in this context.

Table 4 reports the returns of the portfolios created with these alternative sorting variables. The conclusions from the prior analysis remain valid. The evidence is supportive of the wealth creation effect as expressed in Equations (6) and (7). Moreover, in Panel A, we note that the high-investment portfolios for extreme levels of profitability—both

[3]Appendix Tables A.2 and A.3 report the Fama and French (2015) five-factor model loadings for the equity-based and asset-based portfolios.

low and high—are highly mispriced by the five-factor model. It appears, therefore, that the profitability and investment factors are not sufficient to price firms in which these two dimensions interact to generate a wealth creation effect for highly profitable and growing firms, or a wealth destruction effect in the case of highly unprofitable firms that still decide to grow their size. In the next subsection, we assess the statistical significance of the wealth creation effect across a wide range of asset pricing models.

4.2.2 The Wealth Creation Factor

To study the significance and economic magnitude of the wealth creation effect we construct a factor that builds on the logic behind Equation 9. In particular, we use the portfolios from the previous subsection to construct a wealth creation (WC) factor that is long one dollar in the equally-weighted average between the high-profitability/high-investment portfolio and low-profitability/low-investment portfolio and it is short one dollar in the equally-weighted average between the high-profitability/low-investment portfolio and low-profitability/high-investment portfolio.

To assess whether existing factor models account for the wealth creation effect, we compute monthly alphas for the WC factor from several asset pricing models that have been proposed in the literature. We use the CAPM, the Fama and French (1993) three-factor model, the Fama and French (2015) five-factor model, the Fama and French (2018) six-factor model that includes momentum, the q and q^5 models of Hou, Xue, and Zhang (2015) and Hou, Mo, Xue, and Zhang (2019, 2021), and the four-factor model of Stambaugh and Yuan (2017).[4]

In Table 5, we present the average excess return and the factor-model alphas for the WC factor constructed using the ROE and equity-growth portfolios of Table 3. In Panel A, with

[4]We obtain the returns for the factors in these models from the authors' websites. We note, however, that the data is not available throughout our entire sample period for some of these factors. In particular q and q^5 models' factors are available starting in January 1967 and the Stambaugh and Yuan (2017) factors are available up to December 2016. Thus, we estimate the models in the subsample for which the factor returns are available.

value-weighted portfolios, the monthly alpha estimates are always statistically significant across factor models. Their magnitude is contained in a small range between 20bps with the q model and 30bps with Stambaugh and Yuan (2017) model. The latter estimate, however, is mostly the result of the estimation ending in December 2016 due to factor availability.

With value-weighted portfolios, the factor exposure to the market and the small-minus-big factor (SMB) is insignificant. The exposure to HML is insignificant in the three-factor model (FF3). However, it turns positive and significant once the CMA factor, which has a negative and significant loading, is included (FF5 and FF6). Thus, it appears that the value-weighted WC factor is tilted towards value companies that invest aggressively. Moreover, it is exposed to momentum winners (UMD). In the q models, we do not find significant loading on the investment factor (Ria), possibly because of the exclusion of a value factor from this model. We note a positive exposure to the performance-related anomalies factor (PERF) in the Stambaugh and Yuan (2017), possibly as a result of the inclusion of momentum in this factor.[5]

Importantly, the WC factor has an insignificant exposure to the investment growth factor (Rrg) of Hou, Mo, Xue, and Zhang (2019, 2021), which is inspired by similar considerations to the WC factor, but follows a different approach. Thus, the WC factor is not spanned by the q^5 model, which is the closest attempt in the literature to model the wealth creation effect.

With equally-weighted portfolios, in Panel B, the magnitude of the alphas is comparable to what we find in Panel A, with a higher statistical significance. The exposure to factors is different given the tilt towards smaller stocks. The WC factor in this case displays a significantly positive exposure to the size factors (both SMB and Rme) as well as to the market factor, although this loading remains small. Other factor loadings are largely insignificant.

[5] Indeed, in Panel B, where there is no significant exposure to momentum, we also do not find a significant loading on PERF.

4.2.3 Robustness Analysis

For robustness, in Table 6, we conduct the same analysis using the WC factor constructed from the cash-based operating profitability and asset growth portfolios in Table 4. With value-weighted portfolios in Panel A, across the factor models, the alphas become significant only when the profitability and investment factors are included. The magnitude is similar to that in Table 5. Once again, this evidence allows us to conclude that, individually taken, the profitability and investment factors are not enough to price the returns of firms that combine high levels of these two characteristics, which is the essence of the wealth creation effect. In Panel B, with equally-weighted portfolios, the alphas are large and significant across all factor models. The largest alpha, at 32bps per month, is with the q model. Across portfolio formation approaches, it appears that the WC factor does not load consistently on any of the factors. We take this evidence as supportive of the view that the wealth creation effect identifies a previously unexplored dimension in the cross section of stock returns.

A potential reason for the imperfect pricing ability of the profitability and investment factors for the WC factor is the different portfolio sorts that underlie all of them, which could lead the pricing factors to miss some other characteristic that is priced in the cross section. To address this issue, we reconstruct the investment and profitability factors using the same sorting variables that we use for the WC factor in its equity-based version. Specifically, we construct a new profitability factor (RMW_roe) based on a sort by income before extraordinary items divided by lagged book equity, while the new investment factor (CMA_eq) is based on a sort by book equity growth. Other than the sorting variables, the construction procedure mirrors that used for the original RMW and CMA factors in Fama and French (2015).

Table 7 reports the results of this additional robustness analysis. Replacing the reconstructed factors for the original RMW and CMA, one by one and both of them together, does not impact the magnitude and significance of the alphas of the WC factor. We conclude, therefore, that the inability of profitability and investment to explain the wealth creation effect does not depend on how the pricing factors are constructed.

To conclude our robustness analysis, in Appendix Table A.5, we replicate the analysis of Table 5 keeping financial stocks in the portfolios. The alphas remain overall significant and of similar magnitude to those in the main analysis.[6]

4.2.4 Evolution of the WC Premium over Time

We next study the evolution of the premium of the WC factor over time. To this purpose, we choose to run rolling-window regressions using 120 months of returns to trade off a sufficiently long sample for statistical power and a short enough period to capture time-series variation. For this part of the analysis, we compute the alphas of the WC factor using the Fama and French (2015) five-factor model.

In Figure 1, we plot the alphas for the equity-based WC factor constructed with value-weighted (Panel (a)) and equally-weighted (Panel (b)) portfolios. The shaded area provides 95% confidence intervals. In Panel (a), we note that the premium starts very large, around 1% per month, and statistically significant at the beginning of the sample. After a decline in the eighties and early nineties, the premium rises again until about the inception of the Financial Crisis. In the last decade, the premium hovers around zero. Importantly, while not always statistically significant, the alphas of the WC factor are mostly in the positive domain. We draw the same conclusion from equally-weighted portfolios in Panel (b).

In Figure 2, we carry out the same exercise using the asset-based WC factor. With the value-weighted factor (Panel (a)), we find that the alphas stay in the positive domain for most of the sample and are statistically significant in the early part of the sample as well as in the late nineties and early 2000s. For the equally-weighted factor, in Panel (b), we find that the premium is consistently positive for the whole sample and it is statistically significant over a large part of it.

Taken together, this evidence allows us to conclude that the wealth creation effect is

[6] We note that, among the factor models that we consider, the two q-models do not include financial stocks in factor construction.

not an artifact of a specific historical period, but rather it is a pervasive feature of the data.

4.3 Ex-Post Sharpe Ratios

To assess the significance of the wealth creation effect from an investment perspective, we study the improvement in ex-post Sharpe ratios that the WC brings to existing factor models. In particular, we construct the tangency portfolio to the efficient frontier formed using different combinations of factors.[7]

Table 8, Panel A, reports the weights and (annualized) Sharpe ratio of the tangency portfolios obtained using the equity-based WC factor. In the first row, the WC factor by itself has a Sharpe ratio of 0.32, which is about three quarters of the Sharpe ratio of the market (second row).

The WC factor provides the best risk-return tradeoff in combination with other factors. For example, combining the WC factor with the market portfolio raises the Sharpe ratio from 0.44 to 0.56, a 26% improvement, achieved with a 60% weight on WC. The improvements are still sizeable relative to the Fama and French (1993) three-factor model (rows 4 and 5), from 0.61 to 0.70 (a 14% increase), and the Fama and French (2015) five-factor model (rows 6 and 7), from 1.04 to 1.11, a 7% increase. The gains in the risk-return tradeoff are smaller relative to the other factor models under consideration—e.g. we note a 2.5% rise in Sharpe ratio relative to the q model (rows 10 and 11)—but the WC factor always obtains a significant weight in the tangency portfolio, which is never below 6.9%. The asset-based WC factor, in Panel B of Table 8, leads to similar gains in Sharpe ratio on average.

Overall, we conclude that the WC factor allows investors to achieve significant improvement in the risk-return tradeoff relative to the most popular factor models. Not only

[7] To be precise, for the weights of the tangency portfolio, we use the formula

$$q_{tg} = \frac{V^{-1}\mu}{\iota' V^{-1}\mu},$$

where V is the factors' variance-covariance matrix, μ is the vector of means of the factors' excess returns, and ι is a vector of 1's of the same dimension as the number of factors. We estimate the variance-covariance and the means using the sample moments. The Sharpe ratio of the tangency portfolio is then computed accordingly.

is its average premium significant, on average 0.24bps per month across the asset pricing models that we consider (Table 5), but also its residual volatility is relatively small. Thus, integrating the WC factor into the other models improves their Sharpe ratio.

5 Wealth Creation in Earnings Growth

Our analysis suggests that the interaction of current profitability and investment contributes to explain the cross section of stock returns. To confirm that the evidence that we obtain from stock returns reflects the evolution of the underlying fundamentals of the firm, as conjectured in Section 2, we finally turn to forecasting cash flows. In particular, the wealth creation effect predicts that firms that invest at higher levels of profitability are expected to experience higher cash-flow growth.

To test this conjecture, we adhere to the main empirical specifications in the paper and measure profitability, at the annual frequency, as income before extraordinary items divided by lagged book equity (ROE), while investment is measured as the growth in book equity. Consistent with these definitions, in our first set of tests, we measure the growth in cash-flows as the growth in income before extraordinary items. Because this variable can be negative, to measure its growth in a meaningful way, we focus on the change in income before extraordinary items divided by lagged book equity. Importantly, we choose to focus on the change in earnings normalized by lagged book equity, as opposed to the change in ROE, because earnings can grow while ROE, measuring the efficiency in the firm's invested capital, can remain constant or even decrease.

Using this dependent variable, Table 9, Panel A, reports the results of the earnings growth forecasting regressions for up to five years into the future. Focusing on the interaction between profitability and investment, we find significant predictive power for earnings growth in the next four years. The positive slope supports the conjecture of a wealth creation effect in fundamentals.

Incidentally, the negative slope on profitability reflects the time-series properties of earnings. As shown in Appendix Table A.6, ROE follows a mean reverting process. Because the dependent variable in Table 9, Panel A, loads positively on future ROE in its definition, the mean reversion in ROE affects its slope in the forecasting regressions.[8] To explain the negative slope on investment, we also refer to the negative sign of this variable in predicting ROE (see Appendix Table A.6). From an economic point of view, this negatively relationship possibly reflects the decreasing marginal efficiency of investment, which leads to lower ROE for the marginal dollar invested.

For robustness, and to circumvent the potentially confounding effects originating from the time-series structure of ROE, we also run the forecasting regressions using a different dependent variable. In the next set of tests, we define earnings growth as the annual change in gross profits (i.e., revenues minus cost of goods sold) divided by lagged total assets. As argued by Novy-Marx (2013), gross profits is the cleanest accounting measure of true economic profitability because it is less polluted by assumptions that affect the bottom line in the income statement.

Panel B of Table 9 reports the estimation results. We still find a positive slope on the interaction between profitability and investment, consistent with the wealth creation effect. The significance is strong in the first year and survives up to year 5 in the specifications without controls. The sign of the slopes on profitability and investment is also positive, suggesting that the time-series structure of ROE is less relevant for these results.

To conclude, the evidence in this section strongly reflects the presence of a wealth creation effect in earnings growth. Firms that invest profitably tend to have higher earnings in the future. This finding provides the underpinning for the wealth creation effect in stock returns that we have identified in the previous section.

[8] Indeed, using the notation from Section 2, earnings growth is defined as

$$EG_{t+1} = \frac{NI_{t+1} - NI_t}{B_t},$$

which is equal to

$$EG_{t+1} = ROE_{t+1} - \frac{NI_t}{B_t}.$$

6 Conclusion

The paper highlights a previously neglected regularity in the cross section of stock returns. The product of firm profitability and investment correlates positively with average stock returns.

We argue that this finding is consistent with simple valuation principles stating that firms that invest when their rate of return on invested capital exceeds the cost of capital increase shareholder value. Thus, in a present value identity, keeping valuation constant, higher profitability accompanied by higher investment needs to correlate with higher expected stock returns. We label this relation the wealth creation effect. This result holds irrespective of whether asset prices are rational or inefficient, as it stems from a present value identity.

We construct a wealth creation (WC) factor that is founded on the wealth creation principle. The factor is long in high-growth high-profitability stocks as well as low-growth low-profitability stocks. Conversely, the factor is short high-growth low-profitability stocks as well as low-growth high-profitability stocks.

The WC factor earns positive and significant risk-adjusted returns of about 24bps per month. Notably, the alpha is significant when computed across the most popular asset pricing models. In particular, the profitability and investment factors, separately taken, do not explain this premium away. The WC factor has significant value for investors as combining it with the Fama and French (2015) five-factors raises the ex-post Sharpe ratio of the tangency portfolio by up to 8%.

Supporting our interpretation for the evidence from stock returns, we find a wealth creation effect in the cash flows of the firm. In particular, the product of current profitability and investment predicts future earnings growth for at least five years into the future.

We believe these results have implications for investors who follow either a fundamental or a quantitative approach to stock selection. The existing asset pricing models imply a lower score for high-growth companies. Instead, the wealth creation effect provides a more nuanced view. Growth is a welcome corporate activity to the extent that it occurs at sufficiently high levels of profitability, a notion that many practitioners already embrace. In this sense, our findings help to reconcile common sense practices in the industry with the predictions of cross-sectional asset pricing models.

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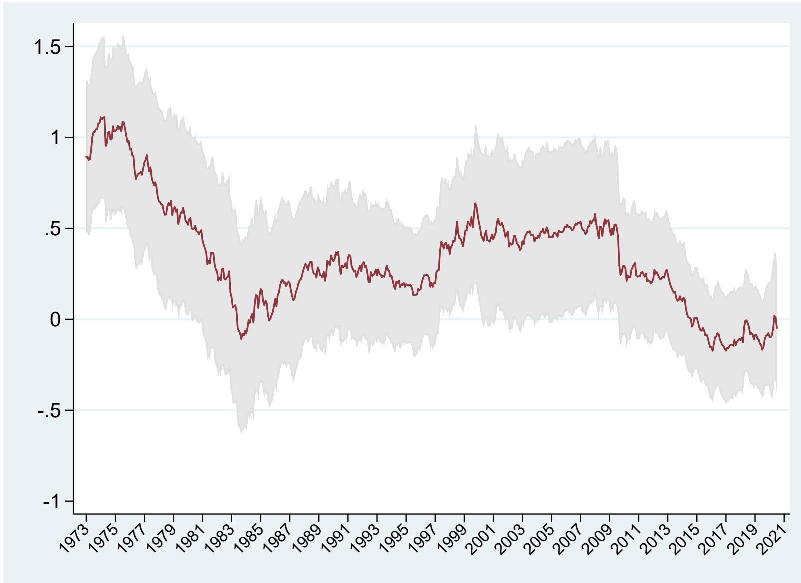
Panel (a)



Panel (b)

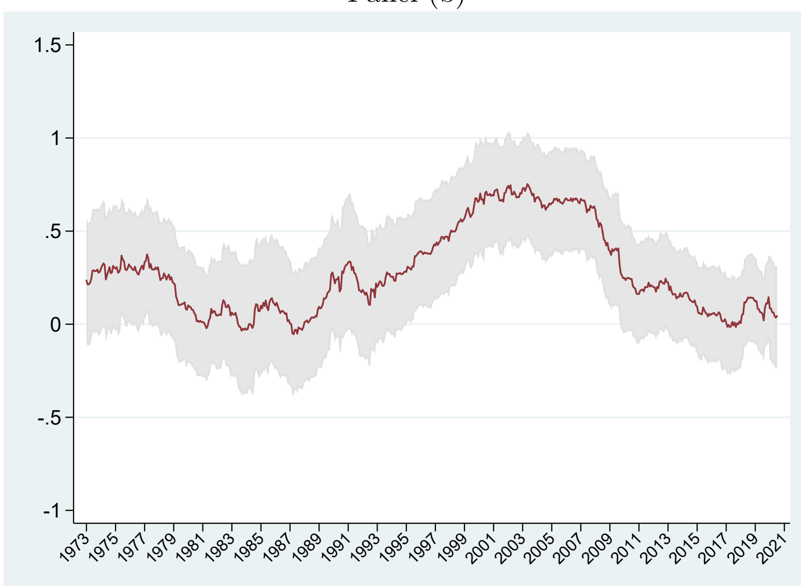


Figure 1: Alphas for the (Equity-Based) Wealth Creation Factor over Time
The figure plots monthly alphas in percent from Fama and French (2015) five-factor model regressions estimated in ten-year rolling-window regressions. The dependent variable is the wealth creation (WC) factor. This factor is constructed as a portfolio that is long one dollar in the equally-weighted average between the high-profitability/high-investment portfolio and low-profitability/low-investment portfolio and it is short one dollar in the equally-weighted average between the high-profitability/low-investment portfolio and low-profitability/high-investment portfolio. The underlying portfolios are formed along the profitability and investment dimensions as described in Table 3 and are market-capitalization weighted in Panel (a) and equally-weighted in Panel (b). Profitability is measured as return on equity and investment as book equity growth. The shaded area provides 95% confidence intervals. The monthly sample ranges from July 1963 and December 2020.

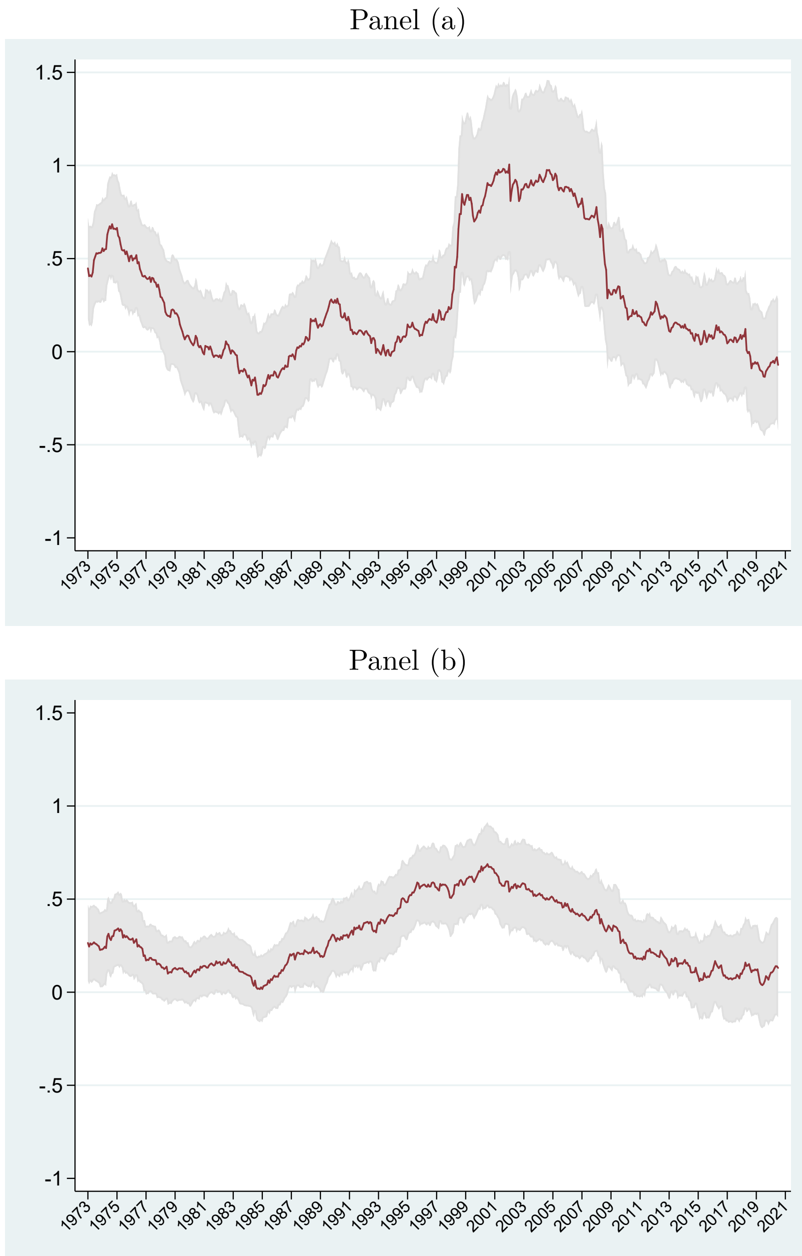


Figure 2: Alphas for the (Asset-Based) Wealth Creation Factor over Time

The figure plots monthly alphas in percent from Fama and French (2015) five-factor model regressions estimated in ten-year rolling-window regressions. The dependent variable is the wealth creation (WC) factor. This factor is constructed as a portfolio that is long one dollar in the equally-weighted average between the high-profitability/high-investment portfolio and low-profitability/low-investment portfolio and it is short one dollar in the equally-weighted average between the high-profitability/low-investment portfolio and low-profitability/high-investment portfolio. The underlying portfolios are formed along the profitability and investment dimensions as described in Table 4 and are market-capitalization weighted in Panel (a) and equally-weighted in Panel (b). Profitability is measured as cash-based operating profits divided by lagged total assets and investment as total assets growth. The shaded area provides 95% confidence intervals. The monthly sample ranges from July 1963 and December 2020.

Table 1: Summary Statistics

The table reports mean, standard deviation (SD), and several percentiles for the variables that are used in the analysis. Panel A summarizes the variables in the monthly predictive regressions. These variables are: the monthly stock return (in %), return on equity (ROE), Investment measured as the change in book equity relative to four quarters before divided by book equity four quarters before, the CAPM beta, one-month lagged monthly returns in month $t-1$ (Ret_1), lagged annual returns between months $t-13$ and $t-2$, the natural logarithm of the book-to-market ratio, the natural logarithm of market value in month $t-1$, and accruals divided lagged total assets. The sample ranges between January 1976 and December 2020. Panel B summarizes the variables used for portfolio formation and in the annual regressions. These variables are: the annual change in income before extraordinary items divided by lagged book equity (Earnings growth), the annual change in gross profits (item REVT - item COGS) divided by prior year total assets, return on equity, the annual change in book equity divided lagged book equity, the annual change in total assets divided lagged assets, cash-based operating profits divided lagged assets, accruals divided lagged total assets. The sample ranges between 1963 and 2020. Detailed variable definitions are given in Section 3.

Panel A: Variables in monthly predictive regressions

			Percentiles				
	Mean	SD	1st	25th	50th	75th	99th
Return	1.258	19.226	-40.157	-7.237	0.000	7.692	60.804
ROE	-0.018	0.162	-0.720	-0.018	0.018	0.040	0.194
Investment	0.213	0.897	-0.813	-0.052	0.077	0.212	4.145
Beta	1.150	0.703	-0.227	0.663	1.080	1.545	3.215
Ret_1	0.750	14.020	-33.333	-7.037	0.000	7.500	44.444
Ret_2_13	11.462	51.997	-74.615	-21.875	4.703	33.578	199.824
log(BM)	-0.589	0.850	-2.788	-1.126	-0.525	0.004	1.184
log(M)	4.923	2.114	0.824	3.319	4.803	6.445	9.800
Accruals	-0.010	0.063	-0.200	-0.035	-0.009	0.014	0.204

Panel B: Variables at the annual frequency

			Percentiles				
	Mean	SD	1st	25th	50th	75th	99th
Earnings Growth	0.018	0.383	-1.017	-0.045	0.013	0.062	1.364
Gross Profits Growth	0.038	0.109	-0.242	-0.012	0.026	0.082	0.405
ROE	0.001	0.467	-1.731	-0.020	0.090	0.165	0.662
Book Equity Growth	0.157	0.674	-0.700	-0.026	0.080	0.192	2.644
Total Assets Growth	0.237	0.779	-0.424	-0.008	0.084	0.229	3.356
Cash-Based Op. Prof.	0.105	0.168	-0.483	0.048	0.120	0.189	0.450
Accruals	-0.022	0.169	-0.433	-0.085	-0.033	0.021	0.570

Table 2: The Wealth Creation Effect in Cross-sectional Regressions

The table reports estimates from Fama and MacBeth (1973) regressions of monthly stock returns in month t in percent on return on equity (ROE) and the change in book equity relative to four quarters before divided by book equity four quarters before (Investment), and the interaction of these two variables. In some specifications, we include additional control variables: the CAPM beta, one-month lagged monthly returns in month $t-1$ (Ret_1), lagged annual returns between months $t-13$ and $t-2$, the natural logarithm of the book-to-market ratio, the natural logarithm of market value in month $t-1$, and accruals. The sample includes all firms (columns (1)-(2)), those above the median market capitalization for NYSE stocks (columns (3)-(4)), and those below the median (columns (5)-(6)). Variable definitions are given in Section 3. The sample ranges between January 1976 and December 2020. t-statistics are reported in parentheses.

	Dep. Variable: Stock Return					
	All Firms		Large Firms		Small Firms	
	(1)	(2)	(3)	(4)	(5)	(6)
ROE	4.873	5.868	2.430	2.317	5.529	6.098
	(5.993)	(9.437)	(2.254)	(2.249)	(6.925)	(9.408)
Investment	-0.765	-0.546	-0.620	-0.609	-0.737	-0.531
	(-5.657)	(-5.322)	(-2.681)	(-3.035)	(-5.584)	(-5.077)
ROE × Investment	5.271	5.165	9.786	8.327	4.226	4.930
	(2.716)	(3.499)	(2.401)	(2.435)	(2.461)	(3.347)
Beta		0.088		0.035		0.117
		(0.799)		(0.216)		(1.137)
Ret_1		-0.044		-0.027		-0.046
		(-12.068)		(-5.209)		(-12.530)
Ret_{2_13}		0.005		0.004		0.006
		(4.860)		(2.426)		(5.310)
log(BM)		0.263		0.067		0.303
		(4.541)		(0.949)		(4.720)
log(M)		-0.101		-0.064		-0.152
		(-2.891)		(-1.727)		(-2.929)
Accruals		-1.006		-0.781		-1.045
		(-2.851)		(-1.447)		(-2.650)
Constant	1.226	4.111	1.090	2.334	1.293	4.903
	(5.167)	(7.701)	(5.283)	(3.333)	(5.131)	(7.605)
Observations	1,061,738	1,061,738	241,849	241,849	819,889	819,889
R-squared	0.013	0.050	0.028	0.126	0.013	0.046

Table 3: ROE and Equity-Investment Portfolios

The table reports monthly excess returns (stock return minus the risk-free rate) and Fama and French (2015) five-factor monthly alphas in percent for nine portfolios formed along the profitability and investment dimensions. In June of each year, we sort stocks independently along the profitability and investment dimensions based on annual accounting variables from the prior year. Profitability is measured as return on equity and investment as book equity growth. For each variable, we form three groups using the 30th and 70th percentiles of the distribution for NYSE stocks. Panel A reports the returns for capitalization-weighted portfolios and Panel B for equally-weighted portfolios. Variable definitions are given in Section 3. The sample ranges between July 1963 and December 2020. *t*-statistics are reported in parentheses.

Panel A: Value-weighted Portfolios

	Excess Returns					FF5 Alphas			
	Investment					Investment			
Profitability	Low		High	High - Low	Profitability	Low		High	High - Low
Low	0.608	0.571	0.099	-0.509	Low	-0.085	-0.088	-0.373	-0.287
	(3.092)	(2.908)	(0.376)	(-3.502)		(-1.350)	(-1.132)	(-3.363)	(-2.364)
	0.682	0.550	0.533			-0.072	-0.138	-0.043	
	(4.094)	(3.393)	(2.691)			(-1.024)	(-2.658)	(-0.560)	
High	0.703	0.540	0.618	-0.085	High	-0.097	-0.082	0.121	0.219
	(3.712)	(3.283)	(3.034)	(-0.567)		(-0.871)	(-1.383)	(2.262)	(1.722)
High - Low	0.096		0.520		High - Low	-0.012		0.494	
	(0.629)		(3.626)			(-0.087)		(4.113)	

Panel B: Equally-weigthed Portfolios

	Excess Returns					FF5 Alphas			
	Investment					Investment			
Profitability	Low		High	High - Low	Profitability	Low		High	High - Low
Low	1.169	1.015	0.492	-0.677	Low	0.416	0.243	-0.075	-0.491
	(4.324)	(4.219)	(1.610)	(-6.411)		(3.894)	(3.200)	(-0.569)	(-5.123)
	0.884	0.858	0.733			0.045	0.046	-0.034	
	(4.797)	(4.574)	(3.160)			(0.735)	(1.064)	(-0.581)	
High	0.919	0.815	0.743	-0.176	High	0.043	0.042	-0.065	-0.108
	(4.476)	(4.551)	(3.035)	(-1.536)		(0.486)	(0.891)	(-1.118)	(-1.133)
High - Low	-0.250		0.251		High - Low	-0.373		0.010	
	(-1.540)		(1.839)			(-2.959)		(0.094)	

Table 4: ROA and Asset-Investment Portfolios

The table reports monthly excess returns (stock return minus the risk-free rate) and Fama and French (2015) five-factor monthly alphas in percent for nine portfolios formed along the profitability and investment dimensions. In June of each year, we sort stocks independently along the profitability and investment dimensions based on annual accounting variables from the prior year. Profitability is measured as cash-based operating profits divided by lagged total assets (ROA) and investment as assets growth. For each variable, we form three groups using the 30^{th} and 70^{th} percentiles of the distribution for NYSE stocks. Panel A reports the returns for capitalization-weighted portfolios and Panel B for equally-weighted portfolios. Variable definitions are given in Section 3. The sample ranges between July 1963 and December 2020. *t*-statistics are reported in parentheses.

Panel A: Value-weighted Portfolios

Excess Returns

	Investment			
Profitability	Low		High	High - Low
Low	0.561	0.476	0.289	-0.272
	(2.483)	(2.627)	(1.282)	(-2.271)
	0.640	0.527	0.515	
	(3.711)	(3.225)	(2.569)	
High	0.773	0.680	0.759	-0.014
	(4.487)	(4.223)	(3.461)	(-0.098)
High - Low	0.212		0.470	
	(1.587)		(4.149)	

FF5 Alphas

	Investment			
Profitability	Low		High	High - Low
Low	-0.195	-0.131	-0.223	-0.027
	(-2.141)	(-1.680)	(-3.633)	(-0.262)
	-0.150	-0.123	-0.068	
	(-2.424)	(-2.347)	(-1.111)	
High	-0.022	0.061	0.422	0.444
	(-0.399)	(1.337)	(6.137)	(5.086)
High - Low	0.173		0.645	
	(1.517)		(6.415)	

Panel B: Equally-weigthed Portfolios

Excess Returns

	Investment			
Profitability	Low		High	High - Low
Low	1.269	0.794	0.367	-0.903
	(4.357)	(3.528)	(1.337)	(-9.105)
	1.144	0.835	0.744	
	(5.006)	(4.385)	(3.126)	
High	1.285	1.029	0.885	-0.401
	(5.451)	(5.082)	(3.631)	(-4.571)
High - Low	0.016		0.518	
	(0.148)		(5.827)	

FF5 Alphas

	Investment			
Profitability	Low		High	High - Low
Low	0.545	0.056	-0.266	-0.811
	(4.066)	(0.777)	(-2.836)	(-9.196)
	0.246	0.042	-0.045	
	(3.203)	(0.938)	(-0.784)	
High	0.456	0.263	0.224	-0.232
	(6.546)	(5.846)	(3.810)	(-3.651)
High - Low	-0.089		0.490	
	(-0.904)		(6.101)	

Table 5: Alphas for the (Equity-Based) Wealth Creation Factor

The table reports monthly excess returns (stock return minus the risk-free rate) in percent, monthly alphas in percent, and factor loadings for the wealth creation (WC) factor. This factor is constructed as a portfolio that is long one dollar in the equally-weighted average between the high-profitability/high-investment portfolio and low-profitability/low-investment portfolio and it is short one dollar in the equally-weighted average between the high-profitability/low-investment portfolio and low-profitability/high-investment portfolio. The underlying portfolios are formed along the profitability and investment dimensions as described in Table 3. Profitability is measured as return on equity and investment as book equity growth. For the factor models, we use the CAPM, the Fama and French (1993) three-factor model (FF3), the Fama and French (2015) five-factor model (FF5), the Fama and French (2018) six-factor model that includes momentum (FF6), the q and q^5 models of Hou, Xue, and Zhang (2015) and Hou, Mo, Xue, and Zhang (2019, 2021), and the four-factor model of Stambaugh and Yuan (2017, SY). Panel A reports the results for capitalization-weighted portfolios and Panel B for equally-weighted portfolios. Variable definitions are given in Section 3. The sample ranges between July 1963 and December 2020 or where the underlying factors are available. t-statistics are reported in parentheses.

Panel A: Value-weighted Wealth Creation Factor								
		Alphas						
	Ex. Return	CAPM	FF3	FF5	FF6	q	q^5	SY
	0.212	0.223	0.216	0.253	0.209	0.200	0.229	0.309
	(2.459)	(2.570)	(2.468)	(2.822)	(2.312)	(2.072)	(2.174)	(3.245)
		Factor Loadings						
Rmkt - Rf		-0.020	-0.011	-0.030	-0.020			0.011
		(-1.032)	(-0.549)	(-1.353)	(-0.914)			(0.446)
HML			0.030	0.106	0.138			
			(0.962)	(2.546)	(3.227)			
SMB			-0.023	-0.025	-0.027			
			(-0.755)	(-0.791)	(-0.866)			
CMA				-0.174	-0.195			
				(-2.751)	(-3.078)			
RMW				-0.002	-0.016			
				(-0.048)	(-0.360)			
UMD					0.062			
					(2.904)			
Rmkt - Rf (q)						-0.018	-0.023	
						(-0.800)	(-0.973)	
Rme						-0.037	-0.041	
						(-1.149)	(-1.255)	
Ria						-0.026	-0.018	
						(-0.501)	(-0.333)	
Rroe						0.016	0.030	
						(0.434)	(0.709)	
Rrg							-0.043	
							(-0.686)	
SMB (SY)								-2.460
								(-0.774)
MGMT								-3.669
								(-0.994)
PERF								5.848
								(2.452)
Observations		690	690	690	690	648	648	642
R-squared		0.002	0.004	0.015	0.027	0.005	0.006	0.013

Table 5: Alphas for the (Equity-Based) Wealth Creation Factor (continued)

Panel B: Equally-weighted Wealth Creation Factor								
		Alphas						
	Ex. Return	CAPM	FF3	FF5	FF6	q	q5	SY
	0.250	0.220	0.191	0.192	0.194	0.231	0.259	0.259
	(3.957)	(3.481)	(3.112)	(3.024)	(3.014)	(3.468)	(3.581)	(3.774)
		Factor Loadings						
Rmkt - Rf		0.054	0.030	0.031	0.030			0.016
		(3.831)	(2.086)	(1.993)	(1.938)			(0.921)
HML			0.035	0.032	0.030			
			(1.602)	(1.085)	(0.994)			
SMB			0.144	0.143	0.143			
			(6.871)	(6.473)	(6.472)			
CMA				0.007	0.008			
				(0.157)	(0.180)			
RMW				-0.005	-0.004			
				(-0.163)	(-0.140)			
UMD					-0.003			
					(-0.206)			
Rmkt - Rf (q)						0.027	0.022	
						(1.742)	(1.346)	
Rme						0.131	0.127	
						(5.960)	(5.675)	
Ria						0.031	0.039	
						(0.883)	(1.086)	
Rroe						-0.058	-0.044	
						(-2.230)	(-1.482)	
Rrg							-0.043	
							(-1.003)	
SMB (SY)								13.296
								(5.818)
MGMT								-3.701
								(-1.393)
PERF								-0.620
								(-0.361)
Observations		690	690	690	690	648	648	642
R-squared		0.002	0.004	0.015	0.027	0.096	0.006	0.013

Table 6: Alphas for the (Asset-Based) Wealth Creation Factor

The table reports monthly excess returns (stock return minus the risk-free rate) in percent, monthly alphas in percent, and factor loadings for the wealth creation (WC) factor. This factor is constructed as a portfolio that is long one dollar in the equally-weighted average between the high-profitability/high-investment portfolio and low-profitability/low-investment portfolio and it is short one dollar in the equally-weighted average between the high-profitability/low-investment portfolio and low-profitability/high-investment portfolio. The underlying portfolios are formed along the profitability and investment dimensions as described in Table 4. Profitability is measured as cash-based operating profits divided by lagged total assets and investment as total assets growth. For the factor models, we use the CAPM, the Fama and French (1993) three-factor model (FF3), the Fama and French (2015) five-factor model (FF5), the Fama and French (2018) six-factor model that includes momentum (FF6), the q and q^5 models of Hou, Xue, and Zhang (2015) and Hou, Mo, Xue, and Zhang (2019, 2021), and the four-factor model of Stambaugh and Yuan (2017, SY). Panel A reports the results for capitalization-weighted portfolios and Panel B for equally-weighted portfolios. Variable definitions are given in Section 3. The sample ranges between July 1963 and December 2020 or where the underlying factors are available. t-statistics are reported in parentheses.

Panel A: Value-weighted Wealth Creation Factor								
		Alphas						
	Ex. Return	CAPM	FF3	FF5	FF6	q	q^5	SY
	0.129	0.087	0.122	0.236	0.229	0.245	0.231	0.269
	(1.688)	(1.135)	(1.611)	(3.128)	(2.991)	(3.009)	(2.610)	(3.186)
		Factor Loadings						
Rmkt - Rf		0.075	0.048	0.008	0.009			0.002
		(4.455)	(2.706)	(0.417)	(0.494)			(0.115)
HML			-0.124	0.018	0.023			
			(-4.679)	(0.512)	(0.637)			
SMB			0.050	0.014	0.013			
			(1.946)	(0.516)	(0.502)			
CMA				-0.316	-0.319			
				(-5.932)	(-5.953)			
RMW				-0.151	-0.153			
				(-4.139)	(-4.172)			
UMD					0.010			
					(0.548)			
Rmkt - Rf (q)						0.023	0.025	
						(1.210)	(1.267)	
Rme						-0.018	-0.016	
						(-0.669)	(-0.588)	
Ria						-0.248	-0.251	
						(-5.720)	(-5.654)	
Rroe						-0.123	-0.130	
						(-3.891)	(-3.598)	
Rrg							0.020	
							(0.379)	
SMB (SY)								-0.622
								(-0.221)
MGMT								-20.054
								(-6.128)
PERF								0.098
								(0.047)
Observations		690	690	690	690	648	648	642
R-squared		0.002	0.004	0.015	0.027	0.092	0.006	0.013

Table 6: Alphas for the (Asset-Based) Wealth Creation Factor (continued)

Panel B: Equally-weighted Wealth Creation Factor								
		Alphas						
	Ex. Return	CAPM	FF3	FF5	FF6	q	q^5	SY
	0.251	0.240	0.268	0.289	0.288	0.324	0.273	0.270
	(5.754)	(5.472)	(6.200)	(6.537)	(6.403)	(6.866)	(5.331)	(5.686)
		Factor Loadings						
Rmkt - Rf		0.019	0.003	-0.003	-0.002			-0.004
		(1.956)	(0.269)	(-0.250)	(-0.214)			(-0.303)
HML			-0.090	-0.076	-0.075			
			(-5.917)	(-3.725)	(-3.536)			
SMB			0.019	0.008	0.008			
			(1.314)	(0.519)	(0.513)			
CMA				-0.028	-0.029			
				(-0.887)	(-0.906)			
RMW				-0.050	-0.050			
				(-2.330)	(-2.339)			
UMD					0.002			
					(0.224)			
Rmkt - Rf (q)						-0.003	0.006	
						(-0.280)	(0.510)	
Rme						-0.002	0.005	
						(-0.121)	(0.342)	
Ria						-0.113	-0.128	
						(-4.507)	(-4.976)	
Rroe						-0.049	-0.074	
						(-2.644)	(-3.532)	
Rrg							0.076	
							(2.513)	
SMB (SY)								-0.323
								(-0.204)
MGMT								-8.011
								(-4.350)
PERF								2.541
								(2.136)
Observations		690	690	690	690	648	648	642
R-squared		0.002	0.004	0.015	0.027	0.046	0.006	0.013

Table 7: Alphas From Reconstructed Profitability and Investment Factors

The table reports monthly alphas in percent and factor loadings for the wealth creation (WC) factor. This factor is constructed as a portfolio that is long one dollar in the equally-weighted average between the high-profitability/high-investment portfolio and low-profitability/low-investment portfolio and it is short one dollar in the equally-weighted average between the high-profitability/low-investment portfolio and low-profitability/high-investment portfolio. The underlying portfolios are formed along the profitability and investment dimensions as described in Table 3. Profitability is measured as return on equity and investment as book equity growth. We use the Fama and French (2015) five-factor model. Moreover, we also present specifications using the reconstructed RMW_roe and CMA_eq factors. The RMW_roe factor is formed using a sort on income before extraordinary items divided lagged book equity and the CMA_eq factor is constructed using a sort on book equity growth. Variable definitions are given in Section 3. The sample ranges between July 1963 and December 2020 or where the underlying factors are available. *t*-statistics are reported in parentheses.

Dep. Variable: Wealth Creation Factor						
	Value-weighted			Equally-weighted		
Alpha	0.253	0.211	0.223	0.191	0.146	0.160
	(2.875)	(2.292)	(2.466)	(3.084)	(2.270)	(2.531)
Rmkt - Rf	-0.032	-0.011	-0.014	0.027	0.044	0.040
	(-1.465)	(-0.486)	(-0.630)	(1.765)	(2.865)	(2.559)
HML	0.108	0.030	0.036	0.036	-0.006	0.001
	(2.632)	(0.808)	(0.957)	(1.230)	(-0.247)	(0.021)
SMB	-0.030	-0.018	-0.025	0.134	0.152	0.143
	(-0.995)	(-0.574)	(-0.802)	(6.214)	(6.855)	(6.542)
CMA	-0.188			-0.016		
	(-2.923)			(-0.360)		
RMW		0.020			0.022	
		(0.444)			(0.701)	
RMW_cp	-0.036		-0.012	-0.060		-0.017
	(-0.857)		(-0.249)	(-2.035)		(-0.486)
CMA_eq		-0.003	-0.022		0.116	0.093
		(-0.058)	(-0.316)		(2.813)	(1.904)
N	690	690	690	690	690	690
R2	0.016	0.004	0.004	0.094	0.099	0.098

Table 8: Sharpe Ratios of the Tangency Portfolios from Factor Models

The table reports factor weights and annualized Sharpe Ratios for the tangency portfolios constructed from different combinations of factors. The factors are the wealth creation (WC) factor; the excess return on the market portfolio (Rmkt - Rf); HML and SMB from Fama and French (1993); RMW and CMA from Fama and French (2015); the excess return on the market (Rmkt - Rf (q)), Rme, Ria, Rroe, and Rrg from the q and q^5 models of Hou, Xue, and Zhang (2015) and Hou, Mo, Xue, and Zhang (2019, 2021); the SMB and mispricing factors (MGMT and PERF) from Stambaugh and Yuan (2017). In Panel A, the WC factor is constructed using equity-based sorting variables, as described in Table 5. In Panel B, the WC factor is constructed using asset-based sorting variables, as described in Table 6. The sample ranges between July 1963 and December 2020.

Panel A: ROE and Equity-Based investments, Value-weighted WC factor

		Factor Weights					
WC	Rmkt - Rf	HML	SMB	RMW	CMA	UMD	Sharpe Ratio
100.0%							0.32
	100.0%						0.44
59.8%	40.2%						0.56
	36.8%	48.4%	14.8%				0.61
32.9%	25.0%	31.4%	10.7%				0.70
	17.1%	-6.9%	11.9%	32.4%	45.6%		1.04
14.1%	14.8%	-7.3%	10.4%	27.2%	40.8%		1.11
	16.6%	0.7%	9.8%	25.1%	35.0%	12.8%	1.21
10.7%	15.0%	-0.9%	9.0%	22.4%	33.1%	10.7%	1.25
	Rmkt - Rf (q)	Rme	Ria	Rroe	Rrg		
	15.3%	13.1%	40.4%	31.2%			1.36
14.0%	12.1%	36.6%	27.9%	9.4%			1.40
	15.8%	13.3%	14.8%	1.7%	54.3%		2.11
6.9%	14.8%	12.6%	13.8%	1.4%	50.5%		2.14
	Rmkt - Rf	SMB (SY)	MGMT	PERF			
	21.3%	18.5%	41.2%	19.0%			1.64
14.1%	18.2%	16.2%	36.0%	15.5%			1.71

Table 8: Sharpe Ratios of the Tangency Portfolios from Factor Models (continued)

Panel B: ROA and Asset-Based investments, Value-weighted WC factor

	Factor Weights						
WC	Rmkt - Rf	HML	SMB	RMW	CMA	UMD	Sharpe Ratio
100.0%							0.22
	100.0%						0.44
45.1%	54.9%						0.47
	36.8%	48.4%	14.8%				0.61
26.9%	25.4%	38.4%	9.4%				0.65
	17.1%	-6.9%	11.9%	32.4%	45.6%		1.04
16.8%	12.8%	-5.6%	8.8%	27.1%	40.0%		1.13
	16.6%	0.7%	9.8%	25.1%	35.0%	12.8%	1.21
14.7%	13.1%	0.2%	7.6%	22.1%	32.4%	10.0%	1.28
	Rmkt - Rf (q)	Rme	Ria	Rroe	Rrg		
	15.3%	13.1%	40.4%	31.2%			1.36
12.0%	10.8%	36.0%	26.8%	14.4%			1.43
	15.8%	13.3%	14.8%	1.7%	54.3%		2.11
9.2%	13.6%	11.8%	15.3%	2.7%	47.3%		2.15
	Rmkt - Rf	SMB (SY)	MGMT	PERF			
	21.3%	18.5%	41.2%	19.0%			1.64
14.9%	17.5%	15.2%	36.8%	15.6%			1.71

Table 9: Wealth Creation Effect in Earnings Growth

The table reports estimates from Fama and MacBeth (1973) regressions of annual earnings growth in years $t+1$ through $t+5$ on year t profitability , investment, the product of these two variables, and other controls. In Panel A, earnings growth is defined as the annual change in income before extraordinary items (item IB) divided by prior year book equity. In Panel B, earnings growth is defined as the annual changes in gross profits (item REVT - item COGS) divided by prior year total assets. Profitability is defined as return on equity (ROE) and investment is defined as the annual rate of growth of book equity (Investment). The control variables include: the natural logarithm of the book-to-market ratio, the natural logarithm of market capitalization, and accruals. Variable definitions are given in Section 3. The annual sample ranges between 1963 and 2020. t-statistics are reported in parentheses.

Panel A

	Dep. Variable: Earnings Growth									
	Year 1		Year 2		Year 3		Year 4		Year 5	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
ROE	-0.190	-0.225	-0.093	-0.105	-0.049	-0.055	-0.026	-0.031	-0.023	-0.029
	(-10.824)	(-12.616)	(-5.210)	(-5.989)	(-3.569)	(-3.856)	(-2.163)	(-2.679)	(-1.710)	(-2.187)
Investment	-0.065	-0.058	-0.027	-0.022	-0.010	-0.007	-0.003	0.000	-0.005	-0.005
	(-10.799)	(-9.828)	(-5.841)	(-4.383)	(-2.192)	(-1.314)	(-0.660)	(0.049)	(-1.209)	(-1.091)
ROE × Investment	0.331	0.334	0.091	0.080	0.055	0.045	0.034	0.027	0.031	0.028
	(10.398)	(11.383)	(4.774)	(4.811)	(2.965)	(2.514)	(2.540)	(2.354)	(1.894)	(1.731)
log(BM)		0.001		0.002		0.001		-0.002		-0.002
		(0.532)		(0.655)		(0.341)		(-1.051)		(-0.803)
log(M)		0.009		0.001		-0.000		-0.001		-0.000
		(8.180)		(1.011)		(-0.659)		(-1.128)		(-0.504)
Accruals		-0.026		-0.024		-0.007		-0.001		0.010
		(-2.627)		(-1.932)		(-0.585)		(-0.112)		(1.085)
Observations	155,532	155,532	140,987	140,987	128,719	128,719	118,051	118,051	108,513	108,513
R-squared	0.080	0.090	0.016	0.023	0.009	0.015	0.007	0.012	0.009	0.013

Table 9: Wealth Creation Effect in Earnings Growth (continued)

Panel B

	Dep. Variable: Gross Profits Growth									
	Year 1		Year 2		Year 3		Year 4		Year 5	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
ROE	0.030	0.031	0.018	0.019	0.017	0.017	0.021	0.020	0.015	0.013
	(3.134)	(4.159)	(2.148)	(2.493)	(2.096)	(2.517)	(2.265)	(2.690)	(2.207)	(2.689)
Investment	0.030	0.026	0.010	0.011	0.007	0.007	0.006	0.007	0.003	0.003
	(9.921)	(8.546)	(2.535)	(2.889)	(2.087)	(2.482)	(2.706)	(3.351)	(1.439)	(1.358)
ROE × Investment	0.076	0.043	0.056	0.019	0.055	0.022	0.040	0.009	0.042	0.019
	(5.824)	(3.721)	(3.529)	(1.565)	(3.495)	(1.900)	(3.288)	(1.168)	(3.122)	(1.916)
log(BM)		-0.024		-0.022		-0.019		-0.017		-0.015
		(-20.028)		(-19.627)		(-17.039)		(-15.858)		(-14.741)
log(M)		-0.003		-0.004		-0.004		-0.003		-0.003
		(-6.903)		(-7.517)		(-7.255)		(-6.485)		(-6.702)
Accruals		0.023		0.009		0.006		0.009		0.006
		(3.337)		(1.752)		(1.188)		(2.146)		(0.880)
Observations	155,192	155,192	143,945	143,945	133,402	133,402	123,720	123,720	114,800	114,800
R-squared	0.028	0.053	0.015	0.037	0.013	0.031	0.012	0.028	0.011	0.026

A Appendix

A.1 The Residual Income Model

We add and subtract rB_{t+i-1} at the numerator of Equation (2)

$$M_t = \sum_{i=1}^{\infty} \frac{E_t \left(NI_{t+i} - rB_{t+i-1} + (1+r) B_{t+i-1} - B_{t+i} \right)}{(1+r)^i}. \tag{A.1}$$

Let us focus on the part of the summation containing $(1+r) B_{t+i-1}$

$$\begin{aligned} \sum_{i=1}^{\infty} \frac{(1+r) B_{t+i-1}}{(1+r)^i} &= B_t + \frac{B_{t+1}}{(1+r)} + \frac{B_{t+2}}{(1+r)^2} + ... \\ &= B_t + \sum_{i=1}^{\infty} \frac{B_{t+i}}{(1+r)^i}. \end{aligned} \tag{A.2}$$

Let us replace Equation (A.2) into Equation (A.1)

$$M_t = B_t + \sum_{i=1}^{\infty} \frac{NI_{t+i} - rB_{t+i-1} + B_{t+i} - B_{t+i}}{(1+r)^i}, \tag{A.3}$$

which, after simplifications, gives the Residual Income model.

$$M_t = B_t + \sum_{i=1}^{\infty} \frac{E_t \left(NI_{t+i} - rB_{t+i-1} \right)}{(1+r)^i}. \tag{A.4}$$

A.2 Additional Empirical Results

Table A.1: Statistics for Profitability-Investment Portfolios

The table reports the averages for the count of stocks, market capitalization ($ million), profitability, and investment for the nine portfolios formed along the profitability and investment dimensions. In June of each year, we sort stocks independently along the profitability and investment dimensions based on annual accounting variables from the prior year. The averages are taken across the stocks in a portfolio at the time of portfolio formation and then averaged across the years in the sample. For each variable, we form three groups using the 30^{th} and 70^{th} percentiles of the distribution for NYSE stocks. Panel A uses the equity-based and Panel B the asset-based definitions of profitability and investment. Variable definitions are given in Section 3. The sample ranges between July 1963 and December 2020.

Panel A: Equity-Based Portfolios

Number of Stocks				Size ($ million)			
	Investment				Investment		
Profitability	Low		High	Profitability	Low		High
Low	890	305	284	Low	572	752	810
	128	533	238		3758	1970	1588
High	61	146	667	High	11708	7509	2235

Profitability				Investment			
	Investment				Investment		
Profitability	Low		High	Profitability	Low		High
Low	-0.21	-0.02	-0.71	Low	-0.17	0.06	1.43
	0.11	0.11	0.13		-0.05	0.09	0.38
High	0.29	0.22	0.33	High	-0.14	0.10	0.73

Panel B: Asset-Based Portfolios

Number of Stocks				Size ($ million)			
	Investment				Investment		
Profitability	Low		High	Profitability	Low		High
Low	521	328	719	Low	457	1095	755
	320	385	307		1388	2696	1901
High	316	300	347	High	2396	4511	4425

Profitability				Investment			
	Investment				Investment		
Profitability	Low		High	Profitability	Low		High
Low	-0.08	0.02	-0.05	Low	-0.14	0.07	0.92
	0.14	0.14	0.14		-0.06	0.07	0.45
High	0.27	0.25	0.27	High	-0.10	0.08	0.42

Table A.2: Factor Loading for Equity-Based Profitability-Investment Portfolios

The table reports estimated factor loadings from the Fama and French (2015) five-factor model for nine portfolios formed along the profitability and investment dimensions. In June of each year, we sort stocks independently along the profitability and investment dimensions based on annual accounting variables from the prior year. Profitability is measured as return on equity and investment as book equity growth. For each variable, we form three groups using the 30$^{\text{th}}$ and 70$^{\text{th}}$ percentiles of the distribution for NYSE stocks. Panel A reports the estimates for capitalization-weighted portfolios and Panel B for equally-weighted portfolios. Variable definitions are given in Section 3. The sample ranges between July 1963 and December 2020. t-statistics are reported in parentheses.

Panel A: Value-weighted Portfolios

Rmkt - Rf

Profitability	Investments: Low		High
Low	1.053	1.022	1.132
	(68.258)	(53.975)	(41.911)
	0.987	0.968	1.004
	(57.523)	(76.691)	(54.283)
High	1.006	0.958	1.027
	(36.953)	(66.299)	(78.490)

HML

Profitability	Investments: Low		High
Low	-0.014	0.022	-0.237
	(-0.491)	(0.623)	(-4.618)
	-0.098	0.084	-0.028
	(-3.012)	(3.488)	(-0.810)
High	-0.199	-0.098	-0.210
	(-3.855)	(-3.567)	(-8.472)

SMB

Profitability	Investments: Low		High
Low	0.227	0.237	0.383
	(10.284)	(8.757)	(9.931)
	-0.045	-0.001	0.217
	(-1.817)	(-0.060)	(8.211)
High	0.003	-0.151	0.110
	(0.065)	(-7.294)	(5.879)

CMA

Profitability	Investments: Low		High
Low	0.510	0.252	-0.192
	(11.431)	(4.591)	(-2.448)
	0.775	0.299	-0.090
	(15.601)	(8.179)	(-1.676)
High	0.670	0.154	-0.381
	(8.492)	(3.673)	(-10.042)

RMW

Profitability	Investments: Low		High
Low	-0.338	-0.187	-0.608
	(-11.056)	(-4.975)	(-11.355)
	0.121	0.162	-0.060
	(3.571)	(6.481)	(-1.627)
High	0.430	0.393	0.156
	(7.964)	(13.729)	(5.998)

Table A.2: Factor Loading for Equity-Based Profitability-Investment Portfolios (continued)

Panel B: Equally-weighted Portfolios

Rmkt - Rf

Profitability	Investments: Low		High
Low	1.004	0.988	1.051
	(38.575)	(53.340)	(32.585)
	0.949	0.924	1.026
	(63.713)	(88.364)	(71.606)
High	0.971	0.930	1.080
	(44.832)	(81.373)	(76.439)

HML

Profitability	Investments: Low		High
Low	0.072	0.110	-0.101
	(1.447)	(3.129)	(-1.656)
	0.234	0.206	0.139
	(8.275)	(10.363)	(5.114)
High	0.150	0.100	0.041
	(3.657)	(4.596)	(1.531)

SMB

Profitability	Investments: Low		High
Low	1.071	0.957	1.050
	(28.787)	(36.147)	(22.775)
	0.507	0.655	0.844
	(23.836)	(43.876)	(41.206)
High	0.639	0.496	0.904
	(20.641)	(30.383)	(44.771)

CMA

Profitability	Investments: Low		High
Low	0.186	0.086	-0.198
	(2.471)	(1.609)	(-2.122)
	0.281	0.142	-0.174
	(6.505)	(4.680)	(-4.194)
High	0.119	0.102	-0.251
	(1.903)	(3.092)	(-6.136)

RMW

Profitability	Investments: Low		High
Low	-0.520	-0.236	-0.785
	(-10.078)	(-6.417)	(-12.269)
	0.214	0.200	0.000
	(7.233)	(9.645)	(-0.007)
High	0.437	0.319	0.162
	(10.169)	(14.078)	(5.784)

Table A.3: Factor Loading for Asset-Based Profitability-Investment Portfolios

The table reports estimated factor loadings from the Fama and French (2015) five-factor model for nine portfolios formed along the profitability and investment dimensions. In June of each year, we sort stocks independently along the profitability and investment dimensions based on annual accounting variables from the prior year. Profitability is measured as cash-based operating profitability divided by lagged total assets and investment as growth in total assets. For each variable, we form three groups using the 30th and 70th percentiles of the distribution for NYSE stocks. Panel A reports the estimates for capitalization-weighted portfolios and Panel B for equally-weighted portfolios. Variable definitions are given in Section 3. The sample ranges between July 1963 and December 2020. t-statistics are reported in parentheses.

Panel A: Value-weighted Portfolios

Rmkt - Rf

	Investments		
Profitability	Low		High
Low	1.142	0.952	1.094
	(51.349)	(50.070)	(73.259)
	1.004	0.978	1.058
	(66.666)	(76.702)	(71.167)
High	1.043	0.956	1.010
	(77.949)	(86.088)	(60.202)

HML

	Investments		
Profitability	Low		High
Low	0.076	0.275	-0.032
	(1.798)	(7.619)	(-1.118)
	0.055	0.101	-0.074
	(1.918)	(4.152)	(-2.615)
High	-0.235	-0.167	-0.306
	(-9.234)	(-7.932)	(-9.621)

SMB

	Investments		
Profitability	Low		High
Low	0.330	0.122	0.272
	(10.383)	(4.479)	(12.765)
	0.121	-0.075	0.139
	(5.643)	(-4.099)	(6.556)
High	0.032	-0.051	0.001
	(1.653)	(-3.225)	(0.044)

CMA

	Investments		
Profitability	Low		High
Low	0.392	-0.055	-0.413
	(6.083)	(-1.007)	(-9.545)
	0.603	0.205	-0.186
	(13.828)	(5.546)	(-4.320)
High	0.801	0.279	-0.634
	(20.680)	(8.665)	(-13.057)

RMW

	Investments		
Profitability	Low		High
Low	-0.353	-0.066	-0.238
	(-8.001)	(-1.755)	(-8.047)
	0.094	0.138	0.066
	(3.139)	(5.440)	(2.253)
High	0.195	0.233	0.008
	(7.339)	(10.597)	(0.235)

Table A.3: Factor Loading for Asset-Based Profitability-Investment Portfolios (continued)

Panel B: Equally-weighted Portfolios

Rmkt - Rf

Profitability	Investments Low		High
Low	1.001	0.941	1.045
	(30.603)	(53.537)	(45.756)
	1.024	0.947	1.078
	(54.591)	(87.428)	(77.603)
High	1.010	0.977	1.049
	(59.441)	(89.236)	(73.191)

HML

Profitability	Investments Low		High
Low	0.045	0.225	0.053
	(0.725)	(6.749)	(1.221)
	0.198	0.242	0.086
	(5.562)	(11.783)	(3.250)
High	0.029	0.021	-0.116
	(0.901)	(1.013)	(-4.254)

SMB

Profitability	Investments Low		High
Low	1.142	0.867	0.988
	(24.436)	(34.516)	(30.280)
	0.849	0.607	0.826
	(31.690)	(39.227)	(41.643)
High	0.939	0.677	0.801
	(38.659)	(43.279)	(39.112)

CMA

Profitability	Investments Low		High
Low	0.160	-0.044	-0.400
	(1.693)	(-0.868)	(-6.053)
	0.362	0.090	-0.170
	(6.666)	(2.857)	(-4.233)
High	0.282	0.097	-0.334
	(5.731)	(3.062)	(-8.051)

RMW

Profitability	Investments Low		High
Low	-0.641	-0.165	-0.398
	(-9.892)	(-4.725)	(-8.800)
	-0.084	0.128	0.036
	(-2.255)	(5.949)	(1.291)
High	-0.160	0.102	-0.017
	(-4.765)	(4.720)	(-0.604)

Table A.4: The Wealth Creation Effect in Cross-sectional Regressions (standardized variables)

The table reports estimates from Fama and MacBeth (1973) regressions of monthly stock returns in month t on return on equity (ROE) and the change in book equity relative to four quarters before divided by book equity four quarters before (Investment), and the interaction of these two variables. The explanatory variables are standardized by subtracting the mean and dividing by the standard deviation in the cross section. In some specifications, we include additional control variables: the CAPM beta, one-month lagged monthly returns in month $t-1$ (Ret_1), lagged annual returns between months $t-13$ and $t-2$, the natural logarithm of the book-to-market ratio, the natural logarithm of market value in month $t-1$, and accruals. The sample includes all firms (columns (1)-(2)), those above the median market capitalization for NYSE stocks (columns (3)-(4)), and those below the median (columns (5)-(6)). Variable definitions are given in Section 3. t-statistics are reported in parentheses.

	Dep. Variable: Stock Return					
	All Firms		Large Firms		Small Firms	
	(1)	(2)	(3)	(4)	(5)	(6)
ROE	0.543	0.652	0.279	0.272	0.598	0.664
	(4.618)	(8.150)	(2.146)	(2.228)	(5.217)	(7.923)
Investment	-0.445	-0.337	-0.280	-0.289	-0.473	-0.351
	(-6.232)	(-6.364)	(-2.398)	(-3.187)	(-6.421)	(-6.236)
ROE × Investment	0.168	0.201	0.237	0.264	0.155	0.192
	(4.007)	(5.033)	(2.182)	(2.729)	(3.686)	(4.606)
Beta		0.047		0.013		0.067
		(0.641)		(0.127)		(0.962)
Ret_1		-0.564		-0.346		-0.586
		(-11.396)		(-5.176)		(-11.819)
Ret_2_13		0.264		0.219		0.279
		(5.518)		(2.809)		(6.040)
log(BM)		0.199		0.054		0.227
		(4.125)		(0.924)		(4.323)
log(M)		-0.196		-0.126		-0.295
		(-2.886)		(-1.758)		(-2.920)
Accruals		-0.064		-0.056		-0.065
		(-3.060)		(-1.729)		(-2.793)
Constant	1.162	1.165	1.070	1.239	1.232	1.100
	(4.571)	(4.558)	(4.732)	(4.478)	(4.591)	(4.174)
Observations	1,061,738	1,061,738	241,849	241,849	819,889	819,889
R-squared	0.013	0.050	0.028	0.126	0.013	0.046

Table A.5: Alphas for the (Equity-Based) Wealth Creation Factor, Including Financial Stocks

The table reports monthly excess returns (stock return minus the risk-free rate) in percent, monthly alphas in percent, and factor loadings for the wealth creation (WC) factor. We keep financial stocks in the construction of the factor. This factor is constructed as a portfolio that is long one dollar in the equally-weighted average between the high-profitability/high-investment portfolio and low-profitability/low-investment portfolio and it is short one dollar in the equally-weighted average between the high-profitability/low-investment portfolio and low-profitability/high-investment portfolio. The underlying portfolios are formed along the profitability and investment dimensions as described in Table 3. Profitability is measured as return on equity and investment as book equity growth. For the factor models, we use the CAPM, the Fama and French (1993) three-factor model (FF3), the Fama and French (2015) five-factor model (FF5), the Fama and French (2018) six-factor model that includes momentum (FF6), the q and q^5 models of Hou, Xue, and Zhang (2015) and Hou, Mo, Xue, and Zhang (2019, 2021), and the four-factor model of Stambaugh and Yuan (2017, SY). Panel A reports the results for capitalization-weighted portfolios and Panel B for equally-weighted portfolios. Variable definitions are given in Section 3. The sample ranges between July 1963 and December 2020 or where the underlying factors are available. t-statistics are reported in parentheses.

Panel A: Value-weighted Wealth Creation Factor								
	Ex. Return	Alphas						
		CAPM	FF3	FF5	FF6	Q	Q5	SY
	0.187	0.197	0.200	0.225	0.174	0.145	0.166	0.271
	(2.220)	(2.320)	(2.342)	(2.567)	(1.972)	(1.540)	(1.619)	(2.954)
		Factor Loadings						
Rmkt - Rf		-0.018	-0.010	-0.021	-0.010			0.030
		(-0.931)	(-0.471)	(-1.003)	(-0.484)			(1.304)
HML			0.003	0.052	0.090			
			(0.116)	(1.291)	(2.158)			
SMB			-0.038	-0.041	-0.043			
			(-1.318)	(-1.335)	(-1.430)			
CMA				-0.112	-0.136			
				(-1.806)	(-2.203)			
RMW				-0.006	-0.022			
				(-0.146)	(-0.518)			
UMD					0.073			
					(3.466)			
Rmkt - Rf (Q5)						-0.008	-0.011	
						(-0.358)	(-0.501)	
Rme						-0.042	-0.045	
						(-1.349)	(-1.421)	
Ria						-0.006	0.000	
						(-0.113)	(0.007)	
Rroe						0.048	0.058	
						(1.308)	(1.397)	
Rrg							-0.032	
							(-0.519)	
SMB_PY								-4.455
								(-1.458)
MGMT								-2.486
								(-0.700)
PERF								7.585
								(3.307)
N		690	690	690	690	648	648	642
R2		0.002	0.004	0.015	0.027	0.005	0.006	0.013

Panel B: Equally-weighted Wealth Creation Factor								
	Ex. Return	Alphas						
		CAPM	FF3	FF5	FF6	Q	Q5	SY
	0.231	0.206	0.177	0.172	0.168	0.210	0.236	0.224
	(3.751)	(3.336)	(2.952)	(2.789)	(2.683)	(3.242)	(3.340)	(3.335)
		Factor Loadings						
Rmkt - Rf		0.044	0.022	0.024	0.025			0.016
		(3.250)	(1.532)	(1.574)	(1.614)			(0.919)
HML			0.036	0.028	0.031			
			(1.702)	(0.986)	(1.054)			
SMB			0.141	0.142	0.142			
			(6.927)	(6.618)	(6.602)			
CMA				0.018	0.016			
				(0.404)	(0.356)			
RMW				0.004	0.002			
				(0.118)	(0.075)			
UMD					0.006			
					(0.393)			
Rmkt - Rf (Q5)						0.019	0.015	
						(1.273)	(0.926)	
Rme						0.130	0.127	
						(6.093)	(5.820)	
Ria						0.033	0.040	
						(0.955)	(1.138)	
Rroe						-0.046	-0.033	
						(-1.812)	(-1.155)	
Rrg							-0.038	
							(-0.918)	
SMB_PY								13.629
								(6.095)
MGMT								-2.465
								(-0.949)
PERF								0.229
								(0.137)
N		690	690	690	690	648	648	642
R2		0.002	0.004	0.015	0.027	0.096	0.006	0.013

Table A.6: Predicting ROE

The table reports estimates from Fama and MacBeth (1973) regressions of return on equity (ROE) in years $t+1$ through $t+5$ on year t profitability , investment, the product of these two variables, and other controls. Return on equity is defined as income before extraordinary items divided by lagged book equity and investment is defined as the annual rate of growth of book equity (Investment). The control variables include: the natural logarithm of the book-to-market ratio, the natural logarithm of market capitalization, and accruals. Variable definitions are given in Section 3. The annual sample ranges between 1963 and 2020. t-statistics are reported in parentheses.

	Dep. Variable: ROE									
	Year 1		Year 2		Year 3		Year 4		Year 5	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
ROE	0.985	0.935	0.874	0.801	0.761	0.681	0.681	0.596	0.625	0.534
	(43.875)	(42.524)	(25.296)	(24.320)	(20.368)	(18.974)	(19.834)	(18.261)	(18.268)	(16.442)
Investment	-0.041	-0.032	-0.073	-0.059	-0.090	-0.075	-0.089	-0.073	-0.096	-0.083
	(-8.346)	(-6.376)	(-11.843)	(-9.148)	(-16.219)	(-12.717)	(-13.586)	(-9.898)	(-11.304)	(-9.400)
ROE × Investment	-0.348	-0.329	-0.262	-0.239	-0.207	-0.182	-0.193	-0.163	-0.157	-0.121
	(-10.818)	(-11.108)	(-8.470)	(-8.624)	(-6.804)	(-6.645)	(-6.619)	(-6.514)	(-6.267)	(-5.383)
log(BM)		0.021		0.027		0.027		0.028		0.027
		(5.512)		(5.305)		(4.941)		(4.887)		(5.478)
log(M)		0.010		0.016		0.019		0.020		0.021
		(8.972)		(9.425)		(10.154)		(10.715)		(11.319)
Accruals		-0.019		-0.033		-0.022		-0.035		-0.020
		(-2.399)		(-2.281)		(-1.492)		(-1.873)		(-0.826)
N	153,272	153,272	137,956	137,956	124,892	124,892	113,537	113,537	103,506	103,506
R-squared	0.438	0.446	0.235	0.247	0.165	0.181	0.132	0.149	0.113	0.130