Forecasting owner earnings based on capital allocation

David Diranko

Abstract

Value investors strive to purchase companies at a price below their intrinsic value. The generally accepted definition of a business's intrinsic value is the total sum of its future free cash flows discounted to their present value, where the discount rate takes into account the investor's expected rate of return and compensates for business and market risks. However, forecasting future cash flows is challenging for two main reasons: firstly, unforeseeable changes within the business and its market can affect them, and secondly, the investor must anticipate the factors that influence these cash flows and forecast them precisely without making analytical or emotional errors. This difficulty is compounded by errors and uncertainties around these factors that increase as the cash flows become more distant in the future. To minimize inaccuracies, most asset managers use highly elaborate models that require numerous parameters to forecast. This paper proposes a different approach that seeks to reduce errors rather than gain an advantage in forecasting the future more accurately. By acknowledging the uncertainty of future cash flows, forecasting errors are minimized in three ways. Firstly, the method requires only four parameters to be forecasted for the next five years in aggregate. Secondly, these parameters are chosen to be as consistent as possible when assessed over a multi-year period, and thirdly, the future values of these parameters depend almost entirely on management actions and can, therefore, be assessed with reasonable certainty.

1 Introduction and outline of the paper

Remark 1.1. The proposed method and its conclusions' applicability are predicated on four assumptions. However, verifying these assumptions necessitates a thorough qualitative analysis of the business, its industry, and its management, which is beyond this paper's scope. The four assumptions are as follows:

1. Owner earnings, as defined by Warren Buffett, cannot be accurately forecasted in the short term because they are significantly influenced by external factors beyond the management's control and may not always be apparent to the investor.

2. Owner earnings are, over time, the product of asset allocation and the return on that invested capital.

3. Profitable asset allocation is a repeatable process that is primarily determined by the business's ability to grow and the management's capital allocation skills.

4. Both of these factors are measurable and, despite being volatile in the short term, tend to follow long-term trends.

Based on these four assumptions, this paper proposes a method to forecast owner earnings over the medium to long term, and subsequently calculate a company's intrinsic value. The two primary contributions of this paper are:

1. Reorganizing cash flows from operations and investing activities to better reflect Warren Buffett's definition of owner earnings.

2. Estimating the distribution of future owner earnings by predicting asset allocation and returns on invested capital for five to ten years, with a subsequent mean reversion.

The paper's structure is as follows:
Section 2 derives some key figures based on the assumptions in Remark 1.1.
Using these figures, Section 3 presents a robust method for forecasting future owner earnings based on the return on invested capital, the cash required to maintain invested capital, and the capital invested to grow invested capital.

Finally, in section 4, the paper discusses the method's applicability and provides recommendations for accurately forecasting the relevant key figures. Additionally, the paper highlights how to incorporate a margin of safety for each figure to mitigate the downside risk arising from incorrect assumptions.

2 Definition of custom key figures

In this section, I derive the relevant figures necessary to forecast owner earnings over time. Each key figure is indexed by a timestamp that indicates the period relative to the current period. For the purposes of this paper, one period refers to one year, with the current year denoted as t, the previous year as $t-1$, and the next year as $t+1$, and so on.
To minimize compounding errors associated with forecasting multiple line items, all derived key figures are based solely on the following four figures:

1. Cashflow from operations (CFO)
2. Cashflow from investing (CFI)
3. Working capital (WC)
4. Invested capital (IC)

To forecast future owner earnings as a result of capital allocation, I propose restructuring the cashflow statement to include all activities that affect invested capital under cashflow from investing activities. Since changes in working capital also impact invested capital, I consider them as an investing activity. This results in the following adjustments for cashflow from operations and cashflow from investing activities:

Definition 2.1. Owner earnings from operations

$$OOE^t = CFO^t + (WC^t - WC^{t-1})$$

Definition 2.2. Owner earnings from investing

$$IOE^t = CFI^t - (WC^t - WC^{t-1})$$

In order to ensure perfect precision, it is important to note that replacement costs of working capital that are not related to business operations, such as write-down of inventory, should also be viewed as an investing activity. However, as the turnover of working capital is usually less than a year, the impact of these effects is expected to be insignificant. Therefore, in this paper, for the sake of simplicity, non-operational working capital replacement has been accounted for within OOE.

Definition 2.3. Owner earnings

$$OE^t = OOE^t + IOE^t$$

Note that I add IOE^t, since adding a positive investing activity translates to subtracting it from OE^t

At this stage, my interpretation of owner earnings is synonymous with the concept of free cashflow, which is derived by subtracting cashflow from investing activities from cashflow from operations. However, this varies from Warren Buffett's definition, as he subtracts only maintenance capital expenditures from cashflow from operations. From my perspective, changes in invested capital, coupled with the return on invested capital, are the primary drivers of future owner earnings. Thus, I disaggregate investing activities into growth and maintenance activities, and assess them relative to a company's cashflow from operations. Given that no company can sustain perpetual growth, investment in growth should gradually decrease over time, causing my definition of owner earnings to converge with that of Warren Buffett.

Definition 2.4. Capital replacement rate

$$\begin{aligned} CRR^t &= \frac{-IOE^t - (IC^t - IC^{t-1})}{OOE^t} \\ &= \frac{-IOE^t - IC^t_\Delta}{OOE^t} \end{aligned}$$

The CRR represents the portion of OOE that is required to be reinvested in order to maintain the previous level of invested capital. The negative sign preceding IOE^t is necessary since positive investing is equivalent to a negative cashflow.

Definition 2.5. Capital growth rate

$$CGR^t = \frac{IC^t_\Delta}{OOE^t}$$

CGR states how much of OOE was used to grow the invested capital.

Definition 2.6. Capital reinvestment rate

$$RIR^t = CRR^t + CGR^t$$

RIR states the fraction of OOE that is reinvested in the business.

Corollary 2.7.

$$\begin{aligned} RIR^t = CRR^t + CGR^t &= \frac{-IOE^t - IC^t_\Delta}{OOE^t} + \frac{IC^t_\Delta}{OOE^t} \\ &= \frac{-IOE^t - IC^t_\Delta + IC^t_\Delta}{OOE^t} = \frac{-IOE^t}{OOE^t} \end{aligned}$$

Over time, it can be assumed that CGR will tend towards zero as it becomes more difficult to grow invested capital profitably. As a result, my definition of owner earnings will eventually converge to the definition used by Warren Buffett.

To obtain a consistent view of the return on invested capital, the OOE return on invested capital must be introduced:

Definition 2.8. OOE return on invested capital

$$OOEROIC^t = \frac{OOE^t}{IC^t}$$

3 Forecasting owner earnings

As stated in Section 1, my approach revolves around forecasting three primary figures:

1. The Owner Earnings from Operations Return on Invested Capital ($OOEROIC$), which measures the amount of cash generated by the business from its operations relative to its invested capital.
2. The Capital Replacement Rate (CRR), which represents the proportion of this cash that is expended in order to maintain the existing invested capital.
3. The Capital Growth Rate (CGR), which indicates how much of this cash is utilized to expand the invested capital base.

These three figures have been selected for two primary reasons: first, their past trends can be accurately evaluated using qualitative assessments of the company, its management, and its industry; and second, extrapolating these trends from the past can be done with a reasonable degree of certainty. By analyzing and estimating these figures over a multi-year time frame, I aim to develop a realistic and robust understanding of future owner earnings.
The following section outlines my methodology by presenting a formula for forecasting next year's OOE based on current year figures.

Theorem 3.1. Forecasting next year's owner earnings from operations

$$\begin{aligned} OOE^{t+1} &\overset{2.8}{=} OOEROIC^{t+1} \cdot IC^{t+1} \\ &= OOEROIC^{t+1} \cdot (IC^t + IC_{\Delta}^{t+1}) \\ &\overset{2.5}{=} OOEROIC^{t+1} \cdot (IC^t + CGR^{t+1} \cdot OOE^{t+1}) \\ &= OOEROIC^{t+1} \cdot IC^t + OOEROIC^{t+1} \cdot CGR^{t+1} \cdot OOE^{t+1} \end{aligned}$$

Rearranging the equation leads to

$$\begin{aligned} OOE^{t+1} - OOE^{t+1} \cdot OOEROIC^{t+1} \cdot CGR^{t+1} &= OOEROIC^{t+1} \cdot IC^t \\ OOE^{t+1} \cdot (1 - OOEROIC^{t+1} \cdot CGR^{t+1}) &= OOEROIC^{t+1} \cdot IC^t \\ OOE^{t+1} &= \frac{OOEROIC^{t+1} \cdot IC^t}{1 - OOEROIC^{t+1} \cdot CGR^{t+1}} \end{aligned}$$

Although the following formula may appear complex, one can discern three main drivers of OOE growth by analyzing its sensitivities:

1. OOE grows linearly with IC.
2. OOE grows exponentially with CGR, where $OOEROIC$ is the key driver of convexity.
3. OOE grows exponentially with $OOEROIC$, with growth being limited only by CGR, i.e., the capacity to reinvest.

The sensitivity analysis supports two of my intuitions. First, future growth of OOE is driven by the capacity to grow invested capital at high returns, and second, future OOE growth is driven by the ability to generate high returns on invested capital.
To forecast next year's owner earnings, I need to subtract capital investments from the projected OOE, which are determined by my forecasts of CRR and CGR.

Theorem 3.2. Forecasting next year's owner earnings

$$\begin{aligned} OE^{t+1} &\overset{2.3}{=} OOE^{t+1} + IOE^{t+1} \\ &\overset{2.7}{=} OOE^{t+1} - OOE^{t+1} \cdot RIR^{t+1} \\ &\overset{2.6}{=} OOE^{t+1} - OOE^{t+1} \cdot (CGR^{t+1} + CRR^{t+1}) \\ &= OOE^{t+1} \cdot (1 - (CGR^{t+1} + CRR^{t+1})) \end{aligned}$$

The combination of the formulas in Theorems 3.1 and 3.2 reveals three important implications for maximizing long-term owner earnings:

1. Minimizing CRR maximizes OE over the long term.
2. Maximizing $OOEROIC$ maximizes OE over the long term.
3. Increasing CGR, as long as $OOEROIC$ exceeds the investor's hurdle rate, maximizes OE over the long term.

While the first two statements may seem obvious, the last one arises from discounting future OE by a hurdle rate. This hurdle rate is subjective to the investor and combines discounts for perceived risk and a target rate of return.
This perspective leads to an implication on how an investor should evaluate management's capital allocation:

Corollary 3.3. Given an investor's target hurdle rate, if management invests OOE to grow invested capital at incremental $OOEROIC$ below this hurdle rate, the investor should sell the stock and invest the money in another company that invests capital at returns above the hurdle rate.

Management's decision to invest capital below the investor's hurdle rate does not necessarily indicate poor capital allocation. The hurdle rate is subjective to the investor, while management makes decisions based on the company's own hurdle rate, i.e., its cost of capital. If the company's hurdle rate is below the investor's hurdle rate, the management's decision is perfectly rational.

4 Discussion

Forecasting future asset allocation and return on invested capital requires a diligent qualitative assessment of the management, business, and industry. Although business conditions can change unpredictably, forecasting asset allocation and expected returns on capital is still the most reliable method for obtaining realistic expectations of future owner earnings.
However, to provide room for potential misjudgments, I recommend the following guidelines to forecast $OOEROIC$, CRR and CGR:

- $OOEROIC$
    1. $OOEROIC$ exhibits strong mean reversion over time and should only be forecasted for five years (including a margin of safety) before converging to the long-term mean of the industry. This mean reversion serves as an additional margin of safety, as most investment hypotheses assume that a company can maintain above-average $OOEROIC$ over long periods.

2. To obtain conservative forecasts for the next five years, I recommend using the geometric mean of the recent three to five years and applying a margin of safety by reducing this number by a fixed percentage. This method is appropriate only if there is good reason to assume that management invests solely in projects with high returns on capital and can maintain its competitive position for the next five years.

- CRR
    1. The CRR is typically observed to fluctuate around a stable mean, which can serve as the best estimate for the future.
    2. If the CRR shows a downward trend, it should only be extrapolated if the business model can take advantage of economies of scale or other size-related advantages.
    3. A margin of safety should be applied by correcting CRR upwards by a fixed percentage rate.
- CGR
    1. Extrapolation of CGR from past trends is only appropriate if management can consistently redeploy OOE to generate high returns in the future.
    2. A margin of safety should be applied by correcting CGR downwards by a fixed percentage rate.
    3. Past trends should not be extrapolated beyond five years for two reasons. Firstly, profitable markets attract competition, and secondly, it becomes increasingly challenging for a company to sustain consistent growth as it expands.
    4. The long-term CGR should mean revert to the rate necessary to grow invested capital at the same rate as the industry or national GDP.

Corollary 4.1. Forecasting $OOEROIC$, CRR, and CGR for five to ten years and subsequently mean-reverting them can provide a reasonable distribution of owner earnings that aligns with the typical business lifecycle:

1. In the near term, sufficient profitable growth opportunities lower owner earnings due to major reinvestment of OOE.
2. As the company progresses into the mean reversion phase, CGR decreases, resulting in a considerable increase in owner earnings.
3. After complete mean reversion has occurred, owner earnings grow or decline in line with the industry or national GDP.