# WEALTH ADDED INDEX: ITS RELATION WITH CURRENT RETURN AND FUTURE ABNORMAL RETURN

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***ABSTRACT***

*Wealth Added Index (WAI) is a popular metric to measure wealth created or destroyed in a publicly traded company. Yet research that link WAI and stock return and its potential to predict future return has been scant. WAI of forty five most liquid companies in Indonesia stock exchange in the period of February to July 2009 are calculated for periods of 2009 to 2011. A model is proposed where WAI and current stock return will indicate whether a stock is over, under, or fairly valued. The stocks performances in the following years are then measured. It is found that over (under) valued stock show lower (higher) abnormal return in the following periods. The result supports the claim that WAI is an accurate wealth creation metric, and in the process explores the possibility to use it as tool for investment decision making.*

***Keywords:*** *Wealth Added Index, Wealth Creation, Abnormal Return, Investment*

## INTRODUCTION

Wealth Added Index (WAI) was invented and popularized by Stern Stewart & Co consulting firm, partly to complement their much more famous Economic Value Added (EVA) metric. Like EVA, WAI attempts to measure how much wealth is created (or destroyed) by a company. And like EVA, WAI also assumes that wealth is created only if 'gain' of the company is greater than the opportunity cost of its capital. The comparison of 'gain' to opportunity cost of capital is a unique characteristic of EVA and WAI compared to traditional accounting variables like ROE, ROA, EBIT, etc. A company may generate high net income, or high ROE, or high ROA and thus score favorably using traditional accounting measurement. But if the opportunity cost of the capital employed by the company is even higher, it actually destroys value for investor. From this point of view EVA and WAI are more accurate compared to traditional accounting variables as measurement for value creation.

The main difference between EVA and WAI is that EVA measures value creation based on only what the company delivers in a particular time. It does not take into account any future possibility of value creation. For example a company that invests in research of a promising product will not generate higher EVA. EVA will only increase in the future when the product is launched to the market. This is evidenced from the calculation method of EVA that (in simple form):

$$EVA = NOPAT - (WACC \times Capital)$$

or

$$EVA = (ROC - WACC) \times Capital.$$

From the equation it can be seen that EVA will not be affected by prospect of value creation. WAI on the other hand, takes into account also the prospect of value creation. This is evidenced from the calculation method of WAI (Stern and Pigott 2002):

$$WAI = \Delta \text{ Market capitalization} - \text{Required return} + \text{Dividend}$$

Any current and future prospect of value creation (or destruction) will be reflected in current stock price, and that will affect the difference between current and previous market capitalization.

While research on WAI is scant, there are several research that link EVA to stock return. If EVA is more accurate compared to traditional accounting in measuring company value creation ability, it is logically followed that EVA should also be better correlate with stock return. However various studies show that compared to EVA, traditional accounting variables are more highly correlated with stock return. Kramer and Peters (2001) found that NOPAT correlates better than EVA to Market Value Added. Ismail (2011) found that EVA has no significant correlation with stock return. Biddle *et al.* (1997) showed that earning correlates better than EVA to stock return, while Kyriazis and Anastassis (2007) showed that net income and operating income correlate better than EVA with stock return. Researches that show EVA outperformed

showed that focusing only on positive EVA and using abnormal return, EVA correlates better to stock than earning and NOPAT

The fact that EVA may not correlates very well with stock return open new possibility to use it as tool to predict future stock return. The premise is that high EVA with low return indicates a stock is undervalued, and will have high return in the subsequent period. Likewise low EVA with high return indicates a stock is overvalued and will have low return in the subsequent period.

Abate *et al.* (2004) formed scatter plot of stocks with value to capital ratio as x-axis and EVA to capital ratio as y-axis. Stocks in upper left area (high EVA and low price) were considered undervalued while stocks in lower right area (low EVA and high price) were considered overvalued. Subsequent period indeed showed that undervalued stocks have higher return compared to overvalued stocks.

Since EVA does not take into account future value creation prospect, WAI is more closely related to stock return because stock price is supposed to be the present value of all future cash flow. It is logical to assume that WAI is more appropriate than EVA to be used in predicting future return of stock. The method of Abate *et al.* (2004) will be repeated with several modifications, with WAI replacing EVA as the independent variable. Forty five most liquid companies in Indonesia stock exchange in the period of February to July 2009 are chosen for the sample. For each calendar year from 2009 to 2011, the stocks are separated into overvalued and undervalued stocks. The stocks returns in the subsequent year are then calculated. It is proposed that average return of undervalued stocks will be higher compared to average return of the overvalued stocks. This paper proceeds as follow: Section 1 contain brief introduction and background of the research, section 2 offers explanation on WAI, section 3 discuss methodology, section 4 provides the results, and section 5 concludes.

**Wealth Added Index**

Wealth Added Index (WAI) was introduced by Stern Stewart & Co consulting firm in 2002 (Stern and Pigott 2002) and described as a company value creation metric that fulfill the following criteria: (1) reflects the relation between money injected to a company by investor and money generated for investor, (2) reflects the risk taken by investor in the form of required return, and (3) in cash figure instead of percentage. Compared to traditional accounting metric it has the advantage of including the required return. Compared to EVA it has the advantage of taking investor's perspective by showing how much investor 'pay' in the beginning of period, and how much investor 'get' in the end of period. WAI is also calculated only using market data and does not use reported profit and thus avoid differences between accounting reporting methods and any reporting inaccuracy. The weakness of WAI is its use of stock price that can be volatile. If WAI is used for management compensation scheme, it means that WAI is also depends on factors outside management control. Another weakness is that required return is calculated using CAPM whose accuracy as opportunity cost measurement is still being debated.

The calculation of WAI is as follow:

WAI = Δ Market capitalization – Required return + Dividend - - - - - - - - - - - (1)

With:

Δ Market capitalization = Market cap end of period – Market cap beginning of period

Required return = Market cap beginning of period x CoE

$CoE = R_f + \beta(R_m - R_f)$ - - - - - - ----------(2)

$R_f$ = Risk Free Rate

$R_m$ = Market return

From the equation of WAI calculation, it can be summarized that WAI calculates the increment of investor wealth between beginning and end of period after deducting the required return. Increment of wealth comes from both capital appreciation and dividend. Required return is the initial wealth times cost of equity where cost of equity is calculated using CAPM formula.

## DATA AND METHODS

WAI and stock return are used to classify a group of stocks into categories of overvalued stocks and undervalued stocks. The classification method follows Abate *et al.* (2004) with EVA component replaced with WAI and value to capital component replaced with stock return. Average return of undervalued stocks in the subsequent period is compared to average return of overvalued stocks. The comparison is repeated using abnormal return to eliminate risk effect whereby stocks with high beta tend to provide higher return than stocks with low beta. Abnormal return itself is defined as return above expected return as calculated using CAPM. Wilcoxon–Mann–Whitney test using minitab software is then used to determine whether there is statistically significant difference between return of undervalued and overvalued stocks.

### Stock Classification

The classification of overvalued and undervalued stocks is as follow. A scatter plot of stocks with WAI/Market cap beginning of period as y-axis and stock return as x-axis is formed. A linear trend line with ordinary least square is then drawn on the scatter plot. The trend line will divide the stocks roughly into two parts. Stocks located in upper left of the trend line (high WAI/Market cap and low return) are considered undervalued stocks. High value creation (as indicated by high WAI) is not reflected by the low stock return, and hence the undervaluation. Stocks located in lower right of the trend line (low WAI/market cap and high return) are considered overvalued stocks. High return does not reflect low value creation (as indicated by low WAI), and hence the overvaluation. Stocks at the trend line are correctly priced stocks. The further the stock from the trend line, the higher its degree of over/under-value. Based on the distance from trend line, ten most undervalued stocks can be chosen and compared to ten most overvalued stocks to enhance the difference between undervalued and overvalued stocks.

### Cost of Equity Calculation

Cost of equity is calculated according CAPM formula. Average BI rate in a particular year is used as risk free rate and IHSG return is used as return market. Beta is calculated for individual stock by calculating monthly data for three years. For example beta of a stock in year 2009 depends on 36 data from January 2007 to December 2009. The following equation is used

$$Rs = Rf + \beta (Rm \quad Rf) \text{ - - - - - - - - - - - - - - } (3)$$

With:

Rs = Return of stock in a particular month

Rf = BI rate in a particular month

Rm = Return IHSG in a particular month

Scatter plot of 36 data for each stock is formed with Rs Rf as y-axis and Rm Rf as x-axis. The gradient of linear trend line is defined as beta of the stock.

**Sample**

Forty five most liquid companies in Indonesia stock exchange, or known as LQ45, in the period of February to July 2009 are chosen as the sample. WAI of each stock is calculated for the year 2009, 2010, and 2011, and used to classify whether the stock is under or over-valued for each year. Out of forty five, three are removed from the sample due to low activity and low price change in 2011-2012 (BNBR and MIRA), and unavailability of data (BYAN). Further nine stocks are removed from 2009 calculation due to unavailability of data in 2007 and thus beta 2009 cannot be calculated.

**Findings: Comparison of overvalued to undervalued stocks**

Results of each year over/under-valued classifications and their subsequent year return are summarized in Table 1 to Table 3. Subsequent year abnormal return (return above expected return as defined by CAPM) is also calculated.

As can be seen from Table 1 to Table 3, for all the three sample years, compared to overvalued stocks, undervalued stocks give both higher return and higher abnormal return in the subsequent year.

**Table 1**. Subsequent Year Return of 2009 Over/Under-valued Stocks Classification

| 2009 | | | | | |
|---|---|---|---|---|---|
| | Overvalued Stocks | | | Undervalued Stocks | |
| | Return 2010 | Abnormal Return 2010 | | Return 2010 | Abnormal Return 2010 |
| MEDC | 37.76% | 5.70% | UNVR | 52.39% | 40.59% |
| BBRI | 41.21% | 6.26% | CPIN | 345.91% | 307.59% |
| BMRI | 40.46% | 1.90% | BBCA | 33.93% | 11.52% |
| BISI | 38.52% | 5.02% | TLKM | -2.91% | -24.84% |
| INKP | -5.75% | -45.28% | ISAT | 16.77% | -5.16% |
| UNTR | 56.24% | 13.33% | SMGR | 28.64% | 3.81% |
| AALI | 17.61% | -17.10% | KLBF | 158.17% | 124.67% |
| PTBA | 35.67% | -1.21% | PGAS | 16.83% | -10.17% |
| BNGA | 169.01% | 133.82% | PNBN | 50.00% | 21.80% |
| TINS | 38.82% | 1.71% | AKRA | 51.86% | 18.36% |
| LSIP | 64.53% | 23.31% | INTP | 17.82% | -15.92% |
| BLTA | -48.55% | -87.84% | SGRO | 19.01% | -13.29% |
| SMCB | 45.16% | 2.01% | INDF | 39.55% | -0.46% |
| BBNI | 97.75% | 51.95% | CTRA | 44.33% | 6.97% |
| TBLA | 23.09% | -19.09% | ANTM | 12.34% | -21.88% |
| UNSP | -32.20% | -86.20% | BDMN | 26.97% | -3.39% |
| BRPT | -12.03% | -63.62% | ASII | 89.05% | 48.79% |
| **Average** | **35.72%** | **-4.43%** | | **58.86%** | **28.76%** |

**Table 2**. Subsequent Year Return of 2010 Over/Under-valued Stocks Classification

| 2010 | | | | | |
|---|---|---|---|---|---|
| | Overvalued Stocks | | | Undervalued Stocks | |
| | Return 2011 | Abnormal Return 2011 | | Return 2011 | Abnormal Return 2011 |
| BNGA | -35.77% | -53.55% | UNVR | 17.00% | 7.80% |
| WIKA | -8.16% | -26.75% | LPKR | -2.40% | -15.03% |
| PTBA | -22.33% | -40.74% | TLKM | 4.49% | -6.42% |
| TINS | -36.36% | -57.21% | ISAT | 5.57% | -10.49% |
| CTRA | 55.74% | 36.61% | BBCA | 26.51% | 12.25% |
| BMRI | 5.42% | -15.42% | SMGR | 23.40% | 9.41% |
| CPIN | 19.84% | 1.70% | PGAS | -25.27% | -40.79% |
| INCO | -13.04% | -33.98% | PNBN | -31.58% | -48.99% |
| BLTA | -44.79% | -62.93% | JSMR | 25.25% | 10.36% |
| INKP | -25.00% | -42.51% | BDMN | -26.28% | -38.01% |
| ASII | 62.61% | 43.21% | ADRO | -29.19% | -44.62% |
| INDF | -3.32% | -23.36% | MEDC | -26.25% | -40.50% |
| LSIP | -10.43% | -26.77% | SGRO | -3.41% | -17.93% |
| TBLA | 49.66% | 33.50% | INDY | -53.50% | -73.08% |
| ELSA | -28.54% | -53.45% | BISI | -50.88% | -70.28% |
| UNTR | 12.34% | -6.25% | AKRA | 91.41% | 75.17% |
| SMCB | -1.60% | -19.55% | KLBF | 13.77% | -1.66% |
| BBNI | -0.49% | -23.14% | INTP | 8.30% | -7.40% |
| ITMG | -21.20% | -42.77% | ANTM | -31.42% | -50.29% |
| BRPT | -34.19% | -54.04% | AALI | -14.13% | -26.67% |
| UNSP | -25.99% | -50.54% | BBRI | 29.71% | 10.75% |
| **Average** | **-5.03%** | **-24.66%** | | **-2.33%** | **-17.45%** |

**Table 3.** Subsequent Year Return of 2011 Over/Under-valued Stocks Classification

| 2011 | | | | | |
|---|---|---|---|---|---|
| | **Overvalued Stocks** | | | **Undervalued Stocks** | |
| | **Return 2012** | **Abnormal Return 2012** | | **Return 2012** | **Abnormal Return 2012** |
| PGAS | 44.26% | 28.74% | WIKA | 146.71% | 128.12% |
| INDY | -33.29% | -52.87% | UNTR | -23.49% | -42.08% |
| SGRO | -15.15% | -29.68% | TINS | -4.45% | -25.29% |
| CPIN | 64.45% | 46.31% | BDMN | 38.75% | 27.02% |
| BNGA | -9.84% | -27.61% | KLBF | 51.47% | 36.04% |
| BLTA | -99.99% | -118.13% | AALI | -8.36% | -20.90% |
| UNVR | 15.46% | 6.26% | SMCB | 35.83% | 17.88% |
| PNBN | -19.23% | -36.65% | BBCA | 16.21% | 1.95% |
| BBRI | 4.50% | -14.45% | LSIP | 3.78% | -12.55% |
| CTRA | 47.40% | 28.27% | PTBA | -10.11% | -28.52% |
| UNSP | -66.01% | -90.56% | ITMG | 16.16% | -5.41% |
| ASII | 17.88% | -1.52% | JSMR | 33.74% | 18.85% |
| ANTM | -16.21% | -35.07% | AKRA | 35.71% | 19.47% |
| BISI | -11.15% | -30.56% | ADRO | -10.17% | -25.60% |
| INDF | 30.41% | 10.37% | MEDC | -32.37% | -46.63% |
| BRPT | -46.75% | -66.61% | INKP | -42.28% | -59.78% |
| TBLA | -14.28% | -30.44% | SMGR | 39.57% | 25.59% |
| BMRI | 16.88% | -3.97% | INTP | 34.31% | 18.60% |
| INCO | -32.50% | -53.44% | LPKR | 52.52% | 39.89% |
| ISAT | 15.32% | -0.75% | | | |
| BBNI | 0.08% | -22.57% | | | |
| TLKM | 45.88% | 34.96% | | | |
| ELSA | -24.78% | -49.69% | | | |
| **Average** | **-3.77%** | **-22.16%** | | **19.66%** | **3.51%** |

**Comparison of ten most overvalued stocks to ten most undervalued stocks**

To enhance the over/under-valued effect, ten of the most over valued stocks are compared to ten most undervalued stocks.

As can be seen from Table 4 to Table 6, again for all the three sample years, compared to overvalued stocks, undervalued stocks give both higher return and higher abnormal return in the subsequent years. Compared to result in previous section where all stocks are taken into account, the spreads between return of ten most overvalued stocks and ten most undervalued stocks are larger. This is due to elimination of stocks that are almost fairly valued, and thus show little tendency to provide exceptionally high or low return in the subsequent year.

**Table 4.** Subsequent Year Return of 2009 Ten Most Over/Under-valued Stocks Classification

| 2009 | | | | | |
|---|---|---|---|---|---|
| | Overvalued Stocks | | | Undervalued Stocks | |
| | Return 2010 | Abnormal Return 2010 | | Return 2010 | Abnormal Return 2010 |
| PTBA | 35.67% | -1.21% | UNVR | 52.39% | 40.59% |
| BNGA | 169.01% | 133.82% | CPIN | 345.91% | 307.59% |
| TINS | 38.82% | 1.71% | BBCA | 33.93% | 11.52% |
| LSIP | 64.53% | 23.31% | TLKM | -2.91% | -24.84% |
| BLTA | -48.55% | -87.84% | ISAT | 16.77% | -5.16% |
| SMCB | 45.16% | 2.01% | SMGR | 28.64% | 3.81% |
| BBNI | 97.75% | 51.95% | KLBF | 158.17% | 124.67% |
| TBLA | 23.09% | -19.09% | PGAS | 16.83% | -10.17% |
| UNSP | -32.20% | -86.20% | PNBN | 50.00% | 21.80% |
| BRPT | -12.03% | -63.62% | AKRA | 51.86% | 18.36% |
| **Average** | **38.13%** | **-4.52%** | | **75.16%** | **48.82%** |

**Table 5.** Subsequent Year Return of 2010 Ten Most Over/Under-valued Stocks Classification

| 2010 | | | | | |
|---|---|---|---|---|---|
| | Overvalued Stocks | | | Undervalued Stocks | |
| | Return 2011 | Abnormal Return 2011 | | Return 2011 | Abnormal Return 2011 |
| INDF | -3.32% | -23.36% | UNVR | 17.00% | 7.80% |
| LSIP | -10.43% | -26.77% | LPKR | -2.40% | -15.03% |
| TBLA | 49.66% | 33.50% | TLKM | 4.49% | -6.42% |
| ELSA | -28.54% | -53.45% | ISAT | 5.57% | -10.49% |
| UNTR | 12.34% | -6.25% | BBCA | 26.51% | 12.25% |
| SMCB | -1.60% | -19.55% | SMGR | 23.40% | 9.41% |
| BBNI | -0.49% | -23.14% | PGAS | -25.27% | -40.79% |
| ITMG | -21.20% | -42.77% | PNBN | -31.58% | -48.99% |
| BRPT | -34.19% | -54.04% | JSMR | 25.25% | 10.36% |
| UNSP | -25.99% | -50.54% | BDMN | -26.28% | -38.01% |
| **Average** | **-6.38%** | **-26.64%** | | **1.67%** | **-11.99%** |

**Table 6.** Subsequent Year Return of 2011 Ten Most Over/Under-valued Stocks Classification

| 2011 | | | | | |
|---|---|---|---|---|---|
| | Overvalued Stocks | | | Undervalued Stocks | |
| | Return 2012 | Abnormal Return 2012 | | Return 2012 | Abnormal Return 2012 |
| BISI | | -30.56% | WIKA | 146.71% | 128.12% |
| INDF | 30.41% | 10.37% | UNTR | | -42.08% |
| BRPT | | -66.61% | TINS | -4.45% | -25.29% |
| TBLA | | -30.44% | BDMN | | 27.02% |
| BMRI | 16.88% | -3.97% | KLBF | | 36.04% |
| INCO | | -53.44% | AALI | -8.36% | -20.90% |
| ISAT | 15.32% | -0.75% | SMCB | 35.83% | 17.88% |
| BBNI | 0.08% | -22.57% | BBCA | 16.21% | 1.95% |
| TLKM | 45.88% | 34.96% | LSIP | 3.78% | -12.55% |
| ELSA | | -49.69% | PTBA | | -28.52% |
| **Average** | **-2.09%** | **-21.27%** | | **24.63%** | **8.17%** |

**Table 7**. Spread Between Return of Overvalued and Undervalued Stocks

| | | 2009 | | | 2010 | | | 2011 | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | Spread | p value | Significant | Spread | p value | Significant | Spread | p value | Significant |
| **All Samples** | Return | 23.14% | 0.2397 | no | 2.70% | 0.3530 | no | 23.43% | 0.0452 | yes |
| | Abn Return | 33.20% | 0.1762 | no | 7.22% | 0.1454 | no | 25.67% | 0.0385 | yes |
| **10 most under/over-valued** | Return | 37.03% | 0.3116 | no | 8.04% | 0.1537 | no | 26.73% | 0.081 | yes |
| | Abn Return | 53.33% | 0.1207 | no | 14.65% | 0.0606 | yes | 29.44% | 0.0606 | yes |

## RESULT SUMMARY

Results in previous section, together with Wilcoxon Mann Whitney test result can be summarized as in Table 7. The table shows spread between return of overvalued stocks and return of undervalued stocks.

For all of the three years under observation, both all samples and ten most under/over-valued observations show undervalued stocks provide both higher return and higher abnormal return. Spread of abnormal return is always greater than spread of normal return due to elimination of risk factor in abnormal return. Spread of ten most under/over-valued stocks is always greater than spread of all samples due to elimination of stocks that are almost fairly valued. Wilcoxon Mann Whitney test shows that only in 2011 the average return between overvalued stocks and undervalued stocks are statistically different.

## CONCLUSION

It is shown that WAI, in conjuction with return, can be used to classify a group of stocks into relatively undervalued stocks and relatively overvalued stocks. Undervalued stocks tend to perform better in subsequent period in term of return and abnormal return compared to overvalued stocks. The result suggest that WAI is indeed able to measure value creation of a company. When stock return does not reflect properly the value creation as measured by WAI, it tends to self correct in the subsequent period as market realize the over or under valuation of the stock. Thus it is also implied that market is not as efficient as Eficient Market Hypothesis suggest.

In two out of three sample periodes the difference in return is not statistically significant. It can be caused by small sample size and high fluctuation of stock price. Further study involving more stocks with longer time frame should be able to confirm if return is indeed different. Further study can also be done to check the presence of return reversal effect as described by DeBond and Thaler (1985) that may influence the result of this study.

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