# An Employment-Weighted Municipal Stock Index

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## Abstract

State and local officials are often tasked with policy decisions that are influenced by projections of future economic conditions. However, properly assessing and predicting local economic performance is challenging. Common macroeconomic indicators can be helpful, but additional tools are needed. Stock indices have traditionally been used in the investment community to evaluate performance. While a recent surge in fundamental indexing has led to a debate over performance measurement, other uses of fundamental indices have been largely ignored. We introduce an employment-weighted stock index as a supplement to traditional forecasting measures for policymakers at the state and local levels.

**Keywords:** economic development, employment, fundamental index, stock index

## 1. Introduction

Stock market indices perform a variety of functions in the investment community. An investor may follow an index such as the S&P 500 or Dow Jones Industrial Average to monitor price changes in the overall market; a money manager may reference one or more indices as a benchmark for performance evaluation. Because each index is essentially a sample that represents a greater population, it can be used to assess information that might be difficult to summarize otherwise.

Indices are also predictive. The stock market is often viewed as a leading economic indicator because gains or losses in the market tend to precede changes in the real economy. Given the relationship between corporate earnings and stock price, investors attempt to anticipate future changes in earnings and invest accordingly. An index that represents the broader market therefore provides insight into investor beliefs about the direction of the broader economy, particularly in the short-term.

In recent years, the number and variety of stock indices has increased significantly. While the Dow Jones Industrial Average may still be the best known to the general public, other indices offer alternate assessments of the stock market based on company market capitalization, geographic location, and investment style. Additionally, *fundamentally-weighted* indices are constructed on the basis of company fundamentals such as dividends, earnings, or book value. The breadth of available indices enables a better evaluation of the performance associated with a particular investment strategy. Also, because of the popularity of index funds and ETFs, more indices mean more varied investment opportunities for investors.

However, there may be additional applications of index analysis that extend beyond investment vehicles and performance measurement. For example, a state or local official may be less concerned with stock market returns than local economic activity. Policymakers who rely on economic variables in making budget projections are limited by historical data. An appropriately-constructed index that reflects investor expectations for regional economic growth would add an additional forward-looking component to economic forecasting.

The primary research question addressed in this paper is how such an index might be developed. In providing an answer, we introduce a fundamentally-weighted, local stock index based on employment data. We use the state of Arkansas as an example in offering a model that can be built and maintained at the state or local level.

## 2. Literary Research

Broad stock market indices have traditionally been constructed based on a price-weighted or market capitalization-weighted approach. Arnott, Hsu, and Moore (2005) were among the first to explore the use of index component weightings based on company fundamentals. Their conclusions suggest multiple benefits of

fundamental indexes and helped spark a broad debate in the investment community about mean-variance optimization and index construction. A primary benefit of what Treynor (2005) calls market value indifferent (MVI) investing is a reduction in the likelihood of overpriced stocks with positive price errors dominating underpriced stocks with negative price errors. In short, with a fundamentally-weighted index, overpriced stocks are not automatically assigned a greater weighting.

Multiple studies offer evidence of the enhanced performance of fundamental indices comprised of U.S. stocks. Furthermore, results appear to be consistent across international markets (see Cai, Jin, Qi, and Xu (2018); Duyvené de Wit, Polakow (2017); Oladele and Bradfield (2018); and Yan and Zhao (2010), among others). The evidence also extends beyond stock indices, as shown by Piljak and Swinkles (2017) in their application of fundamental indexing to bond markets. Importantly, Volkov (2018) demonstrates that the outperformance of fundamental indexing can also be accompanied by lower risk and greater portfolio diversification.

However, others have questioned the superiority of fundamental indices. Some view fundamental indexing as simply an outgrowth of a value orientation (Perold, 2007; Blitz and Swinkels, 2016) . Others have challenged whether the demonstrated outperformance is truly a function of index construction. For example, Kaplan (2008) focuses on a comparison of valuation errors and fair market multiples.  De Moor, Liu, and Sercu (2018) question the relevance of the drag that results from the friction between overpricing and underpricing of components. Fisher, Shah, and Titman (2015) find that a market-cap strategy that is tilted towards high fundamental-to-price ratio stocks delivers many of the same benefits as a pure fundamental approach, but with higher information ratios and lower tracking error. All three examples cast doubt on the ability of a fundamental index to generate alpha beyond the return achieved by a comparable market-cap index. Their findings are also underscored by Kejca and Svenda (2017), whose inconsistent empirical results lead them to express a word of caution about fundamental indexing.

Perhaps some of the apparent discrepancies in results are linked to the many variations of fundamental indices that have been introduced. Fundamental indexing remains a fairly broad term, and specific criteria must be selected before building an index. For example, Arnott, et al (2005) test book value, trailing five-year average cash flow, trailing five-year average revenues, trailing five-year average sales, trailing five-year average gross dividends, and total employment in their initial analysis. Lin and Sanger (2019) introduce an enterprise value calculation that accounts for debt as well as equity value. Balatti, Brooks, and Kappou (2017) focus exclusively on dividend and other income statement measures. Cohen, Haghbin, Malloy, and Schilling (2019) also focus on income statement items, concluding that revenue weighting provides outperformance, greater stability, and a greater risk-return tradeoff than a traditional market-cap approach. It would certainly seem possible, if not probable, that any apparent discrepancies in performance might be a function of the specific fundamental criteria employed.

Interestingly, in their 2011 survey of alternative strategies, Chow, Hsu, Kalesnik, and Little seem to suggest otherwise. They conclude that almost all fundamental strategies are related to size, value, and market factors. Furthermore, De Franco, Monnier, Nicolle, and Rulik (2016) take an additional step in showing that alternative beta strategies tend to cluster together. The fundamental indexing approach seems less about the specific fundamental criteria that are used and more about the departure from a purely cap-weighted approach.

The inconsistencies in the literature, particularly those related to performance measures, raise an obvious question. If the debate about the cause of the outperformance remains, and there seems to be little distinction among different types of fundamental criteria, what is the true value of fundamental indexing?

Almost all of the empirical testing of fundamental indexing focuses on performance, and rightfully so. Given the history of market indexes as performance measures, it just makes sense that any new form of index should be measured by the same standard. And while questions about performance may be central to the debate about fundamental indexing, they are well beyond the scope of this paper. Instead, our research questions explore an alternative measure of usefulness.

More specifically, what if fundamental indices offer an application that cannot be measured by performance? What if they can provide a form of market or even economic insight that cannot be gained from traditional market-cap weightings? Zaremba and Miziołek (2017) hint at this extension in asking whether alternate weighting methods might be applied to countries and not just stocks. While their focal point is still performance, their question acknowledges that fundamental indices may have some usefulness apart from a template for a new index fund or benchmark for a portfolio manager. We look to take an even larger step in proposing that fundamental index strategies may provide needed assistance for state and local officials.

## 3. Data and Methods

One of the fundamental weighting criteria used by Arnott, et al (2005) is total employment. Their justification points to the importance of employment measures in the real economy. Companies with sizable labor forces are in a position to have a direct impact on the economy, and by extension the stock market. As a result, weighting portfolio holdings by total employment would seem to be a logical method of constructing a stock index.

While the authors primary interest is in measuring performance, an index influenced by changes in employment might also prove valuable for policymakers, especially those at the state and local levels. When balancing the program desires of their constituents with available resources, officials may search for a projection of future economic conditions. Forecasting financial trends at the national level is difficult enough, but finding appropriate data for the municipal level may be even more so. A technique that combines local employment trends over time with a de facto forecast or short-term economic conditions would seem to be particularly valuable. Consider how a fundamental index weighted by employment could satisfy those objectives. Given that market indices are forward looking instruments, and the availability of local employment data allows for a direct proxy for economic growth, a local employment-weighted stock index could act as a helpful tool in making budgeting decisions.

To demonstrate how such an index might be constructed, we have selected the state of Arkansas in the United States to use as an example. There are several reasons that Arkansas is a natural choice. Practically speaking, it is small enough to make a statewide index manageable, yet home to companies of vastly different sizes representing a variety of industries.

To construct an employment-weighted index, only two inputs are needed: a list of publicly-traded companies with operations in the state, and the number of people employed by each. To determine the weight for each company, divide the number of firm employees by the sum of all employees for all firms.

*Arkansas Business* is a weekly paper that publishes an annual list of the state's top 40 employers. In 2020, 23 of those were publicly traded, and 16 employed at least 2000 people in the state. We chose to exclude the smallest companies because they had no meaningful impact on the index result. An index comprised of these sixteen companies, and weighted by the number of employees in the state surely provides insight into the financial performance of companies that are important to the Arkansas economy. If the largest employers in the state are doing well – regardless of where they are domiciled - that should also bode well for Arkansas workers and state revenue.

## 4. Results and Discussion

Table 1 shows the inaugural companies in the Employment-Weighted Arkansas Index. A few observations are important. First, Walmart is obviously the dominant employer in the state, and with over 50 000 employees, accounts for over 44% of the employees on the list. Tyson Foods, with 24 000 employees in the state, accounts for another 21%. The combined 65% weighting of the two results in a top-heavy index. However, given the impact of the two companies on the state economy, the results may not be as overstated as it may seem. Furthermore, the disproportionate influence would not likely be as great in most other states and municipalities.

Table 1. Initial Employment-Weighted Arkansas Index (EWAI) components

| Company Name | Ticker | Sector | Headquarters | 2020 AR Employees | Index Weight | 2020 Return |
|---|---|---|---|---|---|---|
| ABB | ABB | Industrials | Zurich | 2,300 | 2.06% | 16.06% |
| ArcBest | ARCB | Industrials | Ft. Smith, AR | 2,152 | 1.92% | 54.60% |
| ATT | T | Telecomm | Dallas, TX | 2,500 | 2.24% | -26.41% |
| Community Hlth Sys | CYH | Healthcare | Brownsville, TN | 2,500 | 2.24% | 156.21% |
| Conagra | CAG | Cons Staples | Chicago, IL | 2,000 | 1.79% | 5.90% |
| Dillard's | DDS | Cons Disc | Little Rock, AR | 2,000 | 1.79% | -14.19% |
| Dollar General | DG | Cons Staples | Goodlettsville, TN | 2,500 | 2.24% | 34.82% |
| Dollar Tree | DLTR | Cons Staples | Chesapeake, VA | 2,000 | 1.79% | 14.88% |
| FedEx | FDX | Industrials | Memphis, TN | 3,917 | 3.50% | 71.69% |
| JB Hunt | JBHT | Industrials | Lowell, AR | 4,894 | 4.38% | 17.01% |
| Kroger | KR | Cons Staples | Cincinnati, OH | 4,470 | 4.00% | 9.56% |
| Lowe's | LOW | Cons Disc | Mooresville, NC | 2,500 | 2.24% | 34.03% |
| Nucor Corp | NUE | Materials | Charlotte, NC | 2,000 | 1.79% | -5.49% |
| Tyson Foods | TSN | Cons Staples | Springdale, AR | 24,000 | 21.46% | 41.28% |
| UnionPacific | UNP | Industrials | Omaha, NE | 2,000 | 1.79% | 15.17% |
| Walmart | WMT | Cons Staples | Bentonville, AR | 50,121 | 44.81% | 21.30% |

*Notes.* The Employment-Weighted Arkansas Index is comprised of the sixteen publicly-traded companies with at least 2000 employees in the state of Arkansas in 2020 as identified by A*rkansas Business*. *Sector* identification is from *Morningstar.com*. *Index Weight* is calculated as the number of people employed by the company divided by the total number of people employed by all companies. *2020 Return* is the price return for the calendar year 2020.

While the Employment-Weighted Arkansas Index may be the first attempt to develop an employment based municipal index, there are a number of other state and local stock indices. One example that is particularly pertinent to the current study is *Bloomberg*'s State Index of Arkansas, which is comprised of sixteen Arkansas companies and weighted by market capitalization. A recent list of member companies includes America's Car-Mart, ArcBest, Bank OZK, Dillard's, Ecoark Holdings, Home BancShares, Inuovo, JB Hunt, Murphy Oil, Murphy USA, PAM Transportation, Simmons First National, Tyson Foods, Uniti Group, USA Truck, and Walmart. An important distinction here is that the State Index of Arkansas only considers companies domiciled in the state. By contrast, the Employment-Weighted Arkansas Index includes the state's largest employers, regardless of where they are headquartered. Consequently, only five companies are included in both indices. We have chosen to include non-Arkansas employers in our screen because we are primarily concerned with the employment impact of the largest employers, regardless of where they are based.

It is also important to note that the State Index of Arkansas is market cap-weighted, which means that price changes in the stocks with a larger market capitalization have a greater impact on the calculated value of the index. As a result, the State Index of Arkansas is particularly influenced by Walmart, which has the largest valuation.

Table 2. Comparing the Composition of Arkansas Indices

| EWAI | | | | BLOOMBERG STATE INDEX OF ARKANSAS | | | |
|------|------|------|------|------|------|------|------|
| Company | Symbol | Emplys | Weight | Company | Symbol | Price | Weight |
| ABB | ABB | 2300 | 2.06% | America's Car Mart | CRMT | 84.64 | 0.14% |
| ArcBest | ARCB | 2152 | 1.92% | Arcbest | ARCB | 25.59 | 0.17% |
| ATT | T | 2500 | 2.24% | BankOZK | OZK | 22.57 | 0.75% |
| Community Hlth Sys | CYH | 2500 | 2.24% | Dillard's | DDS | 24.85 | 0.13% |
| Conagra | CAG | 2000 | 1.79% | Ecoark Holdings | ZEST | 3.18 | 0.06% |
| Dillard's | DDS | 2000 | 1.79% | Home Bancshares | HOMB | 15.12 | 0.65% |
| Dollar General | DG | 2500 | 2.24% | Inuovo | INUV | 0.53 | 0.01% |
| Dollar Tree | DLTR | 2000 | 1.79% | JB Hunt | JBHT | 117.65 | 3.25% |
| FedEx | FDX | 3917 | 3.50% | Murphy Oil | MUR | 13.35 | 0.53% |
| JB Hunt | JBHT | 4894 | 4.38% | Murphy USA | MUSA | 111.97 | 0.88% |
| Kroger | KR | 4470 | 4.00% | PAM Transport | PTSI | 30.31 | 0.05% |
| Lowe's | LOW | 2500 | 2.24% | Simmons First Ntl | SFNC | 30.31 | 0.05% |
| Nucor Corp | NUE | 2000 | 1.79% | Tyson Foods | TSN | 58.57 | 4.47% |
| Tyson Foods | TSN | 24000 | 21.46% | USA truck | USAK | 7.87 | 0.02% |
| UnionPacific | UNP | 2000 | 1.79% | Uniti Group | UNIT | 9.47 | 0.47% |
| Walmart | WMT | 50121 | 44.81% | Walmart | WMT | 119.69 | 87.94% |

*Notes.* A comparison of the components of an Employment-Weighted Arkansas Index to the market cap-weighted *State Index of Arkansas* sponsored by *Bloomberg (symbol: BSTIAR)*. EWAI *Emplys* is the number of people employed by the firm in the state of Arkansas in 2020. Highlighted stocks are included in both indices.

Based on mid-2020 market capitalizations, Walmart accounts for approximately 88% of the current Bloomberg State Index of Arkansas. Tyson and JB Hunt add another 8% combined, leaving the bottom thirteen stocks to account for only 4% in index weightings. So while the employment-weighted index is admittedly top heavy, it is less so than a comparable market-cap weighted alternative. Weighting the index by employment helps remove some of the top- heavy bias.

Given the broader interest in fundamental indexing performance, it is also interesting to note the relative results of alternate approaches. A comparison of 2020 performance reveals a greater parallel between a value-weighted approach and a theoretical EWAI, at least during our brief sample period. Possibly more noteworthy is the lower monthly variability of returns with the Employment-Weighted Arkansas Index. Again, the small sample precludes broad generalizations, but based on the initial composition of the index, it appears that employment weightings may result in less volatility, which would make the index even more helpful for a policyholder seeking guidance for budget projections. More evaluation of performance differences is admittedly needed; this paper simply attempts to introduce the idea of an alternative application of a fundamental index.

Table 3. Comparing returns on indices

| Month End | EWAI | | | S&P 500 | | | DOW | | |
|---|---|---|---|---|---|---|---|---|---|
| | Index Value | Monthly Return | Total Return | Index Value | Monthly Return | Total Return | Index Value | Monthly Return | Total Return |
| 12/19 | 98.71308 | | | 3230.78 | | | 28538.44 | | |
| 1/20 | 96.29367 | -2.451% | -2.45% | 3225.52 | -0.163% | -0.16% | 28256.03 | -0.990% | -0.99% |
| 2/20 | 88.26177 | -8.341% | -10.59% | 2954.22 | -8.411% | -8.56% | 25409.36 | -10.075% | -10.96% |
| 3/20 | 86.3113 | -2.210% | -12.56% | 2584.59 | -12.512% | -20.00% | 21917.16 | -13.744% | -23.20% |
| 4/20 | 93.06756 | 7.828% | -5.72% | 2912.43 | 12.684% | -9.85% | 24345.72 | 11.081% | -14.69% |
| 5/20 | 96.62351 | 3.821% | -2.12% | 3044.31 | 4.528% | -5.77% | 25383.11 | 4.261% | -11.06% |
| 6/20 | 94.74208 | -1.947% | -4.02% | 3100.29 | 1.839% | -4.04% | 25812.88 | 1.693% | -9.55% |
| 7/20 | 101.4931 | 7.13% | 2.82% | 3271.12 | 5.51% | 1.25% | 26428.32 | 2.38% | -7.39% |
| 8/20 | 109.7348 | 8.120% | 11.17% | 3500.31 | 7.006% | 8.34% | 28430.05 | 7.574% | -0.38% |
| 9/20 | 110.0614 | 0.298% | 11.50% | 3363.00 | -3.923% | 4.09% | 27781.7 | -2.281% | -2.65% |
| 10/20 | 108.649 | -1.28% | 10.07% | 3269.96 | -2.77% | 1.21% | 26501.6 | -4.61% | -7.14% |
| 11/20 | 119.8693 | 10.33% | 21.43% | 3621.63 | 10.75% | 12.10% | 29638.64 | 11.84% | 3.86% |
| 12/20 | 115.12 | -3.96% | 16.62% | 3756.07 | 3.71% | 16.26% | 30606.48 | 3.27% | 7.25% |

*Notes.* A comparison of 2020 monthly returns of an Employment-Weighted Arkansas Index to the S&P 500 and Dow Jones Industrial Average. Total return is the total cumulative year-to-date return.

## 5. Conclusion

Amidst the ongoing debate over whether fundamental indexing leads to outperformance, we propose a slightly different question. Are there other applications of fundamental indices beyond performance measurement and product innovation? We introduce an employment weighted index as a tool to assist policymakers in gaining insight into local economic trends. The initial Employment-Weighted Arkansas Index is comprised of the 16 publicly-traded companies operating in the state that employ at least 2000 employees.

Similar indices could easily be constructed and maintained for other states or even large municipalities with significant industry representation. Replicating the index for an entire country or even region of the globe is also is possibility. This paper focuses on the local level because predictive economic data may be easier to obtain for national policy decisions. But a better understanding of the relationship between employment changes and subsequent economic performance would be beneficial at all levels of government.

Opportunities for future research also include index weightings on variables other than employment. Because there is still much to learn about the benefits of fundamental indexing, there will undoubtedly be additional applications in the future. The process outlined in this paper is but one example of how a fundamental variable can be used to enhance economic analysis.

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