SELECTING SECTOR BENCHMARKS

Overview & Description

February 2023

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INTRODUCTION

The IndexUniverse ETF Analytics process evaluates ETFs based on how well they track "the market" for their segment. To ensure we compare apples with apples, we have to choose a common benchmark against which to measure all funds equally. Our guiding principle is to choose a benchmark for each market segment to best represent "the market" for that segment. To select these benchmarks, we make a careful study of all the available choices. We need to know who decides what securities go into an index, and how they make classifications and distinctions.

In evaluating sector ETFs—and thus sector indexes—the biggest distinguishing factor between available options arises from the index providers' business/industry classification systems. Business classification systems classify tens of thousands of companies into sectors and further subcategories, using a rule-set. It's what lets you say with certainty and consistency that, for example, Microsoft is a software company, but Seagate is a hardware company.

In selecting a series of sector benchmarks, IndexUniverse researched the methodology and construction of the three largest and most widely recognized business classification systems.

- S&P/MSCI Barra's Global Industry Classification Standard (GICS)
- Thomson Reuters' Business Classification (TRBC)
- Dow Jones/FTSE's Industry Classification Benchmark (ICB)

Our goal was to determine which system most strongly adhered to the following principles:

- Representativeness: Does the classification system cover the widest range of securities possible?
- Rules Based: Does the system classify companies according to objective standards or does a committee arbitrarily determine where companies are classified?
- Robustness/Effectiveness: Does the system's output make both logical and intuitive sense?

To be representative, a family of sector benchmarks should track a large portion of the equity universe, and should cover the segments with ETFs tracking them. To be rules-based, the system must be consistent, clear and transparent, with the rules publicly available and consistently applied. A robust and effective system should separate sectors based on economic sensitivities, so that securities that respond to the same factors are grouped together and securities that respond to divergent factors are separated. Companies should be classified in sectors that are representative of their true business model. These distinctions should hold up over time, so that companies within the same sectors exhibit high correlations to one another. To quantify these different factors, we examined all the major global business classification systems to evaluate the range and number of companies covered by each system and the number and types of divisions they draw, the quality of the business classification rules and the effectiveness of the sorting system.

We ultimately found that these systems are more similar than different, but there are some key points of divergence that set the systems apart. Those key points led us to choose the Thomson Reuters Business Classification (TRBC) system for our ETF Analytics sector benchmark series.

ESTABLISHING THE UNIVERSE: REPRESENTATIVENESS

All classification systems select a universe of securities from the global equity market. Size matters for a securities universe—it sets the limits on the number, and market capitalization, of equities available to a sector fund. That's important, because indexes with a greater range of coverage are more broadly diversified and have a greater chance of capturing the market most accurately. ICB currently classifies the largest number of securities, followed closely by TRBC.

While GICS covers fewer companies than both TRBC and ICB, it actually exceeds them in classification granularity, naming 154 different subindustries, 30 more TRBC and 40 more than ICB.

CLASSIFICATION SYSTEM	NUMBER OF SECURITIES
GICS	45,770
ICB	74,615
TRBC	74,000

All three of the sector classification systems categorize stocks into four levels of increasingly specialized categorization, beginning by assigning them a broad economic sector (such as industrials or energy) and assigning them subindustries to end up at categorizations such as footwear or oil exploration. The following table shows how many subindustries each system designates at the four levels.

	GICS	ICB	TRBC
Level 1	10	10	10
Level 2	24	20	25
Level 3	68	41	52
Level 4	154	114	124

INDEX CONSTRUCTION: REPRESENTATIVENESS

Each of these sector classification systems have been used by index providers such as Standard and Poor', Dow Jones and Thomson Reuters to build market-capitalization-weighted and market-capitalization-selected indexes. Among market-capitalization-based indexes, which we consider to be most representative of the market, we compared the utility of each of the index providers' offerings as a benchmark for the market.

While all of the index providers have subtle differences in their treatment of nuances such as float or liquidity, the primary distinguishing factor between how the indexes are built is their adjustment of weights to allow investment by registered investment companies (RICs). RICs, which include mutual funds and most ETFs, are subject to laws that govern how heavily concentrated their investments can be. Index providers often cater to these requirements by adjusting or "capping" the weights of the companies in the indexes to remain legally investable by mutual funds and ETFs. Those adjustments, however, skew the index away from representing the true market, making the indexes less effective as benchmarks.

Thomson Reuters is the only major provider of sector indexes that does not adjust the weights of its holdings for RIC compliance. The weights of companies in their indexes reflect the float-adjusted market capitalization of their constituents, making them ideal benchmarks of the market in question.

Underlying Methodology: Rules Based

We believe that any segment benchmark we choose must be rules based, so that it can be predictable and consistent. To this end, we examined the rule-sets for all the major business classification systems. The process for determining the distinctions should use objective measures wherever possible and employ committee discretion as a last resort.

All three classification systems start with the same metric: revenue. One of the primary challenges facing a classification system is deciding where a company with several lines of business truly belongs. The chart below shows the rules for each system for classifying various types of firms. These rules determine how strong the organization scheme is.

	GICS	ICB	TRBC
Dominant Business Segment Threshold	60% of Firm Revenue	51% of Firm Revenue	60% of Firm Revenue
Two Business Lines	Earnings and Market Perception	Accounting Information and Directors' Reports	60% of Firm Assets or Operating Earnings
Three Business Lines	Earnings and Market Perception	Accounting Information and Directors' Reports	51% of Firm Revenue, Assets or Operating Earnings

The higher the threshold for a dominant business segment, the higher the likelihood that company will be classified accurately. As such, TRBC and GICS have the most robust and unambiguous criteria for classifying companies with a dominant business segment.

Sometimes firms have more than one clear line of business—a manufacturing company may also have a financing business. The classification systems vary greatly in their treatment of such firms. ICB reserves the right to classify stocks either by the industrial process they employ or by their end products, a decision not always transparent or obvious to an end investor. GICS' documentation explicitly states that "earnings and market perception" factor into its classification criteria for multiline firms. Ultimately, both ICB and GICS involve some level of judgment that cannot be rules based.

TRBC takes the most standardized approach. For companies with two main lines of business, TRBC first checks to see if either is responsible for at least 60 percent of the firm's assets; if so, the stock will be classified accordingly. If neither business line reaches that number, then TRBC turns to operating profits, again looking for whichever commands a 60 percent share. If neither accounting metric serves to classify a company, Thomson Reuters resorts to market perception.

Should a company possess three or more lines of business, TRBC will conduct the same process, but instead look for a 51 percent threshold in revenue, assets or operating profits, rather than 60 percent. Again, if those metrics fail to distinguish a sector, Thomson Reuters resorts to market perception to classify a company.

Note that TRBC screens three different accounting metrics before settling on indexers' discretion or market perception (a necessarily nonquantitative and subjective measure), which decreases the likelihood that a company will be classified by opinion alone. TRBC's system, with the most layers of objective analysis and the most transparent process, proved to be the standout in this regard.

TESTING THE SYSTEM: EFFECTIVENESS/ROBUSTNESS

Ideally, sector distinctions should be made in a way that clearly segregates sectors by their responsiveness to economic factors. To determine how well each system separates companies with different economic exposures, we studied inter- and intra-sector correlations to measure how companies within each sector behaved relative to each other and how sectors behaved compared with each other. We also looked at case studies to examine the classification rules in action.

Inter-sector correlations measure how each sector's returns over a period of time compare with the returns of other sectors within the classification system. One might expect that a high-quality business classification system would produce a set of top-level sectors that all were as uncorrelated as possible to each other. But remember the overarching criteria: We want to separate firms into groups that respond to the same economic/market factors. There are some economic factors that might affect more than one group. For example, the cost of capital should affect all capital-intensive firms, whether in consumer products, manufacturing or finance. The cost of energy should affect energy firms, for example, but it also should affect utilities and industrials. Conversely, we would not expect the cost of capital to greatly influence utilities, or the cost of energy to greatly affect finance. For this reason, we think a good business classification system should show high correlations among sectors that share sensitivities to one or more economic factors, and low correlations among sectors that have disparate sensitivities.

Intra-sector correlations measure how closely securities within a segment move together. We expect that an effective classification system will have high intra-sector correlations, because it will have sorted similar securities into each classification level.

Case studies allow us to see the classification systems' rules in action, and allow us to gauge the common sense, real-life applications of each firm's rule set.

Inter-Sector Correlations

We judge the value of a classification system's distinctions by looking at correlations between sectors. The returns of sectors as a whole are driven in large part by macroeconomic factors such as global GDP, energy prices, population growth and other variables. Some sectors share the same driving forces behind their returns—and respond similarly to them—and thus are highly correlated. Others respond differently to the same driving forces, or are driven by different macroeconomic factors altogether. Below are the summary results of our correlation study. For the full results, please see the appendix.

Inter-Sector Correlations

	GICS	ICB	TRBC
Mean	0.68	0.71	0.72
Median	0.68	0.71	0.81
Min.	0.55	0.56	0.20
Max.	0.89	0.90	0.98
Standard Deviation	0.08	0.09	0.20

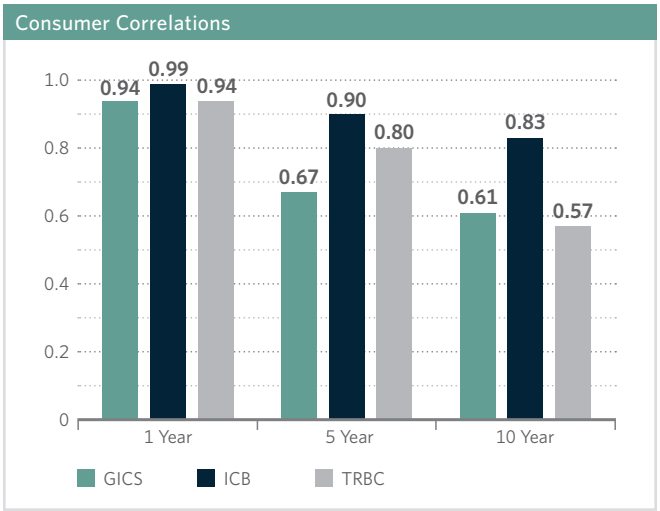
Overall, inter-sector correlations under TRBC show a wide range of correlations, and greater extremes. This corresponds to our expectations that an effective classification system will show very low correlations between truly unrelated sectors, and higher correlations between sectors that share economic exposures. TRBC produces the highest correlation between energy and utilities, with a 98% correlation compared with 66% for GICS and ICB. Energy and basic materials are highly dependent on global rates of GDP, construction spending and mining activity, so we would expect the two sectors to

have strong correlations. TRBC's system manages to do just that, producing a 96% correlation between energy and basic materials, while GICS and ICB produce correlations of 77% and 80%, respectively.

TRBC also produces the lowest inter-sector correlations. The lowest correlation we found—at .20—between consumer noncyclicals and financials, is a result of the fact that the drivers of financials, such as demand for capital, don't apply strongly to the consumer noncyclical companies. TRBC's energy and financial sectors have a correlation of just .31. The economic drivers of financial companies (interest rates and borrowing) are much different than those of energy companies (energy prices, global GDP, US Dollar Index). TRBC's system therefore appropriately distinguishes these companies from one another. In fact, TRBC manages to achieve the widest range of inter-sector correlations, in contrast to GICS and ICB, whose correlations are more concentrated.

The Consumer Issue

Consumer companies are a fertile area for exploring the effects of teasing out economic sensitivities. ICB divides consumer companies into those that provide consumer goods, and those that provide services. GICS and TRBC divide consumer companies—goods and service providers both—by their sensitivity to the business cycle: cyclical or noncyclical goods and services.



The consumer cyclical and consumer noncyclical sectors are a case in which the two sectors share many of the same sensitivities, but respond differently to them. While both are driven by overall consumer spending, in times of falling consumer spending, noncyclical firms fare comparably better. When personal incomes fall, people spend less of their disposable income on luxury goods and more on the necessities. Consumer noncyclical firms selling soap and cereal should therefore be expected to perform better in this environment than consumer cyclical firms selling televisions and handbags. Conversely, as disposable income rises, so should the fortunes of consumer cyclical firms.

We found that the GICS and TRBC classification systems consistently showed lower correlations between consumer sectors than ICB's distinctions did. Over a 10-year period, the TRBC system produced the lowest correlation between these segments, meaning TRBC does the best job of separating consumer companies based on its sensitivity to the economic cycle. ICB's system produced the highest correlation between consumer sectors, making it an imperfect arbiter of consumer companies.

Intra-Sector Correlations

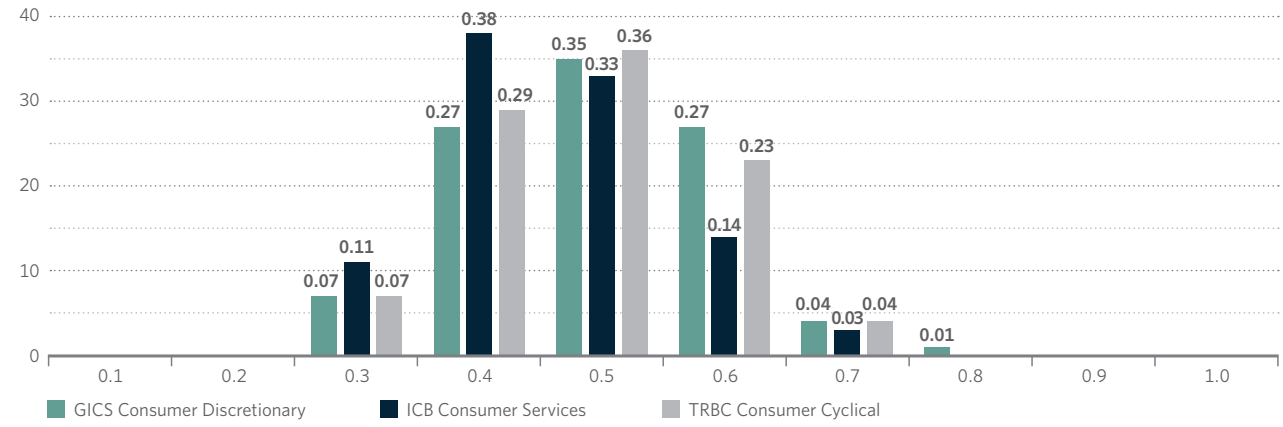
Intra-sector correlations—the correlations between securities in the same sector—should be high in an effective business classification system. This is because the most effective systems should group similar companies together, and should separate dissimilar companies. Sectors built on a sound basis will show lower correlations between sectors, and higher correlations within sectors over a substantial time period. In other words, the underlying stocks

within a sector should behave similarly. Ideally, the behavior of stocks within a single sector is highly correlated, indicating that the businesses are accountable to the same economic forces.

Consumer companies again provide the best place to tease out these economic sensitivities.

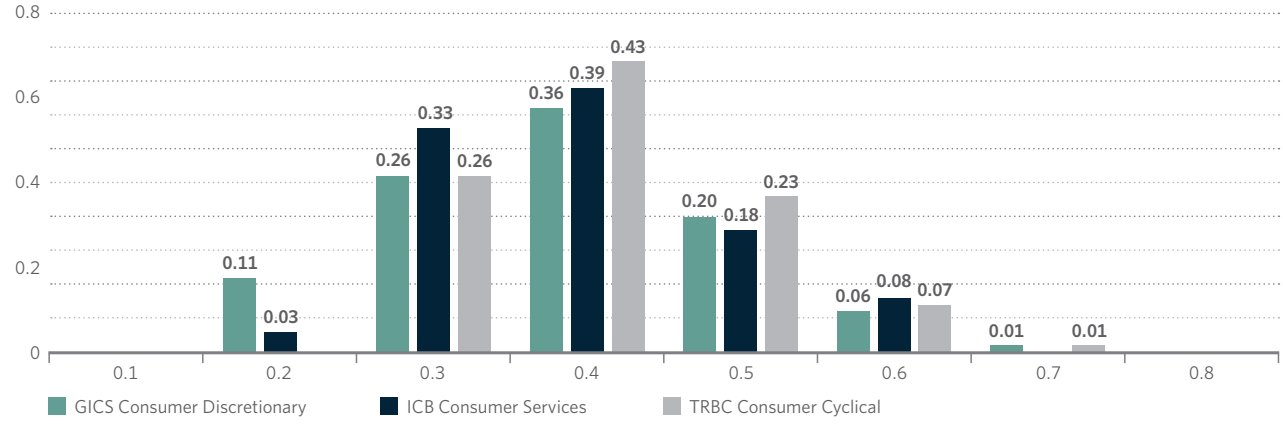
To judge the level of similarity of stocks within a sector, we examined 10 years of returns data for the top 25 holdings of each of the consumer sector indexes (holdings with less than 10 years of data were omitted from our analysis). Here we found that Thomson Reuters' indexes had consistently higher correlations between stocks within each consumer sector. Further, TRBC's correlations exhibited lower standard deviation than ICB, while at the same time achieving higher mean correlations than both GICS and ICB.

10-Year Intra-Sector Correlations



	GICS CONSUMER DISCRETIONARY	ICB CONSUMER SERVICES	TRBC CONSUMER CYCLICALS
Mean	0.44	0.41	0.44
Max.	0.76	0.76	0.98
Min.	0.22	0.19	0.22
Standard Deviation	0.10	0.10	0.10

10-Year Intra-Sector Correlations



	GICS CONSUMER STAPLES	ICB CONSUMER GOODS	TRBC CONSUMER NON-CYCLICALS
Mean	0.33	0.35	0.36
Max.	0.70	0.70	0.70
Min.	0.08	0.16	0.21
Standard Deviation	0.11	0.10	0.09

Case Studies

Finally, to ensure the systems made intuitive and logical sense, we looked at edge cases to evaluate how each system handles potentially confusing situations, and to help us understand the classification systems on an intuitive level.

Amazon: TRBC sorts Amazon into the "Discount Store" subdivision, the same classification used for many traditional brick-and-mortar retail companies. GICS, meanwhile, classifies Amazon into its "Internet Retailers" subcategory. Amazon has clearly indicated its primary business model is to sell high volumes of goods to consumers at a discount; its true competition is far more Wal-Mart than eBay. Therefore, in this case, we find the TRBC and ICB definitions more accurate.

Airlines: TRBC and GICS assign airlines to the transportation sector under industrials. ICB, however, categorizes airlines in the travel & leisure sector—a category that also includes casinos, bars and resorts—under consumer services. Business travel and cargo make up significant portions of the businesses of the largest global airlines, making a travel & leisure segmentation flawed. Segregating airlines into the same bucket as other leisure activities dilutes the travel & leisure segment, as if it were more sensitive to broad economic cycles than it is. In this case, GICS—and again TRBC—make the better choice.

Coal: Like GICS, TRBC classifies coal companies under the energy umbrella, whereas ICB has them as basic materials companies. With such a large portion of the world's current and future energy production coming from coal, investors looking for diversified energy exposure might not get it in an ICB-based index.

OUR CONCLUSIONS

Our assessment is that for the purposes of providing neutral benchmarks, the TRBC system and the indexes based on its classification provide the best fit. TRBC's system covers a wide array of global firms, making its universe both inclusive and expansive. Companies are logically classified and exposures are effectively segregated. TRBC uses the most objective, robust process to determine a company's sector classification. When the lines between sectors are blurred and the economic drivers overlap, TRBC's system reflects this. Evidence of this is borne out by studies of individual industries whose classifications are not black and white. When the cyclicality of the economy should be reflected in the distinction between consumer sectors, TRBC stands tallest. Further, companies classified as existing in the same sector show the highest correlations to one another under the TRBC framework than under that of ICB or TRBC. Finally, TRBC feeds the Thomson Reuters suite of sector indexes whose lack of RIC compliance produces benchmarks that are most accurately reflective of the market. TRBC therefore proved to be the most consistent system available today for the purposes of measuring, comparing and contrasting ETFs claiming to provide certain sector exposures.