

Corficolombiana's PAFF Index

Fundamentally Weighted Equity Index (PAFF by its Spanish initials)

The objective of the fundamental weighting is to

move from a market framework **>>>** to an economic framework

Under an economic framework, the weighting of the investment alternatives will be relative to a measure of economic value.

Various fundamental measures were used for our PAFF indexes.

Theoretical PAFF: Cash Flow from Operations, Revenue, Total Equity and Dividends.

Relative PAFF: Return on Equity (ROE), Return on Assets (ROA), Asset turnover (Sales / Assets) and Operating Cash flow over Sales.

100 = May 2010

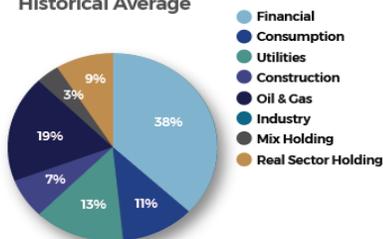


PAFF and COLCAP Indexes

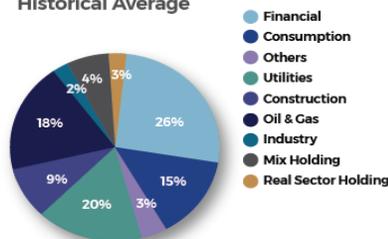
- COLCAP Index
- Relative PAFF (ROE 100%)
- Theoretical PAFF (Equity 100%)

Sources: Capital IQ, Eikon, Superfinanciera and Corficolombiana.

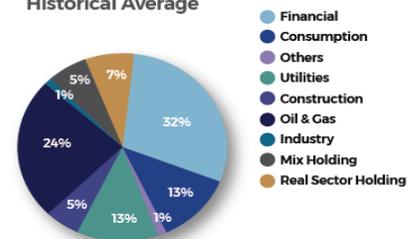
COLCAP Historical Average



Relative PAFF Historical Average



Theoretical PAFF Historical Average



Sources: BVC, Capital IQ and Corficolombiana

¿How is the index calculated?

1. The addition/deletion liquidity criteria used by the PAFF index is the same as that of the COLCAP.
2. We constructed a theoretical PAFF index following "The Fundamental Index" methodology, and a Relative PAFF index, weighted with financial ratios.
3. The variables used in both indexes are obtained quarterly, from the following accounts: assets, equity, intangibles, revenue, operating cash flow and dividends.
4. For each variable, the share of a given company depends on the size of its variable relative to the total.
5. The maximum total weight per company is 20%. The initial size of the index is 1,000 points, beginning in May 2010.
6. The weights are recalculated quarterly, the daily variation of the index is a function of the change in prices.

Fundamentally weighted equity indexes (PAFFs, Spanish initials) for the Colombian stock market

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› Rationale

Measured by the COLCAP capitalization index from 2008 until September 2020, the average annual nominal growth of the Colombian stock market was 1.25% (-2.62% in real terms!). If we take the measure in 2019 to omit COVID-19's effect, the average nominal growth was 4.06% (0.01% real); a deficient performance, specially coming from a "developing" economy.

Is the Colombian stock market accurately measured? The COLCAP index measures the gains (losses) of its member companies' market value of equity, weighted by their free-float market cap (i.e., capitalization index). The inclusion criterion for specific stocks is based on liquidity measures. By the end of September, the member companies' market capitalization (market cap) of the COLCAP index was 80.26% of the total listed companies in Colombia, and the total market cap-to-GDP ratio was 24.83%.

This being the case, **COLCAP's performance is a representative abstraction of the Colombian stock exchange, in the same way other recognized international capitalization indexes represent their markets. This will remain the case when in 2021 the COLCAP is replaced by the MSCI COLCAP index, a capitalization index as well, according to their "Global Investable Market Indexes Methodology"**. The MSCI COLCAP aims to captivate international investors, to that end, the liquidity requirements must be large enough to enable international investors' fluid entrance/exit from the member stocks (and the whole index via ETFs).

A capitalization index is an appropriate market representation, not the only one. It is a useful market benchmark as well, but its structure (weighting) is not necessarily great in terms of an investment portfolio, given this is not the goal of a capitalization index. This being the case and accepting that the market performance of a stock should maintain a relation with its performance metrics, we constructed several stock indexes for the Colombian market, using a fundamental weighting criterion, to obtain an alternative market reading, and accomplish a superior performance from that of the capitalization benchmark (COLCAP index).

Our view recognizes the practical difficulty of "beating" the capitalization indexes with active management, taking positions on the market they represent. In our case, we aim to beat the benchmark passively, by constructing fundamentally weighted indexes.

With this purpose, we build our indexes based on the methodology developed by Arnott, HSU and West, in their book "The Fundamental Index". Furthermore, we

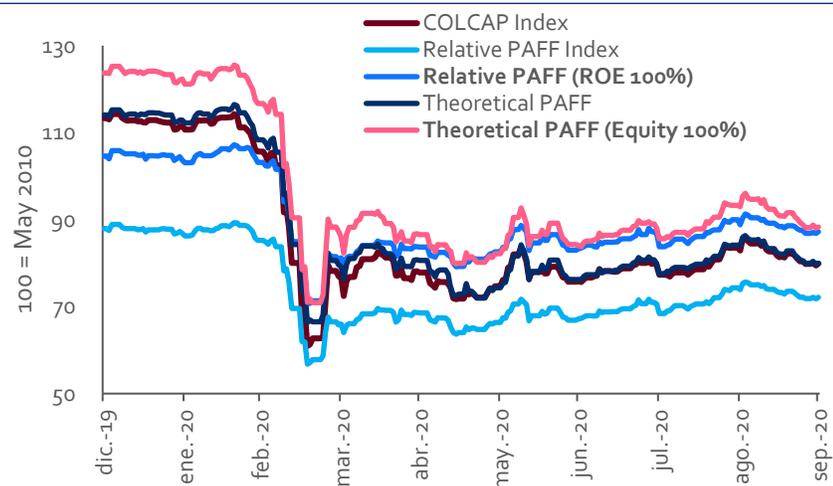
identified a few modifications that can result in superior performance, recognizing that past performance, is not indicative of future results.

Theoretical framework: The fundamental index asserts that a portfolio weighted by an efficiency gauge of a company (fundamental of efficiency weighting), should perform better than one weighted by market cap. Arnott, HSU and West exposed these results for different markets, we evaluated the concept for Colombia:

- Basically and aligned with the comments of Harry Markowitz (Nobel prize in economics) on the fundamental index methodology, **while the CAPM model assumes that future prices are distributed randomly around the actual price, the fundamental model assumes that current prices are distributed randomly around the fair price, and this fair price should be related with the efficiency measures of the companies (return on equity, earnings per share, etc.).**
- **Given that in capitalization indexes, the size of the investment per company is related to the price of its shares, it overweights overvalued stocks and underweights undervalued stocks, limiting future portfolio returns.**
- The goal of fundamental weighting is to shift from a market framework to an economic one. **Under an economic framework, the weight of the investment alternatives will be relative to an economic value gauge (company sales relative to the total sales of member companies, distributed dividends relative to the total dividends distributed, etc.).**
- Several fundamental variables are suitable for our PAFF indexes (Stock Weighting by Fundamental Factors, Spanish initials). **Our fundamentally weighting approach is subject to error of course, but the size of the investment (weight) ceases to be directly and irrevocably associated with price estimation errors.**
- Our **Theoretical PAFF Index for Colombia** uses the variables proposed in the book previously quoted, as well as the methodological description of the FTSE RAFI Index Series (Book value of equity, Sales, Cash Flow and Dividends).
- Our **Relative PAFF index for Colombia**, uses ratios that measure profitability (ROE and ROA) and efficiency (total asset turnover and operational cash margin). These variables were calculated using the same accounts used in the Theoretical PAFF index.
- **The weights of the variables of both indexes are uniformly distributed. Furthermore, the sensibility of risk and return with respect to the weights of each variable was measured in order to obtain optimized indexes, different from those that follow the methodology more squarely. (Graph 1).**
- We used the selection (liquidity) function used by the Colombian Stock Exchange (BVC, Spanish initials) for the COLCAP index, to determine the addition/deletion of companies. In our case, the weight is not determined by stock type but by company, therefore, in the case of companies with more than one stock type in the index, we use the price of the stock that has a higher floating market capitalization.

- On a ten-year period, the performance of the Theoretical PAFF index was similar to COLCAP's, while the Relative PAFF index was considerably lower. However, we highlight that the Relative PAFF's performance during the COVID pandemic market crisis was far superior to both COLCAP and the Theoretical PAFF indexes, falling less and recovering way faster and more.

Graph 1. PAFF Indexes and COLCAP Index



Sources: Capital IQ, Eikon, Superfinanciera and Corficolombiana.

- When loosening the uniform distribution of the weights given to the variables, we were able to obtain superior indexes in terms of risk (market risk) and return compared to the COLCAP. The highest return is obtained when using the book value of equity as the sole weighting variable in the case of the Theoretical PAFF and using only ROE in the case of the Relative PAFF.

› *Index Construction*

PAFF Index construction methodology:

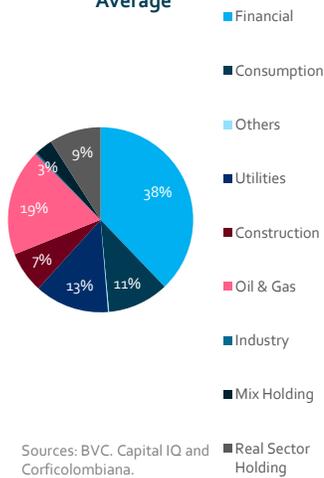
- The selection of the constituent companies follows the liquidity classification scheme used by the Colombian Stock Exchange ("continuous" mode). In particular, the liquidity criteria of COLCAP is based on frequency, turnover and volume data.
- Financial and market information used to build up the index was taken on a quarterly basis from 2Q10 to 3Q20, including the whole universe of companies that have been part of the COLCAP index during this period.
- Daily share prices (calendar days) were used since May 1, 2010. In the case of constituents with both common and preferred shares, the one with the highest free float, according to the Colombian Stock Exchange (BVC, Spanish initials), was used for our index model. Similarly, adjustments were made for those companies' stocks that have undergone splits or reverse splits stocks.

- Following the procedure suggested in "The Fundamental Index" as well as in the FTSE RAFI guidelines, we constructed two indices. The Theoretical PAFF, using accounting financial variables, and the Relative PAFF, which in turn uses financial ratios. Financial ratios were calculated by using balance sheet, income statement and cash flow accounts, collected quarterly.
- The weighting of each issuer within each financial variable is calculated by the participation of the variable of the issuer with respect to the sum of this variable for all the issuers taken into account in the period. All the variables have the same weight, and the total participation per issuer in the index is limited to 20%.
- In the event where a constituent holds a participation greater than 20%, the excess is distributed pro-rata among the remaining companies included that have participations under 20%.
- The PAFF index starts at 1,000 points on May 1, 2010.
- The Index value evolves as a function of the stock price growth of the companies that are part of the index. The index is reviewed on a quarterly basis, establishing new weights based on the fundamental factors explained.
- The PAFF index uses the same treatment as the COLCAP for the entry and exit of constituents due to special corporate events.

Theoretical PAFF Index:

- **Four variables are used to weight holdings in the PAFF Index: Cash Flow from Operations (CFO), Revenues, Total Equity and Dividends.**
- For each quarter, 12-month figures were obtained for Revenues, CFO, Net Income and Dividends, while end of the period figures were taken for the Total Equity Net of Intangibles, Total Equity and Assets.
- The weighting of each issuer within each financial variable is calculated by the participation of the variable of the issuer with respect to the sum of this variable for all the issuers considered in the period.
- The weight of each issuer in the Index was made through a weighted average of the four variables, whose weights are equal (25% each).

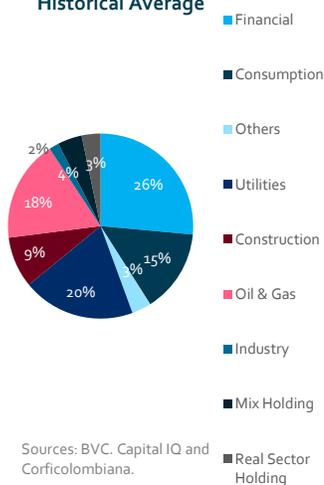
Graph 2. Colcap - Historical Average



Relative PAFF Index:

- The construction of the index was carried out by using ratios and financial indicators. These indicators are Return on Equity (ROE), Return on Assets (ROA), Asset turnover (Sales / Assets) and Operating Cash flow over Sales. Return on equity was calculated using equity without excluding intangibles.
- The Relative PAFF index moves away from the theory consulted at the level of variables but remains within the theoretical framework regarding the relationship expected of the companies' measures of efficiency with its market price.
- Unlike the absolute index, the use of financial ratios implies the weight obtained by each company depends on its efficiency rather than its size.
- The weighting of each company in the index and the weight of variables relative to each other apply the same principle as the Theoretical PAFF index.

Graph 3. Relative PAFF - Historical Average



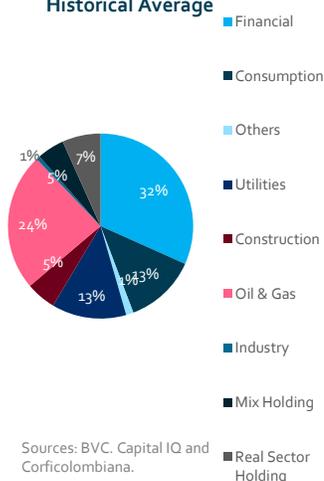
Representativeness

Sectoral Composition:

Regarding the sectoral composition of the PAFF index compared to the COLCAP index, the data is analyzed according to its historical average (until 3Q20) and data from 3Q20. In terms of historical averages, according to our sector classification, the COLCAP index has been highly focused in the Financial Sector (38%) and the Oil & Gas Sector (19%). Historically, both sectors have weighted an average of 57% in the COLCAP index (Graph 2).

On the other hand, PAFF Indexes show a greater representation of economic sectors given a more diversified distribution. In the Relative PAFF index, the Financial Sector has a share of 26%, followed by the Utilities Sector with 20% and Oil & Gas with 18% (Graph 3). Lastly, in the Theoretical PAFF index, the Financial Sector (32%) and Oil & Gas (24%) are the most representative (Graph 4).

Graph 4. Theoretical PAFF Historical Average



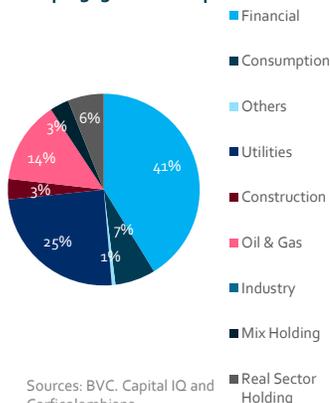
In the case of 3Q20 data, while the COLCAP index has a high concentration in the Financial and Utility sectors, representing 66% of the Index, the Relative PAFF index is more diversified, with the Utilities Sector with 30% of the Index, the Financial Sector with 20% and Oil & Gas with 15%. Finally, the Theoretical PAFF index is heavily concentrated in the Financial Sector (34%) (Graphs 5,6 and 7).

Composition versus GDP:

Overall, equity market indexes are leading indicators that reflect economic and market sentiment; thus, COLCAP should maintain a positive association with GDP growth. However, the sectors and industries that make up the COLCAP index are heavily concentrated on the financial and Oil & Gas sectors, with participations close to 38% and 19% respectively. These sectors are not the most representative sectors of the Colombian economy.

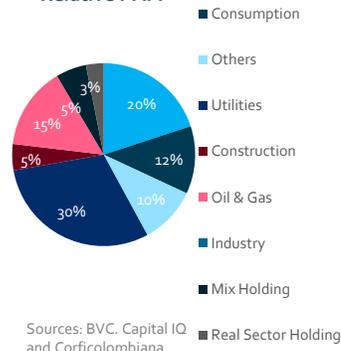
Although the Relative PAFF index manages to increase sectoral representativeness, the universe of publicly traded companies in the Colombian market limits the ability to represent the Colombian economy distribution appropriately. In this sense, both the theoretical and the relative PAFF indexes show similar adjustments to COLCAP since both are weakly correlated with GDP (Graph 8).

Graph 5. 3Q20 Colcap



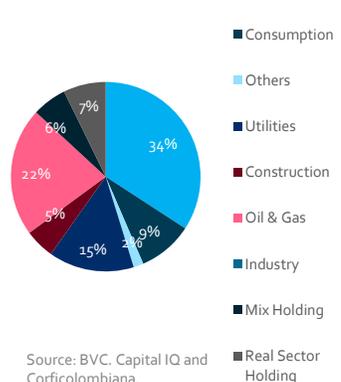
Sources: BVC, Capital IQ and Corficolombiana.

Graph 6. 3Q20 Relative PAFF



Sources: BVC, Capital IQ and Corficolombiana.

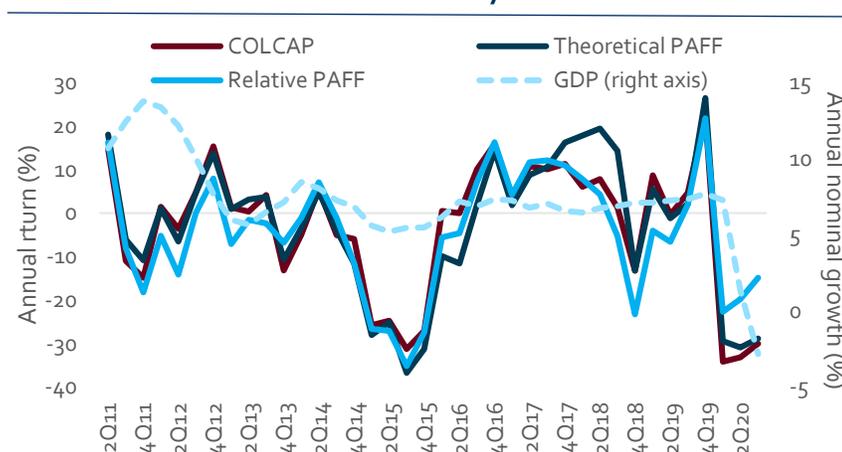
Graph 7. 3Q20 Theoretical PAFF



Source: BVC, Capital IQ and Corficolombiana.

Performance versus GDP:

Graph 8. Performance of the indexes and the economy



Source: DANE, BVC and Corficolombiana

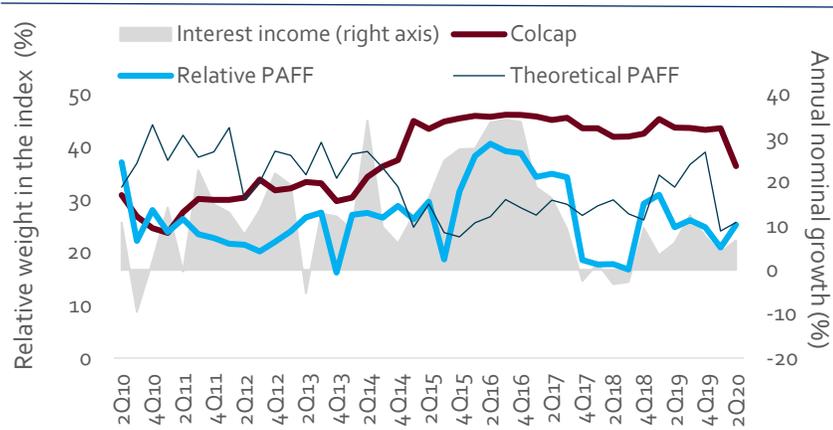
The average annual nominal growth of both COLCAP (-3.9%) and the Relative PAFF (-4.4%) between 2011 and the third quarter of 2020 is well below the nominal growth of the Colombian economy. In general, this is explained by the sectoral composition of the indices and by episodes of volatility induced by political and economic uncertainty across the globe. In particular, the upside potential of the Colombian equity index has been limited by various -and changing factors-, and in the near future, we expect this to continue being the case.

Moreover, with the current expansionary monetary policy stance in both developed and emerging economies, and the depressed stock prices locally, we expect the local market to bounce in the aftermath of the COVID crisis. This will be partially triggered by higher inflows of foreign funds into the equity market, which we expect to favor value driven and cyclical stocks. In line with this, we can infer that both the Theoretical and Relative

PAFF indexes will outperform the COLCAP as they incorporate value driven factors more rapidly.

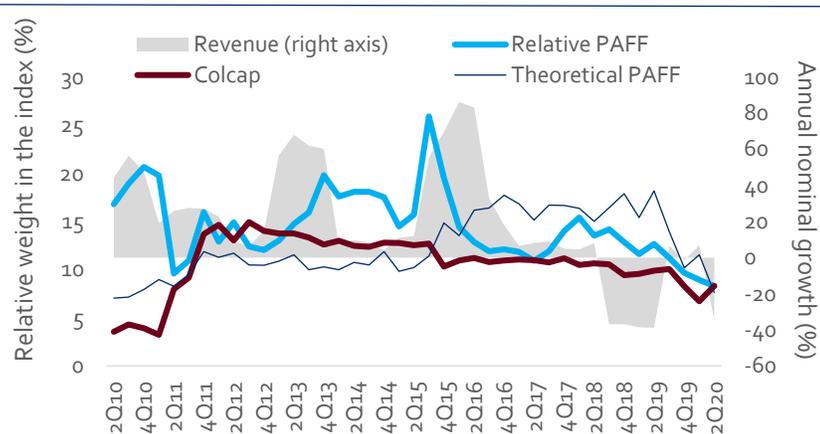
Representative Sectors:

Graph 9. Financial sector participation in the Index



Sources: Capital IQ and Corficolombiana

Graph 10. Consumption sector participation in the Index



Sources: Capital IQ and Corficolombiana

Financial Sector:

The financial sector has made up on average 38.3 % of the COLCAP index since 2010 and when evaluating the sector composition of the index, the financial sector stands as the most important within the broader index. In addition, since its inception, the sector’s relative weight in the index has been relatively stable and immune to financial variables and corporate results of the companies that comprise it.

In contrast, given the incorporation of fundamental variables such as ROE, ROA and Asset Turnover, among others in the Relative PAFF index, the new weights allow the rapid and adjusted rebalancing of financial companies within the index. Once the Colombian banks entered the lower part of the credit cycle, where they experience decelerations in their earnings since 4Q16, the Relative PAFF index responded by reducing its participation from a maximum of 41% to 17% in 4Q18, when the recovery part of the cycle begun.

In general terms, the PAFF indexes show signs of lower sector concentration, allowing for potential better returns on expansionary cycles, while insulating from deteriorating economic environments by leveraging in defensive sectors. In particular, the contribution of the Utility (Energy) sector increased 15 p.p. (percentage points) of participation in the index between 4Q16 and 2Q18, while the financial sector decreased its participation by 21 p.p. during the same period (Graph 9).

Consumption Sector:

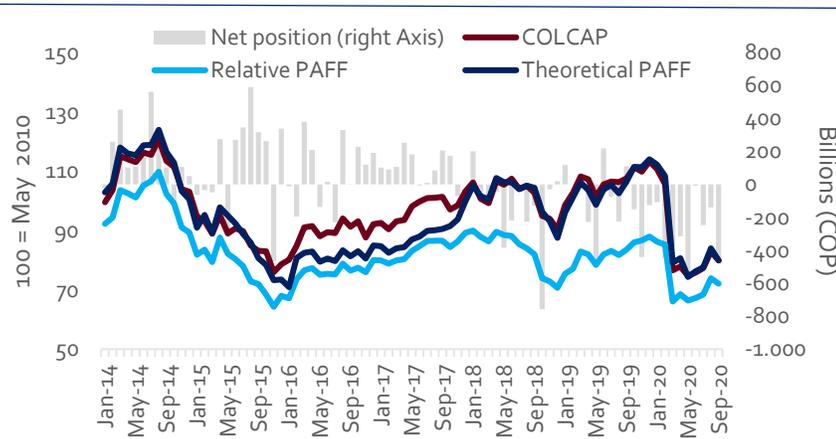
The main consumer companies that make up the COLCAP index are Nutresa and Grupo Exito with participations as of 3Q20 in the index of 6.7% and 0.1% respectively. Both companies have international exposure - to a greater extent Nutresa and belong to the food consumption industry. Their performance has been strongly linked to the behavior of local private consumption, which was the main catalyst of growth for the Colombian economy in 2019. However, the contribution of retail sales in GDP corresponds to 15.6%, relatively above the exposure of the sector in the COLCAP index (10.5%) (Graph 10).

As in the financial sector, the consumption sector's participation in the index has remained relatively stable. This has constrained the index from being able to capture important economic events, while the Relative PAFF index managed to adjust its weighting to relevant corporate movements that took place in 2015, when the financial indicators of Grupo Éxito deteriorated significantly due to the excessive leverage the company incurred in when it acquired GPA. Grupo Exito's price was significantly punished after this acquisition, and the sector's participation in the Relative PAFF index decreased 6 p.p. between 4Q15 and 1Q16.

Given the effect of international sales on these companies, local private consumption partially reflects the corporate results of these companies. Other variables such as the dollar, strength of other economies within the region, and leverage levels, explain part of the fundamentals of these businesses. In this way, the Relative PAFF index incorporates it into its weightings.

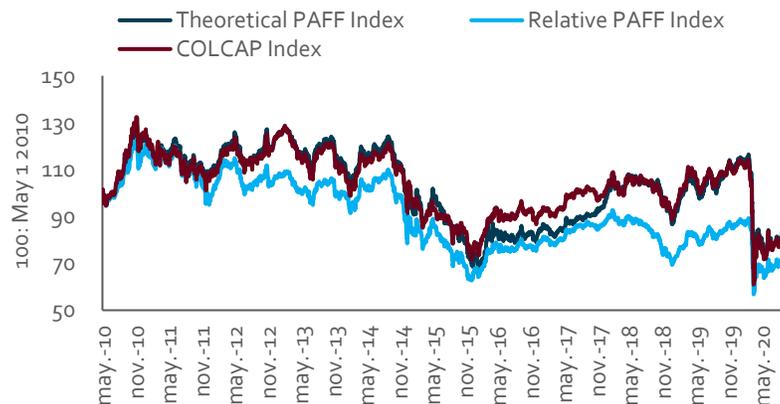
Buyers and Sellers – Foreign:

Graph 11. Foreign investors net position and Indexes



Sources: BVC, Capital IQ and Corficolombiana.

Graph 12. PAFF vs COLCAP



Sources: Eikon, BVC, Capital IQ and Corficolombiana.

So far this year, the COVID-19 pandemic has resulted on greater risk aversion and higher volatility, leading to an outflow of capital from emerging markets to developed ones in search of safe haven assets. Thus, in 2020 foreigners maintained a net selling position in the local stock market, until November (Graph 11). Now, the stocks that have been hit the hardest by the outflow of capital during the most critical period of the crisis corresponded to those of the Financial and the Oil and Gas Sector, especially PF Bancolombia, Grupo Aval and Ecopetrol, with monthly stock price declines in March of 34.6%, 38.1% and 38.8% respectively.

Buyers and Sellers vs indexes:

In 2021, we expect interest rates to remain low in developed countries and an increase in risk appetite. Given that the local stock market remains undervalued, we anticipate a recovery in net inflows from foreigners. In fact, the sharp decline of the COLCAP index

during March and April due to the major sell-off from foreign investors was exacerbated in part due to the market’s strong dependence on the financial and oil & gas sectors. In general, both the COLCAP and the PAFF indexes are contingent to offshore flows, but to a greater extent the COLCAP index. In this sense, offshore purchases of fundamentally undervalued stocks would give higher returns for the PAFF indexes when compared to the COLCAP given their fundamental weighting.

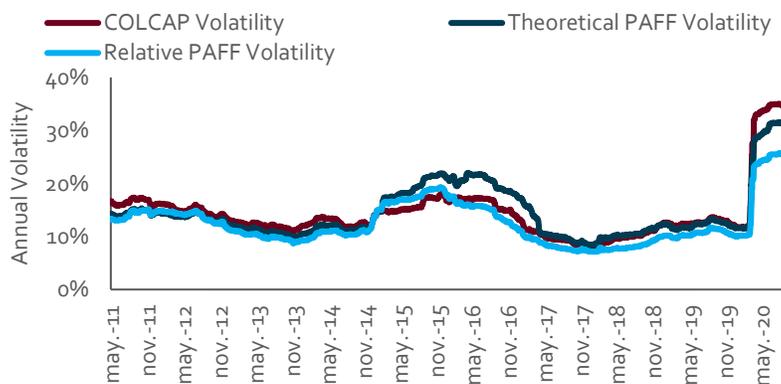
› *Performance*

PAFF Index vs COLCAP Index: The Theoretical PAFF shows a similar behavior to COLCAP’s during various periods, including bear and bull market periods. The Relative PAFF index performs poorly with respect to the other indexes (Graph 12).

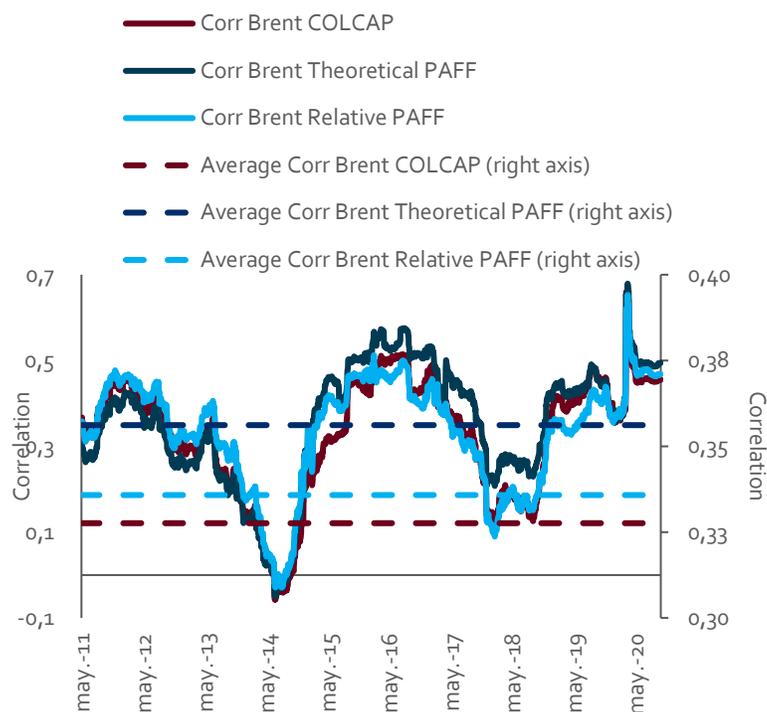
Risk / Return: The Theoretical PAFF Index shows a lower average historical return than the COLCAP, with similar volatility. On the other hand, the Relative PAFF Index has a lower average historical return than the other indexes. Also, its historical volatility is lower, including periods of high volatility and uncertainty, like 2020 (Graph 13). Additionally, the Relative PAFF Index has shown years with higher returns than its peers, particularly in 2013, 2016 and 2020 (LTM as of September 2020), despite being a year with high volatility (Table 1).

PAFF Index VS Oil prices: Analyzing the annual rolling correlation of the COLCAP and the PAFF Indexes against the Brent oil price benchmark, in some periods, the Relative PAFF Index has had a lower correlation with Brent than the COLCAP and the Theoretical PAFF, specially between mid-2016 and 2017, as well as in 2019(Graph 14).

Graph 13. Indexes - Annual Volatility



Sources: Eikon, BVC, Capital IQ and Corficolombiana.

Graph 14. Indexes correlation vs Brent


Sources: Eikon. BVC. Capital IQ and Corficolombiana.

Table 1. Return – Risk

Year	Annual Return			Annual Deviation			Return – Risk Ratio		
	COLCAP	Theoretical PAFF	Relative PAFF	COLCAP	Theoretical PAFF	Relative PAFF	COLCAP	Theoretical PAFF	Relative PAFF
2011	-14.9%	-10.8%	-18.3%	16.2%	14.5%	14.7%	-0.9	-0.7	-1.2
2012	15.4%	13.7%	7.9%	13.0%	12.1%	11.2%	1.2	1.1	0.7
2013	-13.2%	-10.7%	-6.8%	12.0%	10.5%	9.3%	-1.1	-1.0	-0.7
2014	-6.0%	-11.6%	-11.5%	14.0%	13.8%	13.8%	-0.4	-0.8	-0.8
2015	-27.1%	-31.2%	-27.4%	16.9%	21.1%	17.9%	-1.6	-1.5	-1.5
2016	15.8%	14.4%	16.3%	13.2%	17.2%	11.1%	1.2	0.8	1.5
2017	11.3%	16.3%	10.9%	7.9%	8.4%	7.2%	1.4	1.9	1.5
2018	-13.2%	-13.2%	-23.3%	12.6%	12.3%	10.1%	-1.1	-1.1	-2.3
2019	22.6%	26.5%	21.8%	11.7%	11.6%	10.0%	1.9	2.3	2.2
2020	-30.0%	-28.8%	-14.9%	35.0%	31.6%	25.6%	-0.9	-0.9	-0.6
Average	-3.9%	-3.6%	-4.5%	15.3%	15.3%	13.1%	-0.02	0.01	-0.1

Source: BVC. Capital IQ. Eikon and Corficolombiana. 2020: LTM as of September.

› Simulations – Alternatives PAFF Indexes

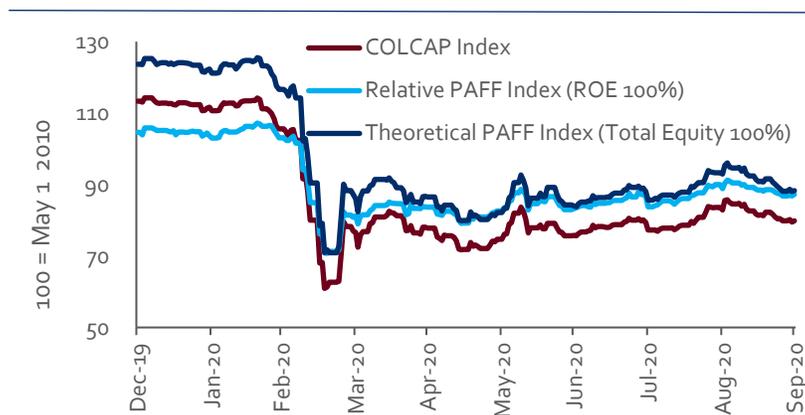
- **Theoretical PAFF Index:** When simulating the weights of the different financial variables included, measuring the ten-year averages since 2010 until September of 2020, it is clear that a smaller loss (-2.5%) is obtained when the index is weighted solely by the book value of equity. This yields an average annual volatility (standard deviation) of 15.4% and a holding period return of -11.7%.

By contrast, the least favorable result is obtained when revenue is used as the only fundamental variable.

- **Relative PAFF Index:** When optimizing returns, the model yields the greatest performance when using ROE as the only fundamental variable (average yearly return for the last ten years). This scenario would yield a -2.6% return, with a yearly average volatility of 12.8% and a holding period return of -12.8%. This result confirms we can obtain a superior performance by using fundamental variables.
- The indexes obtained from this analysis are our flagship indexes, but we maintain the thorough description of the Theoretical PAFF and Relative PAFF, in order to analyze the applicability of the fundamental approach of building market indexes for the Colombian market.

Modifying the weights with respect to the theoretical model, we proved its possible to obtain fundamentally weighted indexes with superior performance when compared to the capitalization indexes (Graph 15).

Graph 15. Alternative PAFF Index



Sources: Capital IQ, Eikon, Superfinanciera and Corficolombiana.

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