NOVA SCHOOL OF BUSINESS & ECONOMICS

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ETB'S VALORATION

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ABSTRACT

The objective of this work is to carry out the valuation of one of the most important companies in the telecommunications sector in Colombia: Empresa de Telecomunicaciones de Bogotá S.A. E.P.S, known and therefore named as ETB, is a Colombian public corporation and public facility, the oldest of Colombia.

The strategic importance of this company is framed in the fact that it has an absolute majority of ownership of the Bogota District in its operation, this way to approach the whole valuation makes it become a benchmark for the valuation of several companies that have state participation. And more than this, it is about obtaining deterministic historical information to try to approximate according to the theoretical foundation of enterprise's valuation, with all its academic improvements, to obtain an implicit value of ETB not only based on its numbers, but also taking into account certain approximations stochastic to reach more solid results. With this, we want to give an objective criterion about the creation of value for a company as important as ETB for the District's economy, since intrinsically it wants to maximize the utility of the shareholders according what Friedman (1970) states about social responsibility.

The way in which it will develop is framed in three essential steps to reach a share value: obtain and process historical information to make cash flow forecasts for the next 5 years, calculate the WACC and with this as rate of discount, reach the intrinsic average price of the share.

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CONTENT

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UNDERSTANDING ETB

Empresa de Telecomunicaciones de Bogotá S.A. E.P.S, known and therefore named as ETB, is a Colombian public corporation and public facility. Created on august of 1884, offering telephone communication services only, by 2019 it offered also household services such as internet and digital television, as well as cellphone services in the whole country's territory, and technology solutions for enterprises and the government.

Its current major shareholder is the city of Bogota's government, and several other State and Public Institutions, holding the 88.3% of its shares, according to the table A1. The other 11.6041% being held by private investors, currently 63.313. The Distrito Capital, the Major's office of Bogotá, has enough shares to influence the most on all important decisions. ETB is therefore a mixed corporation, but ruled by the private law system. However, being a corporation with major participation of the Bogotá's local government, the presidency of the firm and its board has almost always changed by the January next to the year of elections. The new major of the city becomes the head of the board, and names the new CEO of the firm.

Every six months, the Distrito Capital and the representatives of the Minority shareholders (which includes 2 representatives of the investment funds and professional investors, out of a total of 10) must have an assembly where the financial information of the company is presented and discussed (Alcaldía Mayor de Bogotá, 2014). To determine the degree to which this mandatory representation of minority shareholders has led to effective accountability and control of what is going on on the firm is out of scope of this work. However, several concerns exist that the major shareholder might not be acting in the best interest of minority shareholders, as can be seen on Appendix 2. When one takes this into account with the accusations of undue process in contracts assignation and over-reporting of costs, this could lead to the market to make conjectures and corrections on its own on the information displayed by the firm, to make a fundamental based valuation. The greater the correction, the greater the discrepancy

one would observe between the implied share price observed and that resulting on valuation based on official records.

HISTORY

The recent history, that will give context to the current valuation, especially when making assumptions about the future based on the past, is marked by the fluctuation of the corporations capacity of giving profits, during its last four presidencies, starts 2008-2012 period. by then the firm was still giving profits, and was considered a corporation with solid finances. However, there was a real concern that the future didn't depart the same results for the firm, as it was dependent mainly on a service that was in decline: The telephone household service, declining in use in favor of the cellphone service, in which ETB was by then still a new player, with a minor participation on the market. On sight of this, the new presidency on 2012, chosen by the new progressive major of the city, Gustavo Petro, on the head of Saul Kattan, decided it was time to develop a new strategic corporate plan for the modernization of the firm on the next five years.

The jewel of the crown of this new plan was indeed an ambitious plan to create the largest optic fiber network of the city, that would require an investment of a billion pesos, but ended up being of 2.25 billion (Kattan, 2020). In 2014, the firm would launch to the market its interactive TV service, along with 4G cellphone services. In 2015, it would open new offices and client attention points nationwide. The same year, in the middle of a general bullish trend of the market, the price of the stock reached $1200 (Dinero, 2018). On 2006 it was authorized for the Distrito Capital to sell some of the shares it held of ETB, now holding only 86.36%.

RELATIONSHIP BETWEEN SHARE PRICE AND COMPANY'S PERFORMANCE

To meassure the success of the firm during this period is rather puzzling. On the one hand, the share price from 2013 to 2015 of ETB rised by 60%, in a period of bearish tendency of the market worlwide. However, relatively few of the outstanding shares were involved in active trading, as only 0.3% of stock

outstanding was the greatest daily transaction registered during the period, although still a high volume compared with the movement of other Colombian stock (Kattan, 2020). This has lead critiques of the firm's results during this period to say that this prices don't hold a meaningful relationship with the companys performance during that period, again posing more concerns on speculative expectations of future sales as an explanation of that behavior. This could be reasonable, as ETB price share went down during the 2016-2019 period, as it was more and more clear that such a sale woudn't take place, even as the finances of the firm were recovering during the period and it showed outstanding EBITDA margins over its competitors. And also if one considers the whole 2012-2015 period showing an overall downwards tendency, in a period when it was clear that the firm was not for sale due to political conviction of Gustavo Petro's local government (Castellanos, 2020). On the other hand, during the 2012-2015 period the firm distributed dividends even as it faced losses (Dinero, 2018), which might be taken as a decapitalization of the firm. Finally, it must be considered that the dynamism on trade of the stock is fluctuating in time, having entered and being pulled out of the COLCAP index on 2013 and 2019, as it enters and leaves periods of low trade (Blanco, 2020).

The value of the share of ETB is so tied to the political fate of Bogotá and to speculations of its future decisions of selling or holding the firm, that the value of ETB shares dropped 3% after the last Bogotá elections, when major Claudia López was elected, which awakened expectations of neither a future sale nor a future ambitious plan of financing (Amaya, 2019). On the other hand, several concerns on public discussion exist about to what degree ETB is a political enterprise in its day to day operations.

It is out of scope of this work to determine the validity of such claims, but the concerns have to be taken into account in the current analysis for two reasons. First, because these concerns affect directly the cost structure of the firm and its efficiency. Therefore, if with every change in elections, there are new providers and new strategic decisions, then going too much back in history to get financial data to do future projections might be a bad idea. On the other hand, accruing information of only one electoral period would get one a window under which the company was under the same strategic plan, might give

one the most accurate input to make forecasts of cost and performance variables. Especially if it is considered the next government to continue completely or partially the former major's plans, then it might be this frame of time analyzed the relevant one. This lead the choice of the 2016-2019 as it was the period of Major Peñalosa's government, to whom current Major Claudia Lopez has shown some political affinity before.

The involvement in politics and the management of the firm, and the point to which this leads to speculation of the sale of the firm, creates the question of, to what point, discrepancies might exist between the current market valuation of the firm and a valuation based on fundamentals only. This question might be solved by looking at the discrepancies of the market share price with the resulting one of a valuation like the one done in this work.

MARKET SHARE AND POSITIONING

ETB provides its telephone, tv and internet services with both copper and optical fiber cables, the latter with internet speeds of as much as 80 and 3000 MBPS, providing it with the largest optical fiber network of latinamerica. However, its market share is not as big as what its installed capacity would allow.

In these markets, ETB has as main competitors Claro (controled by COMCEL S.A., whose main shareholder is the mexican TELMEX), Movistar, UNE, Tigo, Avantel, Virgin and Directv. Nontheless, not all these firms are competing in the same services or market segments, which makes comparisons imperfect. However, on the services on which ETB is investing more for future results, which are internet for households and mobile services, it is Claro the one ahead, and ETB holding a minoritary market share (Portafolio, 2020).

Graph 1 shows the market shares for 2019 on Bandwith Internet connection. While claro held 48.83% of subsctiptors, with ETB holding only 0.54%. Its closest in comparison where Avantel and Virgin, with 2.29% and 4.36% respectively, while the medium size competitors, Tigo and Movistar, held 17.09% and 24.17% respectively. On the cellphone competition, shares were close to this, with: Claro with 46,93 %, followed by the medium size competitors Movistar (24,26 %) andTigo (17,56 %), and with Avantel

(3,47 %), Virgin 4,51 % and last, ETB (0,59 %). This market share distribution reflects that the Colombian Telecommunications market is characterized for being one of the most concentrated worldwide (Bardey et al., 2020).

Although we cound't find data to make a claim on cost structure of the firms, it must be remarked that the industry services is highly intensive in fixed costs, and presents therefore economies of scale. This creates a relationship between market share and average costs, and terefore, one could speculate that differences in costs with Claro might be huge, while differences with Avantel and Virgin might be rather short. This assumption will be of particular importance to choose the comparison group on the valuation stage of this work.

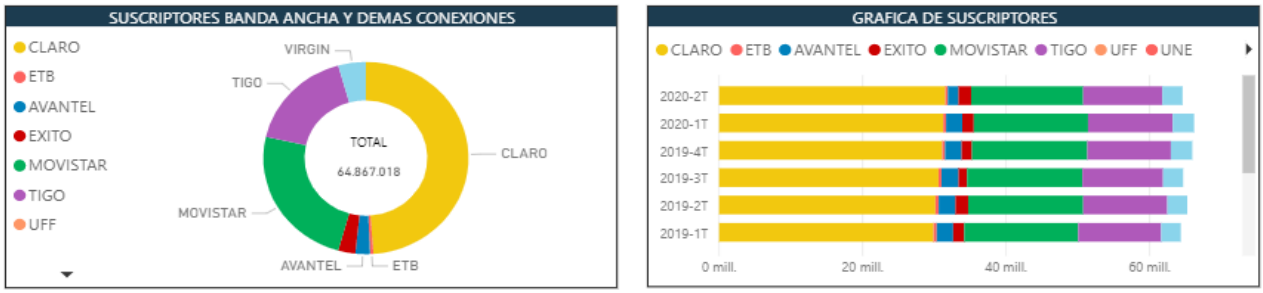

Figure 1. Taken from: https://colombiatic.mintic.gov.co/679/w3-propertyvalue-47274.html

As said before, ETB's bandwith internet speed is definitely the highest of the market. However, on 2018, it was sanctioned by the SIC, the industry regulator of Colombia, due to malfunctions on the internet service provision that lead to relatively low speeds compared with other Latin american countries (Portafolio, 2018). This, however, also applied to Claro, Tigo Une and Movistar, its main competitors and leaders of the market, which then tells more of the industry as a whole than of the firm. On an international internet competitiveness ranking done by World Economic Forum, Colombia is 57 among 140 countries (Portafolio, 2020).

Even though there might be some relative strengths on ETB on its competitors on some services that might be recognized by the market with time, it is a tendency of the market to increase the degree of bundling. Therefore, firms that have dominant position on the voice segment of the mobile services

might eventually use that to get dominant positions on other segments, such as landline communications, household internet and subscription television (Bardey et al., 2020). This in turn would weaken cost advantage on these segments as economies of scale begin to favor the dominant competitor. However, this work will not try to reflect such a complex dynamic structure of demand and costs on the market, which might take more than a decade to consolidate. Rather, it will assume that local conditions of the status quo will hold.

In this status quo, the share ETB holds is enough to hold positive results when operated efficiently. Its net margin has gone from 27% in 2015 (the year before the period of analysis considered in this work) to 37% as will be explained later, which is greater than that of its competitors (Torres, 2020), and its EBITDA margin has been above 40% the last three years. Therefore, one can consider that the market is in a state of competitive equilibrium where the dominant firms are temporarily accomodated and allow for a fringe for smaller competitors, in the absence of sight of new entry threats that could intensify price competition in the short run. This in turn will lead us to assume that the real price of telecommunication services will remain constant during the next five years.

THEORETIC FRAMEWORK

Valuation of Firms are typically done with three approaches: The relative valuation based on multiples of comparable firms, the contingent claim valuation based on option pricing, and the discounted cashflow valuation (Damodaran, 2002). One limitation of the first method is its dependence only on historical data to make future forecasts, without possibility of building counterfactual scenarios for future valuation, or incorporating other relevant information the modeler has (DeMarzo, 2017). On the other hand, the contingent claim valuation might give accurate results, but only for assets that share option characteristics (Damodaran, 2002). When making counterfactuals is important for a Company that holds several kinds of assets, indeed the Discounted Cashflow (ACF) method is the most versatile and transparent of them. Therefore, this is the approach taken.

The ACF method basically valuates a corporation by its capacity of generating future cash for its shareholders and debtholders. This taking into account the relevant financial opportunity cost they face. Therefore, it is critical to be able to make both good cash projections and to calculate the cost of capital. According to Gonzales et al (2020), the process starts with using historical data to build an informed and explicit table of assumptions, that will be the base of future free cashflow projections. Based on these, a financial model is built. The model distinguishes between endogenous variables whose value must be determined by the internal logic of the model (such as the need for loans to have enough cash available or to make temporary investments to use surpluses) and exogenous variables, that depend directly from the assumptions table (like future sales revenue, that depend only on past observations and assumed growth rates of sales). On the other hand, the cost of capital is calculated using information on market interest rates for the part of capital financed with debt, and the CAPM model to asses non-diversifiable risk of equity that requires compensation for the equity part, according to economic literature. A weighted average cost of capital (WACC) is then calculated using the capital structure of the firm as the weights, and this is used as the opportunity cost in de discounting of the projected cashflows.

DFC valuation has shown to work robustly when the firm analyzed is in a mature market and information used was during a stable period and in a stable environment (Damodaran, 2001). However, many times this won't be the case. Several sources of uncertainty will make it likely that point estimates and guesses of future financial variables won't hit the mark, and therefore a deterministic model of valuation might fall short.

Nowak & Hnilica (2012) argue that modelers and decision makers often have some sort of expert knowledge about the nature of this uncertainty. Often it can be modeled as a conjecture of a prior distribution of financial variables. Therefore, when one appeals to deterministic finance models in this setting, then valuable information is ignored. On the other hand, when one uses Montecarlo with a discounted cash flow valuation method (something called the probably-based valuation model on the literature), one addresses some of the weaknesses of an otherwise solid and theoretically sound method

of valuation such as DCF (Ali et al 2020). Moreover, one can think that being risk and uncertainty unavoidable, what determnistic exercises might be doing is to mix in an unclear and black-box fashion the stochastic with the true deterministic variables, hence loosing modeling value as a tools to put explicitly ones assumptions (Janeková and Onofrejová, 2015). Offcorse, such a change in modeling strategy must be justified in answering an important question, which in such a setting, would be whether the top identified sources of uncertainty can in fact jointly vary to an extent that the valuation of the firm might change considerably enough to change financial decisions. It is in this purpose that the Monte Carlo analysis will be done in this work.

However, one possible drawback of MonteCarlo analysis as is usually done is that the distribution of stochastic events is assumed based on historical observations of the variables, and not always future uncertainty will be equal to past one. In such cases, sensitivity to new sources of risk is lost on what is called the tunneling effect (Janeková and Onofrejová, 2015). In those cases, taking a more Bayesian perspective on devicing a prior based on concious knowledge of the distribution one is assuming, might be better. In this setting, Monte Carlo can also be a way in which guesses of expert parties might enter the model.

THE DATA

The data used came from the public financial statements of ETB, which can be found in the investors web page. The data chosen was yearly, for the period 2016-2019. The reason for this is that the firm changed its management in 2016, as a new Major of the city of Bogotá was chosen. This Major made major changes to the strategy of the firm, from its marketing and sales efforts, to its investment schedule and cost structure. These changes abruptly affected the behaviour of many key variables from the start. As the new administration chosen in 2019 is, on the other side, a continuation of Major Peñalosa's efforts, it is reasonable to assume that only the 2016-2019 period is a good source of information to make projections of cash flow.

ANALYSIS

Income Statement

An inspection of the Income Statement on Table A2 shows that a clear change in Trend can be shown in the sales revenue behaviour, starting in 2018, as can be seen on Figure 2. On the other hand, within the first year, the cost to revenues ratio dropped from 70,92% to 61,12% (a considerable 9,6% reduction), and then stabilized around the value of 64%. This shows the degree to which major changes were made under the new management in the cost structure of the firm. EBITDA margin then grew starkly in the first year, going from 29,1% to 35,88%, and then stabilized around 35,4% for the rest of the period. This as the firm shrinked operative costs and increase sales, mainly through new optic fiber subscriptors.

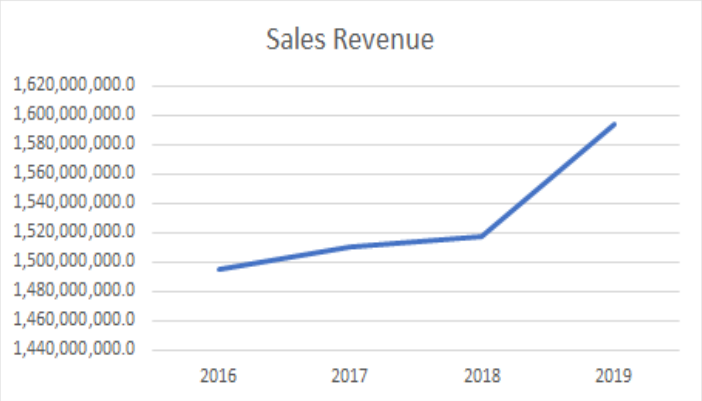

Figure 2: Evolution of Income Statement on period 2016-2019. Source: Financial Statements of ETB.

Depreciation is probably one of the variables that changed the most in its importance during the period, starting at 43% of sales and going down to 28.3%. This as no big new investments were programmed during the period analyzed, while old investments are finishing depreciating on books, and some fixed assets where sold, causing occasional gains (ETB, 2019). This alone was enough to make EBIT rise, and to start being positive on 2018 for the first time in 4 years, and for EBIT margin to keep growing at a 5,86% rate. Lastly, Taxes showed a rather erratic behavior, as the firm was trying to carry forward losses in 2016 and 2017. However, a judicial act ruled in favor of the DIAN, and ordered the firm to pay accumulated taxes. Therefore, in 2018, the firm was paying taxes for three years.

Balance Sheet

It can be seen on the Balance Sheet on Table A3 that the firm had been accumulating increasing amounts of cash and equivalents, and temporary investments, both in absolute terms and as a share of sales revenue. This can be expected from the instructions of Major Peñalosa to stop investment in fixed assets, focusing instead on sales and marketing efforts. Having more revenue from sales, and less projects to invest on, leads to this accumulation of resources. It must be considered that, although it is financially inefficient to hold many unused resources in the public sector, getting those resources back when needed can be a far more difficult task than would if the firm was in the private sector. Therefore, one could find this kind of decision as the second best of the firms, due to the constraints it faces for being a public facility.

Accounts receivable diminished over time in absolute terms when comparing the end and beginning year values, but it can be seen that it has been rising steadily over the last three years. This is reasonable, as ETB's efforts to increase sales has focused on providing solutions to institutional clients, who usually take longer periods of time paying than individual customers.

It must be remarked how, being a public facility that provides a service, more than a product, Inventories are not that important for the firm. Their share of sales revenue is less than 0,01%.

On the other hand, infrastructure, plant and property are a key variable. It can be seen that in absolute terms, the value decreased at rates of around 8% at the beginning of the period, and at a 2,2% at the end. This as the firm sold a few unstrategic assets, while some of the old assets depreciated, while the firm stopped investing on major new assets, considering that the past administration had done enough in this matter, and that the task of the new one was to find a way to monetize that investment effort. The ratio of other asset items to the sales revenues (such as other assets, or intangible assets) remained fairly constant over the period.

On the liabilities side, the firm had been reducing its short term financing, both in absolute terms. At the beginning of the period, they were 4.42 times the value in 2019. This as the firm with increased revenue

was now in capacity of paying some of this debt, and restructuring it, to deal with lower interest rates, as it did when it repurchased its International Global Bond with expiration date on 2023, on 2019 (Becerra, 2019). Something similar happened with other financial obligations, that was just 84% of its value in 2016, although in this case, the debt sometimes increased and decreased during the period, showing no clear trend.

An important liability on Colombian public facilities is the benefits of employees, and the retirement funds. These grew by a factor of 1.32 during the period. Also, long term financial obligations remained constant for most of the period, but reduced sharply the last year, remaining on just 66% of the value they had in 2016. On the Equity side, most variables remained constant for most of the period.

Uses and sources of cash flow

Table A4 shows that during most of the time, Increments on Accounts payable was causing an increase in the cash needs of the firm, while decumulation of Stock was relieving some of these needs. Just by the end of the period, Accounts payable was able to increase, therefore relieving further the cash needs of the firm.

Table A5 shows how investing activities added to the net profit of the firm, while operating and financing activities decreased on both 2016 and 2017. In 2018, things changed, as all activities were adding positive profits to the firm. On the after-tax analysis for this year, one must be careful in remembering that this was the year when the firm was forced to pay taxes of previous years. Therefore, for this year, it would be better to focus on the before-tax analysis. Indeed, in 2019, when taxes were up to date, one can see that operating and investment activities were adding to the after-tax profits, while financing activities were subtracting. Even though this was the first year that the firm could use a tax shield of COP 8.365.143 million, as it was the first time it faced after-tax positive profits.

Table A6 shows that operative activities, jointly, were adding cash to the firm, although at a decreasing rate. Cash added on 2019 was just 68,85% of what was added on 2017. On the other hand, investment activities were draining cash from the firm, but each time less and less. Investment cash flows by 2019

were just 37,5% of what were on 2017, mainly due to a reduction on other non-operational assets, and on reduced CAPEX on the second place. This is according to the new strategic investment plan of the Peñalosa administration. Financing activities drained each time more resources, mainly due to repayment of debt.

VALUATION MODELING: FINANCIAL INDICATORS

To assess the current situation of the firm vis-a-vis the sector, I calculate several standard financial indicators for the firm and compare them with the simple average of four firms, which can be seen on Table A7. The choice of the control group was not easy, as ETB is idiosyncratic among the public facilities. For instance, EPM delivers not only internet service, but other services such as power and water. The same with EMCALI, another big Colombian facility. On the other hand, some of the private competitors, like Claro (owned by Telmex), are too strong on segments in which ETB has no participation, such as television. Therefore, I focused instead on firms that deliver service in the most important segments of ETB, such as optical fiber, landline, and cellphone communication. In this, four firms outstanded: Tigo, Virgin Mobile, Telefonica (owned by Movistar), Avantel and DirecTV. The source of the information was public records, consulted on the EMIS database in October of 2020.

The firm is very different from the benchmark group on the current and quick ratios, having them well above the unity, while the others had them close to 0.6. This can be rationalized, again, by the fact of ETB being a public facility, with more constraints on obtaining quick enough resources for investment or other needs, in a moment when investments have been decreasing this far. Administration might prefer to save those resources for when they are needed then. The amount is so high that it could be used to repurchase all 13% outstanding shares of ETB, and the firm would still hold cash.

The firm also has considerably lower debt than its benchmark group, relative to the amount of assets held, as the debt-to-assets ratio is of just 52.4%, while the one in the benchmark group is of 95.54%.

On the equity side, it must be remarked that several firms in the control group had been having losses for several periods. This, to a point they show negative equity values, as accumulated losses have far exceeded the capital invested. On the only other firm that showed profits,

During the 2016-2019 period, the firm could not have paid its interests at all, only with the operative profits, as those were actually losses. Even in the last year, when operative profits were high, the payment of interests was so high, that the firm still lacked money to pay them, having to use some of the non-operative income to do so. However, before both interest and depreciation, the firm could have paid 5.86 times interest expenses in the last two years, and 6,12 times on average during the entire period. This shows how depreciation of much unused installed capacity is harming the company to a great degree.

The firm has much less days of accounts receivable, and far more days of accounts payable, than the benchmark group. This makes the firm need much less cash on sustaining operations than its competitors, which is another reason why it is accumulating cash so fast. This leads to the firm having a cash cycle of just 10 days, while its competitors have on average a cash cycle of approximately 28.6 days.

Ebitda margin is 13,49% above the average of the benchmark group. Net margin is still negative, but it's not as negative as the average of the control group, being above by 8.36%. It must be remarked that in 2019, the firm got a positive net margin for the first time since 2014. In this year, ROA and ROE were also positive, while the competitors got on average negative returns. However, these returns below 4% are rather low. The Dupont analysis might point out to the cause, as efficiency of assets is rather low. This makes sense considering the amount of unused installed capacity ETB inherited from the past administration. Leverage of ETB is lower by half than the average of the benchmark group. This propagates the effects of the losses competitors got.

Average costs to sales ratio was 33% lower than the average of competitors, that was close to 100%. This as they faced losses most of the period. Capex as a proportion of sales is something all five firms

are similar, as well as de depreciation rate. However, the firm is reducing debt at a lower pace than the average of its competitors.

ASSUMPTIONS

The values assumed for this valuation exercise can be found on table A8. In making these assumptions, I used expectations and forecasts of macroeconomic variables, obtained from the Grupo Bancolombia Inversionistas web page, where they make projections 10 years ahead, updating them every three months. The source was visited in November 2020.

The first and most important assumption made was that revenue would increase at the expected inflation rate. The reason for this was, on one hand, that the country was on the edge of a difficult economic situation (even before covid-19 crisis emerged), and on the other, that the increased competition had driven real prices low to what we expect to be a steady state level. As to 2019, there was no major game changing situation expected, it was reasonable to assume that market shares would remain the same, and that quantities as a whole would increase little, and instead, existing firms would try to gain competitors customers, rather than expanding the market size. Hence, increasing sales at the expected inflation rate would imply a status quo assumption on market shares. I leave for the sensibility analysis chapter an analysis where this assumption is replaced with several possible growth rates of Internet usage brought by the covid-19 crisis, which I assume would only increase market size, but not alter market shares.

Second, I couldn't get from the source data a separation of costs and expenses. However, as this is a services firm, where typically marginal costs are rather low and technologies have great economies of scale with high fixed costs, this should not represent a great issue. Therefore, we assumed that the overall operative costs and expenses-to-sales ratio, would be equal to the value it showed the last 3 years. This is in light of the previous analysis of historical data, where I showed that several key variables showed an abrupt change from 2016 to 2017, and later stabilized or showed a clear smooth trend in the 2017-2019 period. The same reasoning leads to assume the Capex, another cost-related variable (but of long term assets and investments), would behave that way. Depreciation, on the other hand, was assumed

fixed on 10%, as assets of this kind of firm usually depreciate at 10 years. No big investment on amortizables and intangible assets are expected during the next 5 years period of the valuation, as the new Ley de Modernización del Sector TIC of 2019 extended from 10 years to 20 years the time of licence of the electromagnetic spectrum, the main source of investment on intangibles of the sector.

In other variables that showed no clear pattern, but rather showed a structural change in 2019, I assumed the value for the next years would remain fixed on that value. This was done in assumptions over the cashflow rotation days, accounts receivable days, accounts payable days, and stock rotation days. On non-operative variables, it was decided to leave them fixed in their 2019 value. Finally, I assumed there would be no dividends paid.

Projections based on these assumptions, of the Income statement and for the Balance Sheet for the 2019-2024 period are shown in Tables A9A and A9B. Based on these, I will make Cashflow projections for the same period in order to make the valuation of the firm, and to calculate the terminal value, I chose the inflation of Colombia as the growth rate of cash flow beyond year 5. The reasoning to choose this was similar to the one used to project growth of sales revenue during the 5 year forecasted period. Using the Gordon Growth terminal value formula, I get, on year five, a terminal value of COP 1.472.779.714 million.

COST OF CAPITAL

For the cost of capital calculation, I used the Bloomberg database, requested in October of 2020, to get a basket of twenty five firms in the same industry ETB is. The dataset consists of the Raw Beta, the Debt to Equity ratio, and the effective tax rate the enterprise faced, besides its country of origin and market cap. Using each raw Beta, I adjusted it to take into account the leverage the firm has, using the Hamada formula (Hamada, 1972), which makes an assumption that the Beta of debt is zero. Using this formula is reasonable, as ETB held since before the Petro Administration an AAA qualification on its debt given by the Sociedad calificadora de Valores Du and Phelps de Colombia S.A, showing almost unexistent

risk on debt. This situation didn't change much during the Petro Administration despite the three years period of losses.

After doing this, I calculated the average of the adjusted betas, and with the average leverage of ETB, and the legal tax rate in Colombia, to relevered the beta. The choice to use the legal tax rate, rather than the effective tax rate, is because of the anomalous tax situations that happened during the time of study of the firm, in which it tried to do a carry forward of losses, which was rejected by the Tax Authority of Colombia, DIAN. As taxes then were not paid on time, and were paid with sanctions and fees, to calculate an effective tax rate with historical data was misleading.

To calculate the market risk premium for Colombian assets, I used the arithmetic average of the Damodaran database for the market premium on the USA, and added a country risk premium of 2.8%, taken from the Damodaran database. This gives a joint market risk premium for Colombian assets of 9.23%. For the risk free rate, the average of the period, of the same database. This, in turn, results in a cost of equity of 15.81% in dollars. However, as the inflation rates on the USA and Colombia are expected to be different, with the former much lower than the latter, then it would be expected that Colombian peso will depreciate over time in front of the Dollar. Taking into account this, gives a cost of equity, in Colombian pesos, of 17.62%.

Finally, as the interest rate of the loans of ETB has been during the last year equal to the IPC variation plus a 4,15% premium, and as Inflation Rate for Colombia is expected to be of 2% at most during 2020, these result in a credit interest rate of 6,15%. With this value, and assuming the share of debt on total financing of the firm will remain at 43.86%, we would get a WACC of 11,73%, as shown on Table A10.

VALUATION

Table 13 shows the results of the valuation process, with the cash flows projected, the terminal value, and the WACC, as inputs in the calculation. It can be seen that when taking present value on the cash flows, one gets an Enterprise value of COP 1.620.805.638,86 thousands. As the firm currently has debt worth 360.821.019, and has in cash and equivalents 51.175.837, then the Equity value of ETB is of COP

1.311.160.457 thousand. Considering the number of shares, outstanding and in control of public enterprises or entities, is of 3.550.553, then the value of an ETB share, expected by 31 of December of 2019 is of COP 369,28 per share, which is more than $150 pesos above current stock price.

SENSITIVITY ANALYSIS

For the sensitivity analysis, variation of a 10% magnitude (both up and down) was induced on each of the variables relevant from the operative perspective, which are sales growth, costs of goods sold and operational expenditures, cash rotation days, accounts receivable rotation days, stock rotation days, accounts payable rotation days, CAPEX, depreciation of fixed assets, percentage of benefits to employees over the whole costs and expenditures, and taxes. It was calculated then how much the value of the company, as measured by the discounted present value of its cash flows, would change in response to this. Each variation was done one at a time, keeping everything else constant.

Table A13 shows the results of sensitivity analysis. It can be seen that cost of goods sold and operative expenditures is the variable that affects the value of the company the most, as a variation of 10% would induce a variation, of opposite sign, of 71,83% of the company value. This in contrast with the effect of a change on sales growth, which would only cause a 1.01% variation of the same sign. This can be explained by the fact that, as said before, ETB is a consolidated firm, with economies of scale, in a stable market, this far, and it is probably at a really flat part of its average cost curve. Then, increases in sales cause proportional increases in benefits and then, on future cash flows. On the other hand, if fixed costs increase, the degree of operating leverage would decrease, and for all possible amounts of services sold, the margin or profits would be reduced, therefore causing major drops on future cash flows. For similar reasons, it's not surprising that CAPEX variation also caused a major, on the opposite direction, of 32.19% on company value. Indeed, the most strategic decision on the medium run that this firm can do is to take care of its cost structure, and its investment schedule.

Taxes variation can also cause major changes, in the opposite direction, on company value. When taxes decrease 10%, the value of the company rises 7.17%, and when taxes increase 10%, value of company diminishes 7.21%, keeping everything else constant. The lack of symmetry can be explained by the fact that, in Colombia, there is no carry forward allowed, and therefore rises in taxes increase the amount of tax shield if the firm is having profits, but not if the firm is facing losses. On the other hand, a 10% accounts receivable rotation days variation causes a 2,98% decrease. This as, when accounts receivable rotation days increase, the company needs less working capital financing. Depreciation had a high impact of 5.20% on the opposite sign, and this explains the current strategy of ETB of not increasing investment in fixed assets that the firm will be holding but not using at its full potential, as has happened with some of its infrastructure this far.

Finally, the remaining variables had a really low impact on company value. Its not surprising that stock rotation days had a cero effect, as it was seen before that this service company has practically a non-existent stock, as well as its competitors. The percentage of benefits to employees, and cash rotation days, also had a near cero effect.

MONTECARLO ANALYSIS

Sensitivity analysis allowed us to identify the four variables that cause the greater variation of company value, keeping everything else constant, which are costs of goods sold and operational expenditures, accounts payable rotation days, CAPEX, depreciation of fixed assets and taxes. In this, we fixed the degree of variation on 10% for illustrative purposes, but a next question would be, what would happen when the variation is produced as a statistical phenomenon, with some variation values more likely than others. Also, in a more realistic way, what would happen if all four variables could shift at the same time, each following its own stochastic process of motion. Which variable would be responsible the most for company valuation? And how much company valuation could vary, and therefore how much uncertainty on its value are we facing? To answer these questions, a Montecarlo Analysis was done with a thousand simulation runs, using the Crystal Ball extension for Microsoft Excel.

In doing this, the distribution of the Costs and Operative Expenditures variable was assumed to be normal, with mean 66,17% and standard deviation equal to 1,40%. On the other hand, accounts receivable rotation days and effective tax rates variation were assumed to be normaly distributed, with a standard deviation of 10% of its mean, and mean equal to the observed during the 2016-2019 period, which is 68.62 for accounts receivable, and 40.67% for the tax rate. In doing so, the implicit assumption for the Accounts Receivable is that each customer behaves in a random way from the point of view of the firm, taking each year the period of payment from a population normal distribution, that might be particular to him, or common to all customers. Therefore, the law of great numbers would say that, as the number of customers increases, the sum of these random draws of normal values would result in a random normal distribution on itself. For the effective tax case, we are inducing only a 3% standard deviation, as it's not probable a major tax reform on the medium run, and also for convenience, to avoid dealing with problems of negative profits, which would cause negative taxes, which aren't possible in Colombia, as carry forward is not allowed.

Capex was assumed to follow a triangular distribution between 18.77% and 21,63%, and with the most likely value of 20.29%, the middle value between those two. Those values were selected also based on minimum and maximum values observed in the 2016-2019 period.

Results of these exercises are shown in Figures 3 and 4. Figure 3a shows the resulting distribution of Company value. We can see that it has a bell shape form, as consequence of two of the distribution values assumed to be normally distributed. The average valuation value obtained was COP 1.218.196.349,84 miles, with a standard deviation of COP 174.233.135,17 miles. Therefore, with a 95% confidence level, the value of the company can be between COP 892.578.527,93 miles and COP 1.554.771.050.78 miles.

Figure 3b shows the same exercise, but for stock price. Naturally, with the número of outstanding stock fixed, the stock price, which is proportional to Company value, would also follow a bell shaped distribution. It can be seen that the average value was COP 255.89, and the standard deviation would be

49.07. Therefore, with a 95% level of confidence, the stock price will be in the interval between COP 164.18 and COP 350.69.

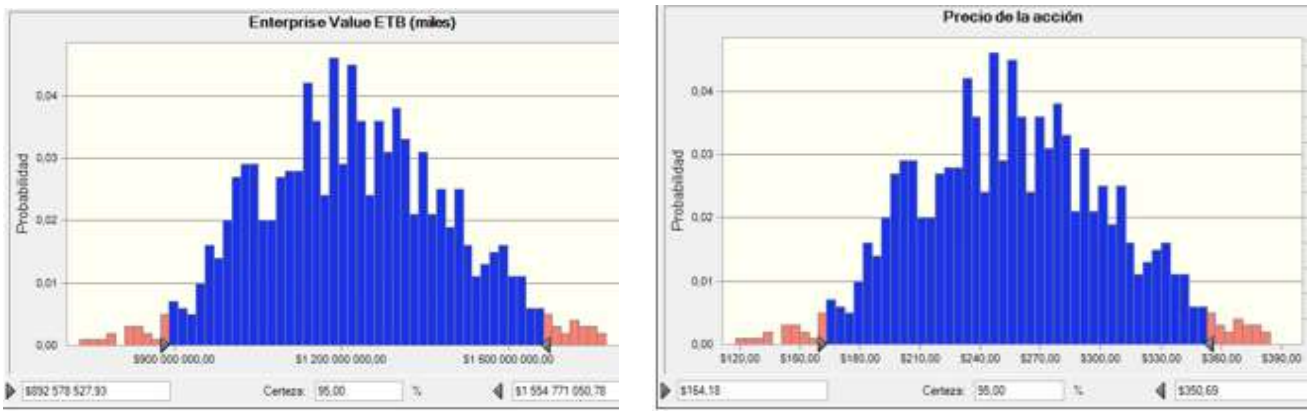

Figure 3: Right panel (a) shows enterprise value while left panel (b) shows stock Price Distribution.

Figure 4 shows how much of the variance of Company Value, and Stock Price Value, can be accrued to each of the four varying variables chosen. It can be seen that Cost and Operative Expenditures is the most responsible for Company Value variation, causing 73.6% of its variance, and having a negative relationship with Company Value, as expected. Next to it, CAPEX variation caused 22.4% of Company Value variation, also in the opposite direction. This confirms the idea that cost structure and investment schedules are the most medium term strategic variables the company should focus on. Accounts receivable rotation days and Effective Tax variation showed shares on Company variance of 2.8% and 1.3% respectively.

Figure 4: Sensitivity of Stock Price to Key Variables

DISCUSSION AND CONCLUSIONS

In this exercise, I have showed that current administrations strategy of capitalizing on previous investment on the optic fiber network (which are entirely a sunk cost by now) with marketing efforts and reducing operative expenditures caused by inefficiencies, are directing the firm into a recovery path. With positive projected free cash flow, and assuming a status quo situation on market shares, using these as inputs of a valuation model of discounted cash flows, I get that the share implicit value is of 350 pesos, on average.

Some key business variables, however, can affect the obtained valuation if one changes their assumed values. Sensitivity analysis identified the most important ones being operative costs, CAPEX, accounts receivable days, and tax the tax rate. However, even considering possible sources of stochastic variation in a Monte Carlo analysis, the resulting implicit value of the share with this fundamental approach is considerably higher than the current market value assigned to it, of 200 pesos. This has been a systematic fact on the behavior of the share price of the firm, with previous valuation efforts giving this kind of result.

As discussed, a probable explanation is that the market has doubts on whether this status quo situation can hold for long, as inefficiencies on previous public administrations had caused the firm to lag in front of its competitors on the telecommunications sector. This makes the value of the share respond more to political changes and to expectations of future sales, than to fundamentals. Therefore, and provided my assumptions are correct, the value I get is the value that current major shareholder would show to an interested buyer that can correct such inefficiencies in a status quo setting, as this would be the value it can generate, at least. To the extent that some additional investments are needed to achieve this, the buyer would object downwards this value. It would be left for future investigation to do this, as this would involve making assumptions about future innovations that can change the structure of the market. However, a status quo situation as the one calculated here is a good starting point to see the degree to which such innovations can affect the company value.

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ANNEXES

Table A1: Ownership Structure		
Public Stockholders	**Número of Shares**	**% Shares**
Distrito Capital	3066154179	86,35%
Universidad Distrital Francisco José de Caldas	71011068	2,00%
Municipio de Villavicencio	757660	0,02%
Gobernación del Meta	615312	0,02%
Empresa de Acueducto y Alcantarillado de Bogotá	1373	0,00%
Fondo de Prestaciones Económicas Cesantias y Pensiones	1373	0,00%
Instituto de Desarrollo Urbano de Bogotá	1373	0,00%
Lotería de Bogotá	1373	0,00%
Total Public Stockholders	3138543711	88,39%
Private Stockholders	**Número of Shares**	**% Shares**
Total Private Stockholders	412099701	11,61%
Total Shares Outstanding	3550643412	100,00%

Table A2. ETB Income Statement				
	2016	**2017**	**2018**	**2019**
Revenues				
Income from Ordinary Activities (Sales)	**1.494.435.049,0**	**1.509.770.488,0**	**1.517.690.241,0**	**1.593.732.281,0**
Cost of goods sold and Operative Expenditures	1.059.847.046,0	968.102.108,0	963.640.054,0	1.054.581.589,0
EBITDA	**434.588.003,0**	**541.668.380,0**	**554.050.187,0**	**539.150.692,0**
Depreciation, Amortizations, and Provitions	645.235.791,0	718.751.679,0	458.782.650,0	452.495.553,0
EBIT	**-210.647.788,0**	**-177.083.299,0**	**95.267.537,0**	**86.655.139,0**
Financial Income	22.172.540,0	12.877.069,0	89.520.682,0	92.676.839,0
Financial Expenses	85.597.933,0	70.619.049,0	94.601.432,0	92.030.691,0
Net Income Before Taxes	**-274.073.181,0**	**-234.825.279,0**	**90.186.787,0**	**87.301.287,0**
Income Taxes	-47.818.215,0	-84.181.505,0	90.436.743,0	7.935.263,0
Net Income	**-226.254.966,0**	**-150.643.774,0**	**-249.956,0**	**79.366.024,0**

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Table A3. Balance Sheet ETB				
	2016	2017	2018	2019
Assets	**$ 4.348.950.928,00**	**$ 4.154.474.820,00**	**$ 4.001.886.856,00**	**$ 3.899.324.260,00**
Current Assets	**$ 686.586.832,00**	**$ 731.004.371,00**	**$ 897.394.203,00**	**$ 930.550.044,00**
Cash Available	$ 42.149.201,00	$ 21.293.455,00	$ 91.136.453,00	$ 51.175.837,00
Temporary Investments	$ 243.705.386,00	$ 273.411.132,00	$ 413.587.103,00	$ 454.113.379,00
Accounts Receivable	$ 380.857.018,00	$ 232.673.179,00	$ 243.198.702,00	$ 291.322.149,00
Inventary	$ 9.312.043,00	$ 5.531.577,00	$ 987.818,00	$ 180.857,00
Other Current Assets	$ 10.563.184,00	$ 198.095.028,00	$ 148.484.127,00	$ 133.757.822,00
Long Term Assets	**$ 3.662.364.096,00**	**$ 3.423.470.449,00**	**$ 3.104.492.653,00**	**$ 2.968.774.216,00**
Net property, plant and equipment	$ 2.624.646.899,00	$ 2.377.348.420,00	$ 2.185.585.148,00	$ 2.137.536.654,00
Net Deferred and Intangibles	$ 458.535.525,00	$ 423.726.129,00	$ 385.107.313,00	$ 390.189.437,00
Other Assets	$ 575.182.181,00	$ 618.396.409,00	$ 529.800.699,00	$ 437.048.634,00
Investments	$ 3.999.491,00	$ 3.999.491,00	$ 3.999.493,00	$ 3.999.491,00
Total Assets	**$ 4.348.950.928,00**	**$ 4.154.474.820,00**	**$ 4.001.886.856,00**	**$ 3.899.324.260,00**
Liabilities	**$ 2.344.045.132**	**$ 2.291.355.766**	**$ 2.098.522.742**	**$ 1.873.879.063**
Current Liabilities	**$ 682.806.131**	**$ 575.395.486**	**$ 599.139.982**	**$ 718.505.387**
Short Term Financial Obligations	$ 29.829.099	$ 10.012.587	$ 11.721.605	$ 6.747.019
Providers	$ 152.171.036	$ 133.831.106	$ 117.509.551	$ 157.115.809
Other Financial Obligations	$ 293.364.105	$ 176.173.776	$ 183.591.029	$ 246.824.541
Other Current Liabilities	$ 107.087.315	$ 104.198.308	$ 127.156.903	$ 128.580.621
Benefits to Employees	$ 57.683.675	$ 75.897.338	$ 64.843.059	$ 76.055.104
Current Taxes Liabilities	$ 42.670.901	$ 75.282.371	$ 94.317.835	$ 103.182.293
Long Term Liabilities	**$ 1.661.239.001**	**$ 1.715.960.280**	**$ 1.499.382.760**	**$ 1.155.373.676**
Long Term Financial Obligations	$ 530.180.000	$ 530.180.000	$ 530.180.000	$ 354.074.000
Other Long Term Liabilities	$ 1.131.059.001	$ 1.185.780.280	$ 969.202.760	$ 801.299.676
Equity	**$ 2.004.905.796**	**$ 1.863.119.054**	**$ 1.903.364.114**	**$ 2.025.445.197**
Capital	$ 1.924.419	$ 1.924.419	$ 1.924.419	$ 1.924.419
Reserves	$ 1.581.081.044	$ 1.570.451.023	$ 1.570.451.023	$ 1.570.451.023
Premium on placement of shares	$ 262.471.466	$ 262.471.466	$ 262.471.466	$ 262.471.466
First Time adoption	$ 851.454.850	$ 851.454.850	$ 851.454.850	$ 851.454.850
Accumulated Loss	-$ 701.945.212	-$ 851.923.390	-$ 851.186.471	-$ 772.202.464
Other Integral Result	$ 2.432.342	$ 22.844.401	$ 63.797.862	$ 106.513.223
Non Controled participations	$ 7.486.887	$ 5.896.285	$ 4.450.965	$ 4.832.680
Total Equity + Liabilities	**4.348.950.928,0**	**4.154.474.820,0**	**4.001.886.856,0**	**3.899.324.260,0**

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Table A4. Sources and Uses on KTNO Accounts

	2016-2017			2017-2018			2018-2019		
	Variation	Source	Use	Variation	Source	Use	Variation	Source	Use
Accounts Receivable	-$ 148.183.839	$ 148.183.839		$ 10.525.523		$ 10.525.523	$ 48.123.447		$ 48.123.447
Inventaries	-$ 3.780.466	$ 3.780.466		-$ 4.543.759	$ 4.543.759		-$ 806.961	$ 806.961	
Accounts payable	-$ 18.339.930		$ 18.339.930	-$ 16.321.555		$ 16.321.555	$ 39.606.258	$ 39.606.258	
Benefits of Employees	$ 18.213.663	$ 18.213.663		-$ 11.054.279		$ 11.054.279	$ 11.212.045	$ 11.212.045	
Current Taxes Liabilities	$ 32.611.470	$ 32.611.470		$ 19.035.464	$ 19.035.464		$ 8.864.458	$ 8.864.458	
Total Uses and Sources		**$ 202.789.438**	**$ 18.339.930**		**$ 23.579.223**	**$ 37.901.357**		**$ 60.489.722**	**$ 48.123.447**
KTNO	**-$ 184.449.508**	**$ 184.449.508**		**$ 14.322.134**	**-$ 14.322.134**		**-$ 12.366.275**	**$ 12.366.275**	

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Table A5. ETB's Income Statement dissaggregation

2016	Consolidated	Operational	Financing	Investment
Revenues				
Income from Ordinary Activities (Sales)	$ 1.494.435.049	$ 1.494.435.049		
Cost of goods sold and Operative Expenditures	$ 1.059.847.046	$ 1.059.847.046		
EBITDA	**$ 434.588.003**	**$ 434.588.003**	**$ -**	**$ -**
Depreciation, Amortizations, and Provitions	$ 645.235.791	$ 645.235.791		
EBIT	**-$ 210.647.788**	**-$ 210.647.788**	**$ -**	**$ -**
Financial Income	$ 22.172.540			$ 22.172.540
Financial Expenses	$ 85.597.933		-$ 85.597.933	
Net Income Before Taxes	**-$ 274.073.181**	**-$ 210.647.788**	**-$ 85.597.933**	**$ 22.172.540**
Income Taxes	-$ 47.818.215	-$ 36.752.232	-$ 14.934.480	$ 3.868.497
Net Income	**-$ 226.254.966**	**-$ 173.895.556**	**-$ 70.663.453**	**$ 18.304.043**

2017	Consolidated	Operational	Financing	Investment
Revenues				
Income from Ordinary Activities (Sales)	$ 1.509.770.488	$ 1.509.770.488		
Cost of goods sold and Operative Expenditures	$ 968.102.108	$ 968.102.108		
EBITDA	**$ 541.668.380**	**$ 541.668.380**	**$ -**	**$ -**
Depreciation, Amortizations, and Provitions	$ 718.751.679	$ 718.751.679		
EBIT	**-$ 177.083.299**	**-$ 177.083.299**	**$ -**	**$ -**
Financial Income	$ 12.877.069			$ 12.877.069
Financial Expenses	$ 70.619.049		-$ 70.619.049	
Net Income Before Taxes	**-$ 234.825.279**	**-$ 177.083.299**	**-$ 70.619.049**	**$ 12.877.069**
Income Taxes	-$ 84.181.505	-$ 63.481.831	-$ 25.315.919	$ 4.616.245
Net Income	**-$ 150.643.774**	**-$ 113.601.468**	**-$ 45.303.130**	**$ 8.260.824**

2018	Consolidated	Operational	Financing	Investment
Revenues				
Income from Ordinary Activities (Sales)	$ 1.517.690.241	$ 1.517.690.241		
Cost of goods sold and Operative Expenditures	$ 963.640.054	$ 963.640.054		
EBITDA	**$ 554.050.187**	**$ 554.050.187**	**$ -**	**$ -**
Depreciation, Amortizations, and Provitions	$ 458.782.650	$ 458.782.650		
EBIT	**$ 95.267.537**	**$ 95.267.537**	**$ -**	**$ -**
Financial Income	$ 89.520.682			$ 89.520.682
Financial Expenses	$ 94.601.432		-$ 94.601.432	
Net Income Before Taxes	**$ 90.186.787**	**$ 95.267.537**	**-$ 94.601.432**	**$ 89.520.682**
Income Taxes	$ 90.436.743	$ 95.531.574	-$ 94.863.623	$ 89.768.792
Net Income	**-$ 249.956**	**-$ 264.037**	**$ 262.191**	**-$ 248.110**

2019	Consolidated	Operational	Financing	Investment
Revenues				
Income from Ordinary Activities (Sales)	$ 1.593.732.281	$ 1.593.732.281		
Cost of goods sold and Operative Expenditures	$ 1.054.581.589	$ 1.054.581.589		
EBITDA	**$ 539.150.692**	**$ 539.150.692**	**$ -**	**$ -**
Depreciation, Amortizations, and Provitions	$ 452.495.553	$ 452.495.553		
EBIT	**$ 86.655.139**	**$ 86.655.139**	**$ -**	**$ -**
Financial Income	$ 92.676.839			$ 92.676.839
Financial Expenses	$ 92.030.691		-$ 92.030.691	
Net Income Before Taxes	**$ 87.301.287**	**$ 86.655.139**	**-$ 92.030.691**	**$ 92.676.839**
Income Taxes	$ 7.935.263	$ 7.876.531	-$ 8.365.143	$ 8.423.875
Net Income	**$ 79.366.024**	**$ 78.778.608**	**-$ 83.665.548**	**$ 84.252.964**

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Table A6. ETB's Cashflow State

	2016	2017	2018	2019
Operative Activities				
NOPAT	-$	113.601.468	-$ 264.037	$ 78.778.608
(+) Dep, Amort & Deterioration	$	718.751.679	$ 458.782.650	$ 452.495.553
KTNO	$	184.449.508	-$ 14.322.134	$ 12.366.275
Current Asset				
Accounts Receivable	$	148.183.839	-$ 10.525.523	-$ 48.123.447
Inventary	$	3.780.466	$ 4.543.759	$ 806.961
Current Liabilities				
Accounts Payable	-$	18.339.930	-$ 16.321.555	$ 39.606.258
Benefits to Employees	$	18.213.663	-$ 11.054.279	$ 11.212.045
Curent Taxes Liabilities	$	32.611.470	$ 19.035.464	$ 8.864.458
Cashflow From Operative Activities	**$**	**789.599.719**	**$ 444.196.479**	**$ 543.640.436**
Investment Activities				
Other Net Income	$	8.260.824	-$ 248.110	$ 84.252.964
CAPEX	-$	479.858.032	-$ 139.804.854	-$ 316.777.116
Other Non Operative Assets	-$	217.237.590	-$ 90.565.070	-$ 25.799.971
Cashflow From Investment Activities	**-$**	**688.834.798**	**-$ 230.618.034**	**-$ 258.324.123**
Financing Activities				
Net Non Operative Expenditures	-$	45.303.130	$ 262.191	-$ 83.665.548
Financial Debt	-$	19.816.512	$ 1.709.018	-$ 181.080.586
Other Non Operative Liabilities	-$	65.358.057	-$ 186.201.672	-$ 103.245.854
Equity Variation	$	8.857.032	$ 36.623.114	$ 42.715.059
Dividends	$	-	$ 3.871.902	$ -
Cashflow from Financing Activities	**-$**	**121.620.667**	**-$ 143.735.447**	**-$ 325.276.929**
Cashflow Variation	**-$**	**20.855.746**	**$ 69.842.998**	**-$ 39.960.616**
Opening Balance in Cash and Banks	$	42.149.201	$ 21.293.455	$ 91.136.453
Final Balance in Cash and Banks	**$**	**21.293.455**	**$ 91.136.453**	**$ 51.175.837**
Check	-$	0	$ -	$ 0

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Tabla A7. Indicadores Financieros para la Empresa ETB y Empresas comparables

	2016	2017	2018	2019	Promedio	Promedio Comparables	2019 comparables
Liquidity							
Current ratio	1,01	1,27	1,50	1,30	1,27	0,61	0,65
Quick Ratio	0,99	1,26	1,50	1,29	1,26	0,57	0,69
Endeudamiento							
Debt-to-Assets Ratio	53,90%	55,15%	52,44%	48,06%	52,4%	0,96	-0,43
Debt-to-Equity Ratio	1,17	1,23	1,10	0,93	1,11	-4,13	5,24
Times Interest is Earned (EBIT)	-2,46	-2,51	1,01	0,94	-0,75	-0,34	-0,42
Times Interest is Earned (EBITDA)	5,08	7,67	5,86	5,86	6,12	-1,59	7,71
Rotation (days)							
Sales outstanding (Accounts receivable)	93,02	56,25	58,49	66,72	68,62	40,63	27,99
Inventary	3,21	2,09	0,37	0,06	1,43	16,26	-14,83
Purchases outstanding (Accounts payable)	52,41	50,46	44,51	54,38	50,44	355,31	-304,87
Total Working Capital Days	43,82	7,88	14,35	12,40	19,61		
Cash Rotation Days	10,29	5,15	21,92	11,72	12,27	28,65	-16,38
Other indicators							
Benefits to Employees / Costs and Expenses	5,44%	7,84%	6,73%	7,21%	0,07		
Profitability Indicators							
EBITDA Margin	29,08%	35,88%	36,51%	33,83%	33,82%	20,34%	13,49%
Net Margin	-15,14%	-9,98%	-0,02%	4,98%	-5,04%	-13,40%	8,36%
Operative Margin After Taxes	-11,64%	-7,52%	-0,02%	4,94%	-3,56%	-5,74%	2,19%
Gross Margin After Taxes	N/A	N/A	N/A	N/A		58,23%	-58,23%
ROA	-4,00%	-2,73%	-0,01%	2,02%	-1,18%	0,09%	-1,27%
ROE	-11,29%	-8,09%	-0,01%	3,92%	-3,87%	12,23%	-16,09%
Dupont (ROA)							
Operative Margin After Taxes	-11,64%	-7,52%	-0,02%	4,94%	-3,56%	-4,24%	0,69%
Efficiency (Sales/Assets)	0,34	0,36	0,38	0,41	37,38%	1,32	-94,18%
Dupont (ROE)							
Net Margin	-15,14%	-9,98%	-0,02%	4,98%	-5,04%	-13,40%	8,36%
Efficiency (Sales/Assets)	0,34	0,36	0,38	0,41	0,37	1,32	-94,18%
Leverage (Assets/Equity)	2,17	2,23	2,10	1,93	2,11	4,26	-215,27%
Return On Invested Capital (ROIC)							
Implicit Tax Rate	17,45%	35,85%	100,28%	9,09%	40,67%	-0,54%	41,21%
NOPAT	-$ 173.895.556	-$ 113.601.468	-$ 264.037	$ 78.778.608	-52245613,43	63777966,63	-116023580,1
Net Capital Invested							
Financial Debt	$ 1.691.068.100	$ 1.725.972.867	$ 1.511.104.365	$ 1.162.120.695	1522566507	566782839,79	955783667
Equity	$ 2.004.905.796	$ 1.863.119.054	$ 1.903.364.114	$ 2.025.445.197	1949208540	1630719631	318488909,5
Total Capital Invested	$ 3.695.973.896	$ 3.589.091.921	$ 3.414.468.479	$ 3.187.565.892	3471775047	1413788415	2057986632
ROIC	-4,70%	-3,17%	-0,01%	2,47%	-1,35%	4,51%	-5,86%
Other Analysis							
%Cost and Expenses over Sales Revenue	70,92%	64,12%	63,49%	66,17%	66,18%	99,92%	-33,75%
%CAPEX/Sales Revenue		31,78%	9,21%	19,88%	20,29%	19,85%	0,44%
%Dep&Amort (PPE & Intangibles)	20,93%	25,66%	17,85%	17,90%	20,58%	15,27%	5,32%
%Benefit to Employees (Over Costs and Operative Expenses)	5,44%	7,84%	6,73%	7,21%	6,81%		
%Current taxes Liabilities (Over sales revenue)	4,03%	7,78%	9,79%	9,78%	7,84%	3,26%	4,59%
Debt payment factor		96,46%	100,32%	66,58%	87,79%	188,24%	-100,46%
Non Operative Assets' Interests	2,66%	1,18%	8,17%	9,01%	5,25%	128,14%	-122,89%
% Average interest rate of debt	15,29%	13,07%	17,46%	25,51%	17,83%	64,52%	-46,69%

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Table A8. ETB Valuation Assumptions Table

	2019	2020	2021	2022	2023	2024
Sales growth	5,01%	1,33%	2,46%	3,28%	3,40%	3,60%
%Cost of goods sold and Operative Expenditures	66,17%	66,17%	66,17%	66,17%	66,17%	66,17%
Cashflow rotation (days)		11,72	11,72	11,72	11,72	11,72
Sales outstanding (Accounts receivable)	66,72	66,72	66,72	66,72	66,72	66,72
Inventary	0,06	0,06	0,06	0,06	0,06	0,06
Purchases outstanding (Accounts payable)	54,38	54,38	54,38	54,38	54,38	54,38
CAPEX	19,88%	20,29%	20,29%	20,29%	20,29%	20,29%
Depreciation PPE		10,00%	10,00%	10,00%	10,00%	10,00%
%Benefits to Employees (Of Costs and Expenses)	7,21%	7,21%	7,21%	7,21%	7,21%	7,21%
Interest payed on financial debt (short and long terr	15,27%	15,27%	15,27%	15,27%	15,27%	15,27%
Debt payment factor	0,67	0,67	0,67	0,67	0,67	0,67
Interest payed by temporal investments	9,01%	9,01%	9,01%	9,01%	9,01%	9,01%
Taxes	9,09%	32%	31%	30%	30%	30%
%Dividend payout ratio		0%	0%	0%	0%	0%

Table A9A. Projected Income Statement of ETB for 2019-2024 period

	2019	2020	2021	2022	2023	2024
Revenues						
Income from Ordinary Activities (Sales)	$ **1.593.732.281,00**	$ **1.614.928.920,34**	$ **1.654.656.171,78**	$ **1.708.928.894,21**	$ **1.767.032.476,62**	$ **1.830.645.645,77**
Cost of goods sold and Operative Expenditures	$ 1.054.581.589,00	$ 1.068.607.524,13	$ 1.094.895.269,23	$ 1.130.807.834,06	$ 1.169.255.300,42	$ 1.211.348.491,23
EBITDA	$ **539.150.692,00**	$ **546.321.396,20**	$ **559.760.902,55**	$ **578.121.060,15**	$ **597.777.176,20**	$ **619.297.154,54**
Depreciation, Amortizations, and Provitions	$ 452.495.553,00	$ 252.772.609,10	$ 260.263.131,47	$ 267.810.689,07	$ 275.704.713,88	$ 283.988.289,39
EBIT	$ **86.655.139,00**	$ **293.548.787,10**	$ **299.497.771,08**	$ **310.310.371,08**	$ **322.072.462,32**	$ **335.308.865,16**
Financial Income	$ 92.676.839,00	$ 40.902.907,98	$ 38.627.721,13	$ 43.648.726,09	$ 52.764.350,81	$ 65.205.426,24
Financial Expenses	$ 92.030.691,00	$ 55.103.797,12	$ 36.004.362,57	$ 23.973.228,11	$ 15.962.389,69	$ 10.628.434,50
Net Income Before Taxes	$ **87.301.287,00**	$ **279.347.897,97**	$ **302.121.129,64**	$ **329.985.869,06**	$ **358.874.423,44**	$ **389.885.856,89**
Income Taxes	$ 7.935.263,00	$ 89.391.327,35	$ 93.657.550,19	$ 98.995.760,72	$ 107.662.327,03	$ 116.965.757,07
Net Income	$ **79.366.024,00**	$ **189.956.570,62**	$ **208.463.579,45**	$ **230.990.108,34**	$ **251.212.096,41**	$ **272.920.099,82**

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Table A9B. Projected Balance Sheet

	2019	2020	2021	2022	2023	2024
Assets	**$ 3.899.324.260,00**	**$ 3.953.527.470,84**	**$ 4.093.289.402,08**	**$ 4.285.102.921,60**	**$ 4.518.555.555,92**	**$ 4.786.830.219,13**
Current Assets	**$ 930.550.044,00**	**$ 909.848.031,13**	**$ 974.134.386,34**	**$ 1.087.007.657,84**	**$ 1.237.624.537,07**	**$ 1.418.439.563,81**
Cash Available	$ 51.175.837,00	$ 51.856.475,63	$ 53.132.144,93	$ 54.874.879,29	$ 56.740.625,18	$ 58.783.287,69
Temporary Investments	$ 454.113.379,00	$ 428.853.737,51	$ 484.598.075,53	$ 585.801.812,59	$ 723.925.459,03	$ 891.062.600,56
Accounts Receivable	$ 291.322.149,00	$ 295.196.733,58	$ 302.458.573,23	$ 312.379.214,43	$ 323.000.107,72	$ 334.628.111,60
Inventary	$ 180.857,00	$ 183.262,40	$ 187.770,65	$ 193.929,53	$ 200.523,13	$ 207.741,97
Other Current Assets	$ 133.757.822,00	$ 133.757.822,00	$ 133.757.822,00	$ 133.757.822,00	$ 133.757.822,00	$ 133.757.822,00
Long Term Assets	**$ 2.968.774.216,00**	**$ 3.043.679.439,71**	**$ 3.119.155.015,73**	**$ 3.198.095.263,76**	**$ 3.280.931.018,85**	**$ 3.368.390.655,31**
Net property, plant and equipment	$ 2.137.536.654,00	$ 2.200.879.221,78	$ 2.264.704.100,12	$ 2.331.458.830,49	$ 2.401.507.742,59	$ 2.475.466.776,10
Net Deferred and Intangibles	$ 390.189.437,00	$ 401.752.092,93	$ 413.402.790,61	$ 425.588.308,28	$ 438.375.151,26	$ 451.875.754,21
Other Assets	$ 437.048.634,00	$ 437.048.634,00	$ 437.048.634,00	$ 437.048.634,00	$ 437.048.634,00	$ 437.048.634,00
Investments	$ 3.999.491,00	$ 3.999.491,00	$ 3.999.491,00	$ 3.999.491,00	$ 3.999.491,00	$ 3.999.491,00
Total Assets	**$ 3.899.324.260,00**	**$ 3.953.527.470,84**	**$ 4.093.289.402,08**	**$ 4.285.102.921,60**	**$ 4.518.555.555,92**	**$ 4.786.830.219,13**
Liabilities	**$ 1.873.879.063**	**$ 1.738.125.703**	**$ 1.669.424.055**	**$ 1.630.247.466**	**$ 1.612.488.004**	**$ 1.607.842.567**
Current Liabilities	**$ 718.505.387**	**$ 701.068.575**	**$ 711.147.092**	**$ 724.425.670**	**$ 741.593.078**	**$ 760.203.429**
Short Term Financial Obligations	$ 6.747.019	$ -	$ -	$ -	$ -	$ -
Providers	$ 157.115.809	$ 159.205.449	$ 163.121.903	$ 168.472.302	$ 174.200.360	$ 180.471.573
Other Financial Obligations	$ 246.824.541	$ 246.824.541	$ 246.824.541	$ 246.824.541	$ 246.824.541	$ 246.824.541
Other Current Liabilities	$ 128.580.621	$ 128.580.621	$ 128.580.621	$ 128.580.621	$ 128.580.621	$ 128.580.621
Benefits to Employees	$ 76.055.104	$ 77.066.637	$ 78.962.476	$ 81.552.445	$ 84.325.229	$ 87.360.937
Current Taxes Liabilities	$ 103.182.293	$ 89.391.327	$ 93.657.550	$ 98.995.761	$ 107.662.327	$ 116.965.757
Long Term Liabilities	**$ 1.155.373.676**	**$ 1.037.057.128**	**$ 958.276.963**	**$ 905.821.796**	**$ 870.894.927**	**$ 847.639.139**
Long Term Financial Obligations	$ 354.074.000	$ 235.757.452	$ 156.977.287	$ 104.522.120	$ 69.595.251	$ 46.339.463
Other Long Term Liabilities	$ 801.299.676	$ 801.299.676	$ 801.299.676	$ 801.299.676	$ 801.299.676	$ 801.299.676
Equity	**$ 2.025.445.197**	**$ 2.215.401.768**	**$ 2.423.865.347**	**$ 2.654.855.455**	**$ 2.906.067.552**	**$ 3.178.987.652**
Capital	$ 1.924.419	$ 1.924.419	$ 1.924.419	$ 1.924.419	$ 1.924.419	$ 1.924.419
Reserves	$ 1.570.451.023	$ 1.570.451.023	$ 1.570.451.023	$ 1.570.451.023	$ 1.570.451.023	$ 1.570.451.023
Premium on placement of shares	$ 262.471.466	$ 262.471.466	$ 262.471.466	$ 262.471.466	$ 262.471.466	$ 262.471.466
First Time adoption	$ 851.454.850	$ 851.454.850	$ 851.454.850	$ 851.454.850	$ 851.454.850	$ 851.454.850
Accumulated Loss	-$ 772.202.464	-$ 582.245.893	-$ 373.782.314	-$ 142.792.206	$ 108.419.891	$ 381.339.991
Other Integral Result	$ 106.513.223	$ 106.513.223	$ 106.513.223	$ 106.513.223	$ 106.513.223	$ 106.513.223
Non Controled participations	$ 4.832.680	$ 4.832.680	$ 4.832.680	$ 4.832.680	$ 4.832.680	$ 4.832.680
Total Equity + Liabilities	**3.899.324.260,0**	**3.953.527.470,8**	**4.093.289.402,1**	**4.285.102.921,6**	**4.518.555.555,9**	**4.786.830.219,1**
Check	*0,0*	*0,0*	*0,0*	*0,0*	*0,0*	*0,0*

Table A10. WACC Calculation	
WACC	11,7284%
Inputs for WACC calculation	
Colombian Variables	
R_Debt in Colombia	6,15%
Tax Rate in Colombia	32%
Debt/(Debt + Equity)	43,86%
Equity/(Debt + Equity)	56,14%
USA Variables	
Risk Free Rate on USA	5,15%
Market Risk Premium on USA	9,23%
Beta_equity on USA	0,8514
R_Equity on USA	15,8083%
Adjustments	
Country Risk	2,80%
Liquidity	0%
Size	0%
Control	0%
Expected inflation rate on USA	2%
Expected inflation rate on Colombia	3,60%
R_adusted_equity in Colombia	17,6249%

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Table A11. ETB Valuation

Free Cashflow (FCF)			$	110.141.169	$	133.990.054	$	141.628.790	$	149.154.889	$	154.231.698
Terminal Value (TV)											$	1.965.752.670
FCF + TV	**$**	**-**	**$**	**110.141.169**	**$**	**133.990.054**	**$**	**141.628.790**	**$**	**149.154.889**	**$**	**2.119.984.368**
WACC		11,73%										
g Terminal		3,60%										
Enterprise Value ETB (miles)		**$1.620.805.638,86**										
(-) Current Debt (Thousands)	$	360.821.019										
(+) Cash Balance (thousands)	$	51.175.837										
Equity Value ETB (thousands)	**$**	**1.311.160.457**										
No. Shares (Thousands)		3.550.553										
Share Price	**$**	**369,28**										
EPS		22,5										

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Table 13. Sensitivity Analysis

		Change		Enterprise Value	
Variables		-10%	10%	-10%	10%
Sales Growth	0%	2,53%	3,09%	$ 365,59	$ 373,02
				-1,00%	1,01%
%Cost of Goods Sold and Operative Expenditures	0%	60%	73%	$ 634,54	$ 104,03
				71,83%	-71,83%
Cashflow rotation (days)	0%	10,55	12,89	$ 369,36	$ 369,21
				0,02%	-0,02%
Sales outstanding days (Accounts Receivable days)	0%	60,05	73,39	$ 380,29	$ 358,28
				2,98%	-2,98%
Inventory Rotation Days	0%	0,06	0,07	$ 369,29	$ 369,28
				0,00%	0,00%
Purchases outstanding days (Accounts Payable days)	0%	48,94	59,82	$ 363,35	$ 375,22
				-1,61%	1,61%
CAPEX	0%	18%	22%	$ 477,65	$ 260,92
				29,35%	-29,35%
Depreciation of PPE	0%	9%	11%	$ 350,09	$ 387,53
				-5,20%	4,94%
%Benefits to Employees (as a share of costs and expenditures)	0%	6%	8%	$ 369,28	$ 369,28
				0,00%	0,00%
Taxes	10%	29%	35%	$ 395,76	$ 342,65
				7,17%	-7,21%

APPENDIX 2:

Claims about missmanagement and overcosts

It must be taken into account that several disciplinary processes against directives of the firm have taken place due to doubts about transparency and veracity of some financial information. For example, the Superintendencia Financiera put a fine on CEO Kattan for withholding information from shareholders, and innacurately reporting interest payment in favor of ETB from Claro. This translated in false utilities reported that were latter corrected[1].

On the other hand, claims exist that the local government can remunerate directives regardless of the performance of the firm during the Gustavo Petro administration. According with former CEO Castellanos, this has already happened several times before, paraphrasing him: "The results foreseen by the artists of spreedsheets didn't materialize and pharaoinc processes of unprofitable investment weren't stopped in time" (Kattan, 2020). This led me to decide to make an analysis on a period of time when there were no such big investments that could create doubts on information validity, being the 2016-2019 period a good one in this sense.

Some concerns about contracts being assigned due to political favors[2] are actually solved in courts and have two former ETB directive officers under research by the Fiscalía for undue celebration of contracts that lead to patrimonial detriment of 45.000 million pesos[3]. Some contracts celebrated by the firm on the last years are being invesigated by control entities of the Colombian State, that found some cases of

[1] https://www.eltiempo.com/bogota/recibi-una-etb-en-cuidados-intensivos-ii-opinion-477716

[2] https://www.kienyke.com/bogota/contrato-publicidad-alcaldesa-claudia-lopez

https://www.dinero.com/edicion-impresa/pais/articulo/irregularidades-contratacion-bogota/186208

[3] https://caracol.com.co/radio/2019/02/05/judicial/1549401775_054154.html

https://www.rcnradio.com/judicial/dos-exdirectivos-de-la-etb-responder-por-45-mil-millones-de-pesos

corruption on contracts with private sector contractors that accrue to 3293 million, as well as with other State entities [4].

[4] https://manuelsarmiento.com/graves-casos-de-detrimento-patrimonial-y-corrupcion-en-la-etb/

https://lasillavacia.com/historia/detector-de-mentiras-petro-frente-lio-de-la-etb-51064