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Equity Valuation of BYD Company Ltd.

Luo Yuqi

Master (MSc) in Finance

Supervisor:
PhD Pedro Manuel de Sousa Leite Inácio, Assistant Professor,
ISCTE – University Institute of Lisbon

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BUSINESS
SCHOOL

Department of Finance

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Abstract

BYD Company Limited is a Chinese manufacturing company that operates across five continents, focusing on automobiles, batteries, solar panels, rail transit components, forklifts, and buses. The company has been growing sustainably since its Initial public offering (IPO) in 2002.

This project is dedicated to estimating the fair value of BYD Company Ltd. on December 31, 2020. The valuation is based on a comprehensive analysis of the electric vehicle industry and BYD's past performance as well as its future prospects. After making some key assumptions on future cash flow projection, the free cash flow approach will be used to estimate the fair value of BYD's share on December 31, 2020. And then, the valuation will also be carried out by applying the multiples approach.

The results show that the fair value estimated by the two approaches is contradictory, whereas the free cash flow approaches suggest selling or holding a short position, on the opposite the multiples approach recommends buying or holding a long position on BYD's share. However, considering industry prospects, the long position on BYD's share is highly recommended.

Keywords: BYD Company Ltd.; Electric Vehicle; Free cash flow to the firm; Free cash flow to equity; Multiples; Fair Value

Resumo

A BYD Company Limited é uma empresa industrial chinesa que opera em cinco continentes, focada principalmente na produção de veículos automóveis, baterias, painéis solares, componentes de trànsito sobre carris, empilhadoras e autocarros. A empresa tem vindo a crescer de uma forma sustentada desde o seu IPO realizado em 2002.

Este projeto tem como objetivo a determinação do valor da BYD Company Ltd. a 31 de dezembro de 2020. A avaliação baseia-se numa análise detalhada do sector dos veículos elétricos e da performance passada da empresa, assim como das suas perspetivas futuras. Depois de estabelecer os pressupostos essenciais para a projeção dos cash flows futuros, utilizou-se o método do Valor Atual dos Cash Flows na ótica Firm para estimar o valor das ações da empresa na data referida. De seguida, procedeu-se a uma avaliação baseada no método dos múltiplos.

Os resultados mostram que o valor estimado por estes dois métodos é contraditório, enquanto o valor baseado nos cash flows sugere a venda da ação, já de acordo com o método dos múltiplos se deveria comprar a ação da BYD. No entanto, considerando as boas perspetivas do sector recomenda-se a compra da ação e a sua manutenção em carteira.

Palavras-Chave: BYD Company Ltd.; Veículo Elétrico; Free cash flow to equity; Múltiplos; Justo Valor

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1 Introduction

This project aims to analyze the Chinese fortune 500 company, BYD Company Limited, according to its industry analysis, financial fundamentals analysis, and ultimately find its fair price by valuation models. The valuation results will be used to make an investment recommendation for its potential investors.

During the past decade, the vehicle's exhaust gas emission issue has been increasingly concerned by human-beings. People are demanding a cleaner and safer environment. Therefore, the emerging investment trend, so-called new energy, has attracted many investors' interests in both primary and secondary markets because of its enormous potential. In the US stock market, Tesla's stock price has risen tenfold in the last five years, an excellent example to illustrate investing prospects in this industry. In many aspects, BYD has many similarities with Tesla but is accompanied by a more complicated Chinese market. This case study will not only provide investment recommendations but will also help us to understand this emerging industry.

BYD Company Limited, which mainly produces automobiles, batteries, solar panels, rail transit components, forklifts, and buses, is a Chinese car manufacturing company headquartered in Shenzhen and operating its business worldwide.

The company's evolution can be divided into three phases.

The first phase started as BYD was created by Wang Chuanfu in 1995. In the beginning, they solely produced low-cost batteries relying on low labor costs to make profits. After 1997, the well-known Asian financial crisis hit the battery market, leading the battery's price to decrease by 20% to 40%. Due to that price fall, many foreign battery makers no longer had the advantage of competing with BYD's low-cost battery. Therefore, they got many large orders in the following years. As the battery business grew fast, they eventually became the second-largest battery maker worldwide and were listed on the Hongkong Stock Exchange since 2002.

The second phase started in 2004 when BYD entered the automobile industry by acquiring another company eligible to produce cars. The company quickly identified three development businesses: petrol-powered vehicles, electric vehicles, and hybrid vehicles. Their business

succeeded in the following few years through their mature supply chain. However, a boom always conceals a crisis. In 2008, BYD had widespread quality problems, including sunroofs, power Windows, clutches. After that, the company suffered a significant loss. Although they were experiencing crises, they never gave up on developing a more advanced battery that made them prepared for the new energy era.

The third phase started when many governments worldwide promoted and supported new energy automobiles. Due to the technical advantages of battery and automobile manufacturing experience, they were able to produce new energy vehicles with low cost, zero-emission, and high quality. In the domestic market, they launched new-energy cars and buses with lower prices than their foreign competitors. With their successful marketing campaign, their products are being sold worldwide. The foreign sales account for 15% of their total orders.

This project will first present a literature review, followed by industry analysis and financial statement analysis. After that, to correctly estimate the fair value of BYD Co Ltd, the company will be evaluated by the Free Cash Flow approaches, the Multiples approach, and combining scenario analysis to determine whether it is currently overpriced or underpriced. The investment recommendation is not only going to be based on the comparison between the valuation model price and market price but also market prospect. Theoretically, If the market price is lower than the model price, the investor will be recommended to take a long position on its shares. Otherwise, the investor is recommended to take a short position.

2 Literature Review

Whether financial or real, every asset has an intrinsic value (Damodaran,2012). Thus, asset valuation plays a vital role in investment activity. Luehrman (1997) also emphasizes that valuation is the financial analytical skill general managers want to learn and master more than any other.

Since no one is willing to pay more than fair value in a financial transaction, valuation has been prevailing and widely used for a long time in wide ranges of areas in finance, for instance, corporate finance, M&A deals, and portfolio management (Damodaran,2012).

The valuation is, however, not a static process. The value generated from any valuation model is dynamic and keeps changing with the arrival of firm-specific and market-wide information (Damodaran,2012). Therefore, the value will be quickly adjusted as new information is disclosed.

The equity asset valuation, known as a branch of asset valuation, determines the intrinsic value of equity, which provides a valuable and robust framework for equity investment decisions. More specifically, investors aim to gain profits in the gap between market price and their expected price on equity by applying the model. Therefore, many researchers have developed many valuation methods to ‘properly’ determine an equity's intrinsic value over the past decades. Some of them proved to be practically valid have been widely applied in valuation analysis.

There are three main approaches for equity valuation (Damodaran,2001): The absolute valuation, the relative valuation, and the asset-based valuation.

Although the models mentioned earlier are all common ways to evaluate an intrinsic value of equity, they all have defects and shortcomings. Research by Benninga and Sarig (1997) has provided evidence that it is more reliable to combine more than one valuation approach in the pre-investment analysis. Therefore, the best strategy is to combine different types of approaches to increase its reliability as much as possible.

Before all valuation models are presented, The Capital Asset Pricing Model (CAPM), a vital tool serving all valuation models, should be introduced first. In finance, the CAPM is a far-reaching theory. For example, it determines the capital cost for firms and assesses portfolios' performance (Fama and French, 2004). The formula is as follow:

$$r_a = r_f + \beta\ [\ E\ (r_m) - r_f]$$

(1)

Where r_f = the risk-free rate of return

β = the coefficient of systematic risk

$E\ (r_m)$ = the expected return of the market

The CAPM describes that the expected return on an asset can be measured by the risk-free rate plus a risk premium multiplied by the coefficient of systematic risk (beta), which is based on the risk relation between a specific asset and the market.

The model has limitations in assumptions that are not valid in a real-world situation, such as assumptions on the efficient market and risk-averse investors. Despite many issues, The CAPM is still widely used because of its intuitive information provided to analysts and its ease of use.

The CAPM is a tool to determine the cost of debt and equity in the following discounting cash flow models.

2.1 Absolute Valuation

The absolute valuation model is also named the discounted cash flow model. It determines an asset's intrinsic value based on its fundamentals and financial projections. In practice, the discounted cash flow model underlies much useful information, such as the state of the economy, interest rate level, firm-specific financial position, and market sentiment. Therefore, the discounted cash flow model is considered the most fundamental equity valuation method (Damodaran,2012).

Damodaran (2012) states that the perfect valuation model does not exist, which means that every model has its drawbacks. Absolute valuation is highly sensitive to assumptions related to

the cost of capital and perpetual growth rates. Besides, the precise forecast for cash flow is always subjective and unrealistic, so the valuation is maneuverable by analysts.

All absolute valuation models are a variant of the pure discounted cash flow model. DCF model states that the value of any asset is the present value of future cash flows (Damodaran, 2002; Luehrman,1997). The formula is as follow:

$$Value = \sum_{t=1}^{t=n} \frac{CF_t}{(1+r)^t} \quad (2)$$

Where n = asset life cycle

CF_t= cash flow in period t

r = discount rate reflecting the riskiness of a particular asset

DCF model can be used in different ways depending on the property of cash flow. There are the three most common types of DCF model: (2.1.1) Free Cash Flow to the Firm (FCFF) Model, (2.1.2) Free Cash Flow to the Equity (FCFE) Model, and (2.1.3) Discounted Dividends Model (DDM). Both of those can generate equity value through some adjustments.

2.1.1 Free Cash Flow to the Firm

FCFF approach can be viewed as an indirect approach for equity valuation. Its core logic is to obtain Equity Value (EQV) by adjusting the Firm Value (FV). According to investment valuation (Damodaran,2001), The author summarizes three steps to determining equity value using the FCFF approach.

The first step:

In this step, The Free Cash Flow to the Firm (FCFF) and the weighted average cost of capital (WACC) are calculated.

In plain language, The FCFF is the net cash flow available to all capital providers after paying out operating expenses, satisfying necessary working capital (e.g., inventory), and fulfilling fixed assets (e.g., equipment) investment. It is sometimes also referred to as unlevered free cash flow. This cash flow assumes that the company is in a full equity-funding

state, depreciation is the only non-cash charge within a company, and the tax rate is constant throughout the firm's lifetime. The formula is generally expressed as:

$$FCFF = NI + Depreciation - WCInv - CAPEX + Int(1 - Tax\ rate) \quad (3)$$

WACC is the weighted average cost of capital, and it is used to eliminate the biased of using only one type of cost of the capital resource. In general, WACC reflects more accurate riskiness of a company. To derive WACC, the analyst should preliminarily obtain some parameters: the market value of debt and equity, cost of debt, cost of equity, and tax rate applicable to debt. The formula is as follow:

$$WACC = \frac{E}{D+E} \times R_e + (1 - t) \times \frac{D}{D+E} \times R_d \quad (4)$$

Where R_e = cost of equity

R_d = cost of debt

D and E = market value of debt and market value of capital.

***The second step*:**

Enterprise value is the present value of future FCFF discounted at the weighted average cost of capital (CFA Equity Asset Valuation Workbook, 2010). The formula is as follow:

$$Firm\ value = \sum_{t=1}^{t=n} \frac{FCFF_t}{(1+WACC)^t} \quad (5)$$

Where n = life cycle of a particular company

WACC = The weight average cost of capital

$FCFF_t$ = Free Cash Flow of the Firm in period t

As we observe in the formula, firm value is a synonym of enterprise value (EV).

***The third step*:**

In the final step of the FCFF model in determining equity value, the equity value is derived from the value of the firm minus the market value of the firm's debt (CFA Equity Asset Valuation Workbook, 2010):

$$Equity\ Value = Firm\ Value - Market\ Value\ of\ debt \quad (6)$$

Where Firm value = the value of operating assets (generated from projected FCFF discounting) + the value of non-operating assets (cash, long term investment in stocks or/and debt).

If non-operating assets account for a high proportion of a firm's total assets, the market value of those should be added to FCFF estimates. Otherwise, the biased firm value will mislead our estimation for equity.

In order to obtain an estimated share price, we simply divide the company's equity value by the number of outstanding shares.

In some circumstances, FCFF is more suitable for valuation compared to FCFE. First, it is more appropriate to employ the FCFF model when a firm obtains a negative result in FCFE because discounting a negative FCFE is meaningless. Second, the growth rate of FCFF more clearly reflects the fundamentals of the company compared to the growth rate of FCFE. Third, The WACC is less sensitive to the shift of financial leverage.

2.1.2 Free Cash Flow to the Equity

The FCFE model can obtain equity value directly from the model result without any adjustment. FCFE describes the net cash flow available to shareholders after satisfying the going-concern assumption, paying out interest (after-tax), and adjusting net debt issues (Fernandez, 2019). The formula for calculating FCFE is as follow:

$$FCFE = NI - CAPEX + Depreciation - Changes\ in\ NWC + New\ debt\ iss - Debt\ repayments \quad (7)$$

Where depreciation is regarded as the only non-cash charge.

After projecting FCFE in each period in the future, all FCFE is discounted to present value at the required return of equity. The formula is as follow:

$$Value\ of\ equity = \sum_{t=1}^{t=n} \frac{FCFE_t}{(1+r_e)^t} \quad (8)$$

Where r_e is the required return of equity

Therefore, the estimated share price is obtained by the company's equity value divided by the number of shares outstanding.

2.1.3 Discounted Dividends

When investors buy stocks, they generally expect to get two types of cash flows—dividends during the holding period and price at the end of the holding period (Damodaran, 2012). In the general model, it assumes that a share will be held infinitely. The formula is as follow:

$$Value\ per\ share\ of\ stock = \sum_{t=1}^{t=\infty} \frac{E(DPS_t)}{(1+r_e)^t} \quad (9)$$

Where DPS_t = Expected dividends per share

r_e = cost of equity

The rationale behind this is that the value of any asset is the present value of expected future cash flows (Damodaran, 2012). There are two essential inputs in this model – The required return of equity and Expected DPS.

Gordon (1956) refines DDM by assuming that the dividend grows at a constant rate (g) in perpetuity and the stock value is the present value of the infinite future dividends.

$$Value\ of\ stock = \sum_{t=1}^{t=\infty} \frac{Expected\ dividend\ next\ period}{(r_e - g)} \quad (10)$$

Where $g = ROE \times (1 - payout\ ratio)$

r_e= cost of equity

This model indeed has drawbacks since the perpetual constant growth rate is unrealistic. Besides, the estimated result is highly sensitive to the perpetual constant growth rate assumption, assuming the pay-out ratio and cost of equity are unchanged (Damodaran, 2012).

2.2 Relative Valuation

Relative Valuation is a model that does not rely on a complicated assumption like absolute valuation. It has many advantages compared to absolute valuation: speedy, more understandable, and better reflecting the market mood.

However, every coin has two sides. First, this model sometimes causes inconsistent estimates of equity value because the differences of some critical variables are neglect, such as capital structure, growth, cash flow potential, or risk. Second, the value generated from the model is too high/low when the market is overestimating(underestimating) comparable firms. Last but not least, the relative valuation is, to some extent, vulnerable to manipulation since it lacks transparency in terms of underlying assumptions (Damodaran,2012)

The analysts should cautiously choose comparable firms and try to narrow the biases as much as possible

In relative valuation, the P/E and EV/EBITDA will be presented in turn following the points analysts must cautiously pay attention to it.

2.2.1 Price-to-Earnings Ratio (P/E)

The most commonly used price multiples is the Price Earnings Ratio (P/E ratio). It can be interpreted as the price of earnings, or the years needed to cover the price paid by a shareholder. There are two types of P/E in the market convention: Trailing P/E and Leading P/E. We can get different insightful pieces of information in both. The leading P/E is determined by:

$$Leading\ \ P/E = \frac{Current\ marekt\ price}{projected\ EPS_1} = \frac{P_0}{EPS_1} == \frac{D_1/EPS_1}{r_e - g} = \frac{(1-b)}{r_e - g} \quad (11)$$

Where $P_0 = \frac{D_1}{r_e - g}$ (Gordon growth valuation model)

b = Payout ratio

g = assumed constant growth rate

In leading P/E, one advantage of this approach is that it links a firm's P/E with its fundamentals. However, It helps us understand the variables that may cause these multiples to vary across firms in the same sector. For instance, an analyst could not conclude that the firm with higher P/E is more expensive than with lower P/E when the reason might be that the market evaluates it with a higher growth rate in the future.

Trailing P/E is determined by the last four quarters' earnings; however, combining trailing P/E with leading P/E may give more convincing estimates. The formula is as follows:

$$Trailing\ P/E = \frac{P_0}{EPS_0} = \frac{D_1/EPS_0}{r_e - g} = \frac{(1-b)}{r_e - g} \quad (12)$$

This measure is based on actual performance rather than expected future earnings. However, a firm's previous earnings are not always a good estimator of future earnings, so cautiousness is needed.

2.2.2 Enterprise Value/EBITDA ratio

This ratio is determined by enterprise value divided by earnings before interest, taxes, depreciation, and amortization (EBITDA). The rationale is indifferent to the P/E ratio, but EV/EBITDA considers all capital providers. However, this ratio can be used to supplement the P/E ratio since it provides information about operating results. The formula also could be decomposed into more details:

$$\frac{EV}{EBITDA} = \frac{(1-t) + t \times \frac{Depreciation\ and\ Amortization}{EBITDA} - \frac{Reinvestment}{EBITDA}}{WACC - g_n} \quad (13)$$

2.3 Asset-Based Valuation

The third category is asset-based models, which the valuation is based on the view that equity value is the market value of assets subtracts the market value of liabilities. The model can be simply described by:

$$Equity\ value = market\ value\ of\ assets - market\ value\ of\ liabilities$$

Where the market value also can be interpreted as fair value.

This model has an obvious shortcoming: it is problematic to value a firm with many intangible assets since its market value is difficult to measure. Therefore, this model is often used to value the firm with primarily tangible assets that its market values are ready. Many practical cases also show that supplementing a more forward-looking valuation is more precise, such as a discounted cash flow model.

3 Industry Analysis

3.1 Macroeconomics outlook

3.1.1 GDP growth

Due to border restrictions, limited human capital mobility, and different COVID-19 prevention policies among countries, the world's major economies have all been negatively affected by the covid-19 pandemic to some extent. Further, combined with the deterioration of international relations between China and the United States, the Chinese GDP growth rate has been dragged down to the growth rate of 2.34%, which was a 10-years historical low, according to IMF calculation.

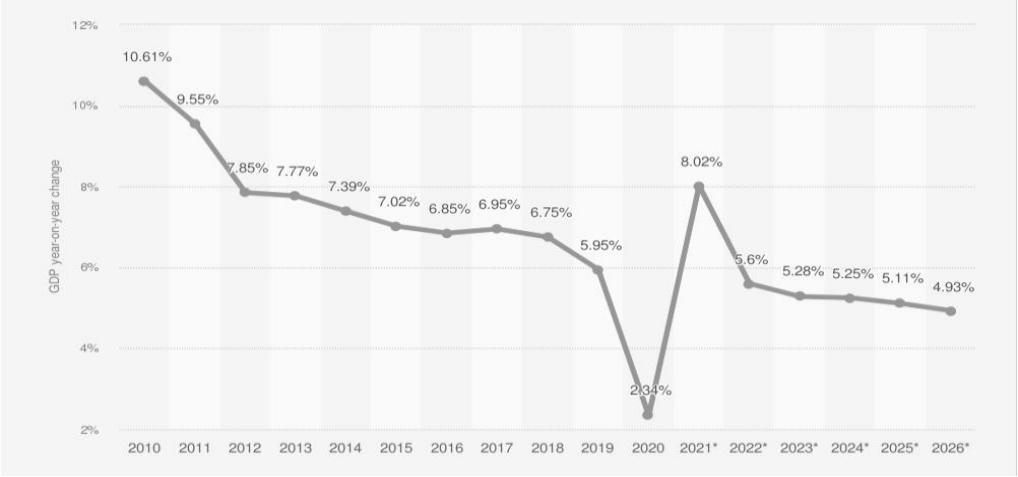

Figure 1 Growth rate of real gross domestic product (GDP) in China from 2010 to 2020 with forecast until 2026

Source: IMF; National Bureau of Statistics of China

As the vaccination progresses, the shocks of COVID-19 on economics will gradually be relieved, and the GDP growth rate is very likely to re-bounce close to the pre-pandemic level. Also, with the stimulus of accommodative monetary policy of lowering the interest rate or reducing the reserve which must be kept in the central bank, the Chinese economy will tend to be more consumption, government expenditure, private investment, and better trade balance. However, the recovery wave in China is forecasted to be quicker and more robust, mainly driven by manufacturing resumption and technology progression and the strong capability of

coordination of resources of the Chinese government. Therefore, the GDP growth is very likely to benefit the value of equity in the years ahead.

3.1.2 Inflation

On the producer's side, the price of raw materials, such as coal, steel, electricity, rose significantly from a year earlier, illustrated by the much deeper slope of the producer price index. Consumers will eventually pay the rising price of energy, car components, and chips in the automobile industry. However, due to income constraints caused by pandemics, consumers are less likely to purchase an automobile in the short run.

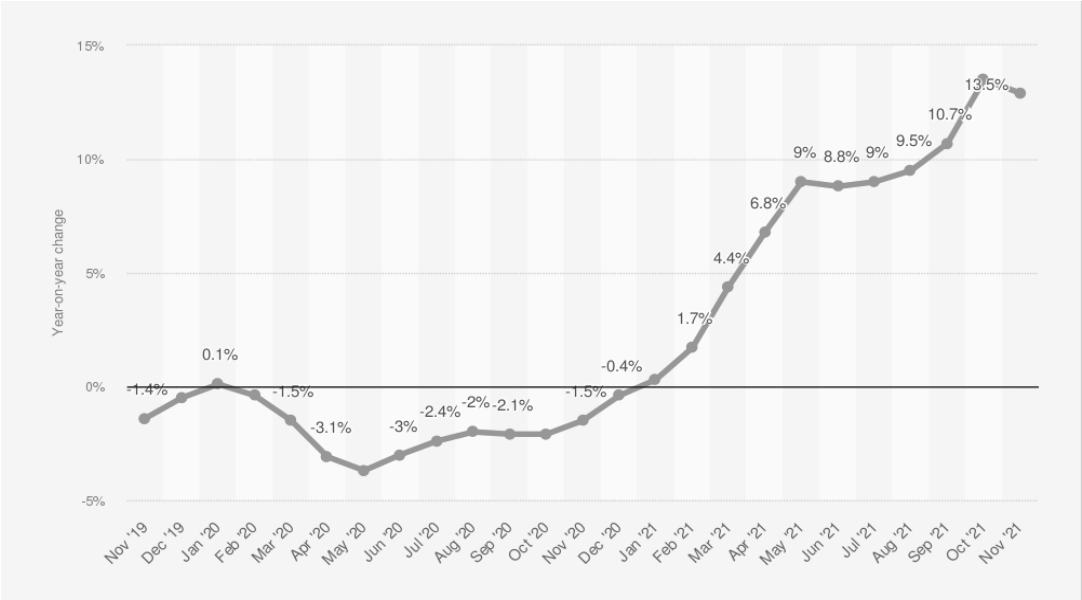

Figure 2: Producer Price Index (PPI) for the industrial sector in China from November 2019 to November 2021

Source: National Bureau of Statistics of China

As the producer PPI evolution showed above, PPI had kept rising since 2020, touching the historically high in November 2021. Since the global economy is suffering low GPD growth rate as well as high inflation, it is evident that the economy is suffering stagflation phase. Hence, inflation will negatively affect the valuation of a company in consumer discretionary, for instance, BYD Co limited, supported by high inflation expectations.

3.1.3 Employment

Apart from peaking up to 4.24 percent amid the pandemic period, the unemployment rate in China has been very stable at the range of 3.62 - 4.14 percent over the past few years, which means unemployment will give a moderate signal to equity valuation. In the post-pandemic phase, unemployment is expected to return to close the pre-pandemic level.

Nevertheless, the recent job-cuts in some Internet companies, such as Alibaba, Tencent, ByteDance, have shown that even monopolies could not grow sustainably and healthily at current economic condition.

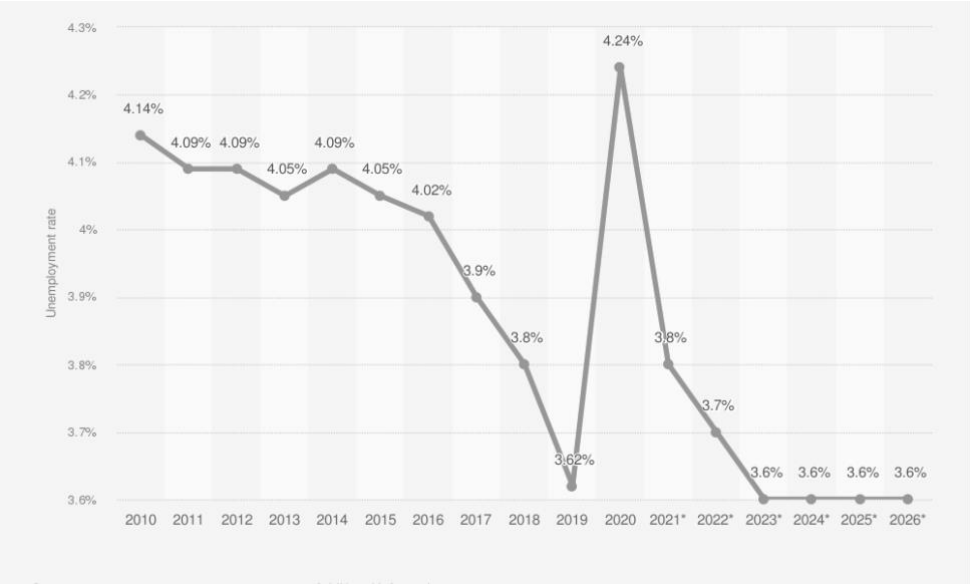

Figure 3: Unemployment rate in China From 2010 to 2020 with forecasts until 2026

Source: IMF; National Bureau of Statistics of China

After rigorously and thoroughly analyzing the macro-economic conditions such as GPD growth, inflation, and unemployment, the moderate impacts of economics on valuation should be included due to uncertain factors in the economy

3.2 Automobiles Industry

Currently, the mainstreams classify automobiles into three categories: HEV (hybrid electric vehicle, plug-in hybrid vehicle), BEV (Battery-electric vehicle), and combustion engine vehicle. In terms of the combustion engine vehicle, the sales growth has been decreasing due to the development of the new-energy vehicle.

3.2.1 HEV (Hybrid Electric Vehicle)

HEV uses a combination of an electric motor and a combustion engine to power a vehicle. This combination can utilize fuel efficiency because the combustion engine will be shut down when an electric motor is sufficient to power the car, reducing the fuel consumed to lower carbon emission.

On the supply side, hybrids are priced 20 percent higher than conventional combustion vehicles. However, the increased price is caused by extra-high-voltage battery packs and an electric engine. For these reasons, consumers are seemingly unwilling to pay this price premium for HEV, and they are more likely to choose the same model with a combustion engine though paying more expensive fuel costs in the long term. Nowadays, HEV, alongside EV and PHEV, allow consumers to get financial benefits and incentives from the government if they purchase these kinds of cars to promote a more environmental-friendly world. Following the forecasting map below, In Asian and European markets, the growth of HEV is higher than in the other parts of the world, which is a niche market since these two continents consist 69.1% of the global population.

Figure 4: Hybrid Vehicle Market – Growth Rate by Region (2021-2026)

Source: Mordor Intelligence

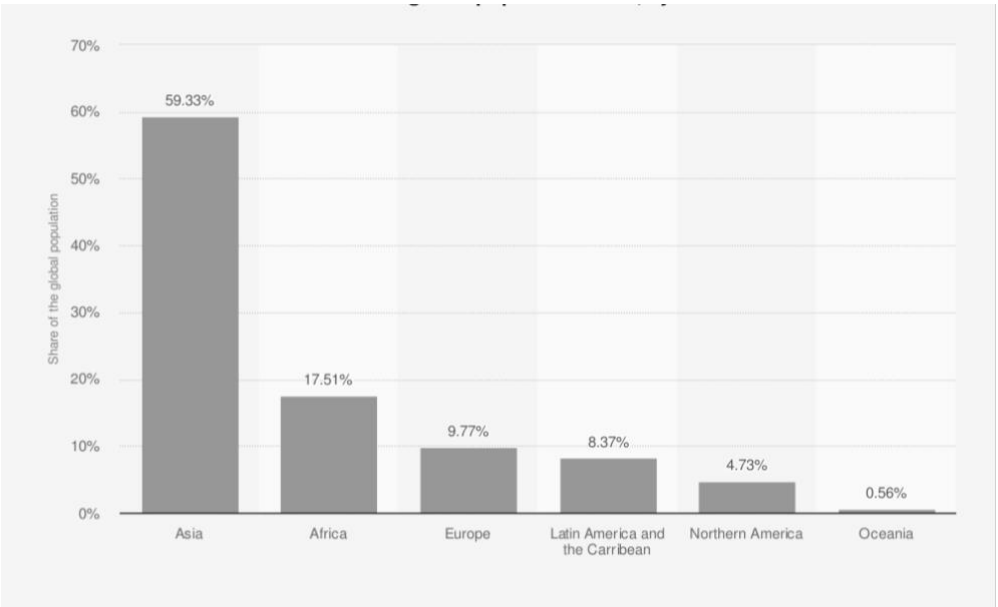

Figure 5: Distribution of global population 2021, by continent

Source: Population Reference Bureau

3.2.2 PEHV (Plug-in electric hybrid vehicle)

Like HEV, PHEV is powered by a gasoline engine and chargeable battery. Compared with HEV, PHEV can operate solely by electricity, which HEV cannot. The most successful model in the market is the Toyota Prius, and this product has been a best seller in the PEHV market over the past 20 years.

As BEVs have been emerging and growing exponentially, consumers are shifting from PHEV to BEV because BEV has no expensive fuel fee and much lower maintenance cost overall. Given the graph with sales data of Prius in the United Kingdom from 2008 to 2018, The indication that BEV has been gradually taking the place of PHEV is clear, and this trend is hardly irreversible.

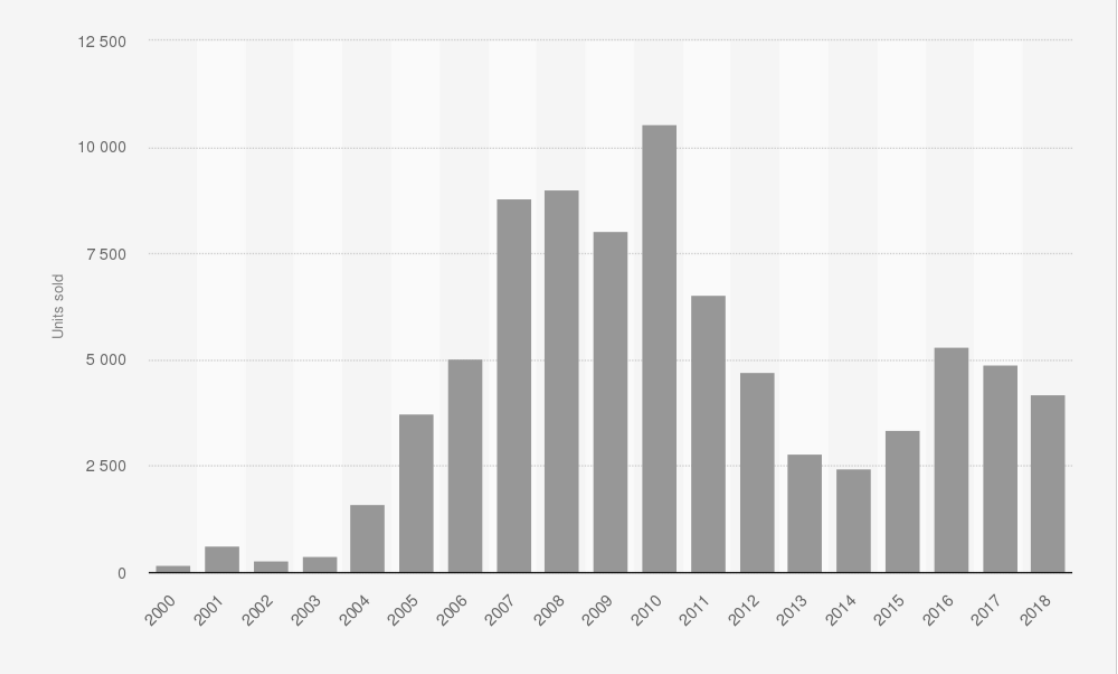

Figure 6: Number of Toyota Prius cars sold in the United Kingdom 2000 - 2018

Source: Toyota

Although BYD is not directly producing PHEV, in another way, they are involved in PHEV production as a battery and other components suppliers. The main market participants in the PHEV market are Nissen, Toyota, and some long-established automakers.

3.2.3 BEV (Battery Electric Vehicle)

BEV is powered solely by electricity with more environmentally friendly characteristics. Since the battery capacity constraint, BEV has a shorter cruise range, and it may cause range anxiety as many drivers would like to ensure their battery has enough energy to cover their trip. However, as battery technology has progressed, the battery capacity has been boosted to more than 500 Kilometers, such as BYD's blade battery.

Nowadays, several competitors are controlling most of the market shares in the BEV industry. Tesla, VM Group, and General Motors occupy around one-third of the Global industry in the first half of 2021. In the case of Tesla, they have been building more and more factories out of the United States, mainly focusing on low-labor costs with capable-skilled regions such as China and Southeast Asia.

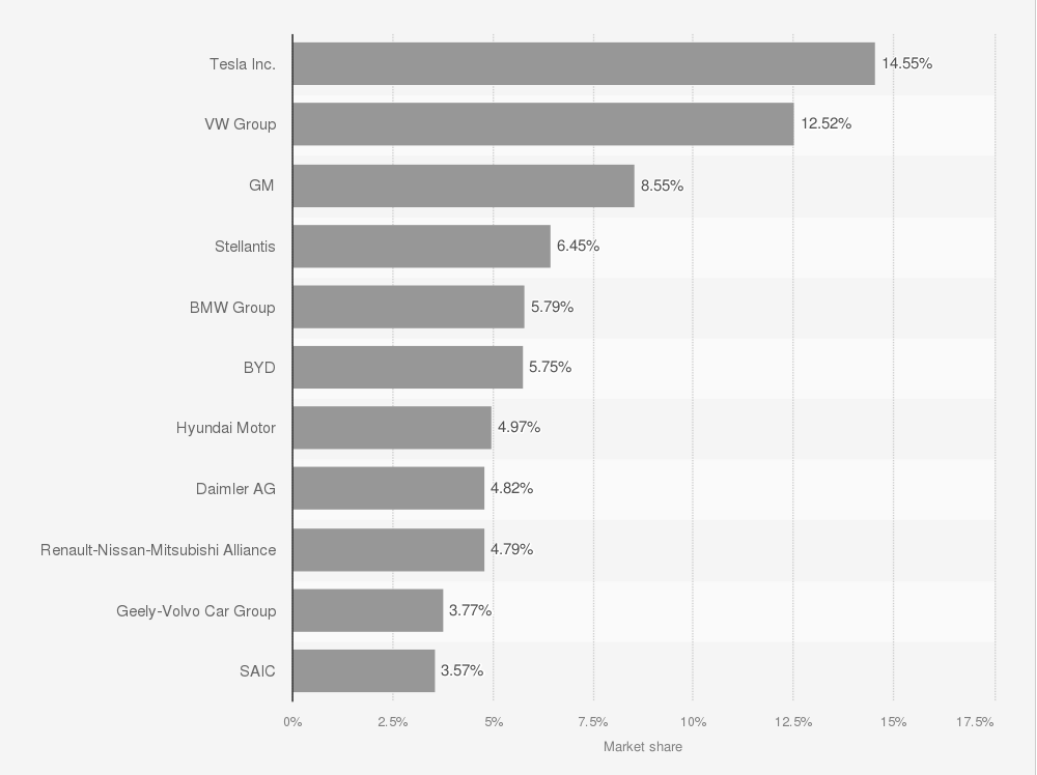

Figure 7: Global plug-in electric vehicle market share in the first half of 2021, by producer

Source: Statista 2021

Due to protectionism, some EV models from international automakers do not have permission to sell in China. For this reason, the national automakers have more room to grow. In the first three quarters of 2021, only Model 3 and Model Y from Tesla were listed on the top 10 best-selling EV models in Mainland China. Notably, Han and Qin Plus DM-I from BYD took third and fourth places out of ten.

3.3 Porter five force analysis

Threat of substitutes:

- A rail system now connects many cities in line with the minor emission scheme initiated by the government.
- A ride-sharing platform such as Uber, DIDI, Bolt with lower cost.

Threat of new entrants:

- Brand loyalty is considered high in the automobile industry. Consumers tend to purchase renowned brands.
- The entry requirement is high because the production of an automobile requires a tremendous amount of capital investment.

Bargaining power of buyers:

- Numerous new models over the few years have given buyers opportunities in negotiation toward a lower price.
- No one customer represents a large portion of revenue.

Bargaining power of suppliers:

- Suppliers have become technology partners with automakers providing more extensive economies of scale. This change will give suppliers more power to bargain.
- The size of capable suppliers is small. Some components and parts need skillful labor and technology to produce and assemble.

Rivalry among competitors:

- Since the EV market has become one of the most lucrative markets globally, market participants are facing fierce competition. Internationally, there are mainly General Motors, Tesla, Daimler, and Toyota, depending on the region. Since some restrictions imposed by the government targeting international EV makers in China, many good EV models are not allowed to enter China. For this reason, their domestic competitors are primarily composed of indigent automakers, including NIO, XPENG, and Greely, etc.
- Industry growth is expected to be strong. In the sub-industry of Electric vehicles, sales were up by 160% in the first half of 2021 compared to a year earlier, though a pandemic existed.
- The barrier to exit is high due to the massive amount of fixed assets and the R&D cost required.

- Low level of industry concentration. The marketplace comprises many firms with similar market shares.

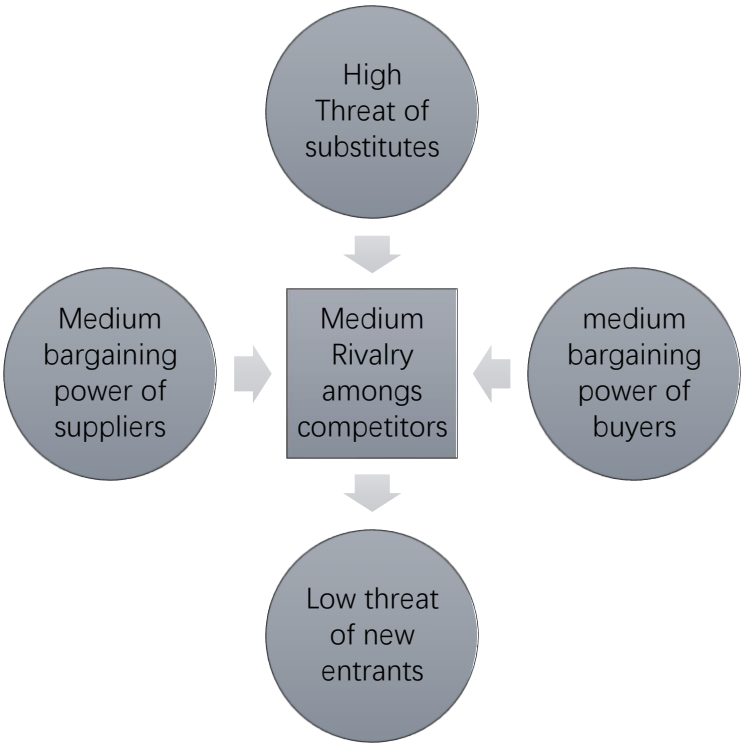

Figure 8: Porter five force analysis

Source: Author

4 Company Analysis

4.1 Company presentation

4.1.1 Early Development Stage

BYD Co ltd. was incepted in 1995 in Shenzhen, well-known as a rechargeable-batteries manufacturer. The acronym of BYD reflects the company's vision, “Bring Your Dreams.”

Like other Chinese companies starting their businesses, BYD was a foundry to copy from Sony or Sanyo batteries and then produce similar products but cheaper under the BYD brand name. However, BYD was not only satisfied with copying products but also desired to develop their technology. Led by CEO Chuanfu Wang, a professor of chemistry and materials science at Beijing Technological University, BYD started to invest a lot of money in research and development.

At the beginning of the 21st century, BYD took advantage of plentiful cheap labor in China and progressed constructively in Battery research & production, which made BYD launch an IPO on the Hongkong Stock exchange in 2003.

4.1.2 Conventional Vehicle Stage

With the success of its IPO, BYD was looking for new areas to broaden their business and then identified the automobile industry as a good candidate. At that time, BYD saw tremendous potential growth in the auto industry in China as the resident income was growing. More importantly, an inspiring opportunity to find a possible outlet for their batteries will make them less dependent on orders externally. However, shareholders disagreed with BYD’s expansion, especially since this plan had not been written and disclosed in the IPO prospectus.

As the auto market was continuously booming and CEO Wang persisted, BYD shareholders eventually agreed to enter the automobile industry by buying Qinchuan automobiles in January 2002. Since Qingchuan automobiles had entered an agreement with Suzuki in 1989, allowing them to manufacture Suzuki products under license. After a few years, The Qingchuan

automobile got incredible success, and then they were capable of developing sedans on their technology.

In 2005, BYD firstly launched its self-developed model, the so-called F3, through dedicated research and technology acquired from Qingchuan. After that, BYD put forward a complete range of first-generation models in succession from F3 in 2006 onwards, which boosted the rapid growth in sales and built a reputation amongst customers.

In F3's generation, BYD produced the Toyota-alike models with slight changes. Then they realized innovation was a must if they wanted to develop sustainably, no matter in design or in technology. For this reason, Wolfgang Egger, a well-known designer who had enriched experiences at Alfa and Romeo, was hired as design director. They invested considerable funds into batteries and electric vehicle fields in terms of technology.

Because of price advantages and durability in the first-generation models, BYD achieved explosive growth in the domestic market. Soon good performance attracted more attention from international investors. For instance, Warren Buffett acquired BYD shares through an investment fund.

4.1.3 Electric Vehicle Stage

In 2013, BYD finally overcame technical difficulties and released its second-generation models, which are all electrified, starting by QIN, followed by Tang, Yuan and Song, which stand for former Chinese dynasties.

Using the historical dynasties has been proved that this marketing strategy successfully attracted more consumers. Also, many financial incentives given by the government side drove BYD to become the largest indigent EV seller in China. From 2014 to 2020, BYD's revenues jumped up about three times from 58.2 billion yuan to 156.6 billion yuan in 2020.

BYD showed they were more agile and flexible during the pandemic than ever. Although sales of the vehicle have been affected to some extent, they instantly shifted to produce surgical masks and medical kits, exporting them worldwide.

In the post-pandemic era, as environmental concerns increased, many governments launched campaigns targeting to create a less emission and more sustainable world. Benefiting from their battery technology, many automakers show a solid willingness to purchase their blade battery. This willingness has been reflected in the share price of BYD, soaring to around 300 RMB level during the pandemic period. In addition, BYD now also had more exposure in the European Union, mainly focusing on electric public buses and airport shuttles.

4.2 Product Mix

Up to now, BYD has developed to be a company that has a diversified product mix primarily composed of a battery, automobile, transit rail, and components.

4.2.1 Batteries

Starting as a battery manufacturer, BYD has a solid foundation in researching and producing state-of-art batteries. From a profitable copying factory to an innovation-oriented company, BYD invested a large portion of their earnings into the R&D of batteries and kept hiring industry experts to enrich their talented team. As of now, BYD owns R&D centers spanning from China to all around the world, which also drive cross-border corporations so that they can generate better research results.

In 2020, BYD officially launched the Blade battery. According to the penetration nail test results, it concluded that the Blade battery is more stable in withstanding high temperatures environment compared to a conventional lithium battery. In addition to safety improvement, the electric vehicle with blade battery also increases cruising range to more than 600 kilometers and an acceleration of 0-100 kilometers/hour in 3.9 seconds, first implemented into BYD's flagship sedan model launched in June 2020.

Moreover, robust research capability has been helping BYD attract more and more cooperation opportunities. Recently Toyota and BYD have jointly announced that Toyota will launch an electric vehicle in China with BYD's battery soon. Besides cooperation with Toyota, Tesla and many other automakers are also said to be in discussion with BYD, intending to

purchase the innovative battery in need of increasing cruising range and safety demanded by customers

4.2.2 Automobiles

With the acquisition of Qingchuan Automobile Co Ltd in 2002, BYD finalized its last step into the automobile industry, from a rechargeable-battery manufacturer to an automaker. And then, they grew at a rapid rate to become the sixth largest in terms of sales among Chinese automakers in 2010, benefiting from their successful company strategy and spill-over effects of the growing Chinese economy.

With the strength of technology research and innovation, BYD has mastered the core technology of new-energy vehicles such as the battery, motors, and electric control. Those technologies owned by BYD gave a substantial advantage for them to enter the electric vehicle industry. Therefore, besides the traditional gasoline-powered model, the electric-powered(new-energy) model has been integrated into BYD's product line over the first decade of the twentieth century.

Until now, BYD can produce Bus Coach, Forklifts, Truck & Van and individual used vehicles at scale in the automobile industry. Therefore, enriched and diversified products would enable them to withstand the risk of suffering economic shocks.

Nevertheless, benefiting from solid R&D and integrated whole industry chain, BYD has been gradually taking the lead in the electric vehicle market, which is most likely the profit center in the next decade.

4.2.3 Rail transits

In rail transportation, BYD had successfully built sky rail to solve city congestion without the traffic disruption caused by in-progress construction. Surprisingly, this state-of-art solution against city congestion only takes one-third of the production time of traditional subways. In addition, it gives a better view to passengers and better secures their safety.

Since the first sky rail launched in Shenzhen in 2016, many other China cities have also shown interest in implementing this innovative technology. According to JP Morgan s estimation, BYD could reach many trillions of RMB without hurting sales in other products by finishing those projects.

2.2 SWOT Analysis

With the growth of China's automobile market, the competition among automakers is becoming increasingly fierce. BYD As one of the leading enterprises in the automobile industry, opportunities and challenges coexist.

Strengths	Opportunities
In-house production Authorities support Leading research team Stable shareholder structure Fast-Growing Industry Vertical integration	Higher demand for Electric Vehicle Becoming Battery supplier Expansion to developing countries Development of chips
Weaknesses	**Threats**
Globalization Lack of marketing skills Over-Diversified product lines Vulnerable to the economic crisis Lack of innovation in vehicle appearance	Unstable Political environment Escalation of international relations Souring labor cost Rising fuel price Stronger competitors

Table 1: SWOT analysis

Source: Author

5 Financial analysis

5.1 Shareholder breakdown

According to shareholders breakdown by global region, 66,41% of BYD is held by a mix of domestic and foreign capital, noted that insiders hold a missing stake of 33.59%. Recently, foreign investors have shown willingness to acquire more stakes in BYD since BYD occupies a large market share in the EV and batteries market. With the internationalization of China's capital market, more institutional investors will enter in the Chinese stock market. Thus, BYD will become their potential target because of its leading position. Likewise, foreign investors will help BYD further expand overseas markets, especially in the European Union and the United States.

Location:Global Region

Location	Investors	% O/S	Pos	Val ($MM)
Asia	207	65,36	1 185 093 354	45 824,57
N. America	46	0,69	12 579 375	528,21
Europe	63	0,36	6 518 650	290,44
Australasia	3	0,00	31 883	1,55
Africa	1	0,00	1 400	0,07

Table 2: Shareholders breakdown by global region

Source: Thomson Financial

5.2 Profitability analysis

EBITDA is regarded as a reliable indicator of operational efficiency because it enables investors to focus on a company's profitability without considering capital expenses into the assessment. Compared with Great Wall Motor and GEELY, two famous Chinese auto enterprises, BYD took the first position for the first time in 2020. The main driver is that sales of BYD increased by 26.06 percent in 2020, exceeding 7.61 percent vs. Great Wall Motor but were lower by -6.17 percent vs. GEELY.

In terms of EBITDA margin, BYD has been increasing smoothly from 2011 to 2020, benefiting from the sales of EV and batteries. As the scale of economics, EBITDA margin is very likely to continue an upward trend in the following years.

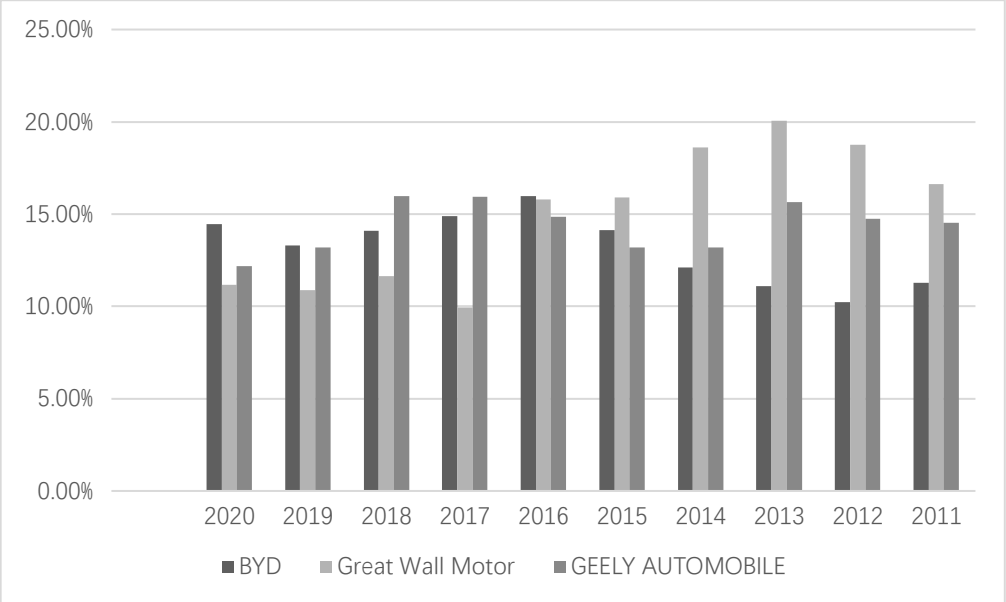

Figure 9: EBITDA margin comparison

Source: Thomson Financial; Author

Regarding net profit margin, BYD always lies at a lower level than competitors. In 2020, BYD only achieved a 2.62 percent net profit margin because they own a considerable portion of fixed assets to be depreciated yearly. The Chinese automobile manufacturers such as GEELY and Great Wall Motor, their factories are all located in mainland China. Conversely, BYD has factories in China, America, and the European Union. In addition, BYD produces broader and more diverse products like batteries and parts, which also causes more capital and operational costs.

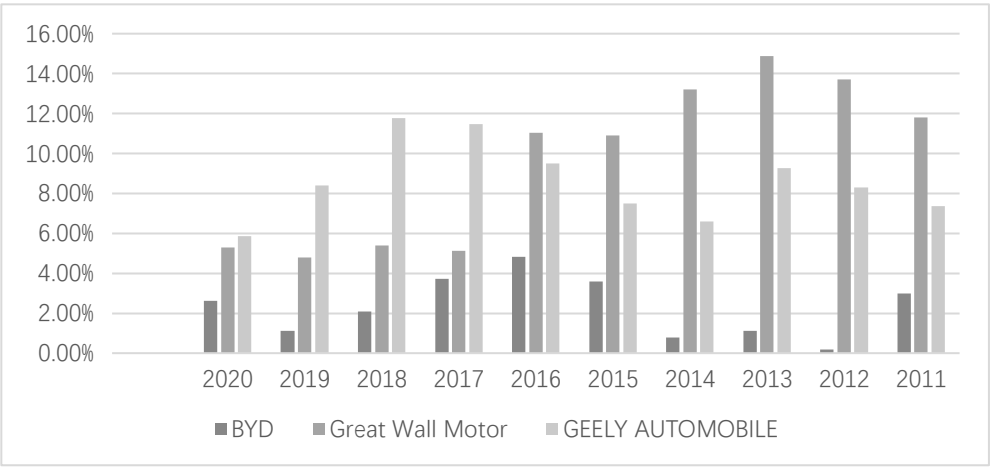

Figure 10: Net margin comparison

Source: Thomson Financial; Author

5.3 Credit analysis

Credit analysis can be divided into liquidity analysis and solvency analysis. Liquidity measures the ability of a company to fulfil its short-term debt obligations, whereas solvency measures the ability to repay the long-term obligations.

Regarding liquidity, the current ratio has been stable at 1 over the past five fiscal years, which means that BYD is able to repay all current liabilities with its current assets. In addition, we can observe that the quick ratio is also at a healthy and controllable level in this period. This ratio (quick ratio) reflects the ability of BYD to repay its short-term debt with the most liquid current assets (cash & equivalents, receivables, marketable securities).

In terms of solvency, BYD has a relatively high debt-to-equity ratio, which may cause heavy interest expenses if the ratio rises to a certain threshold in the future. Until now, BYD has had no difficulties in paying interest expenses since the ratio EBIT/ Interest Expense is equal to 3.4 in the 2020 fiscal year.

Credit Analysis					
	12/31/2020	12/31/2019	12/31/2018	12/31/2017	12/31/2016
Quick Ratio	0,72	0,72	0,73	0,72	0,77
Current Ratio	1,05	0,99	0,99	0,98	1,00
Cash Flow/Current Liabilities	0,39	0,10	0,08	0,04	-0,05
Long Term Debt / Equity	45,83	51,29	34,74	28,88	27,67
Total Debt / Equity	95,69	154,94	133,69	118,19	97,06
Long Term Debt / Total Capital	28,75	31,57	23,88	20,84	20,29
Total Debt / Total Capital	45,72	58,23	54,70	51,87	47,16
Working Capital / Total Capital	5,82	-1,25	-1,62	-3,07	0,06
EBIT/ Interest Expense	3,37	1,61	2,15	3,07	4,20

Table 3: Credit Analysis

Source: Thomson Financial

5.4 Dividend Policy

The dividend pay-out ratio shows how much earnings the company is willing to pay out to shareholders. BYD has had a low pay-out ratio over the past ten years. We can conclude that they reinvested most of their profits into new projects and R&D activities. However, this policy helped them become a leading company in the EV and batteries industry, and the stock price of BYD has increased by more than three times since 2019.

Dividend Policy			
Date	Dividend Per Share	Dividend Yield	Dividend Payout Ratio
12/31/2020CNY	0,148	0,001	0,100
12/31/2019CNY	0,060	0,001	0,121
12/31/2018CNY	-	-	-
12/31/2017CNY	0,141	0,002	0,101
12/31/2016CNY	0,545	0,011	0,291
12/31/2015CNY	0,000	0,000	0,000
12/31/2014CNY	0,000	0,000	0,000
12/31/2013CNY	0,050	0,001	0,213
12/31/2012CNY	-	-	-
12/31/2011CNY	0,000	0,000	0,000

Table 4: Dividend Policy

Source: Thomson Financial

6 Valuation analysis

6.1 Cost of equity

Cost of equity refers to the required return demanded by equity holders. At the same time, it also can be interpreted as the cost that a company must pay to raise capital from the source of equity. In this case study, we will apply CAPM (Capital Asset Pricing Model) to estimate the cost of equity of BYD.

In the calculation of CAPM, the yield of China 10-year government bonds is considered a proxy for the risk-free rate. Additionally, the market risk premium for Chinese market quantitatively measures the extra return for increased risk. The cost of equity is 7,20 percent, estimated by CAPM.

Cost of Equity Estimation	
Risk-free rate	2,75%
Equity market risk premium	4,94%
Beta	0,9
Cost of Equity	7,20%

Table 5: Cost of Equity Estimation

Source: Thomson Financial; Author

6.2 The weighted average cost of capital

The weighted average cost of capital (WACC) measures the cost of capital from all sources, including equity, debt, and tax benefit.

Since the market value of debt is close to its book value, and it is difficult to estimate, we will use the book value of debt as an approximation. Furthermore, the cost of debt is calculated by interest expenses divided by the total amount of debt in the 2020 fiscal year. For the equity components, the cost of equity is obtained by CAPM, and the market value of equity was easily obtained.

Regarding tax rate estimation, the rate that is going to be applied in our valuation analysis is the average tax rate of the most recent two years.

In the end, the weighted average cost of capital of BYD is 6,15 percent. However, this relatively low figure reflects the market's bullish view of BYD.

WACC Estimation	
Cost of Equity	7,20%
Cost of Debt	5,38%
Debt (Book Value)	533769,82
Market value of Equity	728949,00
Average tax rate	12,35%
WACC Estimation	6,15%

Table 6: WACC Estimation

Source: Thomson Financial; Author

6.3 Balance sheet projection

In terms of business life cycles, BYD is on the growing stage but heading to the stakeout stage soon. Thus, it is reasonable to assume that the balance sheet items are going to grow constantly at 1.56 percent, which is the two-year average from 2018 to 2020.

6.4 Income statement projection

In the projection horizon, Depreciation, Depletion & Amortization will maintain the average percentage of PPE over the last five years.

Most of the time, automakers' income statement items change proportionally year by year because they do not have huge portions of financial assets. Therefore, we assume the rest of the items in the income statement will grow at 5 percent in the next five years, considering policy support related to clean energy from governments and BYD's competitive advantages in the sales of EV and blade batteries.

6.5 Free cash flow to the Firm Valuation

According to the previous assumptions, Free cash flow to the firm is projected in the following table below:

	2020	2021	2022	2023	2024	2025
EBIT(1-tax rate)	66810,39	85449,27	93157,83	101305,42	109914,83	119010,01
Depreciation	125159,91	113963,55	115741,39	117546,95	119380,68	121243,02
Change in NWC	62367,56	807,21	819,80	832,59	845,58	858,77
Capex	59644,64	62626,87	65758,22	69046,13	72498,43	76123,35
Terminal value						3172882,70
Perpetual growth rate						1,00%
FCFF		135978,74	142321,20	148973,66	155951,51	163270,90
PV of FCFF		128105,60	126317,57	124566,36	122850,79	2475890,94
Enterprise Value	2977731,26					
Non-operating Asset	144450,54					
Debt	533769,82					
Equity value	2588411,98					
Shares Outstanding	18131,42					
Share price	¥142,76					

Table 7: FCFF projection 2021-2025

Source: Author

In this case, we are going to use a two-stage model. In the first stage, 2021-2025, the projected FCFF is based on the income statement and balance sheet assumptions.

After five years, it is reasonable that the company will enter a mature stage with lower growth of 1 percent in FCFF. In addition, the cost of capital remains at the same level since BYD has a healthy financial condition, according to previous analysis. Therefore, the terminal value in 2025 is 3,172,882.70, calculated by the formula below:

$$\frac{FCFF_{2025}}{WACC - g} \quad (14)$$

Since free cash flow to the firm refers to cash available to debt and equity holders after satisfying the company's obligations and reinvestment needs, WACC will be applied in discounting free cash flow, which considers all fund resources. The enterprise value is obtained by summing up the present value of the projected FCFF. In order to get equity value, the non-operating assets and debt will be added to enterprise value. In the end, the projected share price of BYD on December 31, 2020 is 142,76 RMB, calculated by equity value dividing the number of shares outstanding.

To better understand the valuation of BYD, it is necessary to consider different scenarios. Based on previous analysis, BYD will grow at a higher rate in the long run if they successfully make deals with other automakers in supplying blade batteries. In this optimistic scenario, the share price of BYD on December 31, 2020 will be projected to be 196,19 RMB, derived from 2,5 percent of growth rate. Conversely, as in a pessimistic situation, the projected perpetual growth rate will fall to -0,5 percent; therefore, the estimation of the share price on December 31, 2020 will drop to 113,45 RMB accordingly.

Scenario	Perpetual growth	Share price
Best case	2,50%	¥196,19
Normal case	1%	¥142,76
Worst case	-0,50%	¥113,45

Table 8: Scenario analysis

Source: Author

6.6 Free Cash Flow to Equity Valuation

Free cash flow to equity holders is calculated by adding back net debt issued and deducting after-tax interest from FCFF, which means that is the free cash available to equity holders after fulfilling debt obligation. Thus, the present value of future FCFE is discounted at 7,20 percent of the shareholders' required rate of return. Concerning terminal value, we assume that FCFE is going to grow at 1 percent perpetually. And then, the PV of terminal value is obtained by projected FCFE in 2025 divided by the difference between the cost of equity and perpetual growth rate. Finally, the share price of BYD is projected to be 121,05 RMB in a normal scenario.

	2020	2021	2022	2023	2024	2025
FCFF		135978,74	142321,20	148973,66	155951,51	163270,90
Interest*(1-tax rate)		30128,24	31634,65	33216,38	34877,20	36621,06
Net debt issued		8326,81	8456,71	8588,63	8722,61	8858,69
FCFE		114177,31	119143,26	124345,91	129796,92	135508,53
Perpetual growth rate						1,00%
Terminal value						2187032,439
PV of Terminal value	1545120,39					
PV of FCFE	505179,215					
Non-operating Asset	144450,54					
Equity value	2194750,15					
Shares Outstanding	18131,42					
Share price	¥121,05					

Table 9: FCFE projection 2021 - 2025

Source: Author

6.7 Multiples Valuation

Compared to free cash flow models, multiples valuation has fewer assumptions and is closer to the market. Therefore, both methods should be used to complement each other. The comparable companies are extracted from the database of Thomson Financial. We will use P/E and EV/EBITDA to value BYD because they represent the perspective of firm and equity, respectively. We did not eliminate outliers since BYD's P/E and EV/EBITDA have large differences compared to others.

Name	P/E TTM	EV/EBITDA TTM
Great Wall Motor Company Limited	30,95879299	31,52685139
Guangzhou Automobile Group Co., Ltd	19,09480312	68,2554512
SAIC Motor Corporation Limited	9,701922472	4,483612916
Contemporary Amperex Technology Co., Ltd.	130,9469931	79,25562998
BAIC MOTOR Corporation Limited	4,931556523	0,562439367
HUAYU Automotive Systems Company Limited	13,14213678	4,787500691
DONGFENG MOTOR GROUP COMPANY LIMITED	3,002303598	4,720965753
YUTONG BUS CO., LTD.	38,58189318	21,42338693
ZHONGSHENG GROUP HOLDINGS LIMITED	17,36882811	10,78226324
Mean	29,74769221	25,08867794

Table 10: Peers Multiples

Source: Thomson Financial; Author

As we see below, in order to obtain equity value, the trailing EV/EBITDA is multiplied by EBITDA, adding back NOA and eliminating debt. In the end, the projected share price of BYD is around 288.05 RMB.

EV/EBITDA	
EBITDA	217 028,07
EV/EBITDA	25,86
EV	5612086,999
Non-operating Asset	144450,54
Debt	533769,82
Equity value	5222767,72
Shares Outstanding	18131,42
Share price	¥288,05

Table 11: EV/EBITDA Valuation

Source: Author

Due to the high valuation given by the market, the P/E of BYD is around 191,70 in the fiscal year 2020, which is way higher than their comparable companies. For this reason, the projected share price through P/E valuation is not credible.

P/E	
EPS	1,32
P/E	29,74769221
Share price	¥39,27

Table 12: P/E Valuation

Source: Author

7 Conclusions

The main objective of this project is to estimate the fair value of BYD company limited on December 31, 2020, and then give a recommendation on whether to buy or sell their share.

By comprehensive industry analysis, we concluded that EV and battery sectors are very likely to experience high growth in the projection horizon. Furthermore, the financial fundamentals, such as credit and profitability, have had a good performance during the past few years, even after the appearance of the COVID-19 pandemic.

According to the free cash flow models, the projected fair value of BYD is lower than the market price of 194,30 RMB, indicating that the company is theoretically over-priced. However, the fair value projected by the multiples model is above the market price, benefiting from a high valuation of the peer group. Considering the promising prospects of the electric vehicle industry, we will adopt a valuation method closer to the market. Therefore, we recommend buying BYD shares based on the multiples valuation, which is a long position in the share.

Last but not least, we need to be aware of the timeliness of valuation, and any change in important fundamentals and assumptions will impact valuation.

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9 Appendixes

9.1 Appendix A - Historical Balance Sheet

	12/31/2020 CNY	12/31/2019 CNY	12/31/2018 CNY restated	12/31/2017 CNY	12/31/2016 CNY
Assets					
Cash & ST Investments	144 450,5	126 844,3	130 525,5	99 037,9	76 936,7
Cash	144 450,3	126 500,8	130 521,0	99 026,9	74 463,1
Short Term Investments	0,2	343,5	4,5	11,0	2 473,6
Receivables (Net)	621 385,0	649 819,4	715 181,9	653 692,2	529 281,9
Inventories - Total	313 963,6	255 715,6	263 303,5	198 728,0	173 784,4
Raw Materials	43 465,1	36 506,7	51 278,7	43 724,1	34 292,5
Work In Process	99 123,7	109 827,8	117 474,8	89 957,0	63 501,2
Finished Goods	166 399,2	101 247,7	85 897,5	57 909,5	70 636,9
Progress Payments & Other	4 975,6	8 133,5	8 652,5	7 137,5	5 353,9
Prepaid Expenses	7 243,5	3 627,6	5 077,4	9 854,5	3 196,7
Other Current Assets	29 008,5	33 659,2	39 506,8	66 897,7	338,4
Current Assets - Total	1 116 051,1	1 069 666,1	1 153 594,9	1 028 210,3	783 538,0
Long Term Receivables	18 049,1	12 403,4	21 344,1	10 499,4	2 536,7
Investment In Unconsolidated Subsidiaries	68 856,7	59 824,8	51 818,5	30 649,1	22 447,6
Other Investments	3 791,1	1 435,1	1 735,8	42 521,7	41 464,8
Property Plant & Equipment - Net	657 297,3	625 370,2	494 845,8	478 307,2	420 486,4
Other Assets	128 438,1	172 567,0	208 488,6	175 006,3	165 751,7
Deferred Charges	26 701,2	53 031,5	105 108,8	92 171,0	97 501,5
Tangible Other Assets	0,0	0,0	0,0	0,0	0,0
Intangible Other Assets	101 736,9	119 535,5	103 379,8	82 835,4	68 250,3
Total Assets	1 992 483,5	1 941 266,6	1 931 827,6	1 765 194,0	1 436 225,2
Liabilities					
Accounts Payable	497 916,3	353 406,6	452 223,2	395 273,3	346 631,3
ST Debt & Current Portion of LT Debt	278 131,5	542 809,0	507 684,2	456 486,7	329 284,4
Accrued Payroll	48 352,5	37 827,8	38 556,5	31 799,4	29 785,7
Income Taxes Payable	5 645,0	2 596,1	2 280,9	3 280,1	6 538,2
Dividends Payable	-	-	-	-	-
Other Current Liabilities	234 261,7	143 650,0	164 944,9	163 129,8	70 936,5
Current Liabilities - Total	1 064 307,0	1 080 289,5	1 165 689,8	1 049 969,4	783 176,0
Long Term Debt	255 638,3	268 597,6	178 201,8	147 581,5	131 343,2
LT Debt Excl Capital Leases	247 205,5	263 110,8	178 201,8	147 581,5	131 343,2
Non-Convertible Debt	247 205,5	263 110,8	178 201,8	147 581,5	131 343,2
Convertible Debt	0,0	0,0	0,0	0,0	0,0
Capitalized Lease Obligations	8 432,9	5 486,8	0,0	0,0	0,0
Provision for Risks & Charges	-	-	-	-	-
Deferred Income	22 691,8	22 321,0	19 219,5	16 724,0	14 547,1
Deferred Taxes	(13 758,3)	(14 120,7)	(13 220,1)	(9 700,3)	(8 983,6)
Deferred Taxes - Credit	3 931,5	1 028,6	663,1	6 100,1	5 499,0
Deferred Taxes - Debit	17 689,8	15 149,3	13 883,1	15 800,3	14 482,6
Deferred Tax Liability In Untaxed Reserves	-	-	-	-	-
Other Liabilities	30 011,5	2 110,9	13 954,9	2,5	6,8
Total Liabilities	1 358 890,3	1 359 198,3	1 363 845,8	1 204 577,1	920 089,5
Shareholders' Equity					
Non-Equity Reserves	0,0	0,0	0,0	0,0	0,0
Minority Interest	75 796,4	58 391,3	54 956,9	49 532,9	41 534,3
Preferred Stock	0,0	0,0	0,0	0,0	0,0
Preferred Stock - Non Redeemable	0,0	0,0	0,0	0,0	0,0
Preferred Stock - Redeemable	0,0	0,0	0,0	0,0	0,0
Common Equity	557 796,8	523 677,0	513 024,9	511 083,9	474 601,3
Common Stock	27 281,4	27 281,4	27 281,4	27 281,4	27 281,4
Capital Surplus	200 180,8	200 180,8	200 180,8	199 804,9	199 804,9
Revaluation Reserves	0,0	0,0	0,0	0,0	0,0
Other Appropriated Reserves	-	-	-	-	-
Unappropriated (Free) Reserves	-	-	-	-	-
Retained Earnings	337 224,2	298 010,3	289 799,1	285 326,6	249 127,0
Equity In Untaxed Reserves	-	-	-	-	-
ESOP Guarantees	0,0	0,0	0,0	0,0	0,0
Unrealized Foreign Exchange Gain(Loss)	(2 420,5)	(1 835,7)	(1 971,1)	(1 328,9)	(1 612,0)
Unrealized Gain(Loss) on Marketable Securities	(4 469,1)	40,2	(2 265,3)	0,0	0,0
(Less) Treasury Stock	0,0	0,0	0,0	0,0	0,0
Total Shareholders Equity	557 796,8	523 677,0	513 024,9	511 083,9	474 601,3
Total Liabilities & Shareholders Equity	1 992 483,5	1 941 266,6	1 931 827,6	1 765 194,0	1 436 225,2
Common Shares Outstanding	27 281,4	27 281,4	27 281,4	27 281,4	27 281,4

9.2 Appendix B - Historical Income Statement

	12/31/2020CNY	12/31/2019CNY	12/31/2018CNY	12/31/2017CNY	12/31/2016CNY
Net Sales or Revenues	1 534 691,8	1 217 781,2	1 217 909,3	1 026 506,1	1 002 077,0
Operating Expenses - Total	1 458 465,9	1 185 999,9	1 177 851,4	968 886,3	925 478,0
Cost of Goods Sold	1 166 244,0	951 863,2	959 657,9	788 267,3	757 698,5
Selling, General & Admin Expenses	151 419,7	133 625,1	122 846,4	105 141,6	94 882,2
Depreciation, Depletion & Amortization	125 159,9	98 376,3	94 246,6	70 925,0	70 275,7
Depreciation	96 011,9	85 158,1	76 153,1	57 594,1	53 088,3
Amortization of Intangibles	29 148,0	13 218,3	16 662,9	12 036,9	16 079,8
Amortization of Deferred Charges	0,0	0,0	1 430,6	1 294,0	1 107,7
Other Operating Expenses	15 642,2	2 135,4	1 100,5	4 552,4	2 621,7
Operating Income	76 225,9	31 781,3	40 057,9	57 619,8	76 599,1
Extraordinary Credit - Pretax	-	63,0	736,3	-	260,7
Extraordinary Charge - Pretax	2 698,1	65,9	4 585,6	-	1 708,8
Non-Operating Interest Income	2 146,1	3 537,6	1 872,3	957,8	1 527,0
Interest Expense On Debt	28 693,6	39 309,0	35 902,3	26 689,2	21 360,0
Pretax Equity In Earnings	-	-	-	-	-
Reserves- Increase(Decrease)	-	-	-	-	-
Other Income/Expense - Net	21 019,6	28 097,1	39 210,3	23 301,7	13 000,5
Interest Capitalized	527,9	1 856,3	2 330,1	821,0	1 242,7
Pretax Income	68 527,9	25 960,4	43 719,0	56 011,1	69 561,1
Income Taxes	8 686,2	3 122,7	8 294,5	7 037,1	10 884,0
Current Domestic Income Tax	1 098,1	199,7	300,6	73,2	127,3
Current Foreign Income Tax	6 589,2	4 460,1	6 869,8	8 621,0	15 043,1
Deferred Domestic Income Tax	998,9	(1 537,1)	1 124,1	(1 657,1)	(4 286,3)
Deferred Foreign Income Tax	-	-	-	-	-
Income Tax Credits	-	-	-	-	-
Minority Interest	17 797,0	5 044,1	7 760,0	8 504,6	4 278,6
Equity In Earnings	(1 868,4)	(4 227,8)	(2 247,2)	(2 245,2)	(5 998,2)
After Tax Other Income/Expense	0,0	0,0	0,0	0,0	0,0
Discontinued Operations	0,0	0,0	0,0	0,0	0,0
Net Income Before Extra Items/Preferred Div	40 176,3	13 565,9	25 417,3	38 224,3	48 400,3
Extr Items & Gain(Loss) Sale of Assets	0,0	0,0	0,0	0,0	0,0
Net Income Before Preferred Dividends	40 176,3	13 565,9	25 417,3	38 224,3	48 400,3
Preferred Dividend Require	0,0	0,0	0,0	0,0	0,0
Net Income to Common Shareholders	40 176,3	13 565,9	25 417,3	38 224,3	48 400,3

9.3 Appendix C - Projected Balance Sheet 2021 - 2025

	12/31/2020CNY	12/31/2021CNY	12/31/2022CNY	12/31/2023CNY	12/31/2024CNY	12/31/2025CNY
Assets						
Cash & ST Investments	144 450,5	146 704,0	148 992,6	151 316,8	153 677,4	156 074,7
Receivables (Net)	621 385,0	631 078,6	640 923,4	650 921,8	661 076,2	671 389,0
Inventories - Total	313 963,6	318 861,4	323 835,6	328 887,5	334 018,1	339 228,8
Prepaid Expenses	7 243,5	7 356,5	7 471,3	7 587,8	7 706,2	7 826,4
Other Current Assets	29 008,5	29 461,1	29 920,6	30 387,4	30 861,5	31 342,9
Current Assets - Total	1 116 051,1	1 133 461,5	1 151 143,5	1 169 101,3	1 187 339,3	1 205 861,8
Long Term Receivables	18 049,1	18 330,7	18 616,7	18 907,1	19 202,0	19 501,6
Investment In Unconsolidated Subsidiaries	68 856,7	69 930,8	71 021,8	72 129,7	73 254,9	74 397,7
Other Investments	3 791,1	3 850,3	3 910,3	3 971,3	4 033,3	4 096,2
Property Plant & Equipment - Net	657 297,3	667 551,2	677 965,0	688 541,2	699 282,5	710 191,3
Other Assets	128 438,1	130 441,7	132 476,6	134 543,2	136 642,1	138 773,7
Deferred Charges	26 701,2	27 117,7	27 540,8	27 970,4	28 406,7	28 849,9
Tangible Other Assets	0,0	0,0	0,0	0,0	0,0	0,0
Intangible Other Assets	101 736,9	103 324,0	104 935,8	106 572,8	108 235,4	109 923,9
Total Assets	1 992 483,5	2 023 566,2	2 055 133,8	2 087 193,9	2 119 754,1	2 152 822,3
Liabilities						
Accounts Payable	497 916,3	505 683,8	513 572,5	521 584,2	529 720,9	537 984,6
ST Debt & Current Portion of LT Debt	278 131,5	282 470,4	286 876,9	291 352,2	295 897,3	300 513,3
Accrued Payroll	48 352,5	49 106,8	49 872,8	50 650,9	51 441,0	52 243,5
Income Taxes Payable	5 645,0	5 733,0	5 822,5	5 913,3	6 005,6	6 099,2
Dividends Payable	-	-	-	-	-	-
Other Current Liabilities	234 261,7	237 916,2	241 627,7	245 397,1	249 225,3	253 113,2
Current Liabilities - Total	1 064 307,0	1 080 910,1	1 097 772,3	1 114 897,6	1 132 290,0	1 149 953,7
Long Term Debt	255 638,3	259 626,3	263 676,4	267 789,8	271 967,3	276 210,0
Provision for Risks & Charges	-	-	-	-	-	-
Deferred Income	22 691,8	23 045,8	23 405,3	23 770,4	24 141,2	24 517,8
Deferred Taxes	(13 758,3)	(13 972,9)	(14 190,9)	(14 412,2)	(14 637,1)	(14 865,4)
Deferred Tax Liability In Untaxed Reserves	-	-	-	-	-	-
Other Liabilities	30 011,5	30 479,6	30 955,1	31 438,0	31 928,5	32 426,5
Total Liabilities	1 358 890,3	1 380 088,9	1 401 618,3	1 423 483,6	1 445 689,9	1 468 242,7
Shareholders' Equity						
Non-Equity Reserves	0,0	0,0	0,0	0,0	0,0	0,0
Minority Interest	75 796,4	76 978,8	78 179,7	79 399,3	80 637,9	81 895,9
Preferred Stock	0,0	0,0	0,0	0,0	0,0	0,0
Preferred Stock - Non Redeemable	0,0	0,0	0,0	0,0	0,0	0,0
Preferred Stock - Redeemable	0,0	0,0	0,0	0,0	0,0	0,0
Common Equity	557 796,8	566 498,5	575 335,8	584 311,1	593 426,3	602 683,8
Total Shareholders Equity	557 796,8	566 498,5	575 335,8	584 311,1	593 426,3	602 683,8
Total Liabilities & Shareholders Equity	1 992 483,5	2 023 566,2	2 055 133,8	2 087 193,9	2 119 754,1	2152822,312

9.4 Appendix D - Projected Income Statement 2021 - 2025

	12/31/2020CNY	12/31/2021CNY	12/31/2022CNY	12/31/2023CNY	12/31/2024CNY	12/31/2025CNY
Net Sales or Revenues	1 534 691,8	1 611 426,4	1 691 997,8	1 776 597,6	1 865 427,5	1958698,9
Operating Expenses - Total	1 458 465,9	1 513 934,8	1 585 711,2	1 661 015,3	1 740 022,4	1822916,874
Cost of Goods Sold	1 166 244,0	1 224 556,2	1 285 784,1	1 350 073,3	1 417 576,9	1488455,766
Selling, General & Admin Expenses	151 419,7	158 990,7	166 940,3	175 287,3	184 051,6	193254,2096
Depreciation, Depletion & Amortization	125 159,9	113 963,6	115 741,4	117 547,0	119 380,7	121243,022
Other Operating Expenses	15 642,2	16 424,3	17 245,5	18 107,8	19 013,2	19963,87698
Operating Income	76 225,9	97 491,6	106 286,5	115 582,3	125 405,1	135782,0253
Extraordinary Credit - Pretax	-	-	-	-	- -	
Extraordinary Charge - Pretax	2 698,1	2 833,0	2 974,7	3 123,4	3 279,6	2699,1
Non-Operating Interest Income	2 146,1	2 253,4	2 366,1	2 484,4	2 608,6	2147,13
Interest Expense On Debt	28693,56	30 128,2	31 634,6	33216,3824	34 877,2	36621,06159
Pretax Equity In Earnings	-	-	-	-	- -	
Reserves- Increase(Decrease)	-	-	-	-	- -	
Other Income/Expense - Net	21 019,6	22 070,6	23 174,1	24 332,8	25 549,5	26826,94069
Interest Capitalized	527,88	554,274	581,9877	611,087085	641,6414393	673,7235112
Pretax Income	68527,9	89408,64667	97799,42526	106670,9002	116048,0603	126109,6579
Income Taxes	8 686,2	11 043,9	12 080,3	13 176,2	14 334,4	15577,27278
Minority Interest	17 797,0	18 686,8	19 621,1	20 602,2	21 632,3	22713,93192
Equity In Earnings	(1 868,4)	(1 961,8)	(1 867,4)	(1 960,7)	(1 866,4)	-1866,37
After Tax Other Income/Expense	0,0	0,0	0,0	0,0	0,0	0
Discontinued Operations	0,0	0,0	0,0	0,0	0,0	0
Net Income Before Extra Items/Preferred Di	40 176,3	57 716,1	64 230,6	70 931,8	78 214,9	85952,08325
Extr Items & Gain(Loss) Sale of Assets	0,0	0,0	0,0	0,0	0,0	0
Net Income Before Preferred Dividends	40176,33	57716,14679	64230,56067	70931,79047	78214,92652	85952,08325
Preferred Dividend Require	0	0	0	0	0	0
Net Income to Common Shareholders	40 176,3	57 716,1	64 230,6	70 931,8	78 214,9	85952,08325