



# Analyzing the Financial Impact of Green Bond Issuance on New Energy Vehicle Companies: Insights from BAIC Automotive Group in China

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**Abstract.** This study examines the financial effects of two green debts issued by BAIC and assesses their impact on new energy vehicle manufacturers. Based on the insights from analysis, this study proposes suggestions for promoting the use of green finance instruments in the Chinese NEVs market. This paper demonstrates that green bonds can reduce financing costs for automakers and positively influence investors' expectations, as indicated by the AR and CAR figures.

Despite the benefits of green bonds, BAIC experienced a decline in revenue growth during its transformation, potentially due to a lack of product superiority. The continuous issuance of the second round of green bonds further constrained the company's cash flow and debt repayment capacity. Given the inherent risks associated with the "bond" aspect of green debt instruments, NEV enterprises should evaluate their market conditions and organizational factors before selecting a financing strategy.

**Keywords:** Green Bonds, Financial Performance, New Energy Vehicle.

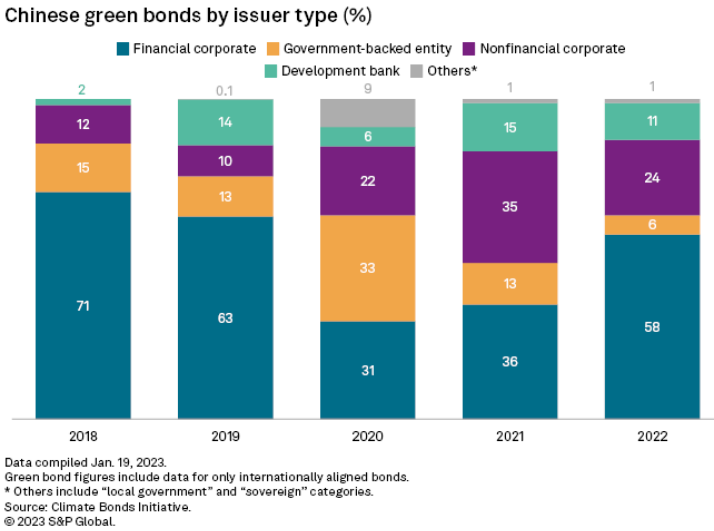
## 1 Introduction

As societies have advanced, the demand for energy has increased substantially. Environmental pollution presents a significant challenge to modern societies, rendering a low-carbon economy essential. Innovative financial methods, such as green bonds, are necessary to fund ecologically friendly projects for global sustainability. The first green bond, the "climate awareness bond," was introduced by the European Investment Bank in 2007 (Ehlers and Packer, 2017) [8]. The green bond market has experienced rapid growth in recent years, with Asian and global green bonds gaining popularity as a means of supporting carbon-neutral firms (Durrani, Rosmin, and Volz, 2020) [7]. China's commitment to advancing green initiatives led to the emergence of green bonds in the country in 2014–2015.

Despite the growing significance of green bonds in China, the nation's strict issuance regulations and program definitions limit the range of industries eligible to issue green debt instruments (Li et al., 2022) [14]. Companies outside these specified industries are unable to take advantage of green bonds as a financing option. The proceeds from the

funds are mostly invested in electricity, building, and railways (iFinD, 2024). A minor portion is distributed to other sectors like new energy vehicles.

Recent trends indicate a decline in support for new energy vehicle production (Shi, Wu, and Lin, 2023) [20]. Growth pressure arises because research and production demand considerable capital inputs. Green bonds may serve as a potential financing option for new energy vehicle companies seeking to address these financial challenges. While green bonds have seen successful innovation, as shown in Figure 1, their primary issuers are still financial and nonfinancial enterprises, development banks, and government-backed entities.



**Fig. 1.** Chinese green bonds by issuer type (%)

(Wu and Ahmad, 2023) [24]

Despite the potential of green bonds as a financing option for the new energy vehicle industry, only three automotive companies—BAIC, BYD, and Geely Automobile—have used green corporate bonds since China's green bond market started (iFinD, 2024). In conclusion, green bond issuance is unusual in a sector that needs massive funding; the underlying reasons are worth investigating.

## 2 Literature Review

### 2.1 Green Bonds

Green bonds are typical fixed-income products with a revolutionary environmental fundraising motivate (Monk and Perkins, 2020) [17]. They are considered impact investments due to their explicit aim to contribute positively to the environment. Traditional bonds can finance any legal commitment, but green bonds exclusively support climate change, natural resource, and biodiversity efforts (Chugan, Mungra and Mehta, 2017) [6].

## 2.2 Impacts of Green Bond Issuance

Green bonds assist enterprises meet their financial objectives while promoting a green image, expanding financial avenues, and attracting investors (Mathews & Kidney, 2012) [16]. Firstly, there is a scholarly consensus that green bonds can help alleviate corporate financing obstacles. Hafner et al. (2019) analyze two important barriers to green investment: policy ambiguity and banking sector short-termism [11]. They show green debt, a new financing method, enhances green finance and overcomes the biggest impediments to green investment. Also, according to Ning et al. (2022), green bonds contribute to solving funding challenges for sustainable activities [18]. Similarly, Bachelet, Becchetti, and Manfredonia (2019) suggest that green debt provides a more cost-effective financing alternative compared to other available options [2].

Extensive research has also explored the relationship between green bond issuance and business statistics. Zhou and Cui (2019) investigate the Chinese green bond market and find that the announcement of green bond issuance positively influences corporate share prices [25]. Kanamura (2020) leverages the Correlation Model to illustrate that green bonds financing is more to yield higher returns than debt investments [12]. MacAskill et al. (2021) indicate that green bonds own green premium in primary and secondary markets over traditional debt [15]. Economic benefits associated with eco-friendly projects suggest considerable investor interest, which could lead to capital gains.

## 2.3 Research about New Energy Vehicles

Considering global warming, polluted air, and the detrimental impacts on human welfare and wildlife, China's new energy vehicle (NEV) business has developed and received major financing (Sun et al., 2018) [22]. Ren (2018) claims that ordinary automobiles utilize fossil fuels, particularly oil, which poses adverse effects to the environment [19]. Given the consumption of renewable energy, NEVs present an alternative to traditional cars' emissions (Ren, 2018) [19]. Gu, Wang, and Wu (2022) employ empirical research to demonstrate that NEVs reduce carbon dioxide emissions, meaning that the global NEVs business should be accelerated to promote carbon neutrality [10]. According to Li (2011), Chinese renewable energy vehicle firms' financing challenges have impeded industry expansion because their R&D and production necessitate substantial capital [13]. Financial organizations should swiftly fund NEV firms with vital technology and specified development goals. Eligible companies could issue corporate bonds in their own countries and overseas to assist their financing in the market.

## 2.4 Current Research Gap

Previous researchers mainly focused on the macro level, with limited study of specialized fields. This article concentrates on BAIC, and case study method is frequently employed to examine actual organizational issues. As the first Chinese corporation to launch green corporate bonds, BAIC's actions demands scrutiny. This paper evaluates

the company's fundraising expenses, share price fluctuations, and economic performance in the short and long run. By doing so, this study might inspire relevant enterprises and guide green finance advancement in China. Different from prior investigations with similar views, this paper's research viewpoint is more concentrated, and the methodology is intuitive.

### 3 Background Information of the Case Company<sup>1</sup>

#### 3.1 Company Profile

State-owned BAIC Motor Limited, established in September 2010, is supported by the Beijing Municipal Government (BAIC, 2024) [5]. In 2014, BAIC listed H-shares on the Main Board of the Hong Kong Stock Exchange. The company's primary operations include passenger vehicle manufacturing, investment, and service trading. It aims to expand its supply chain and brand portfolio.

BAIC Corporation emphasizes ecological sustainability in machinery, innovation-driven tactical shifts, and "high technology and specialization" approach. In 2016, it adopted the "E+S strategy"—new energy and SUV—in 2016 to accelerate the development of its own brands (BAIC, 2016) [3]. The goal is to quickly transform into a leading sustainable smart transportation brand.

#### 3.2 Coupon Rate Comparison

**Table 1.** Coupon rates of bonds issued by NEVs firms

Bond Name (Acronyms)	Issuing Body	Issuance Time	Issue Pe- riod (In years)	Issuance Scale (In bil- lions)	Coupon Rate (%)
15 BA SCP001		18th Nov 2015			
16 BA Green 01	BAIC	21st April 2016	0.75	2.5	3.15
16Cher- ySCP004	BAIC Chery Auto	4th July 2016	7 (5+2)	2.5	3.45
17 CGASCP001	Chi- naGrandAuto	11th Jan 2017	0.75	1	5.6
17 BA Green 01	BAIC BAIC	3rd July 2017	3	2	5.6
18 BA Y1		21st March 2018			

Data source: iFinD

<sup>1</sup> All figures and tables presented in this section and onwards are compiled by the author, using the data from some public databases, and converted into pictures.

BAIC announced its initial green corporate bond in China, a 2.5 billion debt with a 3.45% coupon, on April 21, 2016. This paper analyzes green debt financing expenses benefits. Specifically, it compares two green bonds issued by BAIC to traditional bonds issued by other Chinese NEV enterprises. As illustrated in Table 1, BAIC's two ecological bonds have longer durations, larger issuance sizes, and lower coupon rates.

### 3.3 Stock Market Response

Whenever an entity's activity is unforeseen, investors will assess its effect on cash flow, and the fluctuations in share prices imply their adjusted predictions (Wiles and Danie-lova, 2009) [23]. The abnormal return of a stock—the disparity between the predicted return based on market trends and the real revenue of the event—serves as a clear and fair indication of the event's influence on the firm's value (Sorescu, Warren, and Ertekin, 2017) [21]. This article employs the event study method to investigate the immediate impact of the green debt announcement on BAIC share price.

#### 3.3.1 Data Sources and Processing.

First, this article collects BAIC's daily stock prices from CNINFO and calculates its daily return using Excel. The daily return is computed by subtracting the previous day's closing price from the current day's closing price and dividing by the previous day's closing price. Second, since BAIC was floated in Hong Kong in 2014, the Hang Seng Index, obtained from the Choice Financial Terminal, is used as a basis to gauge the market return.

#### 3.3.2 Abnormal Return Calculation.

Between 2016 and 2017, Beijing Automotive engaged higher and possessed larger bond-financed value. The Chinese initial green corporate bond affected firm transition and investor expectation. This paper explores the marketplace's response to BAIC's two successive green debt offerings using the event study method.

The disclosure of publicly traded firms impacts share prices as investors appraise them. Therefore, this analysis considers BAIC's green debt issuance as a single event and designates the moment of publication of both bond-related activities as the "event date". Subsequently, define a time frame of 5 days prior to and after the time for each of the two events, denoted as [-5,5]. 90 trade days preceding the occurrence is referred to as the estimation window, specifically spanning from day -95 to day -6. Afterwards, the estimation window is applied to forecast the usual rate of return within the event window without the event.

This investigation derives the normal rate through the market model and the subsequent expression:

$$R_{i,t} = \alpha + \beta R_{m,t} + \epsilon t \quad (1)$$

$R_{i,t}$  signifies the firm's stock return on day  $t$ ,  $R_{m,t}$  is the market benchmark return. The regression coefficients are  $\alpha$  and  $\beta$ , with  $\epsilon t$  as the error term.

Importing processed dependent component,  $R_{i,t}$  and independent component,  $R_{m,t}$  into Stata, an OLS regression generates the predicted yields for BAIC on April 22, 2016:

$$E(R_{i,t}) = -0.0016443 + 1.034506 \times R_{m,t} \tag{2}^2$$

Also, the anticipated return on July 3, 2017, is:

$$E(R_{i,t}) = -0.0011755 + 0.8008081 \times R_{m,t} \tag{3}$$

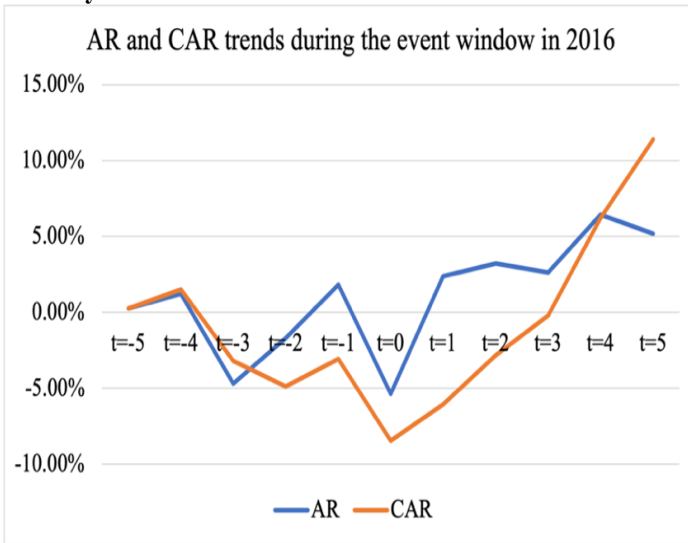
The abnormal rate of return is calculated by:

$$AR_{i,t} = R_{i,t} - E(R_{i,t}) \tag{4}$$

Cumulative abnormal rate of returns indicates the sum of daily abnormal returns:

$$CAR_{i,t} = \sum AR_{i,t} \tag{5}$$

**3.3.3 Result Analysis.**



**Fig. 2.** AR and CAR trends in 2016

The immaturity of the Chinese green debt market in 2016 might explain the volatility AR before issuance. At that time, investors had limited knowledge of green bonds and viewed such issuances with suspicion. Doubts about the income potential of this corporate decision likely led investors to lower their earnings predictions for the firm, resulting in a downturn in the financial market.

<sup>2</sup> The coefficients of equation (2) and (3) are calculated by the author through conducting linear regressions of the collected  $R_{i,t}$  and  $R_{m,t}$ , as mentioned in section 3.3.1.

Nonetheless, the AR were negative for only three days during the time frame, and the reduction was small. Green debt signals to shareholders that businesses are committed to energy reduction through sustainable transition. Investors are more likely to recognize this proactive dedication to social responsibility. The AR figures remain constantly positive from the day after the event date, demonstrating that investors are confident about the green debt issuance. Figure 2 illustrates a steady increase in CAR values following the green debt offering.

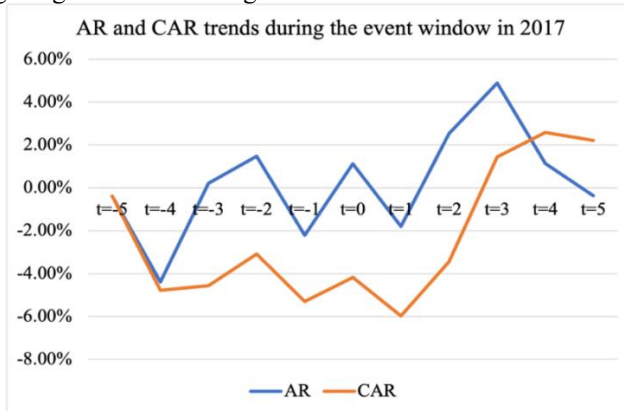


Fig. 3. AR and CAR trends in 2017

Figure 3 shows that prior to the second green debt offering, BAIC's cumulative abnormal return was low and declined into negative numbers. However, starting from the second day of issuance, the CAR increased and turned positive by the third day, indicating that the market reacted positively to this fundraising activity.

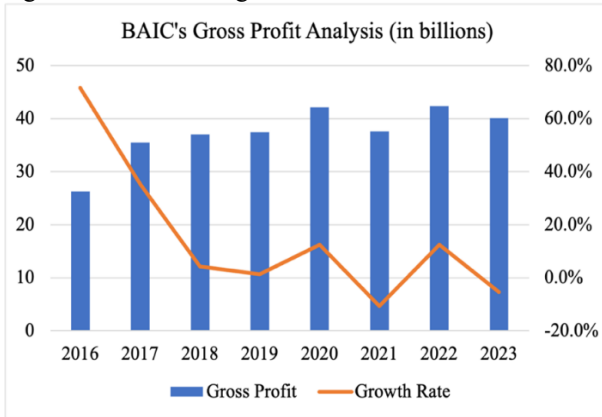
Overall, investors are favorable toward the short-term profitability of green debt issuances. Debt financing can help NEV manufacturers swiftly overcome economic challenges associated with green transformation. However, green debt also introduces higher leverage, which reshapes firms' capital structures and long-term liquidity. Further investigation is necessary to confirm these outcomes.

## 4 Effects of Green Bonds Issuance

BAIC's Zhuzhou-Based Technological Renovation and Extension Program received 2.5 billion from the first green debt offering. Of this amount, 1.5 billion was allocated for technology and plant enhancement to manufacture BAIC's electrical vehicles, while 1 billion was earmarked for working capital (BAIC, 2017) [4]. However, the 2016 green debt yearly statement fails to disclose the 1 billion's distribution. Originally, these funds were intended for BAIC's research and development of NEVs. In reality, investors were not informed about how the funds were used. While the green funds boosted working capital, they also revealed BAIC's inadequate ability to generate cash from operations. External observers cannot determine whether the corporation utilized the resources to settle short-term debts or to support its traditional fuel-powered automobiles.

**4.1 Market Effects**

**4.1.1 Gross Profit Analysis.** Environmental initiatives often require extended investment periods, which is why the majority of green loans are long-term. Flammer (2020) found that green bonds may not immediately impact a firm’s financial figures within a single year [9]. As project benefits materialize gradually, longer periods may better evaluate the financial impacts. Therefore, this study examines financial data over longer periods following BAIC's launch of green debt.



**Fig. 4.** BAIC’s growth profit analysis (in billions)

Data source: iFinD

From 26.23 billion to 35.5 billion in 2017, BAIC's gross profit grew by over 70%, indicating that green debt had favorable effects. However, it is evident in Figure 4 that since 2018, annual increases have been minimal and have even declined in two of the last three years, suggesting a slowdown in growth. Profit margins have also declined over this period.

**4.1.2 R&D Capacity Analysis.** BAIC Organization's trademark brand debuted late amongst Chinese leading automakers. In 2009, BAIC acquired manufacturing platforms and some intellectual property rights from SAAB, a Swedish automaker, but it lacks an effective R&D system. Most of its novel innovations and vehicle-production designs come with Saab (Anicic, 2018) [1]. BAIC makes minimal advancements in automobile technology and invests less in R&D compared to other automakers. Insufficient budgets make it difficult for BAIC to manufacture high-quality cars that meet market needs. Shown as Table 2:

**Table 2.** The annual input of R&D (in billions)

Year	2016	2017	2018	2019	2020	2021	2022	2023
BAIC	2.8	2.79	2.4	3.08	2.6	2.65	2.71	3.57
BYD	4.5	6.27	8.54	8.42	8.56	10.63	20.22	39.92

Data source: iFinD



Therefore, to assist automakers in their transition, their primary focus might be on increasing investment in new energy vehicle R&D instead of expanding manufacturing capacity. Meanwhile, enhancing vehicle design is crucial to improve product quality. The company can only achieve sustainability by independently controlling key technologies and customizing products to meet customer demands.

## 4.2 Financial Analysis

**4.2.1 Investment Cash Flow Analysis.** The high flexibility of green fund improved BAIC's temporary situation without altering its capital structure. But it might be risky in the long run if the company's operations rely on outside financing. Shown as Table 3:

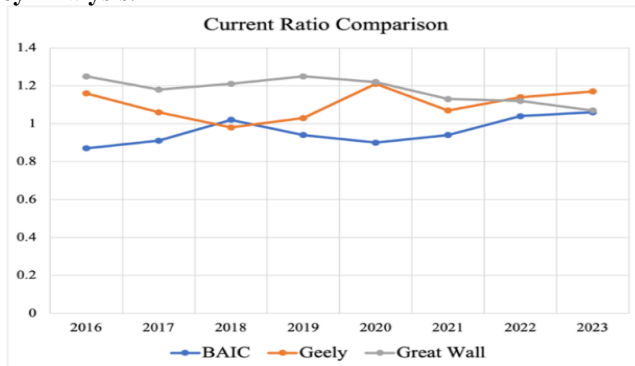
**Table 3.** New debts and repayments

Year	New Loans (In billions)	Debt repayments (In billions)
2016	29.71	24.68
2017	29.33	33.19
2018	25.96	33.74
2019	17.22	17.52
2020	19.88	23.73
2021	20.26	18.19
2022	15.43	17.65

Data source: iFinD

According to BAIC's cash flow statement from 2016 to 2022, its annual borrowing and debt payments are roughly equivalent, suggesting that it has borrowed excessively to settle past obligations, potentially leading to future financial difficulties.

### 4.4.2 Solvency Analysis.



**Fig. 5.** Current ratio comparison

Data source: iFinD

One prominent short-term solvency indicator is the current ratio, which analyzes a company's current assets and liabilities. As shown in Figure 5, from 2016 to 2023, the majority of BAIC's current ratios have been below 1, implying that its current assets are insufficient to cover its current liabilities. Moreover, this departure is significant compared to similar-sized enterprises in the same industry.

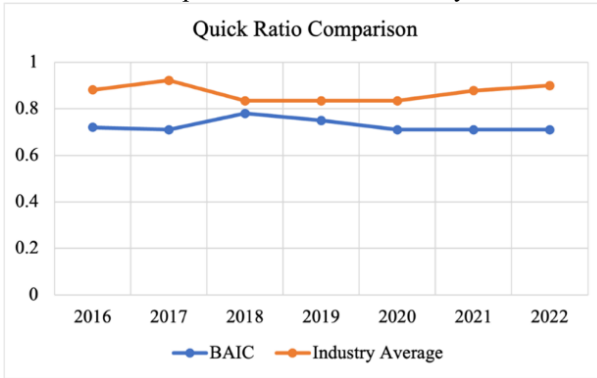


Fig. 6. Quick ratio comparison

Data source: iFinD

Figure 6 demonstrates that BAIC's quick ratio is remarkably below the automotive industry standard. The primary cause is the organization's extensive dependence on short-run debt funding lately, leading to a considerable number of temporary loans. The lower current ratio and quick ratio indicate that BAIC manages its current liabilities unfavorably. Furthermore, there is a risk of cash allocation discrepancy, where long-run obligations may be used to cover short-run liabilities.

The solvency statistics indicate that both long-term and short-term liquidity for repaying debts are below the market average. Continued issuance of debt will increase BAIC's financial burden, potentially threatening its cash flow stability.

## 5 Conclusions

Green loans offer less coupon and longer maturities, reducing financing expenses for corporations compared to traditional debt. They improve ecological accountability for automakers. Therefore, investors normally appreciate green bond declarations which elevates the firm's stock price rapidly. But high debt amounts may cause cash flow unpredictability in the longer term.

Chinese green debts have strong credit ratings and are offered by large, competent issuers. However, due to inherent "bond" nature, green bonds must be evaluated regarding their risks. Firms should avoid adopting green loans heavily without considering debt settlement afterward. Currently, China retains policy loopholes in utilizing green funds. The state should guarantee that green resources are employed to programs that safeguard the environment. It ought to assist green loans issuers, promote preferred policies, and advise enterprises on green transition.

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