

The Impact of Differentiation Competitive Strategy on Market Share of New Energy Vehicle Enterprises: A Comparative Analysis of BYD and Tesla

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Abstract

This paper examines the heterogeneity of market share impacts of product breadth, brand salience, and channel depth between BYD and Tesla, and whether China's subsidy phase-out moderates these effects. Based on quarterly panel data covering 2018Q1-2023Q4, separate OLS regressions are applied to each firm. Product breadth significantly influences BYD's market share ($\beta = 0.527$, $p < 0.001$) but not Tesla's; brand salience presents similar heterogeneity; channel depth positively affects BYD ($\beta = 0.196$, $p < 0.001$). The Tesla percentage reached its maximum value of 18.00% in Q1 2020 before falling to 9.81% in Q4 2023; none of the differentiation variables offer meaningful explanatory power. Sensitivity to moderation model specification is illustrated by the fact that the interaction between SKU $\times$ Subsidy is -15.00 (marginally significant, $p = 0.065$) in the absence of control for a time trend, but becomes nonsignificant ($p = 0.290$) when time trend is controlled for. Using an Effective Subsidy variable for the firm (subsidy in China weighted by firm's share in China) changes the sign ($p = 0.747$). Differentiation strategy effectiveness varies between firms depending on resource endowments.

Keywords

Differentiation strategy, market share heterogeneity, new energy vehicles, resource-based view, subsidy phase-out.

1. Introduction

Worldwide sales of NEVs reached about 13.8 million units in 2023, marking an increase of almost six times in comparison with 2018 figures. Overall, the leading companies occupied 61% of the total volume of the global market [1]. Among them, BYD and Tesla can be named key players on the EV market since they occupy 35% of the global volume of sales. However, despite a similar level of market leadership, their strategies for reaching the current results differ greatly. For instance, BYD has managed to grow its product range from 8 cars in 2018 to 31 vehicles by 2023. At the same time, the share of BYD increased from 10.7% to 19.2%. Unlike that, Tesla maintained a narrow lineup of 3 to 6 models and occupied 7.65% to 18.00% of the market [2].

The early lead Tesla had in the battery electric vehicle (BEV) category slowly waned as more players entered the market and the regulatory environment changed, exposing the limitations of a product-centric strategy, even for a well-known brand [3]. BYD's simultaneous diversification into various price points and channel structures offered a different combination of strengths and weaknesses, including high volume but also increased dependence on favorable regulatory environments and channel structures. The entry of Tesla in China stimulated the emergence of competitive challenges domestically and reshaped market share competition within the industry [4].

Differentiation at the firm level is one variable that has not yet been studied thoroughly enough regarding its effect on market-share outcomes in the NEV literature. It is unknown whether

product line width, brand prominence, and distribution channel intensity have differential effects between firms, or even how the effect can be moderated by subsidy cycles, based on quarterly panels covering both firms. Utilizing 24 quarters' worth of observations from 2018 to 2023, the current study will compare differentiation effects between BYD and Tesla and see whether China's subsidy phase-out moderates the effects.

2. Theoretical Framework and Hypotheses

Three complementary theories underpin competitive differentiation in the NEV industry. According to Porter's model of competitive advantage, the primary dimensions along which businesses derive their competitive advantage include product scope, brand positioning, and market penetration [5]. Expanding on the above concept is the resource-based theory of competition, which postulates that a competitive advantage is only sustainable if it stems from non-imitable resources, including battery integration capabilities, brand equity, and direct sales channels [6]. As applied to the entry strategy for the EV market, companies that possess both technological and adaptive capabilities exhibit greater persistence in their market penetration compared to those dependent solely on one aspect of the resource base [7].

The differentiation process occurs through channels of consumer perceptions. The brand equity elements that include awareness, associations, perceived quality, and loyalty affect purchase intention among Chinese electric vehicle consumers; perceived price will moderate the effect of these variables on purchase intention [8]. Consumers of both BYD and Tesla EV brands exhibit different behaviors: BYD buyers place emphasis on product variety and availability, while Tesla buyers attach greater importance to brand image during decision-making [9]. Structural channeling of distribution creates these differences regardless of the firm's product choices. Competitive orientation in business strategy, when complemented by the company's innovative capabilities, brings about increased performance [10].

Five hypotheses can be developed within this model. First, product breadth has a positive impact on market share, but its impact on the market share is much greater for BYD compared to Tesla (H1). Secondly, Salience correlates with market share; this can vary not only in the relationship but also in its magnitude across firms (H2). Thirdly, channel depth has a positive effect on BYD's market share (H3). Fourthly, higher oil prices positively affect new energy vehicle market share by raising the relative cost of internal combustion alternatives. Lastly, Subsidies might reduce the effectiveness of product differentiation for market share; similarly, the removal of subsidies would increase the value of product differentiation. This reasoning depends on the ability to distinguish between period effects and policy effects (H5).

3. Data and Methodology

3.1. Data Sources

The data includes 24 successive quarters beginning in Q1 2018 and ending in Q4 2023, comprising 48 firm-quarter observations in total (24 for each of BYD and Tesla). Market share is measured as the percentage of the global sales of each firm divided by the global sales of NEVs. The data on BYD is collected from China's monthly bulletins on production and sales, and data for Tesla is collected from quarterly SEC filings. Differentiation through products is captured in terms of the number of models available for purchase at the end of each quarter, based on Dongchedi's archive of models. For brand differentiation, we measure the average intensity of searches using data from Google Trends for one export per quarter, since separate exports result in an index that cannot be compared to previous periods as it would have been rescaled. Lastly, channel differentiation refers to the proportion of direct sales in total retail locations, using information from annual reports.

3.2. Variable Definitions

Table 1 summarizes the variable definitions, types, measurements, sources, and geographic scope.

Table 1. Variable Definitions

Variable	Type	Measurement	Source
Market share (MS)	Dependent	Quarterly sales / global NEV total	Production bulletins / SEC
SKU count	Product differentiation	Models available at quarter-end	Dongchedi
Search index	Brand differentiation	Google Trends quarterly mean	Google Trends
Direct sales ratio	Channel differentiation	Direct outlets / total outlets	Annual reports
Subsidy policy	Moderator	Active subsidy = 1	MIIT
Oil price	Control	Brent quarterly average (USD)	EIA
GDP growth	Control	Annual rate, quarterly assigned	World Bank

3.3. Model Specification

Two separate OLS regressions are carried out for each of BYD and Tesla to avoid any potential problems of pooled regression owing to different modes of competition between them. Model 1 tests the influence of differentiation in products, brands, and channels on market share:

$$MS_{it} = \alpha + \beta_1 SKU_{it} + \beta_2 Search_{it} + \beta_3 Direct_{it} + \gamma X_{it} + \varepsilon_{it} \quad (1)$$

where X_{it} contains oil price and GDP growth. Model 2 introduces an interaction term to test whether subsidy phase-out moderates the returns to product differentiation:

$$MS_{it} = \alpha + \beta_1 SKU_{it} + \beta_2 Policy_t + \beta_3 (SKU \times Policy)_{it} + \gamma X_{it} + \varepsilon_{it} \quad (2)$$

The following three estimation constraints are required for the specification of the model. First, Tesla's direct sales percentage stays constant at 100% for the full sample period, and therefore cannot contribute to estimating the effect. The direct sales percentage and SKU count for BYD have a strong association $r=0.979$; using them together will result in uninterpretable parameter estimates. Therefore, H3 is estimated using bivariate OLS between direct sales ratio and market share, reported in conjunction with other estimations. For standard errors, the classical OLS approach is used. Because of the low number of observations in each panel data set $N=24$, robust estimators' asymptotics cannot be achieved.

A number of methodological issues should be made clear. (1) Unit roots are detected in market shares of BYD ($p = 0.98$) and Tesla ($p = 0.46$), as well as in search index ($p = 1.00$), according to the Augmented Dickey-Fuller test results. In addition, Durbin-Watson statistics are low (0.5-0.67). (2) Heteroskedasticity- and autocorrelation-consistent (HAC) standard errors by Newey-West are used everywhere with lag length of 4. (3) Because of perfect collinearity ($r = 0.979$ between SKU and direct-sales ratio), the H3 model uses the bivariate approach as suggested in Wooldridge (2019); PCA expansion-intensity index is shown for robustness check. (4) Linear time trend is introduced in moderation models as the result of nearly perfect negative correlation ($r = -0.99$) between the subsidy dummy and SKU variable in the BYD sample. (5) Effective Subsidy is calculated as $EffSub_{it} = ChinaSubsidy_t \times ChinaSalesShare_{it}$, where $ChinaSubsidy = 5.00, 2.50, 2.25, 1.80, 1.26, 0$ (measured in 10K RMB per vehicle for 2018–2023), $ChinaSalesShare$ is the annual share of sales in China's NEVs from firm i (approximately BYD = 0.97 and Tesla = 0.23). The approach translates policy effect at the country level into policy

exposure measured at the firm level as commonly practiced (see Pierce & Schott, 2016). Binary dummy remains Model A in Table 4.

4. Empirical Results

4.1. Descriptive Statistics

The BYD corporation shows continuous growth in all aspects of differentiation, with SKUs rising from 8 to 31, search index going up from 1.0 to 10.3, and its market share increasing from 10.7% to 19.2% from 2018Q1 to 2023Q4. On the other hand, Tesla reveals a completely contrasting picture regarding its characteristics. Its SKUs have stayed between 3 and 6 during the period under consideration, its search index averaging 62.76, roughly 22 times that of BYD (mean 2.83), and the market share was highest during 2020 Q1 when it touched 18.00%, then it fell down to 9.81% by 2023 Q4, showing a decrease of 8.19 percentage points since its peak, which is equal to an average slope of -2.18% per annum. While the two companies occupy polar opposite sides in the branding salience aspect, their market shares intersect, thus calling for firm-by-firm analysis. Table 2 provides the main indicators of the variables under study. The graph is shown in Figure 1.

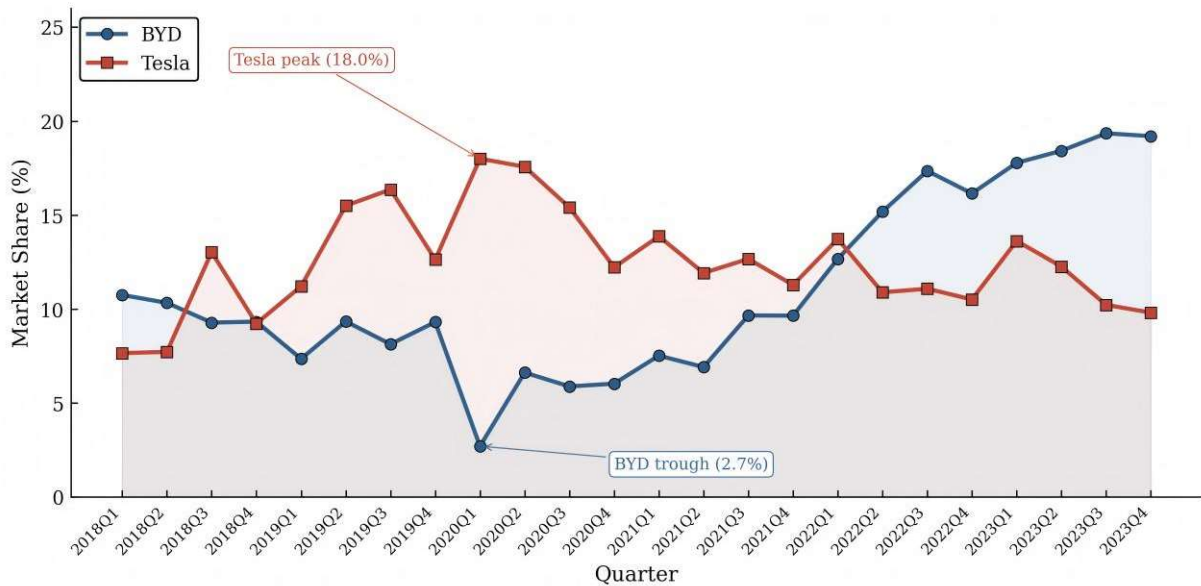


Figure 1. Market Share Trajectories of BYD and Tesla, 2018Q1–2023Q4

Table 2. Descriptive Statistics

Variable	Full sample (N=48) Mean (SD)	Full sample Min- Max	BYD (N=24) Mean (SD)	BYD Min- Max	Tesla (N=24) Mean (SD)	Tesla Min- Max
Market share (%)	11.73 (3.94)	2.70–19.35	11.04 (4.80)	2.70–19.35	12.43 (2.76)	7.65–18.00
SKU count	10.71 (8.27)	3–31	16.83 (7.79)	8–31	4.58 (0.78)	3–6
Search index	32.80 (32.12)	1.0–88.0	2.83 (2.42)	1.0–10.3	62.76 (15.12)	38.0–88.0
Direct sales ratio (%)	60.78 (41.99)	0–100	21.57 (19.83)	0–51.8	100.00 (0.00)	100–100
Subsidy policy (0/1)	0.21 (0.41)	0–1	0.21 (0.41)	0–1	0.21 (0.41)	0–1
Oil price (USD/bbl)	71.67 (18.77)	29.4–111.6	71.67 (18.77)	29.4–111.6	71.67 (18.77)	29.4–111.6
GDP growth (%)	5.38 (2.16)	2.34–8.57	5.38 (2.16)	2.34–8.57	5.38 (2.16)	2.34–8.57

Note: Tesla's direct sales ratio registers 100% across all 24 quarters and is excluded from Tesla-specific regressions.

4.2. Correlation Analysis

Correlation tests for Pearson correlation reveal different structural models among firms. Taking BYD for instance, there is a strong positive relationship between SKU and market share ($r=0.856$, $p<0.001$), as well as between the direct sales ratio and market share ($r=0.811$, $p<0.001$). The structural models are consistent with the growth model, under which both product and channel development occur simultaneously. The intercorrelation between SKU and direct sales ratio is significant ($r=0.979$), confirming the multicollinearity issue observed in section 3 and thus warranting Hypothesis 3 being tested independently. As for Tesla, negative correlations between subsidy policy and market share ($r=-0.506$, $p<0.05$) and oil prices and market share ($r=-0.507$, $p<0.05$) confirm that fluctuations in Tesla's market share are attributed to factors beyond its differentiation efforts.

4.3. Main Effects

The SKU coefficient for BYD is 0.527 ($p<0.001$, $R^2=0.732$), while the search index has a coefficient of 1.514 ($p<0.001$, $R^2=0.584$). The direct sales ratio gives a coefficient of 0.196 ($p<0.001$, $R^2=0.658$), whereas the oil price gives a coefficient of 0.192 ($p<0.001$, $R^2=0.564$). On the other hand, none of the differentiation variables reach statistical significance for Tesla. The SKU has a beta value of 0.006 ($R^2=0.000$), and the search index has a beta value of 0.032 ($R^2=0.031$). Oil price is the exception, carrying a negative coefficient of -0.075 ($p<0.05$, $R^2=0.257$).

Table 3. Main Effects - Bivariate OLS Regression Results

Variable	BYD β	Sig.	R^2	Tesla β	Sig.	R^2	Hypothesis
SKU count $\rightarrow$ MS	0.527	***	0.732	0.006	—	0.000	H1 $\sqrt$
Search index $\rightarrow$ MS	1.514	***	0.584	0.032	—	0.031	H2 partial $\sqrt$
Direct sales ratio $\rightarrow$ MS	0.196	***	0.658	n/a	—	—	H3 $\sqrt$
Oil price $\rightarrow$ MS	0.192	***	0.564	-0.075	*	0.257	H4 BYD $\sqrt$ /Tesla $\times$

*Note: MS= market share. Separate bivariate OLS regressions estimated for each firm. Tesla's direct sales ratio is not applicable due to zero within-sample variation. H4 supported for BYD, directionally reversed for Tesla. *** $p<0.001$; * $p<0.05$; -not significant.*

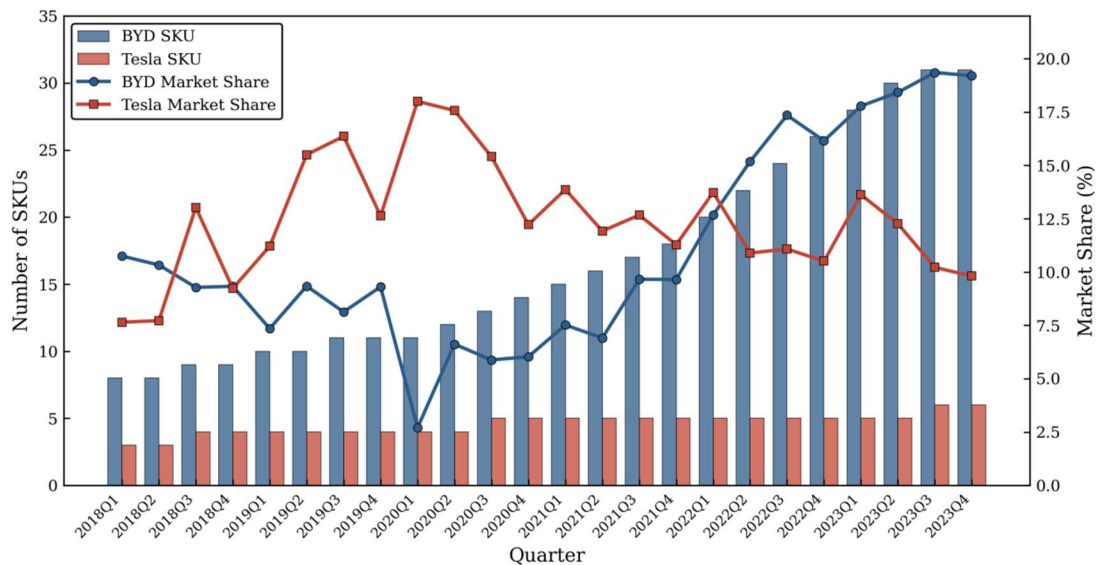


Figure 2. Product Differentiation (SKU) and Market Share: BYD vs. Tesla, 2018Q1–2023Q4

H1 is confirmed: product breadth is positively significant for BYD market share but not for Tesla, confirming expectations of cross-firm mechanism differences. H2 receives partial confirmation: BYD's brand-salience coefficient is statistically significant while Tesla's is near zero. However, the size of the search index coefficient of BYD should not be underestimated since the suggested effect on market share ($1.514 \times 9.3 = 14.1\%$) is larger than the variability of the market share of BYD itself (8.5%). This difference implies that the bivariate coefficient includes co-moving effects. When the expansion intensity PC (Chapter 4.5) is included, the coefficient becomes equal to $\beta = 0.282$ ($p = 0.073$). Thus, Hypothesis 2 can be seen as measuring co-movements between brand salience and market share. H3 is confirmed from the bivariate regression ($\beta = 0.196$, $p < 0.001$). H4 holds for BYD but is directionally reversed for Tesla. Table 3 displays the bivariate OLS estimates.

4.4. Moderation Effect

Table 4. Moderation Effect — SKU $\times$ Subsidy Policy Interaction (BYD)

Variable	β	SE	p-value	Sig.
SKU count (standardized)	4.283	0.540	0.000	***
Subsidy policy	-11.804	7.888	0.151	—
SKU $\times$ Policy (interaction)	-15.002	7.657	0.065	†
Oil price	0.062	0.024	0.020	*
Constant	5.841	1.698	0.003	**
R ²	0.905	—	—	—
N	24	—	—	—

Note: Dependent variable = market share (%). SKU count is standardized (mean = 0, SD = 1). Classical OLS standard errors reported. † $p < 0.10$; * $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$.

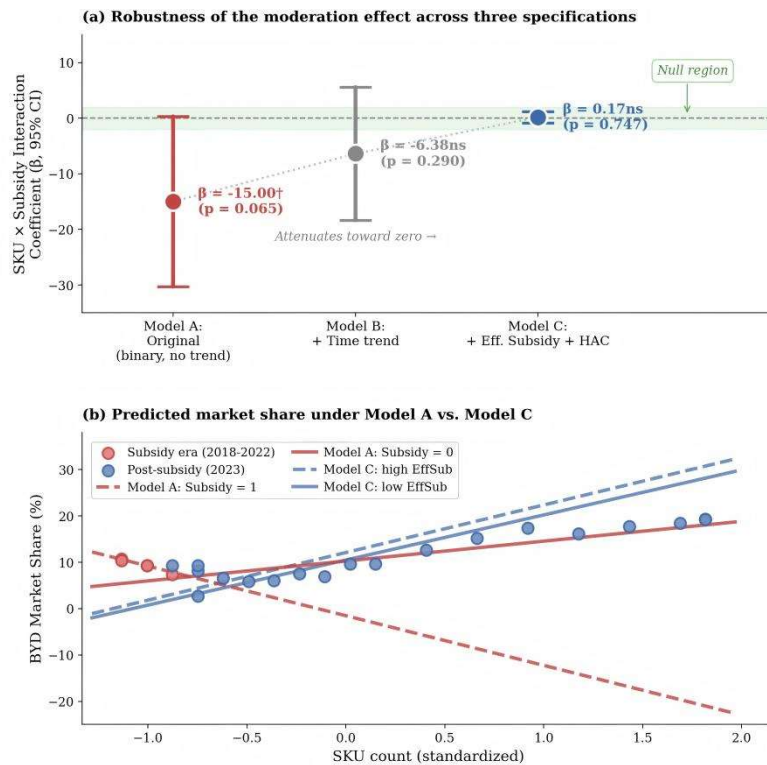


Figure 3. Moderating Effect of Subsidy Policy on the SKU–Market Share Relationship (BYD)

Moderation analysis seeks to test if subsidy policy serves to moderate the effect of SKU share. In Model A, the interaction $\text{SKU} \times \text{Subsidy}$ takes on the value -15.00 ($p = 0.065$) when a binary dummy variable is used and there is no time trend. But within the BYD data sample, there is high collinearity between the binary subsidy policy variable and the SKU variable ($r = -0.99$), whereby the subsidy era represents a low-SKU era (mean = 8.8), while the phase out era marks a high-SKU era (mean = 29), and therefore Model A fails to distinguish the two effects. The inclusion of a linear time trend reduces the effect to $\beta = -6.38$ ($p = 0.290$). In Model C, the Effective Subsidy variable replaces the binary dummy, and the interaction is reversed to $\beta = 0.17$ ($p = 0.747$). These models fail to provide any solid evidence of H5. See Table 4 below.

4.5. Robustness Checks

Four robustness tests support the stability of the main results. After excluding the two quarters impacted by the pandemic (2020Q1 and 2020Q2), there is no change in sign, size, or significance of the key parameters. When the sample is restricted to 2021Q1-2023Q4, when data quality is relatively high, BYD SKU parameters retain their sign and significance. Thirdly, using an index based on the PCA of expansion intensity, which is made up of SKU and direct sales (explained by PC1 with 99.0%), we obtain $\beta = 7.675$ (HAC $p < 0.001$). The corresponding value for the pure search index is $\beta = 0.282$ ($p = 0.073$). This provides evidence in favor of the product-channel expansion being used as a single strategy. Fourthly, the first difference regression gives us $\Delta \text{SKU } \beta = 1.061$ (HAC $p = 0.032$) and $\Delta \text{Direct } \beta = 0.385$ ($p = 0.004$), while ΔSearch is insignificant ($p = 0.434$).

5. Discussion

The empirical results reveal two structurally distinct paths to competitive positioning. BYD's market share growth from 10.7% to 19.2% tracked closely with SKU expansion ($\beta = 0.527$, $p < 0.001$) and direct sales network deepening ($\beta = 0.196$, $p < 0.001$), consistent with a volume-penetration logic in which product breadth and distribution reach compound each other's effects. Market share for Tesla, on the other hand, peaked at 18.00% in Q1 2020 before falling gradually to 9.81% by Q4 2023, despite not being affected by any differentiation variables. It was mainly due to competition from external factors such as the entrance of competitors from China into the market and price competition. These are not symmetric versions of the same competitive model: BYD is building position through expansion; Tesla's brand capital did not prevent share erosion. This is further elaborated by the moderating effect analysis, whereby the significant negative relationship between SKU and Subsidy noted in the initial model disappears once either a time trend or Effective Subsidy for each company is introduced into the regression. This implies that subsidy timing and BYD's independent growth cannot be differentiated. The mechanisms behind BYD's and Tesla's positions differ entirely, as the heterogeneous resource base argument predicts [11].

The issues related to brand differentiation deserve more attention than significance tests alone. BYD's search-index coefficient ($\beta = 1.514$, $p < 0.001$) suggests an association between brand-building and market share. However, one must take into consideration the size, as it is larger than the actual contribution of shares (14 percentage points compared to 8.5 percentage points), suggesting that the coefficient reflects the influence of simultaneous increases in SKUs and channels. The latter accounted for, the coefficient drops to $\beta = 0.282$ ($p = 0.073$). For Chinese NEV manufacturers, brand capital is still in an early-accumulation phase. Tesla's search index averages 22 times BYD's yet is irrelevant to market share dynamics. With all this said, even though Tesla enjoys strong branding, the company saw its market share fall from 18.00% to 9.81%, suggesting that for companies with established branding, the marginal gain of investing in their brand approaches zero [12]. For Chinese carmakers expanding internationally, brand-capital accumulation must proceed alongside product expansion [13].

There are several restrictions on these results. The sample consists of just two firms over 24 quarters, making external validity questionable. The $r = 0.979$ collinearity between BYD's direct-sales ratio and SKU means product- and channel-differentiation effects cannot be separately estimated. Additionally, the Effective Subsidy weighting uses annual rather than quarterly China shares, and 24 quarters is insufficient to jointly identify time trend and policy effects. Moreover, the subsidy measure does not isolate purchase subsidies from the Dual Credit Policy [14]. Channel depth is proxied by the direct-outlet ratio and excludes charging infrastructure, which co-evolves with EV sales [15]. Google Trends is a convenient brand-equity proxy but does not capture brand equity in full [8]. Future research should test this framework on other NEV producers, collect brand-related data via surveys, and apply instrumental variables.

6. Conclusion

The current paper examines if the dimensions of differentiation strategy have different impacts on the market shares of BYD and Tesla, and if the removal of subsidy in China reduces their effect. In line with the RBV heterogenous paths theory, growth of BYD can be explained by increasing diversity in products and deepness of distribution channels, whereas for Tesla, the peak market share was recorded in 2020Q1 with value of 18.00%, and dropped to 9.81% in 2023Q4, with no reaction to any differentiation variable. The moderation effect is sensitive to specification: with the addition of linear time trend, there is no longer an $\text{SKU} \times \text{Subsidy}$ interaction, and the introduction of Effective Subsidy for individual firms makes the effect negative. Therefore, Hypothesis 5 (H5) cannot be accepted based on presented evidence. Some limitations should also be noted, such as limited two-firms sample and high collinearity among SKU and channel measures. The extension of analysis for other firms could shed some light on which effect is caused by specific features of a firm and which is more general.

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