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Oligopoly in the Passenger Vehicle Segment of The Indian Automobile Sector – A Meta-Analysis

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ABSTRACT:

The main point of this paper is to advance the general understanding of market dynamics and the imperfections that creep in when an industrial sector or a sub-sector matures. This article effectively highlights the different factors that directly contribute to market imperfections within the automobile sector. It examines competition among automakers in the passenger vehicle sub-segment. It is concerning market power, concentration, as well as type of market. It analyses how it manifests and its effects on the automobile and automotive sector. Nevertheless, it examines several aspects such as the lock-in effect, market variability and shelf-life, production capacity. These aspects also including associated strategy along with competitiveness. Furthermore, the paper also studies how collusion is contributing to complexities and practices that lead to market imperfections, resulting in oligopoly and monopsony. The dichotomy is when oligopoly contributes significantly to undermining competition while demanding higher prices for their final product. At the same time manufacturers and suppliers of components view monopsony as a serious threat to their capacity to negotiate prices despite having production efficiency, consequently reducing their profitability. The tendency of the monopsony input market is the cause of social losses like the creation of unemployment and lower collection of corporate and indirect taxes. They are also likely contributory factors for the perineal dwarfism of Micro and Small Industries among MSMEs. The Micro and Small Industries serve as captive suppliers, manufacturers or vendors to large enterprises (LEs) and Original Equipment Manufacturers (OEMs).

Keywords: Passenger vehicle, automobile industry, market, monopoly, monopsony, oligopoly, production, bargaining power, collusion

1) Introduction:

The basic concept of Economics on competition rests with the idea that competition encourages efficient resources use through effective allocation of resource. This argument has conceivably undergone a transformation, and this idea can be contested in the case of Indian automobile Passenger Vehicle (PV) sector. Despite the rise in the number of automakers operating in the Indian PV market, the Concentration Ratio (CR) of auto makers has been consistently rising since 2011. It clearly states that only a few automakers like Maruti Suzuki and Hyundai dominate the market share throughout. This suggests the concentration of a PV oligopolistic sector in India. In addition to this, the examination using the Herfindahl-Hirschman Index (HHI) and the CR of the five major automobile Original Equipment Manufacturers (OEMs) between the years 2014 and 2020 exposes another noteworthy signal. The analysis reveals, despite the arrival of new automakers in the PV segment, market concentration ratio rose from 82.19 in the year 2011 to 86.32 in 2020. Concurrently, HHI grew from 2204.70 to 3086.44 during the same period, indicating the concentration of major automobile OEMs from moderate to high level. This signifies that the market has unmistakably shifted to become an oligopoly. When PV automaker brands were compiled by their parent group for a more comprehensive analysis, the number of OEM brands operating in the Indian PV market decreased from 23 to 13. A few automakers, including Ford and General Motors, exited from the Indian PV market during the period of study, whereas Datsun, Mitsubishi, and Fiat ceased to produce their cars in India. This has resulted in a moderate change to the HHI dropping to approximately 2158 in 2022, and also the 5CR to 83.4%, showing a high

concentration. The PV OEMs' ability to potentially use monopsony power is strongly indicated by the high 5CR and HHI. This effect is further heightened in situations when the supply curve is inelastic, such as when the number of automakers decline; while the number of upstream supplier/vendors to the automakers remain constant, thereby increasing the monopsony power of the PV OEMs. Under such circumstances, anticipating demand through forward planning become challenging. This particular situation results in planning limitations for upstream Micro, Small and Medium enterprises (MSMEs), who act as supplier, vendor, or manufacturers.

Under the circumstances when the forward planning becomes more difficult, MSME auto-component upstream suppliers and manufacturers stockpile their inventories, which make their business more dependent on working capital. This immediately results in experiencing additional financial stress and it further makes them more vulnerable to a liquidity crisis. MESEs always try to stockpile raw materials and finished goods in order to respond better to market variability. This significantly raises the level of risk to investments made when the anticipated demand does not materialize. The MSME suppliers/manufacturers may not be able to modify their demand or stagger input material uptake due to the intricacies of the supply chain, and risk of reallocation to competing industries. Likewise, on occasions when demand soars above anticipated, delays or an inability to meet supply can lead to reallocation of orders to competition. Additionally, the MSME suppliers/manufacturers maintain stockpile of inventories both inputs and finished goods based on speculative assessment of PV automakers. However, automakers follow Just-in-Time (JIT) inventory model. Due to contractual obligations, it is challenging for the component manufacturers or suppliers to pass on the cost escalations to the OEMs due to inflation and variations of inputs like raw materials and metals such as iron, steel, aluminum, copper etc. This frequently leads to a decline in gross margins, which often finds difficult to meet the needs of working capital. Furthermore, additional problems like enhanced freight cost and supply chain disruptions may also impact gross margins of the MSMEs. All the aforementioned factors weaken the auto-component firm's ability to survive.

One could argue that the sharp contrast in business strategies causes an imbalance in bargaining power. However, the top five PV automakers have the capacity to use their monopsony power in a systematic manner, which would give them the leverage while negotiating as a buyer. Theoretically, the automobile PV sub-segment and automobile component sector integrate for their mutual growth and benefit. The value chain structure begins with knowledge creating brands, and oligopoly in the product market and monopsony with most of the component segment firms. The production knowledge is distributed among the auto component firms and not protected under IPRs. There is the possibility of utilizing these preferences in favour of OMEs to increase their profits through the disintegration of production in the value chain. It also suggests countervailing measures to ensure level playing field for PV automakers and their suppliers, paving the way for just remunerative price to be ensured and maintained for the auto component manufacturing firms.

1.0 Indian Automobile Sector

Automobiles have become necessary utility for people's mobility and transportation of goods that are delivering economic benefits besides saving time for work and leisure. Therefore, the automobile industry is an important segment of the industrial sector because of its direct and indirect linkages to the economic development of India. The opening of the Indian automotive industry to foreign investment and technology acquisition has had a significant influence. The arrival of international competition changed the dynamics of the industry (Ranawat & Tiwari, 2009). India is the fourth largest producer and the third largest market for automobiles in the world after the United States of America (USA) and China. The Indian automobile sector is one of the leading sectors through the world. It produces different types of vehicles and covers multiple market segments. It satisfies the wants of different classes of people for their mobility needs and transportation of goods and employees for industries. It includes PV, Commercial Vehicle (CV), two-wheelers (2W), and three-wheelers (3W). Additionally, it also produces quadricycle, construction and mining vehicles, and tractors and farm equipments. In the domestic market, the 2W leads the market with 79% of domestic sales and this can be attributed to the underdeveloped mass transit systems and the demand for affordable fast, efficient, and effective means of mobility. This is followed by PV in second place with 14.8%, CVs at 3.8% and 3W at 2.6% (SIAM Annual Report, 2024). Both domestic and foreign markets are served by the Indian automotive industry. The Indian automakers produced over 28.43 million vehicles in FY 2023-24. According to PIB (2023), India is the largest producer of 2W, 3W, and tractors, second largest for buses, third largest for PV, and the fourth largest producer of CV.

The Indian automotive industry is a vital part of India's economy. It now accounts for 7.1% of GDP, up from 2.1% in 1992-93. In addition to providing more than 37 million direct and indirect job opportunities, it also accounts for 49% of manufacturing GVA and 26% of industrial GDP. As a result, India's manufacturing sector reflects the expansion of and advancement of the automotive industry, in terms of capital accumulation, scale and scope economies, and technological advancements (Szirmai, 2013; Marconi, et al., 2016), promoting change, technological improvements, and increase involvement in higher-value output and as a catalyst for driving innovation. Therefore, the automobile sector has a major impact on adjacencies and other industrial sub-sectors. It also impacts the primary and tertiary industries (Humphrey, & Schmitiz, 2002; Yang, et al., 2021) due to infrastructure development, job creation, technological advancements, and boosting innovation.

1.1 Factors Contributing to the Growth of Automobiles

Sizable Market: Due to the large domestic market, automobile sector has attracted investments from both domestic players and multinational corporations (MNCs). Huge investments gradually added capacity and minimised cost through economies of scale which helped to create a competitive environment in the automobile sector. This has triggered a cycle of rapid technological absorption, innovation and advancement, including improvements to product safety, quality and technology. These factors are crucial have been instrumental in bringing Indian automobiles at per with international standards, which has led to a shift in consumer expectations.

Symbiotic Relationship: There exists a symbiotic relationship between the automakers and the auto-component sector. The growing number of businesses in the auto-component industry offer the advantages of local sourcing and time-to-market to the automaker. Likewise, the auto-component industry benefits from the expansion of the automobile sector due to diffusion on knowledge and technology in the space of production methods and managerial skills which improves competitiveness (Bodman & Le, 2013). The diffusion of both knowledge and technology has greatly expanded the possibility of localisation propelling the growth of automotive sector and the Indian economy.

Compliance: Since, the automobile sector is heavily regulated, comparing product features, performance and quality to established standards in developed economies also acts as a catalyst for determining and adoption of the right technologies. This encourages competition and supports compliance enforcement (Calabrese, et al., 2022) besides the development of the value and supply chain ecosystem that is needed to support to the automakers.

Synergy: Demand and collective action by the automakers and the government have influenced the sub-sector development, with the later having a significant impact (Ranawat, & Tiwari, 2009). India's position as the world's fastest growing major economy suggests that there will be plenty of headroom for expansion in the future, which will undoubtedly propel the automotive sector. As a result, automakers that manufacture in India are uniquely placed to take advantage of both domestic and international markets.

1.2 Automobile PV Sub-Sector

Until 1990s, there were only three automakers operating in the Indian PV sub-sector – Hindustan Motors, Premier Automobiles, and Standard Motors. The entry of Global Corporations (GCs) into the Indian PV market diluted the concentration that was in place at that time and improved the dynamics. Due to improved product technology, sophisticated manufacturing processes, and better management strategies, GCs' arrival transformed the market and increased competition. In the mid-1990s, several leading GCs including Hyundai, Daewoo, Peugeot and other joint ventures, such as Fiat-Tata, Toyota-Kirloskar, Mercedes-Benz with TELCO etc., increased market competition as India developed into a popular investment destination for automakers for both market-making and market-sourcing (Ranawat and Tiwari, 2009). The three domestic enterprises progressively lost ground to the GCs since they were unable to compete with them on these grounds.

Today, India is the third largest market for PVs. Since the year, 2010, this sector has grown at an average annual growth rate of 6%, more than doubling the overall production. India's ranking in the automobile PV sub-sector has steadily improved, moving up from the fifth place in 2019 to fourth in 2021 and third place in 2022, with around 3.89 million new PV (passenger cars, utility vehicles, and vans) sold in the domestic market. This owes to growing infrastructure and economic levels.

Consistent increases in production capacity of PV automakers in India have enabled them to grow their domestic market. Additionally, it allowed them to explore new markets and export the surplus quantities of PV. In FY 2023-24, automakers in India produced over 4.91 million PV. The domestic market for PVs has continued to show an increasing trend since 2010. It has grown at an annual average growth rate of 6.28%. Likewise, the exports of PVs from India have also grown since 2010; in absolute terms, the overall number of PVs exported from India grew by 51% since 2010. PVs constitute approximately 16% of total automobile exports from India. Table 1 furnishes the total production of PV, domestic sales and export volumes.

Table 1: PV Production, Domestic and Export Volumes

Year	Total Production of PV	Domestic Market Sales Volume in No.	Growth %	Export Volume in No.	Export as a % of Production	Growth %
2001-02	6,69,719	6,89,830		53,656	8.01	
2002-03	7,23,330	7,07,198	2.46	72,005	9.95	25.48
2003-04	9,89,560	9,02,096	21.61	1,29,291	13.07	44.31
2004-05	12,09,876	10,61,572	15.02	1,66,402	13.75	22.30
2005-06	13,09,300	11,43,076	7.13	1,75,572	13.41	5.22
2006-07	15,45,223	13,79,979	17.17	1,98,452	12.84	11.53
2007-08	17,77,583	15,49,882	10.96	2,18,401	12.29	9.13
2008-09	18,38,593	15,52,703	0.18	3,35,729	18.26	34.95

2009-10	23,57,411	19,51,333	20.43	4,46,145	18.93	24.75
2010-11	29,82,772	25,01,542	21.99	4,44,326	14.90	-0.41
2011-12	31,46,069	26,29,839	4.88	5,08,783	16.17	12.67
2012-13	32,31,058	26,65,015	1.32	5,59,414	17.31	9.05
2013-14	30,87,973	25,03,509	-6.45	5,96,142	19.31	6.16
2014-15	32,21,419	26,01,236	3.76	6,21,341	19.29	4.06
2015-16	34,65,045	27,89,208	6.74	6,53,053	18.85	4.86
2016-17	38,01,670	30,47,582	8.48	7,58,830	19.96	13.94
2017-18	40,20,267	32,88,581	7.33	7,48,366	18.61	-1.40
2018-19	40,28,471	33,77,389	2.63	6,76,192	16.79	-10.67
2019-20	34,24,564	27,73,519	-21.77	6,62,118	19.33	-2.13
2020-21	30,62,280	27,11,457	-2.29	4,04,397	13.21	-63.73
2021-22	36,50,698	30,69,523	11.67	5,77,875	15.83	30.02
2022-23	45,78,639	38,90,114	21.09	6,62,891	14.48	12.83

Source: SIAM

As shown from Table 1, the total production of PV has consistently increased, and both domestic sales and export volumes have also grown. This is also suggesting that capacity increase leads to market growth.
The industry leaders in PV manufacturing in India have launched numerous technologically advanced products and continue to innovate to increase their production and operations. In addition to the domestic market, products specifically designed for Indian roads and driving conditions have found success even in export destinations on other continents (McKinsey & Company, 2018). The growing acceptance of Indian PVs in overseas markets, domestic competition and stringent regulations have further pushed automakers in India to enhance their technological capabilities through research and development (R&D) or technology acquisition.

1.3 Car Ownership Index

In regions with extremely limited public transportation infrastructure, passenger vehicles always provide mobility alternatives more quickly. However, in comparison with majority of the large economies, India's Car Ownership Index (COI) is quiet low (ET Auto, 2018). In relation to the population of India, there are only 34 PVs per 1000 people (Waghmare, 2024, September 27). The number of cars per 1000 persons for a few developed and emerging economies is shown in Table 2. It serves as evidence of the phenomenal growth potential and the primary factor that attracted major international automakers to India.

Table 2: Automobiles Per Capita

Country	Car Ownership Index (COI) *	Data Year
USA	908	2023
UK	600	2022
France	668	2022
Germany	628	2020
New Zealand	884	2022
Australia	782	2022
Canada	790	2020
Japan	661	2023
China	221	2022
India	59	2020
Brazil	386	2022
Russia	395	2022

Source: World Population Review
*Cars include both passenger cars and commercial vehicles, excluding two-wheelers.

One can find from Table 2 that India's PV market has significant potential to grow considering the low automobiles per capita. In contrast, saturation is expected to slow down and stagnate PV sales in developed economies. Policy measures such as vehicle scrapping, technology migration and complete shift to green mobility solutions may be main drivers of future growth in the developed economies. However, India's PV segment is expected to grow at a robust rate due to many

factors, including lack of integrated public transportation network, rising income levels and a rapidly expanding middle class with shifting mobility needs, improved road connectivity and quality, and low insurance cost.

1.4 Discussion: Market Imperfections

The industrial ecosystem is a network of heterogenous interconnected autonomously managed businesses (di Comite, et al., 2011) and within the network businesses exchange resources, technology and interdependent activities. The setting promotes forging purposeful relationships for co-creation of value between, regulatory institutions, producer groups, intermediaries and demand side agents (Andreoni, 2018). Alliances between specialist businesses with an ecosystem that lead-producers rely on form the value chain networks. This network is made up of diverse businesses that collaborate in ways that offer entities within a network to gain competitive advantage over the other competing networks and businesses engaged in similar activities (Morgan, & Hunt, 1995; Madhok, & Tallman, 1998). Contracts that define a firm's affiliation with a lead-producer and the hierarchical relationship between firms, in addition to determining the flow and control of resources, also guide the terms for establishing a reliable value chain, for output and technical contributions. Furthermore, these agreements enable network entities to work for a shared vision that fosters innovations, investments, and cooperation for sustainability (James F. Moore., 1996).

The law of supply states that the size of production determines its level of demand. According to this principle, businesses can continuously generate and capture value by taking advantage of unexplored territories to gain market share. The new-fangled wisdom since globalisation is employing contract manufacturing to boost profitability, lower marginal costs, and achieve above-average productivity levels (Lee, 2011). As a result, OEMs effectively include procurement management into their operational strategy (Handfield, et al. 2002) and consider it critical in order to gain advantages from cost savings, higher productivity and capability (Porter, 1985; Barney, 2001). In addition to that, this enables the development of an industrial ecosystem in developing economies and assists micro and small businesses in breaking free from the hold of perineal dwarfism. However, the automotive industry is typically described as a differentiated products oligopoly in the literature of economics (Ju, 2001; Biesebroeck, et al. 2012).

Automotive sector is a multiproduct ecosystem that drives lock-in and automakers are at the core of it. For instance, PV automakers scramble, body and chassis, engine and components, drive and transmission, suspension and breaking, electrical and electronic systems, rubber components, interiors and upholstery etc. leading to retention of vendors/suppliers. In addition to these, ground-breaking new age technologies are also sourced by automakers that improve navigation, safety, convenience, security, and environmental sustainability like Autonomous Driving (AD), Advanced Driver Assistance System (ADAS), connected technology, and telematics. Due to the stringent regulations on safety and efficiency in the automobile sector, Tier-suppliers and vendors are locked-in to the lead-producers due to compatibility of products. The lock-in condition occurs when network effects and switching costs makes a business or a customer reliant on a single supplier/vendor/manufacturer for a specific service and are unable to switch vendors without incurring expenses or inconvenience (Farrell, & Klemperer, 2007). Additionally, it prevents consumers from switching providers in response to efficiency gains, whether predicted or not.

1.5 Lock-in and Switching Cost

Product differentiation is one of the main goals for Original Equipment Manufacturer (OEM). From a design standpoint, it keeps their product and components from being incompatible with those of their rivals. It is a strategic measure that secures the value and supply chain, creating a barrier for the supplier/vendor base from moving to competitors and continue relying on specific business or brand for repeat businesses. Additionally, this approach increases the supplier/vendors customer lifetime value and makes it easier to establish a direct, one-on-one relationship with the client.

The automotive industry is subject to strict regulations. Automakers are therefore required to adhere to specific processes and use tested, validated and certified components that use approved materials in order to ensure vehicles meet and fulfil safety and design standards. As a result, supplying components to a competitor, who is positioning similar product, in a different network, necessitates capital investments for R&D, testing, certification, and deployment of new technologies. All these are time-consuming and have a significant switching cost. Therefore, lock-in results in significant switching costs which can be viewed as the outcome of an irreversible investment; however, the kind and approach of the investment can vary. The following types of customer lock-in by automakers combine these concepts with various strategies which can be broadly classified under (Carl Shapiro and Hal Varian):

i) Legal
ii) Technological
iii) Economical or in combinations to the lock-in

Contractual Commitments: This gives both buyer and supplier certainty for purchase of products and services. In this instance, the switching cost is damages for contract violations that include delayed deliveries or acceptance of supplies, and quality of supplies, apart from termination fees. In the most basic scenario, customer lock-in is valid for the duration of the contract. However, if the product is not outdated or obsolete, and the production equipment has a longer technical life than the contract's initial duration, and if the product is incompatible with those of competitors that provide comparable goods or services, then lock-in period may extend beyond the initial contract duration. This scenario draws attention to the fact that short-term contracts control long-term relationships (Farrell, & Klemperer, 2007). Therefore, crucial aspect of the

lock-in concept is the invested asset that necessitates future supplies be made from the same manufacturer/supplier. This reliance is created by technological limitations like compatibility or patents.

Durable Purchases: The lock-in effect and switching costs are enhanced by incompatibilities and the addition of proprietary features to the equipment. In the event of the equipment not being stand-alone but rather a component of a complex system, it contributes to expand and widen the lock-in. In this instance, automakers resorts to buy more peripheral or any other related parts from the existing supplier vendor. Furthermore, it occasionally may require additional CAPEX before recovering their initial investments. However, the number of suppliers that are prepared to supply additional range of products to the automaker will be determined by the manufacturer/supplier capacity to do so.

Product-specific Training: Depending on how product specific the training is, the cost incurred in learning to use a product per service is switching cost. The cost of product-specific training includes both direct cost of learning a new system and the indirect cost of lost production. If the market pioneer has gained significant penetration in the vendor/supplier base and has created a brand specific network, it will make testing and certification of products expensive for a late entrant (Carpenter, & Nakamoto, 1989).

Information and Database: Businesses need to share and save their data in specific format and physical form throughout the product lifecycle. They do so to enhance capabilities, efficiency and for security reasons. This feature necessitates technical convergence between the vendor/supplier and the lead-producer in a network due to their mutual need for a comparative advantage. This might require the manufacturer/supplier/vendor to invest in Information and Communications Technology (ICT) and Electronic Data Interchange (EDI) to organise knowledge and to build capabilities on various activities throughout the workflow (Alves, & Pinheiro, 2022). Additionally, this improves coordination and opens new avenues for future collaborations. In this case scenario, converting data to a new format is referred to as switching cost. Even with a high degree of automation, conversion and transfer will inevitably come with expenses, such as labour, data loss risk, and potential short-term use loss.

Specialised Suppliers: Specialised suppliers are frequently used in business-to-business (B2B) transactions, and their significance is expanded to business-to-consumer (B2C) transactions due to customization. The cost of identifying and possibly financing a new supplier is referred to as switching costs in this context. These costs could rise over time if current suppliers do not improve their capabilities and meet the specifications. To strengthen lock-in with a specific supplier, an automakers contract with another vendor/supplier may call for the use of that particular supply provider.

Search Cost: Finding a different buyer or a seller than the current ones can be expensive to find both online and offline and requires comparing a variety of parameters. To calculate the switching cost, even if the transportation cost incurred is eliminated, the buyer or the seller is still responsible for the time spent in obtaining and analysing information.

1.6 Market variability and shelf-life

The supplier/vendors or component manufacturers maintain inventory of finished goods to respond better to market volatility, despite relying heavily on input raw materials to transform them into finished goods. In contrast, the automakers use Just-in-Time inventory model. As an outcome of contrasting business models, the supplier/vendor is at higher risk of inventory pileups of raw materials, discreet parts and final assembled goods, thereby creating a lock-in situation and heavy dependence on the PV automaker for liquidation of inventory and free up investments. Numerous technological constraints such as patent or compatibility leads to deepening dependence apart from the degradation to the finished goods due to corrosion, warpage, brittleness, and swelling etc. It is also because of aging and exposure to humidity in the absence of storage in a controlled environment.

From the above presentation, it can be concluded that the lock-in effect can give the PV automaker considerable monopoly power.

1.7 Competition and Market Concentration

The production of vehicles mainly depends on the size of the local market, production costs and economies of scale. For automakers, reaching the economies of scale is required for profitability and it has been one of the biggest challenges. To optimize cost and for profitability, automakers produce cars on the same platform. The automobile industries lucrative economies of scale had expanded even further by 2023, when a single platform was needed for about a million cars to be produced annually. Both emerging and developed economies cannot afford this level of manufacturing as production of PV necessitates intricate supply chains that links various regions (UNCTAD, 2024, October 30).

Firms compete intensely to capture market share in the same product category or market segment (di Cintio, 2006). More than price wars, product differentiation is used as the main strategy by businesses to increase their market share. However, automakers also employ pre-emptive strategies like introductory discounts and penetration pricing when:

i) Competition is Intense
ii) Low Product Differentiation
iii) Entering a New Market
iv) Launching a New Product

Numerous other strategic elements, including market pioneers or the first mover (Carpenter, & Nakamoto, 1989), consumer trust and confidence, distribution channel dominance (Finney, Lueg, Campbell, 2008), technological leadership, and creation of entry barriers and switching costs (Farrell, & Klemperer, 2007), can determine a company's ability to control its market share. These tactics not only lessen competition but also decreases productive efficiency and fogs product

differentiation. For instance, due to network effects, even large multimarket conglomerates have found it difficult to compete with the pioneers in a market due to the first mover advantage (Gupta, et al., 2019).

The concept of effective competition, as used in the classical market structure classification, refers to ideal competition. However, a low-level of product differentiation is one of the features of oligopolistic setting and monopolistic competition. This characteristic of the PV automakers shows the presence of monopsony power when they purchase components from small scale producers and some oligopoly power within the market of output controlling the market share according to product quality and characteristics. This means they face almost little to no competition from other producers in terms of purchase volume. In such situation when few large buyers who enjoy market dominance, they tend to engage in setting terms of supply quality, time and volume, apart from price and payment terms (Fang, 2006) with their suppliers/vendors in a way that benefits them (Bulow, et al., 1985; Chen, 2007). The lack of alternate market provides PV automakers a favourable condition to maximise their profits by coercing their supplier/vendors to reduce the price of goods and services they supply on terms that work for them (Ro, et al., 2013). This imbalance in negotiating power is the consequence of market concentration.

Market concentration defines the market structure and is a significant measure of market dominance (Pavic, Galetic, & Piplica, 2016). Therefore, it is a crucial aspect of market structure that might affect the performance and behaviour of all the stakeholders in the automotive sector. By calculating the CR, we may ascertain an organisation's capacity to regulate productivity, impact supply for market exchange, and affect working conditions. This is done by determining the market share of a select handful of the largest firms. HHI, however, helps us to comprehend the degree of concentration, by computing the square of market share of every company in the sector. Therefore, in order to gain a thorough grasp of market power, two distinct metrics are used to calculate and interpret. HHI, which considers all companies, and CR, is the sum of market share of three, four, five, or eight largest firms operating in the market. Both can be used to substantiate each other's conclusions and to accurately determine the degree of market concentration. Notably, a low level of concentration denotes efficient competition, whereas a high level of concentration implies weak competition (Dastan, 2016).

There is a certain level of market power associated with each level of market concentration; this implies market power is disproportionately distributed among stakeholders. This variability can be used to determine the market structure. Those with greater degree of market power are characterized by price-setting behaviour and display traits of oligopsonist-oligopolistic and monopolist-monopsonist behaviour (Hamilton, Bontems, & Lepore, 2013). The market characteristics are categorized according to its degree of concentration and the impact of its market power at various concentration levels is indicated in Table3.

Table 3: Measure of Market Concentration and Market Type

Degree of Market Concentration	Market Type	Measure		Market Power	Product Differentiation
		5 CR	HHI		
Non-Concentrated	Efficient and Part of monopolist competition	<45	<1500	Low	Low
Moderately Concentrated	Part of monopolistic competition with few dominant players, loose oligopoly*	45 – 60	1501 – 2500	Moderate	High
Highly Concentrated	Tight Oligopoly** with few dominant players and one that stands out with significantly higher share	>60	> 2501	High	Very High

Source: Pavic et al., 2016

*Loose Oligopoly refers to a market with multiple companies with near equal market share in addition to a dominant player.
**Tight Oligopoly refers to a market in which dominant players along with few companies' stand out with a significant market share.

1.8 Significance of the Study

The importance of analysing the market type and the market power cannot be understated, as the competitive landscape is always changing. Therefore, qualitative assessment of a sub-sector to investigate the extent of competition is uncommon; this is especially true in the case of capital-intensive industries. This study investigates the relationship between production capacity, and market share and factors that may contribute to market imperfection. The study focuses on the automobile PV sub-sector and uses statistical analysis to rank the PV automakers operating in India and in direct competition. It is clear the increase in production capacity leads to increase in market growth. However, production capacity and market

growth need not translate into increase in market share; it is likely that firms need to combine capacity expansion with strategic initiatives. The study further investigates the market structure and the market power exercised by the PV automakers by applying CR and HHI. This is applied in order to determine competitive practices. In addition, it also explores the strategic actions that different firms have taken to avoid market equilibrium.

2) Methods and Methodology:

This study uses secondary data of the sales data published by AutoPunditz of each PV automaker in India. The study applies statistical analysis to determine the extent of capacity utilisation, automakers performance, market share, and CR and market power of each automaker. In order to define the market structure, the concentration level in the industry was computed. The study makes use of 5CR and HHI to improve the accuracy and dependability of competitiveness and concentration of the PVs firms. The analysis excludes data on sales from imports of PV. It is assumed imports of PV are in the luxury vehicle segment, which is negligible relative to the mass-market models and hence does not interfere with the market power of local manufacturers.

3) Results:

3.1 Level of Market Competition

A market's level of competition and the number of enterprises that control and dominate in an industry can be adjudicated by determining concentration and productive capacity (Dastan, 2016). Understanding each firm's relative size in relation to its market share and its market power to dominate in the sector is helpful to learn the level of market competition. Furthermore, it sheds light into the firm's concentration levels and the evolving dynamics of the market structure. Table 4 indicates the 5CR and HHI from 2011 to 2022.

Table 4: 5CR and HHI

Year	Total Sales (Domestic + Exports)	5CR	Number of Firms	HHI
2011	31,46,069	82.19	18	2204.70
2012	32,31,058	82.02	18	2116.29
2013	30,87,973	79.96	18	2318.16
2014	32,21,419	81.93	20	2494.51
2015	34,65,045	83.67	21	2633.89
2016	38,01,670	81.85	21	2668.00
2017	40,20,267	83.98	22	2889.23
2018	40,28,471	85.76	21	3031.41
2019	34,24,564	84.43	22	2908.23
2020	30,62,280	86.32	22	3086.44
2021	36,50,698	83.63	22	2538.21
2022	45,78,639	83.40	21	2158.95

Source: compiled and calculated by the author

Table 4 shows both CR and HHI move in the same direction, and the high degree of CR is the second factor, we note that the number of PV automakers rose from 18 to 22 during the period of study. Additionally, it is noteworthy that when competition grew, 5CR and HHI also increased, suggesting the market progressed toward greater concentration and oligopoly. It has been noted that the CR values have consistently stayed above the threshold of 80. This demonstrates that the PV sub-sector is a tight oligopoly, with a few PV automakers holding the majority of the market share. This suggests even though the PV automakers are able to manufacture and market comparable PV, the market is distorted and less competitive.

An oligopolistic market denies competitor of a fair competition and revenue gains. And this can be achieved through supplier coercion or other nonmonetary means, such as expanding distribution channel. Such strategies may cause the competitors market share and revenue earnings to steadily decline, ultimately forcing them to exit the market. Table 4 shows two disparities that supports this assertion. In 2018, for example, both 5CR and HHI increased despite a PV automakers exit. This could mean that the market's propensity towards tight oligopoly and monopoly while increasing product differentiation was not significantly impacted by the automaker's departure.

That being said, there is a noticeable decline in both 5CR and HHI in 2021 and 2022. The data shows that the PV automakers did a great job of meeting the pent-up demand after the COVID-19 disruptions, as evidenced by the increase in the production figures. Table 4 also shows that the degree of concentration remained above 80 despite the HHI declining to and below the 2500 threshold. This suggests a major attempt by one or more of the PV automakers lagging behind the

dominant ones to catch-up the market share. Even though the HHI shows a moderate level of concentration, this time frame is typical with a tight oligopoly. Therefore, it is safe to presume that a distortion occurred.

During this time, Tata Motor's market share increased dramatically as it attempted to overtake Hyundai Motors. Noteworthy development during this period was the product basket expansion of Tata Motors into Electric Vehicles (EVs) and the introduction of multiple new PVs targeting the mass-market entry level to the premium segment. Therefore, in addition to the shift in consumer preference that saw a move from hatchback and sedan to Utility Vehicles (UVs) and the widespread adoption of EVs, product differentiation can be attributed as a crucial factor in Tata Motors rise in the PV segment. Tata Motors became a formidable competitor in both of these sub-categories, setting itself apart from the competition with a focus on safety and sturdy build quality. This suggests that product differentiation can have an arbitrage effect on the market share without significantly altering the market concentration.

3.2 Production Capacity and Competitiveness

Generally speaking, capacity expansions are seen as an essential precondition for growing market share. Market share is seen by businesses as a crucial metric of their competitiveness. From a sales revenue perspective, increased capacity increases total revenue by making more products available for sale. And businesses assume that gains in market share eventually translate into increased profitability. This is because advances in market share improves possibility to progress towards and establish themselves as market leader and gain monopoly power (Porter, 1985). Additionally, increases in production capacity enables firms to explore new markets and sell the extra quantities of PV. PV automakers in India have progressively increased the production capacity to nearly 7 million. Table 5 indicates production capacity, market share as of 2022 and the automakers' plant efficiency.

Table 5: Production Capacity, Market Share and Efficiency

Sl. No.	Group	Brand	Production Capacity	Domestic Sales: 2022	Market Share	HHI	Production Efficiency
1	BMW Group	BMW	14,000	12,694	0.33	0.11	90.67
		Mini					
2	Stellantis	Jeep	3,40,000	19,397	0.50	0.25	5.71
		Citroen					
		Fiat					
3	Honda	Honda	2,80,000	95,022	2.44	5.98	33.94
4	Hyundai	Hyundai	11,70,000	8,24,072	21.20	449.39	70.43
		Kia					
5	Tata	Tata	8,53,500	5,27,919	13.58	184.43	61.85
		JLR					
6	Suzuki	Maruti Suzuki	20,50,000	15,69,125	40.37	1629.34	76.54
7	Toyota	Toyota	4,00,000	1,60,357	4.13	17.02	40.09
8	Renault-Nissan	Renault	4,80,000	1,73,461	4.46	19.91	36.14
		Nissan					
9	Mitsubishi	Mitsubishi	30,000				
10	Volkswagen Group	Skoda	2,60,000	1,05,457	2.71	7.36	40.56
		Volkswagen					
		Audi					
11	Mahindra	Mahindra	6,30,000	3,35,088	8.62	74.30	53.19
12	Ford*	Ford	1,50,000				
13	Isuzu	Isuzu	50,000	852	0.02	0.00	1.70
14	SAIC	MG	1,10,000	48,063	1.24	1.53	43.69
15	Mercedes Benz	Merecedes	20,000	15,822	0.41	0.17	79.11
16	General Motors*	Chevrolet	1,40,000				
			69,77,500	38,87,329			
				55.71	100.00	2389.79	48.74

Source: Compiled by the author from multiple sources.
*General Motors is the plant has been acquired by Hyundai.

As is evidenced from Table 5, not all production increases need to have translated into in their market share. And the second factor is that the PV automakers are functioning at only 48.74% of their plant efficiency to serve the domestic market. Only four automakers in 2022 were operating at above 70% plant efficiency, 2 mass-market brands and 2 premium brands. It is clear the market offsets the need for capacity addition for the premium brands like BMW and Mercedes Benz. Likewise, the market power exhibited by the automakers excluding Maruti Suzuki indicates low and the overall market power indicates moderate.

Maruti Suzuki has clearly taken a lead in capacity increase to over 2 million units annually and enjoys a market share of over 40%. Its high-volume push has clearly established itself as the dominant player in the mass-market segment, benefiting from the cost leadership, compelling competitors to adjust their strategies. The continuous production capacity expansion of Maruti Suzuki, could have attracted the attention of globally leading PV automakers to India and set their shop here, thus increasing the level of domestic competition. Although this may sound speculative, there are ambitious entries and silent exits of several PV automakers from the Indian market, such as GM and Ford or the 2019 Volkswagen-Skoda merger, which aimed at increasing efficiency by pooling expertise, coordinating and streamlining talent acquisition to gain market share, and increase presence (ETAuto, Sep 2019). As late entrants, Ford, GM and Volkswagen were unable to achieve expected market share as they did not launch technologically superior products to alter perceived differentiation, and neither did they carve out new segments or reposition their products in segments Maruti Suzuki or Hyundai were not present or offer their products at lower prices to gain market share. This allowed the pioneers Maruti Suzuki and Hyundai to preserve their market share and made competition expensive for market rivals.

The expansion of production capacity by other PV automakers could have been a strategy to counteract negative effects due to the rampant expansion of Maruti Suzuki. However, this seems to have resulted in industry overcapacity as domestic demand which is met from production of new PV and from stock constitutes only 56% of the total installed production capacity in India. With Maruti Suzuki clearly wielding a moderate market power, it could be harming the industries profitability and for all its competitors. However, for Suzuki, outside of Japan, India is its largest market (Acko Drive, 2023, October 3). As a result, it has increased its production capacity to counter its competitor's effort. However, the market share of Maruti Suzuki has also progressively declined due to growing awareness of its competitors; this indicates increasing production capacity need not necessarily result in increasing market share. Maruti Suzuki may, however, have gained cost leadership from economies of scale increasing its competitiveness.

3.3 Tacit and Overt Collusion

Cooperation is usually beneficial when market segmentation is in place (di Cintio, 2006). The Indian PV market is highly segmented represented by multiple brands including inter-group producing PVs that are close substitutes to products offered vertically within the group and by the market rivals. There are at least five indicators that strongly imply cooperation. Additionally, it is hypothesized that collusion serves as a stimulant for Resale Price Agreements (RPA), Symmetry, Joint Ventures, Buyer Power, and Links among market rivals.

Links Among Market Rivals: On closer examination of the mass-market PV automakers, 10 brands from four major automotive conglomerate groups are found to be active in India. The groups and the brands representing them are, Hyundai (Hyundai, Kia), Renault-Nissan Alliance (Renault, Nissan), Stellantis (Fiat, Jeep, Citroen), and Volkswagen (Audi, Skoda, Volkswagen). By itself, the necessity of competing with a sibling reduces the motivation to contest, which lowers the degree of competitiveness. Additionally, their operation in the same geography is thought to support and encourage tacit collusion (Leheyda, 2008). It goes without saying that these automakers would collaborate on product development projects and share designs, platforms, vital systems, components, and suppliers, which would result in homogeneity across product categories within the group reducing product differentiation. In this situation, pricing strategy deviations may appear counterintuitive, and siblings may wind up losing market share to the deviant's rather than grabbing the competitors. Therefore, the coexistence of a multimarket conglomerates group companies in a given location raises concerns about economic efficiency and aggregate concentration (Scott, 1982).

Buyer Power: In the event of a conglomerate group's multiple brands operate in a geography, the purchase department is more likely to be centralized and assigned the responsibility to serve as a common procurement cell. As a result, they have an inherent edge when negotiating for the entire group. When order flows are concentrated unilaterally, the bargaining power during the buying and selling is higher. This is because a monopolist is also a monopsonist (Ashenfelter, Faber, Ransom, 2010) likewise; the oligopsonist is also an oligopolist. The dichotomy of the functions performed by a single entity, which functions as both buyer and seller. In the absence of client options, loss aversion, order regularity, frequency, and supply volumes with reference to dependence compels supplier/vendors to lower prices (Levy, 1996; Fang, 2006; Sigurðardóttir, 2019) resulting in unfair treatment. Alternatively, unified pricing can be applied as a last resort to discover other ways to keep input prices within acceptable range. The last alternative, vertical integration, allows businesses to do it themselves in situations where supplier switching costs is high. Very high product quantities and patented technologies are other requirements that would satisfy vertical integration, particularly when the cost of the investment is justified by profits in case of uniform product offering across the group brands.

Joint Ventures and Tie-Ups: Many PV automakers that have opened operations in India have done so through Joint Ventures (JV), in addition to the 100% investment approach. Fiat and Tata Motors have a JV assembly plant, where the

FCA group and few of Tata Motors vehicles are produced. Additionally, Fiat manufactures its Internal Combustion Engine (ICE), which is procured by Tata and other Indian PV automakers.

Symmetry: Under an agreement between Maruti Suzuki and Toyota, Toyota markets Maruti Suzuki designed and manufactured cross-badged PVs to expand its product line into entry-level cars. In exchange, Toyota serves as a supplier and shares it Hybrid Electric Vehicle (HEV) technology with Maruti Suzuki. In India, this arrangement aids Toyota in growing its market share and enhancing its competitiveness (ETAuto, 2020). Additionally, Maruti Suzuki saves billions of dollars by gaining access to proprietary technology rather than having to develop it from ground up. Cost and need concerns result in strategic Relationships. Such collaboration agreements give PV automakers a compelling reason to collude and work together emphasising mutual long-term benefits (Larsen, & Fredborg, 2014). Additionally, increased coordination and visibility in each other's pricing and marketing policies will be made possible by both companies cross-investing in each other and having representation on each other's board, which will serve to restrict any discrepancies.

RPA: Additionally, RPA is another area where automakers may collude with downstream retailers (Hunold, & Muthers, 2024), specifically in cases where one retailer represents multiple market rivals and, in a setting, if any those brands do not generate sufficient profits or receives nonlinear incentives, they may naturally not concentrate on stocking items, or offer customer assistance, resulting in lower sales of that brand triggering collusion. Similarly, another driving behaviour that can be theorized to increase sales of specific products in specific geographies offered as close substitutes to products vertically within the brand is for manufacturer to collude with particular retailers to increase sales and market share by lowering the resale price maintenance, which departs from the RPA entered with other retailers.

From the aforementioned, despite varying degrees of market power of several automakers, it has been seen that there is sufficient evidence to assume collusion. The prevalence of tacit and overt collusion in the form of collaboration across group companies for cooperative technological development, resource sharing to minimize innovation costs, and a reduction in time and expenses required for production-to-market are all reason to consider. It is pertinent to remember that in 2022, the top 10 brands from the four main automakers with collaboration agreements sold over 3.5 million PV domestically; their collective market share in the mass-market PV sub-sector is 91%.

3.4 Production Capacity and Associated Strategies

The ability of an automaker to compete for market share in both domestic and export markets apart from profitability mainly depends on its production capacity. Both the premium brands, Mercedes Benz and BMW, have relatively low manufacturing capacity because they cater to niche luxury segment market, which has a cumulative market share of less than 1%. However, their high efficiency that is with premium pricing and larger margins that guarantee higher profits, justifies the trade-off for low production capacity.

The market share of PV sub-sector by price segment is shown in Table 6. It compares the current production levels with those at 80% capacity utilisation. Overall, there is a 57% increase in production potential above the current levels considering the total installed capacity. This might have raised domestic sales improving car ownership index and also boosted the GDP. The automakers wasted chance represents a social loss.

Table 6: PV market share by Price, Production Volume, and Capacity Utilisation at 80%

Product Price	Market Share	Current Levels	@80% Capacity Utilisation
<10	56.9	19,63,542	31,76,158
11 - 15L	34.8	12,00,441	19,42,536
16 - 20L	5.9	2,01,973	3,29,338
21 - 25L	1.6	1,67,697	89,312
>40	0.8	27,299	44,656
		35,60,952	55,82,000

Source: computed by the author

Tables 5 and 6 indicate the PV automakers are infusing far less supply into the market, than what their productive capacity would normally allow. Low production volumes limit supply and create inelastic supply, which slows product diffusion due to artificial scarcity, thereby less supply in concentrated market suggests imperfect market competition. This indicates that the monopsonist may affect the upstream input supplier as well as downstream distribution route (Ganesh, & Enderndorf, 2012). Another effective way to present this would be loss of employment generation prospects which is detrimental to the society. Sexton and Zhang (2001) had pointed out how monopolies use their greater market power to maximise profits in order to hide efficiency losses.

A less-than-optimal capacity utilisation rate suggests an inefficient decline in output and income. Economic theories suggest two reasons for this:

i) A stagnant or low-demand market for the automobiles and associated services
ii) The market structure being monopolistic, automakers may purposefully cut back on output and revenue, meaning they forgo productivity gains while compensating for loss by lowering all production-related expenses.

That is the output would decrease proportionately if the quantity of inputs purchased was reduced. By shifting the cost of production to profits, a monopsonistic corporation is incentivized to experience a decline in output and income. This behaviour effectively assists the notion that profits can be generated by retaining profits, without passing it on to the customer, in addition to lowering labour costs and input purchasing prices (Charveriat, 2001).

4) Conclusion

India's automobile industry has advanced significantly after its liberalisation in 1991. Due to foreign investment and technology acquisition, the Indian automotive sector has seen substantial changes, and its dynamics have been altered by competition. Despite a large number of players operating in India, high market concentration along with automakers collusion and cooperation are demonstrated in this paper. Furthermore, low-capacity utilisation is also observed. These elements contribute to the build-up of market power, and it is likely that oligopolistic-monopsonistic market power is at work which results in social losses. It is posited that monopsony in the automobile PV sector denies the auto-component industries a fair competition and revenue gains. This causes a continuous decline of market share and earnings not just for the PV automaker but also for the auto component firms and they ultimately find it difficult to continue in the supply chain. The automobile PV sector and the auto-component firms should operate at peak capacity in order to be financially healthy and competitive and to take advantage of high-quality components at lower prices.

5) Recommendation

The study reveals, excluding Maruti Suzuki and Hyundai, all the other PV automakers were functioning at levels significantly lower than 60%. Due to that cost reduction is aided by economies of scale; this might have a substantial effect on the auto-component industry's output, raising manufacturing costs and PV market prices. PV automakers therefore must concentrate on and enhance their overall performance through renewed focus on both their domestic sales growth and export markets. This is necessary to prevent idle excess capacity and to increase capacity utilization. In 2022, Indian exports of PV stood at a little over 0.6 million units, this represents approximately 15% of total manufactured passenger cars in India. For a comparison with Japan which India had recently overtaken in automobile manufacturing, Japan's exports make up more than 20% of its total output, which is a substantial portion (Haugh, Mourougane, & Chatal, 2010).

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