A STUDY ON THE FUTURE OF THE AUTO SECTOR IN INDIA

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Abstract

A machine that has wheels and uses an engine for transport on land is called an automobile. To enhance and upgrade the road travel, automobiles have been used and evolved over the years. This study lays out details on the present scenario of the Auto Sector in India, reasons for slowdown and future challenges with focus on passenger vehicles. Having the highest participation in the global value chains and being the most important driver of economic growth in India is the automobile industry. Uniquely obliging the demands of low- and middle-income groups of population in the country makes this automobile sector stand out among other countries which produce automobiles. With the advent of newer technology (Electric Vehicles and Autonomous Vehicles) and improved regulatory policies like Bharat Stage VI, the auto sector in the country is facing challenges for the future and needs to amplify its functioning in order to maintain its position.

The study intends to study the factors and reasons for the slowdown in sales of auto sector particularly in the year 2019 and how the usage of electric and autonomous vehicles will be the future of the sector.

The study is using secondary and previously acquired data which will be progressively used for the purpose of analysis with the nature of the study being descriptive. The limitation is that the

study is mostly based on four-wheeler fuel operated vehicles however, the opportunity of electric vehicles has also been discussed sparsely.

Keywords: Auto Sector, Automobiles, BS VI, Economic slowdown, Electric Vehicles, Export, INR Equivalent of 1USD, Inflation, GDP growth

Introduction

As stated earlier, a machine that has wheels and uses an engine for transport on land is called an automobile. To enhance and upgrade travelling by road, automobiles have been used and evolved over the years. It has assisted the users in reducing time and efforts and approaches to be one of the most efficient and convenient ways of travelling for the common man. Everything comes with its pros and cons and automobiles are no exception to this universal rule. Roads have been known to have the largest connectivity amongst all kinds of transportation and therefore serves as a key reason of tremendous increase in the use of automobiles over the decade.

The Auto Sector of India has been performing quite well over the years as the world's fourth largest automobile industry, with the sub-continent presently ranking as the world's fourth largest manufacturer of cars and seventh largest manufacturer of commercial vehicles in the year 2018. As per reports, India is also expected to become a leader in shared mobility by 2030. But there are issues pertaining to fluctuation in the fuel prices and several other factors that will be discussed in the later sections of this paper which can hamper the growth and hence, presents the uncertainty in the working of this sector. There are regular ups and downs in the sector with every passing month and has a connection with several economic and uneconomic factors that need to be studied.

The recent economic slowdown in the Financial Year 2019 and first quarter of Financial year 2020 with the GDP growth rate dropping to nearly 5%, being the lowest in over six years in the history of India is an indication of tough times for the country ahead and the collapse of the Auto Sector in India has a major hand in the deceleration of the growth rate at an alarming rate.

The most prominent automobile companies of India put forth their sales for the months of July and August 2019 and showed highly discouraging numbers. To quote an Economic Times article on September 10 2019- "Automobile sales in India see the worst ever fall in 21 years". Data delivered by the Society of Indian Automobile Manufacturers (SIAM) revealed passenger vehicle sales declined steadily over the last ten months especially in August by 31.57% which was the sharpest fall registered since SIAM started recording data in 1997-98.

India's biggest carmaker Maruti Suzuki India had been spectating a down fall for more than half the year and captured a 33.5 percent reduction in net sales to 1,09,264 units in the month of July and 36.1 percent to 93,173 units in August 2019. Mahindra & Mahindra had registered a dip of 15 per cent in aggregate month wise sales to 40,142 units in the former mentioned month, with passenger vehicle sales touching a total of 13,507 units in the latter month which was 32 per cent lower than in August 2018; while coming to another leading automobile company in the country Honda cars whose domestic sales went down by 48.67 percent in the same month and plunging 51.3 percent in the following month. Hyundai Motor's domestic sales dived to 16.58 percent to 38,205 units in August 2019 from 45,801 units in the same month last year.

However, the festive season had bumped up retail sales of automobiles in the month of October during an incredibly poor year for the sector. Statistics show that passenger vehicle registrations improved 11% in October, followed by two-wheelers showing an improvement of 5%. However, commercial vehicles registrations carried on the decline, shrinking 23% in comparison to the previous year. 1

Reasons for slowdown in auto sales in the year 2019

Analyzing the situation, the reasons that can be considered for the decline in auto sales for the year 2019 are:

Bharat Stage VI, Regulatory policies- After adoption of BS-VI on April 1,2020, future of BS-IV vehicles is very unpredictable. Adoption of BS-VI is set four years earlier than the original plan which caused the stagnancy in vehicle demands.

Cost of vehicles- The cost of cars is estimated to have risen by 15% in the past few months due to mandatory additions like airbags, reverse sensors, ABS and crash conformity standards.

Fuel Prices- Constant fluctuation in oil prices during the time span of 2015-2019 with prices rising by nearly 15 percent has held back buyers from purchase of vehicles.

[1] The above statistics and numbers have been taken from the Economic Times:

https://economictimes.indiatimes.com/industry/auto/auto-news/festive-october-a-quirk-amid-auto-slump/articleshow/72134918.cms?

Purchasing power of people- There is a drop in the purchasing power of people caused by a sustained rural distress. Also, demonetisation has had a long term effect.

Rise of Radio Taxi (Ola and Uber)- Heavy traffic congestion, lack of parking slot availability, poor road quality, expensive vehicle ownership cycle and decreasing resale value are a few reasons that can be quoted for people preferring commercial platforms like Ola and Uber. In cities, now-a-days, people prefer taking taxis for commuting instead of owning and driving themselves.

Motor Vehicles Act- Stricter rules for driving and heavier penalties and sanctions that have risen exponentially has acted as a purchase dissuasion after The Motor Vehicle Amendment Act, 2019 which was passed by the Parliament and brought into effect on September 1, 2019. Though not a key factor of course, but can be considered as one of the reasons.

EV Policy- The government's sustained push for electric mobility has created doubts for buyers who are now comparing ownership cost of a petrol/diesel car to that of a battery-operated car.

Job uncertainty- An estimated 0. 2 million people associated with the auto industry have been laid off in less than a year. There were 18.6 million Indians without a job in 2018 and that was estimated to go upto 18.9 million by the end of the year, according to the International Labour Organisation.

Review of Literature

Tripathy, et. al. , 2018 drive most of their attention to autonomous and electric vehicles' scope in India and shells out the multiple technological possibilities that lie before the Auto Sector in India primarily focusing on passenger vehicles. The automotive industry is in a continuously changing state with companies adopting different strategies to jump to higher technological levels and taking hold of tech-savvy yet ecofriendly customers and develop a reputation in the market. The study describes how the Indian Government gravitates towards following Euro emission norms and hence Euro 7 is awaited in 2020 which is believed to maximize focus on

limiting CO2 emissions instead of pollutants and all of this is in addition to adopting BS VI to make more environment friendly vehicles. This entire shift by the government is necessary as the emission levels have been shown to increase manifolds in the past several years with the development and growth of the auto industry and the number of vehicles on the road. They also mention that NOx must be reduced by 68% and PM (particulate matter) for diesel cars by 87% under BS VI norms in contradiction to those of BS IV, adding a mandatory 25% reduction of NOx in gasoline cars. This push is important, they say, as the national capital Delhi has been swaying under hazardous levels (Particulate Matter 10 greater than 3004) of pollution and had itself declared as the 'Most polluted city on Earth' with vehicular exhaust as one of the primary donors to the hazardous air in the national capital. Another highlighted trend these days is the inclination towards "electrification of drivetrains". China leads the global automotive market followed by the USA whereas India stands on the 6th position in the market with 3.61 million car sales of which only 0.8-1% are electric vehicles including Battery Electric Vehicles (BEVs) and Plug-in Hybrid Electric Vehicles (PHEVs). Moving ahead to the technological aspect, Tripathy et. al. say that an extensive variety of future scope in the form of autonomous vehicles with different levels of autonomy to different cars will be made available with advancements in artificial intelligence, machine learning and natural language processing. This jump is being made by globally leading companies in the field of technology such as Google, Apple, Intel and Uber thereby posing a huge threat for the Original Equipment Manufacturers (OEMs) making them choose between either putting their best foot forward by proposing their own strategies and plans for automation of vehicles or partnering with any of these companies. To quote the authors, IoT has expanded into the auto manufacturing sector and spelled 'Industry 4.0' into existence which acts as the upcoming borderline authorizing smarter manufacturing facilities with increased association between the machines. Therefore, the study concludes by saying that the Indian market and Indian auto sector is aware of the opportunities before them but not proactively embracing them as they should but shift to BS VI and electric vehicles is one of the stepping stones however, autonomous vehicles still remains a farfetched dream in the country.

Objective of Study

Growth of automobile sector in India

Establishment of relationship between production of automobile units in auto sector and export of automobile units

Establishment of relationship between exchange rates and export of automobile units

Establishment of relationship between export, production of automobile units, exchange rates and inflation

Establishment of relationship between export, production of automobile units, exchange rates, inflation and GDP at constant price

Methodology

The study used secondary and previously acquired data which has been progressively used for the purpose of analysis. The nature of the study is descriptive, and the data was mostly collected from news bulletins like The Economic Times, The Hindustan Times, The Hindu, India Today, SIAM bulletins, BSE India bulletins. The study focuses entirely on the Auto Sector based in India. The data used is of 15 years from 2005 to 2019. In the data analysis, 1 variable, 2 variable, 3 variable and 4 variable regression methods have been used.

Hypothesis

H_{00}: Growth of automobile sector has no significant impact on the GDP growth.

H_{10}: The auto sector contributes to nearly 7% of the country's GDP and therefore, is considered to influence the GDP growth. With the decline in sales in the auto sector, India's GDP dropped to nearly 5% which is the lowest ever in six years.

As is evident from the table #5 we can see that R square (Regression square) is 0.97475 which shows a 97.475% explanatory power of dependence by GDP growth which is the dependent variable in the equation on automobile production, INR equivalence of 1USD and inflation being the independent variables. It however, does not show a significant dependence on the export of automobile units. Hence, the automobile sector's growth has a significant impact on the GDP growth of India.

H_{01}: Growth of automobile sector has no significant impact on export.

H_{11}: As per reports, it is observed that India exported around 3.48, 4.04, 4.63 million units in the financial years 2017, 18 and 19 respectively.

As is evident from table #1 we can see that R square (Regression square) which is the fitness of the model is 0.98168 which shows a 98.168% is the explanatory power of dependance by automobile export units on automobile production and in table #2 export is dependent on production and exchange rates i.e. INR equivalence of 1USD with R square of 0.98184. Therefore, the growth in the automobile sector i.e. growth in production of automobile units is seen to have a significant impact on the export of automobile units.

Data Analysis

Table #1

Association between export and production of automobile units

SUMMARY OUTPUT								
Regression Statistics								
Multiple R	0.990799954							
R Square	0.981684549							
Adjusted R Square	0.980275668							
Standard Error	0.178678879							
Observations	15							
ANOVA								
	df	SS	MS	F	Significance F			
Regression	1	22.24	22.24	696.78	1.11793			

		560016	560016	32277	E-12			
Residual	13	0.41503984	0.03192614					
Total	14	22.66064						
	Coefficients	Standard Error	t Stat	P-value	Lower 95%	Upper 95%	Lower 95.0%	Upper 95.0%
Intercept	-0.66676041	0.12916993	-5.16188	0.000182839	-0.945815089	-0.387705735	-0.94582	-0.387705735
X Variable 1	0.17180869	0.00650873	26.39665	1.11793E-12	0.157747433	0.185869947	0.157747	0.185869947

Table #2

Association between export, production of automobile units and exchange rates

SUMMARY OUTPUT								
Regression Statistics								
Multiple R	0.990882301							
R Square	0.981847734							

Adjusted R Square	0.97882 2356							
Standard Error	0.18514 4532							
Observations	15							
ANOVA								
	df	SS	MS	F	Significance F			
Regression	2	22.2492 9803	11.1246 4901	324.53 72408	3.57755 E-11			
Residual	12	0.41134 1971	0.03427 8498					
Total	14	22.6606 4						
	Coefficients	Standard Error	t Stat	P-value	Lower 95%	Upper 95%	Lower 95.0%	Upper 95.0%
Intercept	-0.54269 9138	0.40073 3549	-1.35426 4299	0.2006 04761	-1.41582 2536	0.3304 24259	-1.41582 2536	0.3304 24259
X Variable 1	0.17695 7114	0.01706 4364	10.3699 802	2.4152 6E-07	0.13977 706	0.2141 37169	0.13977 706	0.2141 37169
X Variable 2	-0.00409 1968	0.01245 854	-0.32844 6864	0.7482 34326	-0.03123 6794	0.0230 52858	-0.03123 6794	0.0230 52858

Table #3

Association between export, production of automobile units, inflation and exchange rates

SUMMARY OUTPUT								
Regression Statistics								
Multiple R	0.993807671							
R Square	0.987653687							
Adjusted R Square	0.984286511							
Standard Error	0.159480793							
Observations	15							
ANOVA								
	df	SS	MS	F	Significance F			
Regression	3	22.380864 64	7.460288215	293.3180801	8.94834E-11			
Residual	11	0.279775356	0.025434123					
Total	14	22.66064						
	Coefficients	Standard Error	t Stat	P-value	Lower 95%	Upper 95%	Lower 95.0%	Upper 95.0%
Intercept	-1.4947	0.542577998	-2.75497	0.018723334	-2.68899	-0.300	-2.689	-0.3005

	8909		5497		5212	58		8
X Variable 1	0.1598 88837	0.01650 3904	9.68794 0596	1.0139 1E-06	0.12356 399	0.196 214	0.1235 64	0.1962 14
X Variable 2	0.0134 55493	0.01321 7124	1.01803 4863	0.3305 30137	-0.01563 52	0.042 546	-0.0156 4	0.0425 46
X Variable 3	0.0454 76897	0.01999 5228	2.27438 7518	0.0439 67498	0.00146 7697	0.089 486	0.0014 68	0.0894 86

Table #4

Association between GDP growth, production, export of automobile units, exchange rates and inflation

SUMMARY OUTPUT								
Regression Statistics								
Multiple R	0.98784 2673							
R Square	0.97583 3146							
Adjusted R Square	0.96616 6404							
Standard Error	0.49118 7472							
Observations	15							
ANOVA								
	df	SS	MS	F	Signific			

					ance F			
Regression	4	97.42042298	24.35511	100.9474742	4.84637E-08			
Residual	10	2.412651325	0.241265					
Total	14	99.8330743						
	Coefficients	Standard Error	t Stat	P-value	Lower 95%	Upper 95%	Lower 95.0%	Upper 95.0%
Intercept	-0.698424957	2.172416743	-0.3215	0.754453024	-5.538871104	4.142021191	-5.538871104	4.142021191
X Variable 1	0.366936511	0.156937334	2.338108	0.041473079	0.017258339	0.716614682	0.017258339	0.716614682
X Variable 2	0.080378493	0.042582163	1.887609	0.088409938	-0.014500479	0.175257464	-0.014500479	0.175257464
X Variable 3	0.036097661	0.074672731	0.483412	0.639213409	-0.130283553	0.202478875	-0.130283553	0.202478875
X Variable 4	-0.621053854	0.928629664	-0.66879	0.518772355	-2.690169687	1.448061979	-2.690169687	1.448061979

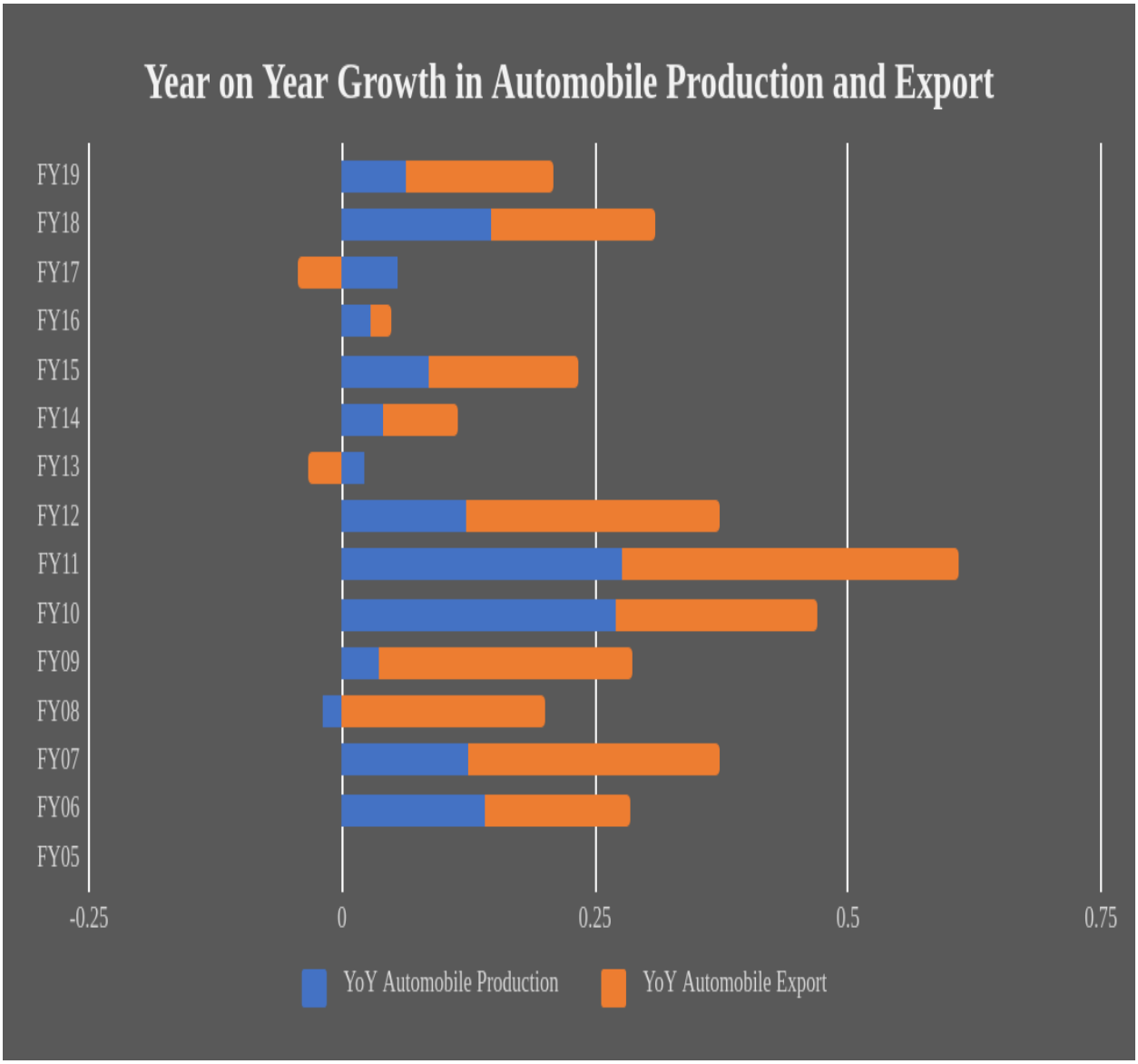
Table #5

Association between GDP growth, automobile production, exchange rates and inflation

SUMMARY OUTPUT								

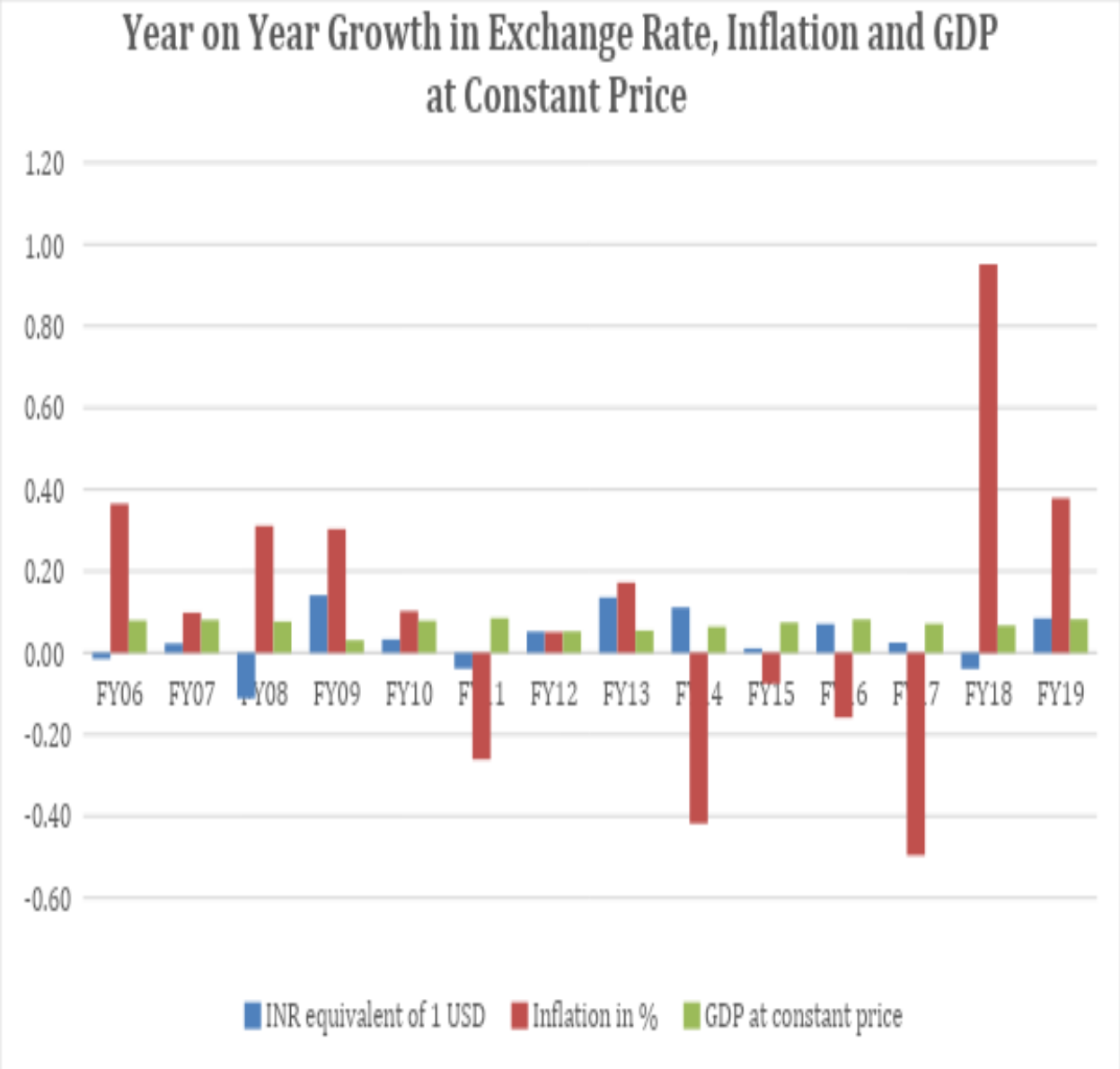
Regression Statistics								
Multiple R	0.98729541							
R Square	0.974752226							
Adjusted R Square	0.967866647							
Standard Error	0.478687874							
Observations	15							
ANOVA								
	df	SS	MS	F	Significance F			
Regression	3	97.31251141	32.4375038	141.5606584	4.55098E-09			
Residual	11	2.520562887	0.229142081					
Total	14	99.83330743						
	Coefficients	Standard Error	t Stat	P-value	Lower 95%	Upper 95%	Lower 95.0%	Upper 95.0%
Intercept	0.229919569	1.628569207	0.141178875	0.890280908	-3.353457088	3.814376	-3.35454	3.814376
X Variable 1	0.267636933	0.049537116	5.402755675	0.000215754	0.158606476	0.376667	0.158606	0.376667

X Variable 2	0.072021907	0.039671716	1.815447229	0.096785756	-0.015294951	0.159339	-0.01529	0.159339
X Variable 3	0.007854059	0.060016463	0.130865078	0.898244711	-0.124241286	0.139949	-0.12424	0.139949



Graph 1

Graph 1 shows the Year on Year (YoY) in Automobile Production and Export ranging from -0.25 to +0.75 with the highest YoY automobile production and export both in the Financial Year 2011, lowest YoY automobile production in the Financial Year 2017 and lowest YoY automobile export in the Financial Year 2008.



Graph 2

Graph 2 shows the Year on Year(YoY) in Exchange rate, Inflation and GDP at constant price ranging from -0.60 to +1.20 with the highest YoY inflation in the Financial Year 2018, highest YoY GDP at constant price in the Financial Year 2011 and highest YoY exchange rate in the Financial Year 2014, lowest YoY inflation in the Financial Year 2017, lowest YoY GDP at constant price in the Financial Year 2009 and lowest YoY exchange rate in the Financial Year 2008.

Conclusion

The study shows what the auto sector in India has been like in the past and what its present stage is encapsulating all possible reasons of decline in sales in the sector and its effect on the GDP of the country. It also shows what future possible opportunities lie ahead and how efficient use of them can elevate the market to higher levels.

The shift to BS VI from BS IV is an important aspect of the paper and needs to be highlighted because it can serve as a key factor in increasing sales in the coming year(s) by coming into effect nationwide in a single go in 2020 as it is believed to be more focused on reducing a significant amount of NOx and particulate matter thereby making for greener, safer and more environmentally friendly vehicles in the future. After the announcement of shift to BS VI in September 2016, a few companies had already made BS VI fuel available for usage in cities like Delhi, however, using BS VI supported fuel in BS IV vehicles would not reduce the emissions and therefore, would not serve the designated purpose. Hence, it is ultimately required for the manufacturing and usage of BS VI vehicles in order to bring about changes.

Another important aspect of the paper is Electric Vehicles and Autonomous Vehicles which are the future and though Electric Vehicles have started kicking in the Indian Automobile Market, the autonomous vehicles still appear to be a far-sighted goal at least for the near future.

The auto sector contributes to nearly 7.5% to the GDP of India and around 49% to the manufacturing GDP and provides employment to nearly 3.2 crore people directly or indirectly and hence, has a very crucial role to play when trying to elevate the GDP of the country. As is evident from the current situation of the GDP and sales of auto sector, elevation in the latter is highly demanded and necessary in order to raise the former.

The study clearly showcases the relationship of export of automobile units with the production of units, exchange rates and also with inflation and shows the regression statistics of R square of around 0.98 or 98% which is a huge dependence relation exhibiting a significant impact of production on exports. Another relationship has been established between GDP growth and automobile production, exchange rates, inflation and export of automobile units showing an R square of 0.97583 or 97.583% and without export showing an R square of 0.97475 or 97.475% which shows that export does not make a huge impact on the GDP growth.

Future Scope

The study can be extended extensively in the area of autonomous vehicles and their manufacturing techniques. An extension can also be made in the area of two wheelers as well as three wheelers and their future opportunities and technological advancements. The data analysis can also be done to establish relationship between production, export of automobile units and (i) import of machinery in India (ii) bank credit (iii)employment

Limitations

The limitation of the study is that it is mainly focused on four-wheeler fuel powered vehicles.

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Annexure

Table #1

Financial Year	**No. of automobiles produced**	**INR equivalent of 1 USD**	**Inflation in %**	**No. of automobiles exported**	**GDP at constant price**
	in million units			**in million units**	**in million**
FY05	8.5	44.95	4.25	0.7	5.48
FY06	9.7	44.28	5.8	0.8	5.91
FY07	10.9	45.29	6.37	1	6.39
FY08	10.7	40.24	8.35	1.2	6.88
FY09	11.1	45.91	10.88	1.5	7.09
FY10	14.1	47.42	11.99	1.8	7.65
FY11	18	45.58	8.86	2.4	8.30

Financial Year	**No. of automobiles produced**	**INR equivalent of 1 USD**	**Inflation in %**	**No. of automobiles exported**	**GDP at constant price**
FY12	20.2	47.95	9.31	3	8.74
FY13	20.65	54.45	10.91	2.9	9.21
FY14	21.5	60.5	6.35	3.11	9.80
FY15	23.36	61.15	5.87	3.57	10.53
FY16	24.02	65.46	4.94	3.64	11.39
FY17	25.33	67.09	2.49	3.48	12.20
FY18	29.07	64.45	4.86	4.04	13.01
FY19	30.92	69.89	6.7	4.63	14.08

Table #2

Financial Year	**YoY Automobile Production**	**YoY Automobile Export**
FY06	0.141176	0.142857
FY07	0.123711	0.25
FY08	-0.01835	0.2
FY09	0.037383	0.25
FY10	0.27027	0.2
FY11	0.276596	0.333333
FY12	0.122222	0.25

Financial Year	YoY Automobile Production	YoY Automobile Export
FY13	0.022277	-0.03333
FY14	0.041162	0.072414
FY15	0.086512	0.14791
FY16	0.028253	0.019608
FY17	0.054538	-0.04396
FY18	0.147651	0.16092
FY19	0.063639	0.14604

Table #3

Financial Year	YoY Growth		
	INR equivalent of 1 USD	Inflation in %	GDP at constant price
FY06	-0.01	0.36	0.08
FY07	0.02	0.10	0.08
FY08	-0.11	0.31	0.08
FY09	0.14	0.30	0.03
FY10	0.03	0.10	0.08
FY11	-0.04	-0.26	0.08
FY12	0.05	0.05	0.05
FY13	0.14	0.17	0.05

Financial Year	**YoY Growth**		
	INR equivalent of 1 USD	**Inflation in %**	**GDP at constant price**
FY14	0.11	-0.42	0.06
FY15	0.01	-0.08	0.07
FY16	0.07	-0.16	0.08
FY17	0.02	-0.50	0.07
FY18	-0.04	0.95	0.07
FY19	0.08	0.38	0.08