

**AN EXAMINATION OF AUTOMATIC FUEL PRICING IN INDIA FROM BUYER'S
PERSPECTIVE**

**REPORT ON MAIN PROJECT
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**UNDER THE GUIDANCE OF
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**IN PARTIAL FULFILMENT OF THE REQUIREMENT FOR THE AWARD OF THE
DEGREE OF
MASTER OF COMMERCE WITH COMPUTER APPLICATIONS**



**DEPARTMENT OF COMMERCE
AVINASHILINGAM INSTITUTE FOR HOME SCIENCE AND HIGHER
EDUCATION FOR WOMEN
COIMBATORE – 641043**

MAY 2022

CERTIFICATE

CERTIFICATE

This is to certify the Project work entitle "AN EXAMINATION OF AUTOMATIC FUEL PRICING IN INDIA FROM BUYER'S PERSPECTIVE " submitted to the Department of Commerce, Avinashilingam Institute for Home Science and Higher Education for Women, Coimbatore - 641043, in partial, fulfilment of the requirement for the award of degree of **MASTER OF COMMERCE WITH COMPUTER APPLICATIONS** is a record of original research project work done by **A.ANNI SYLVIA**, during the period of her study, under my super vision and guidance.

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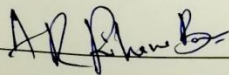
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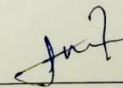
I hereby declare that this project work entitled “AN EXAMINATION OF AUTOMATIC FUEL PRICING IN INDIA FROM BUYER’S PERSPECTIVE” submitted to Department of Commerce, Avinashilingam Institute for Home Science and Higher Education for Women, Coimbatore, in partial fulfilment of the requirements for the award of the **DEGREE OF MASTER OF COMMERCE (COMPUTER APPLICATIONS)** is the record of the original project work done by us during the period of study, under the supervision and guidance of **Dr. A.R. RIHANA BANU M.COM(CA), Ph.D. SET**, Assistant professor Department of Commerce.

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ACKNOWLEDGMENT

ACKNOWLEDGEMENT

Every work on its backdrop has the blessing of Lord Almighty. I submit my heart full gratitude on the feet of the Lord Almighty. I take immense pleasure to thank all those who helped to do this study during the course.

I would like to express my sincere gratitude to **DR. S. P. THYAGARAJAN, D.SC IN MICROBIOLOGY., Ph.D., M.D** Chancellor, Avinashilingam Institute for Home Science and Higher Education for Women, for providing all the necessary facilities for this study.

I extend my sincere thanks to **DR. V.BHARATHI HARISHANKAR Ph.D., FRSA** Vice Chancellor, Avinashilingam Institute for Home Science and Higher Education for Women, for providing the opportunity to gather knowledge.

I thank **DR. (MRS) S. KOWSALYA, M.Sc., M.Phil., Ph.D.,** Registrar, Avinashilingam Institute for Home Science and Higher Education for Women, for providing adequate help required to carry out the work.

I thank **DR. (MRS) P. CHITRAMANI, MBA, M.Phil., Ph.D., SLET, NET,** Dean, School of Commerce and Management, Avinashilingam Institute for Home Science and Higher Education for Women, for giving her necessary help and support for completing this project successfully.

I thank **DR. (MRS.) P.SANTHI M.Com., DIP.IN MGT., M.Phil., Ph.D.,** Professor and Head, School of Commerce and Management, Avinashilingam Institute for Home Science and Higher Education for Women, for her motivation and support for the successful completion of this project.

I extend my sincere gratitude to **Dr.A.R. Rihana Banu, M.Com(CA),Ph.D.,SET.,** Assistant Professor, Department of Commerce, Avinashilingam Institute for Home Science and Higher Education for Women, for her guidance, help and motivation throughout the study.

I thank all the Staff members of the Department of Commerce and the Librarians, Avinashilingam Institute for Home Science and Higher Education for Women, who rendered their help whenever required.

I extend my heart full thanks to my Parents for giving moral support to complete this project successfully and all the Respondents for their patience, cooperation and help to complete this study

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ABSTRACT

ABSTRACT

India is the third-largest country in terms of fuel consumption and has followed the Regulated Tariffs Policy to adjust petrol prices. In June 2017, India moved to Automatic Fuel Pricing at full rate, allowing automatic, daily adjustment of petrol and diesel prices in line with global prices. In the form of an automatic or variable fuel price, the retail price is updated daily due to changes in world prices. The default fuel price makes price adjustments clear and logical. As fuel prices play an important role in economic trade and social engagement, the need to continue to enter this field exists, and as a result, this study was conducted. Mathematical fluency methods are used to cancel or minimize the effects of random variations on data, which are collected over time. The current study investigated the impact of inflation on consumer behaviour and attempted to determine the effect of automatic fuel prices on consumer behaviour with data collected from 230 respondents in and around Coimbatore using a standard questionnaire. Mathematical analysis tools such as split tables, pie charts, histograms, multiple regression analyses, paired sample t-test and ANOVA were used to analyse data and test ideas. The major results showed that consumers' income has an impact on the travel pattern to workplaces and leisure trips and it is also the reason for the increase in fuel prices. And there are also other findings on demographic factors like age, income, gender, vehicle ownership, and designation that have an impact on the factors influencing fuel price changes. And difference before and after the implementation of daily revision of fuel prices.

INTRODUCTION

CHAPTER I

INTRODUCTION

The level of retail petroleum prices is a crucial economic variable in developing countries as mentioned by (Federico et al.,2001). India is the third-largest country in fuel consumption followed by the U.S. and China and consumes 83.5 million tones of diesel, while petrol 34consumption was 28.3 million tones within the year 2018-19 a reported by petroleum planning & analysis cell, Ministry of Petroleum & Gas government of India (2019). There was a dramatic increase and reduction in the international petroleum prices and this alteration was always bringing a roller coaster experience to the Indian government and buyers. (Dani ,2014) mentioned that it is one of the essential community needs. Even a little increase in international oil prices can have a big impact on the economy as observed by (MaCulloh et al.,2017).

CRUDE OIL

Economic growth is inextricably coupled to energy. Energy is needed for nearly all economic activities. Petroleum, comprising of oil and refined fossil oil product, is one amongst the prime sources of energy within the world. To an outsized degree, fossil oil fuelled the fast post-war economic process achieved within the OECD (Organization for Economic Cooperation and Development) countries. many decades earlier, fossil oil began to erode coal's dominance as Associate in Nursing energy source; by mid-century (1950s) it had confiscated because the most popular fuel in these countries. By the Seventies, fossil oil was powering transportation, provision common fraction of commercial sector power and roughly one-quarter of electricity generation within the OECD countries. one fossil oil has been enjoying Associate in Nursing progressively important role behind the expansion story of the non-OECD countries also.

Oil consumption within the developing and rising non-OECD countries particularly Bharat and China currently dominates international oil demand growth. However, the central downside that nations worldwide have systematically been facing is that this significant non-renewable energy resource is scarce and is targeted in a very few countries/regions of the planet. the excess production capability of fossil oil is basically targeted within the geographical region and West Asia. This imbalance

in distribution has serious implications on the expansion also as energy security of the countries that aren't self-sufficing in terms of autochthonal production of fossil oil and area unit mostly addicted to imports from the said regions to fuel their economies. The oil crisis of 1973-74 bears ample testimony to the severity of the matter underlying this imbalance in offer of oil. returning to Bharat, though the fossil oil business of the country is one amongst the oldest.

India is one amongst the least-explored countries within the world. In 2005-06, the balance redeemable reserve of oil in Bharat stood at 786 million metric weight unit and also the annual production of oil was solely around thirty three million tonnes. The annual demand therein year, however, was over a hundred thirty million metric weight unit, thereby line for Brobdingnagian imports of crude. In fact, given the burgeoning growth in oil consumption thanks to the fast growth of the Indian economy post-1991, as well as supply-side constraints, like insignificant domestic offer of crude (attributable to a stagnating domestic production), low reserve accretion and inadequate accessibility of applicable substitutes, among alternative factors, created Bharat emerge as a significant internet bourgeois of oil. Bharat has persistently been looking on foreign oil (primarily from the oil and fossil oil mercantilism countries within the Middle East) to fulfill the lion's share of its demand.

The import dependence for crude and also the subsequent vulnerability of the country to grease worth shocks has exacerbated over the recent past as a result of rapid climb of the Indian economy post-1991 that has fuelled a rapid climb in oil consumption. Given the preponderant importance of fossil oil for the Indian economy and its increasing import dependence on this front, domestic valuation of oil and fossil oil product assumes huge significance for the country. The valuation regime not solely influences the value of energy for the economy as a full however additionally has important implications on economic process and welfare. an in depth investigate the valuation regime within the fossil oil sector in Bharat reveals that for nearly 2 and decades (from 1975 to 1997) the fossil oil sector within the country was operative in a very state of complete protection below Administered valuation Mechanism (APM). it's solely in 1998 that the world commenced a gradual transition to a regime of freeing and open competition. The valuation of crude and fossil oil product within the country has been influenced by a multiplicity of politico-economic factors and (oft-contradictory) interests of varied actors and interest teams concerned within the

matrix, like the customers, significantly the vulnerable sections; the producers; refiners; promoting companies; and also the government. However, before one delves into Associate in Nursing analysis of determination of domestic valuation of oil and fossil oil product in Bharat it is imperative to know the functioning of worldwide oil market. Associate in Nursing in-depth analysis of the functioning of worldwide oil market assumes explicit significance for Bharat, given the extent of its import dependence particularly on the {opec Organization of fossil oil-Exporting Countries OPEC world organization world organisation international organization international organisation global organization oil cartel} (Organisation of Petroleum mercantilism Countries) the one largest international oil manufacturing entity, for its crude procurance and also the subsequent vulnerability of the country on the oil front. In fact, the importance of the developments within the international oil marketplace for Bharat has been additional re-inforced by the onset of the gradual activity of the APM in late-90s, that has created the economy, in general, and fossil oil sector, specially, a lot of sensitive to the worldwide crude worth movements. The study thus begins by exploring the operating of the worldwide oil market.

A central issue that has been extensively debated within the literature handling the determination of {the international the worldwide he world} oil costs is that the stakes of the international organisation within the global oil market. within the typical energy modelling systems, like the one followed by the National Energy Modelling System (NEMS), USA or International Energy Agency (IEA), Paris, the international organisation has been assumed to act sort of a residual producer. In alternative words the international organisation is assumed to supply the number that's being demanded from it (often noted as 'Call on OPEC'), when accounting for offer from Non-OPEC (i.e. remainder of the world) and stock adjustment from the whole world demand for oil. all the same such assumptions within the said models, the OPEC's role even as a residual producer continues to stay Associate in Nursing open question. In fact, this issue has clad to be the main target of Associate in Nursing intriguing dialogue within the literature handling international oil market. many queries are raised against the said conjecture. First, international organisation isn't a uniform entity however consists of producers with numerous verified reserve position and thence numerous interests and expectations. So, it'd be rather naive to expect that the international organisation as a full would accommodates the decision while not taking into

consideration the interests of its member countries. though the assembly quota of the international organisation is set when taking into consideration the 'Call' however an inclination to defect or cheat.

A study by (Bhattacharya and Batra,2009) found that any change in the price of petroleum impacted the belief that the worth of fuel, and this reflected that the bill of the energy bill of the economic agents (households, industry, and government) grows from the buyer standpoint. Post-war II, the (Canova,1992) In India, the administered pricing policy was followed for several years on fixing up the retail fuel prices. However, this continued despite the fluctuations in global oil prices and the rising demands of a developing aspirational economy. The policy intent was to insulate the domestic economy from price volatility within the international market on one hand and inflationary control on the opposite it had been believed that an administered price policy protected the economy from such price shocks, whereby the impact was largely absorbed by the oil marketing companies and consumers didn't bear the results. The oil marketing companies, because they were unable to undergo the value increase in the retail selling prices, incurred an under-recovery on their sales

A study done by (Shome et al., 2018) found that India's demand will double to eight .2 million bbl./d by 2040, while domestic production will remain relatively flat, hovering around I million bbl./d (Dani ,2014) mentioned that the costs of fuel change daily, which is coined dynamic fuel pricing. This everyday change in fuel prices is predicated on the international market value of petroleum and the exchange rate.

AUTOMATIC FUEL PRICING MECHANISM

Many developing and rising countries that do not pass through will increase international fuel costs to domestic retail costs, with adverse consequences for fuel tax revenues and tax volatility. The adoption of an associate automatic fuel rating mechanism will facilitate handling this drawback, additionally the } incorporation of a worth smoothing mechanism will guarantee pass-through over the medium term but also avoid sharp will increase (and decreases) in domestic costs. This technical note addresses the subsequent issues:

- (i) the look of associate automatic fuel rating mechanism;
- (ii) the incorporation of domestic worth smoothing associated ensuing tradeoffs;

(iii) the transition from impromptu rating changes to associate automatic mechanism;
and

(iv) policies to support this transition and also the maintenance of an automatic mechanism. a regular guide for simulating and evaluating the implications of different rating mechanisms for worth and monetary volatility is on the market for the asking.

The Automatic rating Mechanism (APM) was introduced in April 2004 to directly depart this world to the customers all worth changes on petrol (Mogas-
l'essence) and heating oil (Diesel) foreign by the State commerce Corporation (STC).
The Certification Committee (CC) of the APM met every quarter to verify the
correctness of the retail costs. As of November 2008, the CC met every month. In the
Gregorian calendar month of 2006, fuel was enclosed below the APM.

It was determined that customers found it laborious to reconcile actual oil
worth movements on the planet market with the domestic worth changes certified by
the Certification Committee. the subsequent square measure the most factors that
rendered the exercise complex:

- ✧ Volume issue
- ✧ Windfall Gains/Losses
- ✧ Rates of Exchange

Implementation of the fossil oil rating Mechanism (PPM)

The fossil oil rating Mechanism (PPM) was introduced in the Gregorian
calendar month of 2011 to switch the APM to alter the complexness of the exercise.
The retail costs of Mogas and heating oil square measure computed supported the
buyer Protection (Control of worth of fossil oil Products) Regulation 2011. The main
objective of the PPM is to mitigate the results of world-worth movements on retail
costs. The computation of the retail costs for Mogas and heating oil supported a
twelve months' average Platts worth (last six months' actual costs + six months' future
costs + a margin of up to four-dimensional. As of November 2015, the twelve months'
average Platts worth has been reduced to six months (last three months' actual costs +
three months' future prices).

The windfall gains/losses are not accounted for within the worth structure of Mogas and heating oil as was the case below APM. Instead, they're enclosed within the worth Stabilisation Account (PSA).

Price Stabilisation Account (PSA)

For the aim of stabilizing the retail costs of Mogas and heating oil, 2 separate PSAs are originated. Any surplus/deficit in respect of each tanker of Mogas and heating oil is transferred to the PSA. Windfall Gain arising out of a rise within the retail worth likewise as windfall loss arising out of a decrease within the retail worth, square measure restricted within the PSAs.

Timing of worth Fixing

Any worth revision for Mogas and heating oil is applied severally reckoning on the evolution of world costs and also the balance accessible within the PSA in respect of every product. The government on 08, September 2014 adopted a motor vehicle rating mechanism for fossil oil products—diesel, fuel, and kerosene— in an exceedingly bid to envision the flight losses. The motor vehicle system, which is anticipated to eliminate expensive fuel subsidies, can get impacted from Tues. The new system, however, does not apply to the Liquefied fossil oil Gas (LPG). per the motor vehicle rating mechanism, worth revision of the fossil oil merchandise is created each fortnightly supported by the tariff sent by the Indian Oil Corporation (IOC). IOC reviews export costs of fuel and diesel/kerosene each fortnightly and of different merchandise such as aviation fuel and LPG every month.

As a part of the new rating strategy, the perennially stone-broke Kingdom of Nepal Oil Corporation (NOC)—has slashed Rs one.44 on an l of fuel and twenty-seven fractional monetary units on a liter of diesel and lamp oil effective from tomorrow. With the revision, an l of fuel can currently price Rs. 133.06, whereas an l of diesel can currently price Rs. 105.23 within the national capital depression. "Finally, we've adopted the motor vehicle worth mechanism within the industry which can curtail the burgeoning loss of operative and to alter non-public sector into the oil trade," same Sunil Bahadur Thapa, Minister for Commerce and provides. International Experiences

Many countries have directed to cutting fuel subsidies through victimization the automated fuel evaluation regulation mechanism with being attentive to the consequences on households, per the IMF paper. One of these countries is Jordan. The country began implementing a gradual reduction in fuel subsidies since 2005, and by 2008, it managed to realize a full pass-through for the international costs on the domestic ones that contributed to achieving enhancements publicly finance. Yet, Jordan thought-about protective its households from the negative impacts of the mechanism through increasing the remuneration, additionally to giving a one-time bonus to low-income government workers and pensioners. Moreover, the government provided the low-income households with money transfers similarly as saying an inspiration to extend funding to the National Aid Fund as a part of a program to enhance the look and implementation of this national safety internet program with World Bank help.

Another country followed the mechanism is country. per the IMF Paper, the Indonesian government began the fuel costs' increase from 2005 once it doubled the costs and continued cutting subsidies in might 2008 during which prices of fuel product were exaggerated by 25–33%. Yet, the country took preventative measures for its households through initiating a short lived money transfer program to nineteen million poor families in 2005, similarly as adopting the same money transfer program in 2008 for seven months. On the opposite facet, the Indonesian government reallocates subsidies' saving in different fields as well as education, health, and infrastructure.

In 2007, Gabun followed the mechanism similarly by increasing gasoline and diesel costs by twenty sixth. viewing the impacts on the households, Gabun worked on protective them through totally different measures as well as the beginning of the National Social Guarantee Fund money payments to the poor, similarly as increasing the mass transport network in national capital.

Egypt Following the Mechanism

Egypt has followed the new automatic fuel evaluation regulation mechanism similarly to manage the market expeditiously. June 2018 has witnessed approving the Prime Minister, Mostafa Madbouly on applying the mechanism. The IMF supported that transition in their third economic review as how to alter Egypt relieving public

budget from sudden fluctuations and direct the resources to a lot of vulnerable classes. “Applying the mechanism could be a complementary procedure to the subsidies’ elimination strategy adopted by the Egyptian government, particularly if it targets maintaining a 100% value recovery to ensure having a whole elimination,” Esraa Ahmed, Senior social scientist at Shuaa commented. Moreover, Pascal Devaux, MENA Senior social scientist at BNP Paribas united, informative that “the government managed to adopt this reform on time, given the sustained level of inflation, it absolutely was rough from a political purpose of read.”

As associate degree initial step to implement the mechanism in Egypt, the Ministry of fossil fuel and natural resource selected a tenth worth cap, as a ceiling and floor, for the fuel prices’ amendment. “According to the regulation mechanism settled by the government, worth changes can occur quarterly and there is a tenth cap on every adjustment,” Devaux noted, additionally, Ahmed extra that “the government got to announce the evaluation formula which will be followed to assure a clear implementation for the mechanism.”

As associate degree initial step, the Minister of fossil fuel proclaimed in Gregorian calendar month that the mechanism are going to be enforced on nine5-octane gasolene in Apr with redaction the worth each 3 months to presently in Gregorian calendar month reach EGP 9, up from EGP seven.75. After that, the government determined to implement the regulation mechanism on all fossil fuel product ranging from this fall 2019, with victimization a similar 100% worth cap, a ministry official told Reuters last Gregorian calendar month. per the ministry official, the government won't implement the mechanism on some classes. it'll still support fuel cylinders, similarly because the fossil fuel product provided to bakeries and power stations. “At the start, the market suffered from a shock thanks to the boost in fuel costs, however then, the market began to just accept these changes,” Esraa declared. With an eye fixed on the impact of applying the mechanism on inflation rates, Devaux declared that thereunder mechanism “the link between inflation and variation in oil costs can increase, however the approach it'll influence depends on the oil worth trend.”

Moreover, Ahmed expected that “implementing the mechanism can push rate of inflation up sharply, particularly once the market gets accustomed absorb these

changes, and conjointly because of the share amendment cap determined by the government.,” adding that the government can manage a productive implementation for the mechanism if it continues watching the market to stop any “unnecessary” worth will increase. Currently, the cupboard is reviewing the violations received by the unified government complaints system that followed the new costs of fossil fuel product.

Egypt can still implement the economic reform program because the government is keen to realize economic prosperity. “This reform of fuel costs could be a key component as fuel subsidies was a robust constraint for public finance. The mobilized funds are often a lot of helpful in different kinds of financial expenditures,” Devaux commented, “it ought to contribute to the reduction within the financial deficit.”

THE CASE OF INDIA.

On June 16, 2017, a replacement scheme was implemented under which prices were to be revised every morning at 6 am(IST). Before this development, fuel prices in India were reviewed every first and 16th day of the month to support the worldwide prices and therefore the rate of exchange of the currency and subsequently revised (Madhukalya, 2018).

The underlying reasons for this alteration are summarized as follows:

- Daily revision of costs tends to reflect small, marginal changes, unlike changes once in 15 days, which can mandate bigger adjustments or accommodate larger changes. A greater rise in prices accompanied by relatively inelastic demand for the merchandise places pressure on the consumer budget.
- To move towards a free enterprise, where market dynamics are guided by the actions of buyers and sellers, there must be systematic attempts to align both buyers and sellers to the market, while government interferes to manage and stabilize. Besides when the market rules, the advantages of a fall in prices are transferred to the consumers.
- Fuel subsidies attempt to stay the domestic prices less than global prices, which tend to draw in more consumption of fuel and should largely discourage the event of

renewable substitutes. Policy wisdom should ideally do the other towards sustainability goals.

- Automatic fuel pricing made the fixation of costs more transparent and logical. Consumers are conscious of the underlying reasons behind market value movements, and intrinsically create greater trust within the market mechanism.
- Automatic fixation of fuel prices also dissociated politics with price fixation and disabled its use as a tool to garner political mileage.

(Goyal and Shiva, 2016) in their study, it supported a high degree of cost-consciousness of the Indian consumer concerning both the running of vehicles and their maintenance. we've drawn useful insights on the worth placed on the value element in consumer decisions. (Tara et al.,2015) acknowledged that the green marketing philosophy is gaining support from the masses, and this attitude of the consumers was motivating the adoption of innovative and environmentally sustainable ways. We gauged from the study the importance of sustainability as central to any policy associated with nan renewable fuel-based vehicles, further implying a high demand for petrol and diesel. A sustained high While there are several studies conducted on the petroleum prices and government policies, however not much literature is out there associated with the dynamic fuel pricing in India. Since today of pricing may be a recent phenomenon in the Indian petroleum market therefore it's quite obvious that not much work is completed in this area. Therefore, the research of this paper will certainly be a crucial contribution to this area. a variety of structural indicators suggest that Irish retail fuel markets at the national level are competitive, with the markets characterized by relatively tight margins. Still, the perception persists that the retail transport fuel market in Ireland might not be entirely competitive with consumers not benefitting from falls in petroleum prices with an equivalent rapidity as they're burdened with rises in petroleum prices. it's been found that the retail prices react more quickly when price pressures are negative compared to positive, from an investigation done on the movements of refined prices, wholesale prices, and retail pump prices in Ireland during 2008 (Bermingham may act as a motivation for the implementation of automatic fuel pricing. Brien, 2011). A study on the consequences of the worth level and industrial output revealed that the impact on the U.S. and Canadian economies is substantial, with smaller and significant effects in

Japan, Germany, and the U.K. For industrial production, it had been found that the worth of oil exerts a sizeable influence within the U.S. and the U.K., but the responses in other countries are, by comparison, quite small (Burbidge and Harrison, 1984). during a study, it had been found that between 1999 and 2008, world oil prices quite quadrupled in real terms. thanks to this, the oil-importing countries need to spend a substantial portion of the GDP on oil imports. Considering medians, low-income countries had the very best vulnerability in 2008 and therefore the highest increase in vulnerability between 1999 and 2008 (Kojima, 2012). In India, the petrol prices rise mostly due to the value of the petroleum and refined products in international markets and the absence of compensation to the oil companies. the corporate should have the freedom to line fuel prices within the competitive market and the government should help consumers by providing subsidies which doesn't have any negative effect on oil companies while setting oil prices within the marketplace (Dani, 2014). petroleum and other petroleum products play a really important role in an economy and India imports around 100 million plenty of petroleum and other petroleum products. it's been usually observed that in India, the pricing scheme is meant in such how that it offers a system to moderate the rising international oil prices, and therein way it studies the impact of growth, inflation, etc. the rising oil prices may differ from country to country depending upon their demand and provide structure (Aparna, 2013). Till 1939 there has been no control on the costs of the petroleum products and from 1939 to 1948 the oil companies themselves use to account for the products without none interference from the government In 1948 the attempt was made to regulate the costs through the value stock procedure it had been a formula that supported import parity to regulate the varied cost like ocean freight, insurance, ocean loss, remuneration, duty, and other levies charges this continued till the early 70s. Post 1973 the government formed the oil price committee under the chairmanship of Krishnaswamy 1974. The oil price committee (OPC) removed the import parity and introduced administered pricing mechanism (APM) for the petroleum product (Bandyopadhyay, 2009).

PRICE SMOOTHING

Smoothing techniques in statistics are wont to cancel or reduce the consequences of random variations in data that are collected throughout your time. The application of those techniques tends to smoothen out any random variations within the statistic data

set, which helps in establishing trends. supported these observations, predictions are often made about the longer term. (Amihud and Mendelson, 1983) observed that the character of price smoothing depends on the character of economic shocks, the inventory holding cost, and the value of backlogging.

Price smoothing includes the subsequent mechanism. Those are:

- Price band mechanism: This mechanism establishes a fringe to the magnitude of price changes at the retail level by defining the utmost limit or caps.
- Moving average mechanism: This mechanism centres retail price alteration on variations within the average important costs within the past.

PRICE-SMOOTHING SCHEMES

Many governments have operated schemes designed to smooth the variation in domestic oil prices for consumers. The success of a price-smoothing scheme is often judged on

(1) the reduction within the volatility of domestic prices;

(2) the reduction, if any, within the overall level of domestic prices; and/or

(3) the fiscal cost or revenue foregone. One commonly adopted approach of price-smoothing schemes is to line the domestic price by averaging past, and possible future, prices over several months. An analysis of historical spot and futures WTI crude prices shows that needless to say, volatility declines with an increasing averaging period. Additionally, the volatility of the target domestic price supported by averaging spot prices from the past three months is about an equivalent to that supported by averaging spot prices during the past three months and therefore the derivative instrument prices during the subsequent three months. Similar calculations in local currency in Kenya and Ghana (which experienced high levels of depreciation during the study period) show that volatility is somewhat above in U.S. dollars, but, despite much larger depreciation in Ghana, there's essentially no difference between the 2 countries.

INTERNATIONAL SCENARIO

Projected global oil consumption is predicted to register considerable growth over these levels. Recently published energy reports project incremental demand of about 38 million barrels per day (mbpd) in 2030 over the 80 mbpd levels in 2003. Most of this incremental demand will emanate from developing countries including China and India where oil consumption is predicted to grow at the speed of three .8 and 2.4 percent respectively as against the planet's average of 1.4 percent. Non-OPEC (Organisation of Petroleum Exporting Countries) production, though showing an upward trend, won't be sufficient to service this incremental demand emphasizing, once more, the continued dependence of the planet on OPEC oil for its energy requirements.

High oil and gas prices have prompted increased investments within the exploration and production (E&P) sector posing new challenges for the world within the sort of increased cost of operations thanks to high service costs, exposure to logistically difficult terrain, and lack of technical manpower. Global refining scenario indicates little or no to negligible addition in capacities in major developed consuming markets just like the USA and therefore the European countries. Developing countries just like the Middle East, China, and India are fast emerging as refining hubs. Needless to mention that capacity augmentation in these regions would also result in possible integration of both the refining and petrochemicals business.

Gas has been rightly termed the fuel of the 21st century. gas, the third-largest contributor to the worldwide energy basket, is projected to extend at a rate faster than the other energy source. within the global context, the gas market era has truly begun during the last 5 years. the worldwide gas markets are fast integrating, commercial models are undergoing rapid changes, and therefore the market structures are evolving and fast-changing. Leading this growth in the global gas sector are the Asian markets with special investment specialists in countries like China and India.

It is indeed difficult to predict what is going to happen to grease prices over five years but current assessments indicate that oil prices will remain high. this may exert downward pressure on the economy, both directly and also through their impact on the world economic process. Currently, the impact of high oil prices on the planet's economy has somewhat been offset because the industrialized countries have adjusted to those higher oil prices. Sustained conditions of high oil prices, however, will

eventually create macro-imbalances within the world economy making it susceptible to any future 'oil shock'. Simulations with macro-models suggest that if oil prices increase sharply in the future, the rate of growth might be compromised by between 0.5 and 1.0 percentage points below the amount projected with present levels of oil prices.

INDIAN SCENARIO

India is and shall remain heavily hooked on coal for about half its primary commercial energy requirements with the opposite half being dominated by oil and gas put together. The Indian hydrocarbon industry is currently passing through a challenging phase. Increasing concern for energy security, increasingly stringent environmental regulations, the emergence of gas, and soaring petroleum and gas prices have thrown up both challenges and opportunities to the Indian oil and gas industry.

Projected high domestic demand for petroleum products is predicted to push investments into the refining sector. India, with 18 refineries, currently features a surplus refining capacity which has placed India among net petroleum product exporter countries. Increasingly stringent fuel specifications have put pressure on the old and non-compliant refineries to upgrade their refinery configurations to supply compliant fuels. the govt is seriously considering promoting India as a competitive refining destination to service export marketplace for petroleum products and also integrating it with the petrochemical and chemicals businesses to supply and export higher revenue-generating value-added products.

Exceptionally high petroleum prices within the international market and an almost stagnant domestic petroleum production have caused a drain on the country's exchange reserves. the govt is committed to mitigating these challenges and has met with accelerated domestic exploration through its New Exploration Licensing Policy (NELP) policy initiative. several planet-class oil discoveries have recently been reported from blocks offered under the NELP regime. Five NELP rounds have resulted in 110 PSCs being signed and therefore the Sixth round offering 55 exploration blocks remains underway. Besides augmenting domestic reserves, India has successfully ventured overseas to accumulate oil and gas assets and entered into long-term Liquefied gas (LNG) contracts as measures for enhancing energy security.

Creating sustainable transportation through cross-country petroleum and petroleum product pipelines within the next few decades, with the target of preserving the environment and protecting human health and safety would be a true challenge for the petroleum industry.

The persistence of high oil prices and dependence on imported oil leaves India with some difficult choices to form. the selection is between

(a) passing on the worth increase to the consumer;

(b) rationalizing taxes and other levies on petroleum products, and

(c) making the National Oil Companies (NOCs) bear the burden. Although the govt has resorted to a mixture of all the above three options in the past, each of those options has its drawbacks. At the end of the day, the sole viable policy to affect high international oil prices is to rationalize the tax burden on oil products over time, remove the anomaly, if any, within the existing pricing mechanism, realize efficiency gains through competition at the refinery gate and retail prices of petroleum products, and expire the remainder of the international oil increase to consumers, while compensating targeted groups below the poverty level the maximum amount as possible.

With the arrival of LNG and progressive de-control of gas prices, the gas sector in India has progressed and achieved a point of maturity. it's managed to receive progressively growing attention from global companies and has made rapid strides during the last five years. Current gas policy dispensations have created numerous challenges for the gas sector. Major among them is the stress of competing consumer industries, ensuring competition and open access within the pipeline transportation and distribution networks, reducing the availability demand gap that exists today.

FUEL PRICING POLICY IN INDIA

Notwithstanding the rising level of oil imports, hikes in international oil prices, and therefore the consequent impact on the import bill, India has continued to follow an administered fuel pricing policy. The Administered Pricing Mechanism (APM) was initiated with the target of ensuring stable prices and insulating the

domestic market from the volatility of petroleum prices within the international market. These objectives were achieved through the operation of the Oil Pool Account that was wont to adjust the variation in various elements of costs to the oil companies. However, in due course, it had been realized that to sustain/accelerate the domestic exploration and production efforts essential for future oil security of the country the general public sector oil producers needed to be free of government-controlled pricing mechanism to urge international prices for his or her products. Accordingly, starting in a phased manner the APM was fully dismantled in April 2002. The oil companies made frequent price revisions in the price of petrol and diesel between 2002 and 2003 when international prices were fairly stable. However, in subsequent years when international prices of petroleum began to witness sharp and spiraling increases, India, within the interest of the buyer, resorted to moderate policy-induced revisions in fuel prices. the method of fuel price fixation in India while protecting consumers from the worth variations entails that the worth volatility shocks be absorbed either by the oil marketing companies (OMCs) or the government The OMCs in India buy petroleum products from their refineries on an import/trade parity basis.¹⁰ The retail asking price at Delhi for petrol and diesel springs by the OMCs on the idea of formula within the framework important substitution.¹¹ From this by deducting the taxes and statutory charges¹² internet sales realization of the OMCs springs. The difference between this and therefore the sales price as allowed by the government is termed as "under-recovery" per unit of the great. So, to the extent that thanks to government-imposed restraints on the retail selling prices of refined products, the OMCs are unable to expire to the buyer the rise in cost on account of costlier petroleum they incur an "under-recovery" on their trading sales. this is often evident once we draw comparisons between movement in international and domestic fuel prices. Between March 2005 (when Brent crude prices first crossed the \$50/barrel mark) and March 2008, the worth of Brent crude increased by 96%. Over an equivalent period, the domestic price of petrol increased by only 13%. an identical story unfolds once we analyse the differential increase in domestic and international diesel prices. Since March 2005, the international diesel prices have increased by 106% while domestic prices increased by only about 21%. The scenario for kerosene is even starker. Domestic kerosene prices are the smallest amount reflective of changes in international prices. Since March 2005, international kerosene prices experienced a rise of 93%. In contrast, the domestic kerosene prices increased from

8.995/lit to Rs 9.0775/lit thus registering a rise of but 1%. the worth of public distribution system (PDS) kerosene has been frozen since May 2006. Marginal price adjustments to the tune of 10 paise/liter were made in April 2006. In July 2008 when international prices were at their peak the OMC "under-recovery" was Rs 12.90/liter of petrol and Rs 13.9/litre in the case of diesel.^{13,14} inherent this price mechanism followed in India is thus an enormous subsidy that's given to the buyer within the sort of significantly lower prices for the four sensitive items, namely, motor spirit, high-speed diesel (HSD), PDS kerosene, and domestic liquefied petroleum gas (LPG) and, the OMCs to catch up on their under--recoveries through the difficulty of oil bonds. it's now widely accepted that enormous fuel subsidies in India adversely impact government deficit, OMC efficiency, and energy consumption patterns. Hence, the necessity of the hour is to try to do away with subsidies and deregulate fuel prices. within the next section, we examine the impact of a formula-based automatic adjustment of fuel prices on inflation and output growth in India. as long as inflation is the primary channel of the passage of international and domestic fuel price hikes to the supply-side of the economy, we first make an effort to know the prevailing relationship between international prices, domestic fuel prices, and general inflation in some detail before the formal impact analysis is undertaken. The analysis is undertaken using monthly data for the amount (April 1994 to December 2008). The representative international petroleum price used for the analysis is Brent because it features a high correlation with the opposite benchmark international petroleum prices as also as the worth of the Indian basket. the worth of the correlation is over .95 altogether cases. the info for various variables has been culled from various sources including the International Financial Statistics of the IMF, Handbook of Statistics on the Indian Economy, and monthly bulletins (various issues), of the Federal Reserve Bank of India; BP Statistical Review; www.ppac.org.in and Basic Statistics of the Ministry of Petroleum and Gas, Government of India.

STATEMENT OF THE PROBLEM

This study was limited to gasoline and diesel prices only and did not consider CNG and kerosene for this study. Fuel prices have a direct effect on other commodities. Buyer sentiment will be affected by the impact of auto fuel pricing. This study failed to capture the relationships and associations between fuel prices and other commodities and the resulting impact on buyer behaviour. The inferences and

recommendations drawn from this study are limited to the natural sample basis. Research can be done to better understand consumer acceptance of fuel cards or fleet cards as an alternative payment method to exercise control over purchases and the resulting impact on spending. Research on purchasing and consumer activities at the level of individual consumers with a moderate impact of price fluctuations for household budgets will add all existing knowledge about the owner. This title. The scope of using trade intelligence and analysis predicts to support government decision making is also discovered as a tool for discounting.

SCOPE OF THE STUDY

Research on individual consumer purchase and consumption habits that mitigate the impact of price volatility on household budgets will add to the body of knowledge on the subject. The price of gasoline has a direct impact on the price of other goods. The spillover effect of automatic fuel pricing will have an impact on buyer attitude. The use of business intelligence and predictive analysis to aid government decision-making could potentially be investigated as price smoothing tools. There is room for more research into customer acceptance of fuel or fleet cards as an alternate payment mechanism for exercising purchase control, as well as the cost implications.

RESEARCH QUESTIONS

- ✧ What is an enforcement of automatic fuel pricing mechanism in India?
- ✧ What are the factors influencing fuel prices?
- ✧ What is the consumers behaviour and the problems faced by them towards changes in international gas prices to domestic fuel prices?
- ✧ It is to find out how the fuel prices are in India with selected states using comparative analysis?

OBJECTIVES

- To study the enforcement of automatic fuel pricing mechanism in India.
- To study the factors influencing fuel prices.
- To examine buyers behaviour and the problems faced towards changes in international gas prices to domestic fuel prices.

- To conduct a comparative analysis of fuel prices in India with select states.

HYPOTHESIS

H0₁: There is significant difference between pre and post price in the crude oil price basket before and after the implementation of revision on price on daily basis.

Ha₁: There is no significant difference between pre and post price in the crude oil price basket before and after the implementation of revision on price on daily basis.

H0₂: There is significant relationship between respondents act for rise in fuel price and consumer opinion about fuel price revision on daily basis.

Ha₂: There is no significant relationship between respondents act for rise in fuel price and consumer opinion about fuel price revision on daily basis.

H0₃: There is significant relationship between respondents travel pattern and income.

Ha₃: There is no significant relationship between respondents travel pattern and income.

H0₄: There is significant relationship between respondents travel pattern and age.

Ha₄: There is no significant relationship between respondents travel pattern and age.

H0₅: There is significant relationship between respondents travel pattern and vehicle ownership.

Ha₅: There is no significant relationship between respondents travel pattern and vehicle ownership.

LIMITATIONS OF THE STUDY

- ✧ This study solely looks at the price of gasoline and diesel; it does not look at the price of CNG or kerosene.
- ✧ The conclusions and recommendations reached in this study are constrained by the data's type and timeliness.
- ✧ In addition, the results of the analysis may differ if the survey is conducted with a bigger sample frame.

CHAPTER II

LITERATURE REVIEW

In an automatic mechanism, the retail price which consumers buy fuel is revised daily in response to changes in global price. Many developing countries and emerging economies within the world have a system of administered pricing for fuel within the domestic economy. This suggests that they modify within the global prices aren't fully skilled to the buyer as and once they occur. This exposed the respective economies to financial risks when the worldwide government often found difficult to manage policy-wise. Adoption of an automatic mechanism for fuel price adjustment intended to support governments in managing fiscal costs and risks during this regard. A search study by (Coady et al., 2012) on automatic fuel pricing underlined the subsequent objectives:

- Pass through global price changes to domestic retail prices.
- Arrest instability in fuel tax revenues.
- Remove unplanned approach to fuel price fixation, making the system more transparent.
- Reduce government interference within the market mechanism.

Review on Petroleum Industry:

(**Tanzer, M., 1978**)¹ studied Oil Exploration Strategies for Developing Countries. This study mainly insists on the government's role of developing countries in the area of oil exploration, production shares, passive tax collection, control, or full state ownership. The secondary data was used in this study and tools for analysis were like pie charts, statistical document. This paper reveals that it is just the myth that only developed countries who have good technology can have profit from full state ownership of Oil. The benefit can be seen in the developing countries also with government full state control which can be seen from India, Vietnam, and Mexico.

(**Hamilton, 1983**)² studied the History of Indian Petroleum Industry. The work by James Hamilton was considered as one of the pioneer's works in this area. This study

explained the role of oil price shocks in U.S. business cycles over 1948-1981. The study revealed that the transmutations in the oil price affected GDP and resulted in the surge of unemployment in the U.S economy. The study utilized VAR models for Canada, Germany, Japan, Amalgamated Kingdom, and the Coalesced States, Burbidge, and Harrison for Testing the Oil price effect and Gas Industry in India. The main focus of this study is to examine the history of the Indian Petroleum industry, its development, organizational arrangements, and national policies. This study analyses the activities of the petroleum industry, its services for the industry, indigenous manufacturing of equipment, infrastructure, condition of the employment, regional impact and financial aspects, etc.

(Naik, S.C, 1988)³ studied on Some Thoughts on Petroleum Scenario. The study has observed that the demand for petroleum products is increasing very fast whereas the domestic production of crude oil is not increasing so fast. The study has suggested some suggestions to fill this gap. First of all, India has to improve the production energy through other sources secondly to make the best use of crude products, and lastly to put up additional refining capacity. If all these three suggestions are implemented properly along with proper technological advances, use of legislation, collective actions, R&D support, technically trained, staff and education of public, very good results can be obtained. Many of the negative ecological impacts can be avoided or can be reduced and will lead to the development of the country without any harm to nature.

(Damodaran, K.,1988)⁴ studied about Petroleum Production in India - Present Status and Future Prospects. In this study petroleum production of India has been explored. The study points out that the use of natural gas could be the best alternative to liquid petroleum. Further, it is important to conserve liquid petroleum and to make the optimum use of petroleum. It was pointed out in the study that India was producing at the rate of 1% but the requirement was 1.5% so as to full fill the demand for energy. The annual growth rate of demand is 7% in petroleum and it increasing at the rate of 3Mt ton per annum. Considering 1.5% annual exploitation of resources, the establishment of 200 Mt annual reserves will meet the country's growing demand. Priorities for maximum utilization of petroleum are also suggested in the study.

(Hamilton, Mark, 1989)⁵This study has put forward a non-linear definition of oil prices and distinguished between positive and negative oil price changes. They concluded that positive oil prices have a vigorous negative and paramount relationship with vicissitudes in authentic GDP while the change in negative oil prices exhibits no such outstanding effects. Not much literature is available regarding the dynamic fuel pricing in India. Since this type of pricing is of recent origin Indian petroleum market. it is quite obvious that not much work is done in this area.

In 1973 before the Arab oil embargo, the study of the effect of oil shocks on macroeconomic variables was conducted. In the last forty-five years, dozens of analysts have explored the relationship between the oil price and oil shocks. Different analytical methods have been utilized. Mostly the researchers have fixated on studying the impact of oil prices mainly in developed countries. They are mainly conducted on the U.S economy and OECD countries. It is prominent fact that the impacts of oil prices vary from country to country. Many factors such as the country's institutional structures, sectoral composition, level of economic development, and many other factors affect the oil price. There are reviews of some studies that are conducted on developed economies, developing economies, and some studies about net oil-importing countries in this chapter.

(Kaul, 1991)⁶studied India's oil policy commenced in the third five-year plan. In this study he has mentioned that most of the international oil companies were backed by their respective authorities. These companies in course of time tried to acquire certain rights under the guise of the sizeable voluminous revenue they derived from their operations in the host countries. The history of oil in several countries is marked by political pressure exercised by peregrine countries.

(Kaneko and Lee, 1995)⁷studied about Relative Paramountcy of Economic factors in the U.S. and Japanese stock market. In their comparative study (between U.S and Japan) used eight variables VAR model to identify the prices influencing the economic factors of U.S. and Japanese stock market returns. The eight variables utilized in the study are risk premium, term premium, magnification rate in industrial engendered, rate of inflation, transmutations in terms of trade, vicissitudes in oil prices, vicissitudes in exchange rates, and excess stock returns. They found the

average values of excess stock returns, rates of inflation, risk premiums, and term premiums to be higher for the Amalgamated States than from Japan.

(Lee, Ni, and Raati, 1995)⁸ studied on Oil Prices Shocks and GDP Magnification from 1944 to 1992. In this study they utilized the GARCH model and concluded that positive oil price shocks are significantly negatively correlated with the genuine GDP magnification but negative oil price shocks are not.

(Mishra and Kar, 1998)⁹ researched on Predictive Power of the Different Financial Ratios in Connection with Oil Prices. In this study they analysed how predictive power of different financial ratios has connection with the oil prices. The analysis of the automobile industry reveals that there is a paramount correlation among the different financial ratios that quantify profitability, liquidity, and cash flow of a company. The discriminate analysis infers that cash flow measures are better indicators of the financial health of the company.

(Chaudhuri and Daniel, 1998)¹⁰ researched on the Long-run Equilibrium Authentic Exchange Rates and Oil Prices. The author used co-integration and casualty test to demonstrate that nonstationary comportment of the US dollar's genuine exchange rate is explicated by non-stationary deportment of genuine oil prices. The study revealed that oil price shocks could have long-run effects on genuine exchange rates even if perfect markets subsist in the long run.

(Stewart, Robert R., 1999)¹¹ studied Seismic Swirls and Sadhus in India. In this study authors examined important reforms brought by the government of India in the Indian Oil Industry in 1999 January. These reforms were concerned with New Exploration Licensing Policy (NELP). Under this policy, India will be giving 48 exploration blocks to the domestic and international oil industry which will include many regions of offshore both shallow and deep water along with foothills of the Himalayas.

(Mukhopadhyay and Chakraborty, 2000)¹² examined the Pattern of Vicissitudes in Energy Consumption. The authors have studied the pattern of vicissitudes in energy consumption during the reform period, i.e., 1991-92 to 1996-97. Based on the input-output model, the study found that during 1991-92 to 1996-97, India's total

commercial energy consumption incremented by 5.7% per annum, oil and gas sector recorded 5.5% per annum. The further study recommended that energy policy must include fiscal incentives associated with tax concession and energy saving instead of subsidies. This will offer new opportunities to international companies as well as Indian Companies. The cost of incipient technology needs to be shortened and opportune pricing of energy needs to be assembled.

(Ramesh and Patil, 2000)¹³ analysed the study on the variables influencing the profitability of urban cooperative banks in the state of Goa. The multiple regression model is employed to analyse the variables (factors) influencing profitability. There are influences of a rupee increase in both the interest rate spread and the non-interest income variables on the profitability. On the other hand, there are influences of a rupee hike in all the three expenses variables i.e., manpower expenses, the other expenses, and overdue interest and sceptical debt provisions together on profitability.

(Moosa and Silvapulle, 2000)¹⁴ studied on Price and Volume Relationship in the Crude Oil Futures Market. In their study the authors examined the price and volume relationship in the crude oil futures market. They worked on linear and non linear casualty testing for the presence of a causal relationship between price and volume in the crude oil futures market. The sample data study in the study included day-to-day monitoring of prices of future and volumes of crude oil of WTI from January 2nd, 1985, and July 11th, 1996. The linear causality testing result disclosed the presence of causality running from volume to price but the reverse was not found. Whereas the testing result for non linear causality was irreconcilably unpredictable. Mostly the result showed that causality goes in both directions.

(Bhattacharya and Bhattacharya, 2001)¹⁵ analysed The Impact of an Increase in Oil Price on the Price of Other Commodities in India. The authors analysed through their study that any hike in oil prices, apart from the direct impact, it impacted indirectly on the prices of other commodities also. With the increase of petrol and diesel prices all other commodities price also increases in light of transport cost, production cost which are dependent on use of energy for production or supply of commodities. However, a wise policy formation on the monetary policy front can help nullify such an effect.

(Bahram, Chatrath, Raffieand Ripple, 2001)¹⁶analysed the Price Dynamics of Alaska North Slope Crude Oil and L.A. Diesel Fuel Prices. The authors by using VAR methodology and bivariate GARCH model analysed the price dynamics of Alaska north slope crude oil and L.A. diesel fuel prices. They found strong evidence of a unidirectional causal relationship between these two prices. Out of the two prices when there was a price spread, the conversion of price was mainly due to L. A diesel market price. It is a matter of contestability of the West Coast crude oil market as its presence causes it to react relatively comparatively but its absence inclines to circumscribe its competitiveness. The result of all this is to make price adjustment gradual but to follow the price signals of crude oil. Further, the study revealed that the derived demand theory of input pricing was not held in this case. Alaska North Slope crude oil price in this case was the driving force responsible for changes in L.A. diesel price.

(Shroff, B. S, Yadnik S.D., 2002)¹⁷studied the points out the Anhydrous Alcohol: Ethos-Technological Challenge. The study pointed out that almost 70% of the annual crude petroleum requirement is imported by India which means 110 million tons. The price ranges between 25 \$ to 30\$ per barrel and expenditure on the purchase of crude is approximately 800 INR billion thus giving a huge burden on the country's foreign exchange reserves. So, keeping the expenditure in mind the Indian petroleum industry started using ethanol as fuel which is expected to be beneficial for farmers as well as for the oil industry in long run. According to this study to reduce the expenditure on imports more and more focus must be on the use and production of ethanol in India.

(Agarwal S.C, 2004)¹⁸studied the Conversion of an Old Crude Oil Pipeline to Product Services. In this study attempt has been made to explain the process of conversion of the crude oil pipelines to give services through the modification in the pipeline system, cleaning methodology, commissioning, and hydro testing of the system. As there is a capacity expansion in the refineries of Western India there was a need to adjust the additional product. So, pipeline being the most reliable, economical, and environment-friendly mode of transportation became the primary choice. Laying down the pipeline will require a considerable amount of capital investment so the

pipeline was taken on lease. This study covers the experience gathered during the conversion of Crude oil pipelines.

(Gangopadhyay et al., 2005)¹⁹ studied subsidizing Petroproducts is generally justified on equity consideration. Through analysis, it has been observed that in the urban sector the higher expenditure groups have utilized the LPG subsidy largely. On the other hand, Kerosene is a widely used fuel. The limited availability of subsidies on kerosene in rural areas as it is used for lighting purposes rather than cooking. Further, the rural subsidy is regressive as higher expenditure groups receive more subsidized kerosene than lower-income groups. The subsidy of Kerosene has diverted and never reaches customers.

(Swaminathan, S.K, 2005)²⁰ a study on Indian petroleum scenario current challenges and opportunities for auto fuel and lubricants. Indian Oil Corporation Limited. This study is about the discussion on the petroleum industry of India which covers consumption of primary energy in India including oil, natural gas, retail auto fuels liquid, hydroelectric and nuclear alternative fuels (CNG, LPG&H₂) liquid automated fuels like diesel, and substitute fuels like (Ethanol blended petrol and Biodiesel). The Indian Government is trying to reduce automobile pollution, the introduction of Strick emission and control rules. India is also taking initiative in the development of alternative fuels along with the future development of Indian Oil.

(Rakshit, 2005)²¹ study proposed that as far as inflation is concerned, it is to be regulated by fiscal and monetary policy measures. Oil price shock need not have changed like fiscal and monetary policy. The study also disclosed that as far as the observation of RBI is concerned- with no government intervention, each US dollar increase in crude oil price results in raising the WPI inflation by 30 substratum points.

(Rehman et al., 2005)²² studied to find that according to a conservative estimate about 25% of the kerosene supplied for the PDS gets diverted to the black market for sale to unauthorized users and adulteration of other petroleum products.

(Chinn, Leblane, and Coibion, 2005)²³ examined the Connection Between Spot and Futures Prices for Energy Commodities. The study examined the connection between

spot and futures prices for energy commodities (crude oil, gasoil 13/46 markets, and natural gas). The data for four variants viz., WTI crude oil, Henry Hub natural gas, Gulf Coast gasoline, and No.2 Gulf Coast heating oil was collected. All the futures prices were amassed from NYMEX from January 1st, 1999 to October 31st, 2004 as per Bloomberg. Utilizing ARIMA and using OLS, the study concluded that futures prices were an equitable and precise presager of subsequent spot prices.

(Nagamatsu, S., 2006)²⁴ studied the Present and Future Heavy Oil upgrading Technology in Petroleum refining. The study revealed that utilization of heavy crude which includes unconventional oil may be indispensable to cope with an increasing demand for crude oil in developing countries like India and China. Improved processes and technologies must be imported in utilizing such heavy oils.

(Dey, P.K., 2006)²⁵ studied to point out the Innovation in Project Management Practices: A Case Study of Indian Organisation in the Petroleum Industry. The study pointed out that the petroleum industry of India is passing through a very dynamic business environment due to ongoing liberalization across the globe, the existence of multinational companies, and vertical integration among organizations. The study further revealed this competition among various organizations in the public sector of the Indian petroleum industry. This study focuses mainly on the problems in managing projects in the Indian petroleum sector to resolve its issues and also suggests ways and means ensure superior performance.

(Ying, Z. et.al., 2007)²⁶ studied about the Dynamic changes in microbial activity and community structure during biodegradation of petroleum compounds: A laboratory experiment. The study revealed that the shifts in community structure to a community documented by Sphingomonadaceae within α -subgroup of Proteobacteria could be served as a sensitive and precise indicator of diesel fuel contamination. Based on the results it was found that the soil function in the Shen Fu irrigation area was disturbed to some extent. Results further showed that amendments of ≤ 1000 mg/kg diesel fuel stimulated the growth of aerobic heterotrophic bacteria, and increased the activity of soil dehydrogenase, hydrogen peroxidase, polyphenol oxidase, and substrate-induced respiration. Soil bacterial diversity decreased slightly during the first 15 days of incubation and recovered to the control level on day 30.

(Aiyar and Anklesaria, 2007)²⁷the study points out that there are threats to oil-importing country's acquiring oil fields abroad. There are chances of foreign investors being expropriated by the countries in which they have invested. Russia has on bogus environment grounds cancelled Shell's license in the giant Sakhalin II oilfield and now seeks to force British Petroleum out of the giant Kovykta gas field. Venezuela has abrogated contracts with foreign oil companies and acquired majority rights in most oil fields. This highlights the perils of strategic oil field purchases or oil diplomacy.

(Behuria, 2007)²⁸studied that the downstream oil sector in India, is dominated by PSUs and it has to ameliorate its productivity and adaptability with the expeditious-transmuting environment, domestic as well global. Changes and challenges are confronting the downstream oil sector on almost all fronts. One, there is a supply-constrained in the global oil market; second, there is a national economy undergoing a massive transformation; third, the downstream oil sectors themselves have many issues to deal with and stakeholders' interest to take care of. Lead-time for equipment deliveries for Indian refineries is getting longer. The major crunch for Indian refineries is for project management and field marketing.

(Mueller, 2007)²⁹The study found that refineries all over the world are increasing investment to manage the changing designations of diesel fuel and gasoline. The demand for petroleum products continues to increase even as the specification of fuels for transport, in particular, is different.

(Lee, Huang and Yang, 2012)³⁰researched about the 124 employed the momentum threshold error- correction model with generalized autoregressive conditional heteroskedasticity to investigate asymmetric co-integration and causal relationships between WTI crude oil and gold prices in the U.S. futures market. They collected the data from May 1st, 1994 to November 20th, 2008. The empirical results showed that an asymmetric long-run adjustment exists between gold and oil. Furthermore, the causality relationship shows that WTI crude oil played a dominant role.

RESEARCH GAP

The review of literature shows various aspects of fuel pricing in various countries like Bangladesh, China, Brazil, Indonesia, Mexico, and even portrays the Indian economy. Even through the review acknowledged the main happenings and academic research evidences on automatic fuel pricing and price smoothing, the density of contributions to the Indian context have found to be limited. This conceives a research gap for study. Moreover, on the big picture of the Indian scene, although the government has competitive fuel prices policies, the effectiveness of those effects is quite invisible. Consumer perspectives in such a situation, at best. Oil prices saw a marginal or no pass-through to domestic prices. To fill these gaps, this study is specifically built around the Indian context and examines Indian consumer behaviour towards auto fuel pricing and price smoothing.

RESEARCH METHODOLOGY

CHAPTER III

RESEARCH METHODOLOGY

Research Methodology is a way to systematically solve the research problem. The explanation for the exploration is to search out answer to handle through the employment of logical methods. The Primary Purpose of the analysis is to get reality that is roofed up and that has been not be found at the purpose. The assortment of data and investigation procedure square measure organized in like manner.

Research design

This study will focus on two key areas such as the price of motor fuel and its price adjustment and consumer behaviour in it. The type of research used here is therefore descriptive and evidence-based in nature.

Study Period

In India the price of automatic fuel was used on June 16 2017. However this study was designed to assess consumer behaviour during the period December 2021-February 2022. This was to find a completely real impact and not as a general reaction to government policy. change. As a result of the immediate implementation of the policy, the responses of ordinary consumers are at risk of being influenced by noise in the environment. The aim was to allow sufficient time for effective measurement of behavioural responses, ensuring sound impact analysis of the actual effect.

Study Area

Coimbatore research facility where key data was collected, and secondary data was collected through India stat and from capital line (Petroleum Planning & Analysis Cell Ministry of petroleum & natural gas, Government of India.)

Sample Size

The sample size of the study was 230 and was selected based on the two appropriate sample categories as the selection was based on respondents' knowledge of the price of fuel and the smoothness of price across the country. The data was collected in a systematic questionnaire consisting of 20 questions including a few small questions. Data was collected through personal interactions with respondents and invitations sent by post to other social media platforms.

Data Analysis

To analyse basic data, statistical tools such as making cross tables, pie charts, histogram were used in both basic and secondary data. And with basic data retrieval

and anova is used. A simple percentage analysis was used to understand the distribution of respondents to various research items. Pie charts and histograms are used to represent the answers of the respondents to the graphic research questions. Paired sample t test is used for secondary data for pre and post difference in the average fuel price for 5 years. Reversal analysis is used to predict dependent variables (improved fuel costs at a guaranteed snow price) from the different variables used in this study. ANOVA is used to determine the significant effect of independent variability on dependent variables, level of dependent variables, and to evaluate ideas.

Tools for analysis

- ❖ **Paired sample t-test** - This tool is used to find the difference before and after the implementation of automatic fuel pricing in India. To find the pre and post difference for the pre and post implementation of the automatic fuel pricing a paired sample t-test is used. A paired sample t-test sometimes called the dependent sample t-test, is a statistical procedure used to determine whether the mean difference between two sets of observations.
- ❖ **Multiple regression** - This tool was used to find out the buyers behaviour and the problems faced towards changes in international gas prices to domestic fuel prices, using multiple regression. It is a statistical technique that can be used to analyse the relationship between a single dependent variable and several independent variables. The objective of multiple regression analysis is to use the independent variables whose values are known to predict the value of the single dependent value.
- ❖ **ANOVA** - This tool was used to find the factors influencing usage of fuel from consumers perceptively by using the tool anova that is Analysis of variance. It is an analysis tool used in statistics that splits an observed aggregate variability found inside a data set into two parts. A one way anova is used for three or more groups of data, to gain information about the relationship between the dependent and independent variables.

ANALYSIS AND INTERPRETATION

CHAPTER IV

ANALYSIS AND INTERPRETATION

This chapter deals with analysis and interpretation of the collected data. In order to achieve the objectives of the study the primary and secondary data has been collected and it was classified under various heads. Data will be collected, coded and then entered in software(SPSS) whereby frequency and percentage will be used to analyse demographic characteristics of respondents and descriptive statistics such as mean, standard deviation, anova, Multiple regression, and paired sample t-test will be used to analyse the objectives of the study which are;

- Socio Economic Profile of Consumers
- Enforcement of automatic fuel pricing mechanism in India.
- Comparative analysis of fuel prices in India with selected states.
- Factors influencing fuel prices.
- Buyers behaviour and the problems faced towards changes in international gas prices to domestic fuel prices.

It can be taken from the below table 2 that there was an average price fluctuation between 2000-2001 to 2021-2022. With prices have been steadily growing and declining, with an average peak of 111.89 between 2011 and 2012 This shows that the year 2011-2012 had the highest value of India's crude oil. For more information on this, median prices for almost two decades show significant fluctuations. This is consistent volatility, which needs to be passed on to the consumer for the benefit of both oil companies and consumers. When land prices fall, profits should be passed on to the consumer, and when they do, oil companies should be protected from the loss of an effective market system. From the table, it is assumed that the years such as 2011-12, 2012-13, and 2013-14 witnessed the highest rate -crude oil prices in India are 111.89, 107,97, and 105.52, respectively. The sale price of petrol and diesel is based on import costs by including goods, taxes, and a portion of the commission at the base price. And the below table shows the selling price calculation. This varies from state to state in India due to different taxes. The formation of petrol and diesel prices is calculated according to New Delhi.

Monthly Average Price of Crude Oil in Indian Basket (2000-2001 to 2021-2022-upto January 2022)													
													(In \$/bbl.)
Year	Apr.	May	Jun.	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Avg.
2000-2001	22.51	26.6	28.49	27.26	28.33	31.34	30.5	30.93	23.25	24.02	25.92	23.82	26.92
2001-2002	24.82	26.95	26.63	23.99	25.01	24.79	20.05	18.24	18.24	18.92	19.53	23.31	22.55
2002-2003	25.03	24.99	24.05	25.18	25.86	27.5	26.9	23.68	27.11	29.59	31.31	28.83	26.6
2003-2004	24.21	24.99	26.43	27.46	28.66	26.27	28.45	28.23	28.97	30	29.65	32.21	27.98
2004-2005	32.37	36.08	34.16	36.35	40.52	39.15	43.38	38.9	36.82	40.96	42.67	49.27	39.21
2005-2006	49.43	47	52.72	55.01	60.05	59.74	56.28	53.14	55.05	60.54	58.95	60.01	55.72
2006-2007	67.06	67.22	66.9	71.29	70.78	60.93	57.27	57.79	60.34	52.53	56.53	60.26	62.46
2007-2008	65.48	65.7	68.1	72.58	68.98	74.78	79.33	89.11	87.92	89.52	92.37	99.76	79.25
2008-2009	105.72	120.91	129.72	132.47	113.05	96.81	69.12	50.91	40.61	43.99	43.22	46.02	83.57
2009-2010	50.14	58	69.12	64.82	71.98	67.7	73.06	77.39	75.02	76.61	73.69	78.02	69.76
2010-2011	84.08	76.16	74.33	73.54	75.13	76.09	81.11	84.26	89.77	93.87	101.62	110.71	85.09
2011-2012	118.64	110.8	109.99	112.53	106.94	108.79	106.11	109.62	107.19	110.47	117.67	123.61	111.89
2012-2013	117.97	108.05	94.51	100.34	110.07	111.77	109.79	107.87	107.28	109.55	112.68	106.45	107.97
2013-2014	101.57	101.1	101.11	104.86	108.45	109.47	107.37	106.55	108.72	105.29	106.19	105.3	105.52
2014-2015	105.56	106.85	109.05	106.3	101.89	96.96	86.83	77.58	61.21	46.59	56.43	55.18	84.16
2015-2016	59.07	63.82	61.75	56.3	47.33	46.1	46.68	42.5	35.68	28.08	30.53	36.42	46.17
2016-2017	39.88	45.01	46.96	43.52	44.38	44.48	49.25	44.46	52.74	54.08	54.86	51.47	47.56
2017-2018	52.49	50.57	46.56	47.86	50.63	54.52	56.06	61.32	62.29	67.06	63.54	63.8	56.43
2018-2019	69.22	75.25	73.83	73.47	72.53	77.88	80.08	65.4	57.77	59.27	64.53	66.74	69.88
2019-2020	71	70.01	62.37	63.63	59.35	61.72	59.7	62.53	65.5	64.31	54.63	33.36	60.47
2020-2021	19.9	30.61	40.63	43.35	44.19	41.35	40.66	43.34	49.84	54.79	61.22	64.73	44.82
2021-2022	63.4	66.95	71.98	73.54	69.8	73.13	82.11	80.64	73.3	84.67	97.13	123.98	80.05

Table 2 Note : Crude oil prices are average of daily prices of respective month.

Source : Ministry of Petroleum & Natural Gas, Govt. of India.

Paired Sample T Test

Table 3 paired sample correlation for secondary data

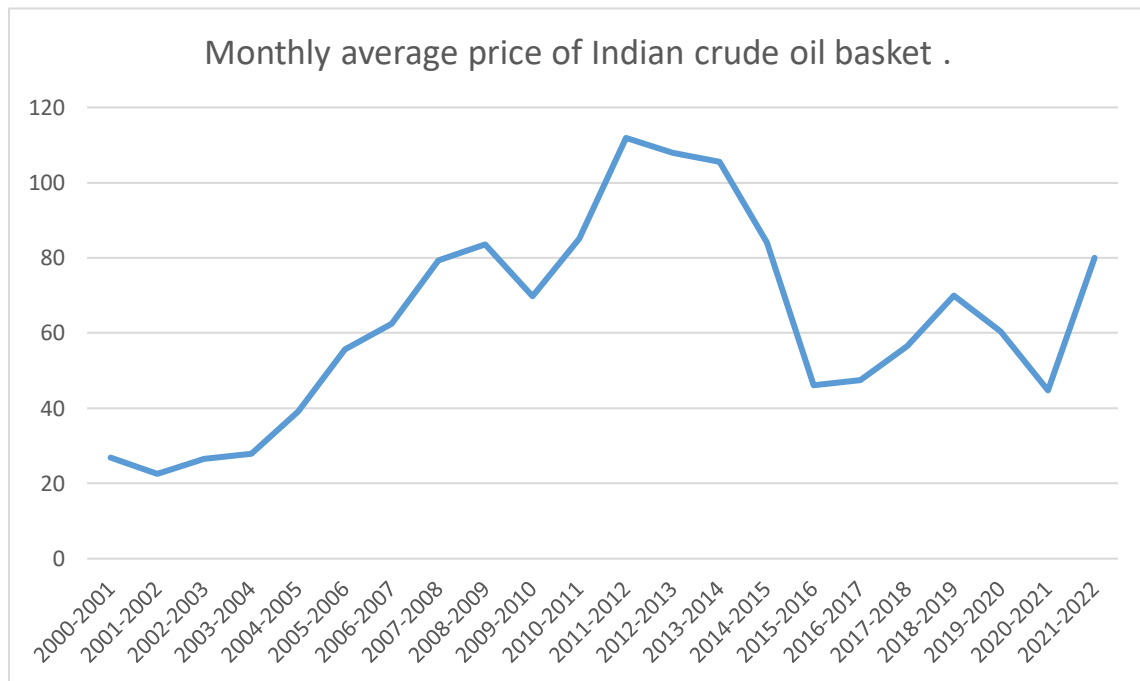
Paired Samples Correlations				
Pair 1	pre & post	5	0.068	0.914

Table 4 Paired Samples Test for crude oil prices

Paired Samples Test											
				Paired difference							
Pa ir 1		Me an	Std. Deviati on	Mea n	Std. Devia tion	std. error mean	95% confidence interval of the difference		t	df	Sig. (2- tailed)
	pre	67. 968	25.966 8	5.63 8	28.39 328	12.69 786	lower	upper	0.44 4	4	0.68
	po st	62.3 3	13.377 8				- 29.61691	40.89291			

A paired sample t-test was conducted to evaluate the impact on the crude oil prices before and after the implementation of revision on price on daily basis pre (2013-2017) and post(2017-2022). The result is insignificant, before (M=67.968, SD=25.9668) to after (M=62.33, SD=13.3778), T=0.444, P= 0.68 (two tailed) as given on the table4. Hence the significant value is more than 0.005 thus H1 is accepted. Thus there is no significant difference between pre and post price in the crude oil price basket before and after the implementation of revision on price on daily basis.

Figure 1 Monthly average price of Indian crude oil basket



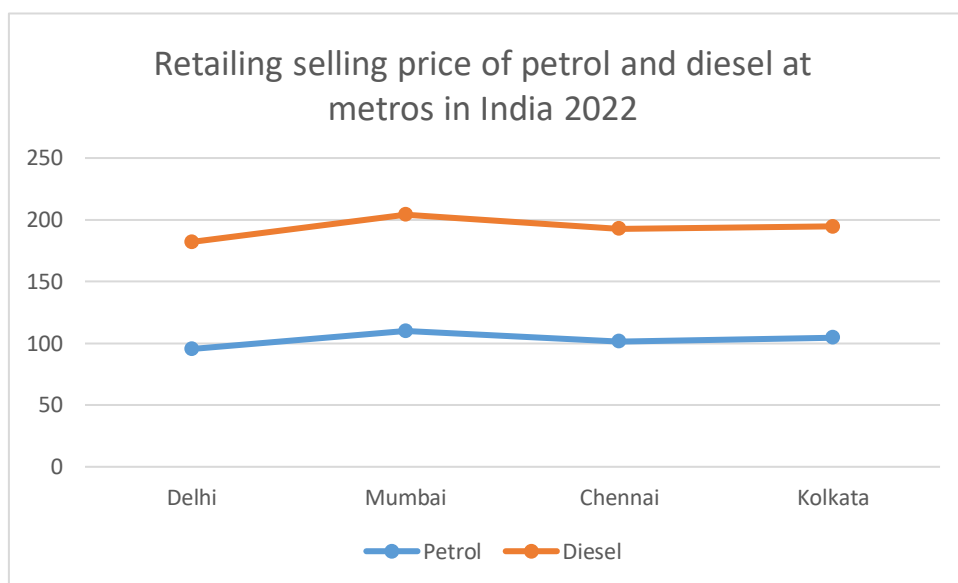
As of 1 March 2022, at a basic price of Rs.28.28 litres the price of petrol per day was made to Rs.69.59. In diesel, the basic amount of Rs.31.78, after adding up all the costs, operates at Rs.62.29 litres. The table2 shows a comparative analysis of petrol and diesel prices across metro such as New Delhi, Mumbai, Chennai, and Kolkata as of 2022. From the Table 4, it can be said that the highest fuel prices are was in Mumbai. (Rs.109.98 litre) and the lowest price was in New Delhi (Rs.97.41 litre) for petrol. the lowest price of Rs.86.67 a litre was observed in New Delhi, while other metros were more or less the same as the separate variants such as Mumbai- Rs.94.14, Chennai -Rs.91.43, and Kolkata -Rs.89.79.

Table 5 Retailing selling price of petrol and diesel at metros in India 2022

Retailing selling price of petrol and diesel at metros in India 2022

City	Petrol	Diesel
Delhi	95.41	86.67
Mumbai	109.98	94.14
Chennai	101.4	91.43
Kolkata	104.68	89.79

Figure 2 Retail fuel prices in metro cities for 2022



The graphical presentation of the Table 5 . In the above table shows that prices across India are not the same. It also opens the debate on one India, one market. Also, the figure shows that Mumbai had a peak of 109.98 litres of fuel and again Mumbai had a peak of 94.14 litres of diesel on 2022.

MONTHLY FUEL PRICE TREND IN INDIA FOR 2022

In India, the worth of petrol opened the month of February standing at the speed of Rs.95.45 per litre while diesel stood at Rs.86.71 per litre. there have been no changes within the prices, in comparison to the price of both the fuel within the previous week.

The price of the both the fuel stood steady in India during the month. within the month of February, the costs of both the fuel were unaltered and witnessed no fluctuations.

The price of petrol closed the month of February while being traded at the speed of Rs.95.45 per litre. Diesel, on the opposite hand, closed the month standing at the speed of Rs.86.71 per litre. the general performance of both the fuel witnessed a stability during the month of February in India.

Table 6 Trend of Fuel Price in India for 2022

Trend of Fuel Price in India for 2022 (rates per litre):		
Parameters	Petrol (Rates/litre)	Diesel (Rates/litre)
1st February	Rs.95.45	Rs.86.71
28th February	Rs.95.45	Rs.86.71
Highest Rate	Rs.95.45	Rs.86.71
Lowest Rate	Rs.95.45	Rs.86.71
Overall Performance	Stable	Stable
Percentage Change	0%	0%

Indian is one among the world's biggest oil consumers. Among all industry lines, oil and gas industry features a significant impact on the expansion of the country's economy and Gross Domestic Product. It accounts for a minimum of 15% of GDP. The industry operates in three segments: 1) upstream, 2) downstream, 3) midstream. The upstream segment covers all activities associated with exploration and production. The midstream segment deals with stowage and transportation of gas and petroleum . The downstream segment deals with fabrication and refining of petroleum products, storage, transportation and marketing of commodities like gas and petroleum .

AGE OF THE RESPONDENTS

AGE	Frequency	Percent
18-30	69	39
31-40	46	26
41-50	40	23
51-60	22	12
Total	177	100

Source: Primary Data Table 7

The most (39%) of respondents are in the age group of 18-30 years, 26% of the respondents are in the age group of 31-40 years, 23% of the respondents are in the age group of 41-50 years and 12% of the respondents are in the age group of 51-60 years.

Thus the majority of the respondents are in the age group of below 18-30.

INCOME OF THE RESPONDENTS

INCOME	Frequency	Percent
10000-20000	50	28
21000-50000	53	30
50000 or above	47	27
100000 or above	27	15
Total	177	100

Source: Primary Data Table 8

The most (28%) of respondents have 10000-20000, 30% of the respondents have 21000-50000, 27% of the respondents have 50000 or above and 15% of the respondents have 100000 or above as their income level.

Thus the majority of the respondents have 21000-50000 as their income level.

DESIGNATION OF THE RESPONDENTS

DESIGNATION	Frequency	Percent
Student	34	19
Private employees	71	40
Government employee	37	21
Retired	11	6
Business	24	14
Total	177	100

Source: Primary Data Table 9

The most (19%) of respondents are student, 40% of respondents are private employees, 21% of respondents are government employees, 6% of respondents are retired and 14% of respondents are doing business.

Thus the majority of the respondents are private employees.

GENDER OF THE RESPONDENTS

GENDER	Frequency	Percent
Male	95	54
Female	77	44
Others	5	3
Total	177	100

Source: Primary Data Table 10

The majority (54%) of respondents are male, 44% of the respondents are female and 3% of respondents does not want to say.

Thus the majority of the respondents are male.

VEHICLE OWNERSHIP

Particulars	Frequency	Percent
Own a vehicle	123	70
Do not own a vehicle	54	31
Total	177	100

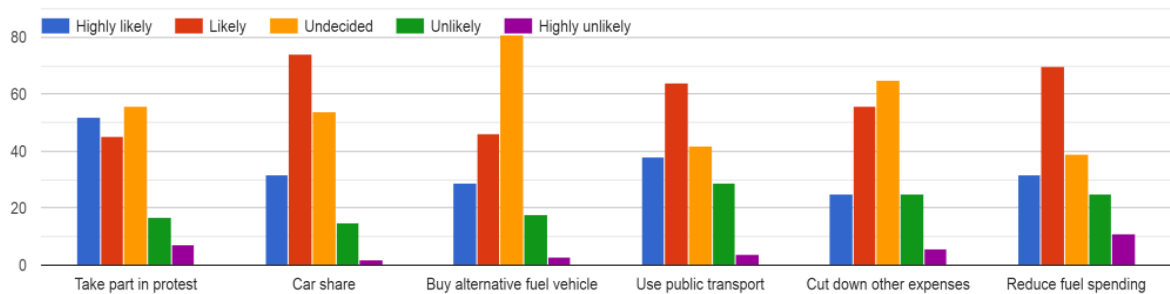
Source: Primary Data Table 11

The majority (70%) of respondents have own vehicle and 31% of the respondents do not have own vehicle.

Thus the majority of the respondents have own vehicle.

Figure 3 consumer act for rise in fuel prices

Consumers act for rise in fuel prices



Most of the respondents could not decide (31.6%) towards taking part in the protest when there is rise in fuel price, because not every time some one cannot take part in the protest or protest for rise in fuel prices. Thus, most of the respondents have selected undecided towards take part in protest when rise in fuel price.

Most of the respondents are likely towards taking car share during rise in fuel prices(41.8%), it is because when people take car share to travel from one place to another the cost of travel will be low compared to travel during the rise or travelling alone in a vehicle. Thus most of the respondents are likely towards take car share when there is rise in fuel price.

Most of the respondents could not decide to buy an alternative vehicle due to rise in fuel price(45.8%) not everyone can afford new vehicle at the time of fuel price rise. Thus most of the respondents have selected undecided towards buying alternative fuel vehicle when rise in fuel price.

Most of the respondents are likely towards using public transport(36.2%) for travelling from one place to another. Its because when people use less vehicle they can save the amount spend on fuel during hike. Thus most of the respondents are likely towards using public transport when rise in fuel price.

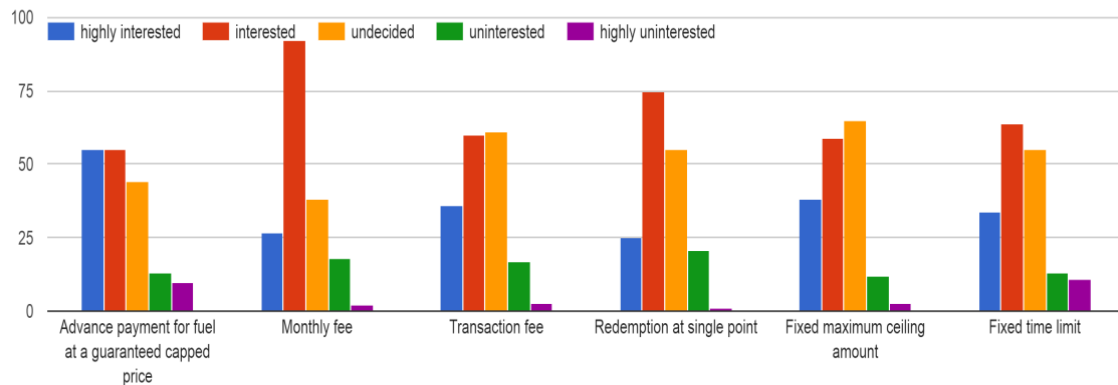
Most of the respondents could not decide whether they could cut down the other expenses to balance them to spend them on fuel (36.7%). Thus most of the

respondents have selected undecided towards cutting down other expenses when there is rise in fuel price.

Most of the respondents are likely to reduce fuel spending when there is rise in fuel prices(39.5%) because only that can be done to control the expenses during the rise in fuel price hike.Thus most of the respondents are likely towards reducing fuel spending when there is rise in fuel price.

Figure 4 interest of prepaying plan for fuel by consumer

Consumers interest on prepaying plan for fuel.



Most of the respondents are interested (33%), for advance payment for fuel at a guaranteed capped price. This pricing option is a new unique way to cap the price the customers pay on regular diesel whilst still being able to benefit if prices drop. This allows customers to protect their business against potential rising regular diesel prices by capping the price* customers pay for fuel purchased at any gas station with a gas fuel card for over a 12 month period. So most of the respondents prefer advance payment for fuel in India

Majority of the respondents are interested (52%) for monthly fee payment system for fuel. Using fuel cards can provide huge benefits to businesses that use vehicles on a daily basis. Operating fleets requires seamless organisation and efficiency and using fuel cards facilitates easier management of those requirements. Thus majority of the consumer are interested in monthly fees payment method for fuel.

Most of the respondents could not decide (35%) for transaction fee method for fuel payment because that is not suitable for normal consumers. Thus most of the respondents have selected undecided for transaction fee.

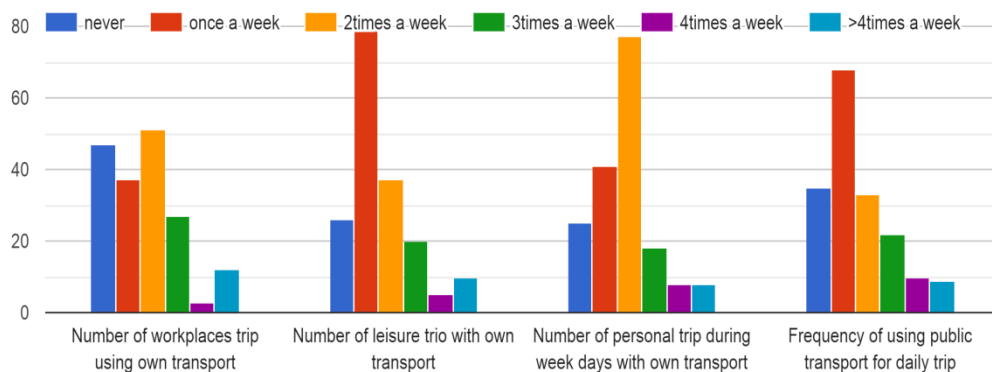
Most of the respondents are interested (42%) for redemption at single point, because most of the employees use credit as a reward for every time they spend on their credit card where customers can collect these points as they spend on their credit card. Once they have collected enough points, they can redeem them for gift vouchers, merchandise, air miles and more. So, most of the respondents have selected interested for redemption at single point.

Most of the respondents could not decide whether they want (37%) fixed maximum ceiling amount because it is not suitable normal customers. Thus, most of the respondents have selected undecided for fixed maximum ceiling amount.

Most of the respondents are interested (36%) for fixed time limit. Thus most of the respondents have selected interested in fixed time limit.

Figure 5 consumers travel pattern during increase in fuel price

Consumers travel pattern during increase in fuel price



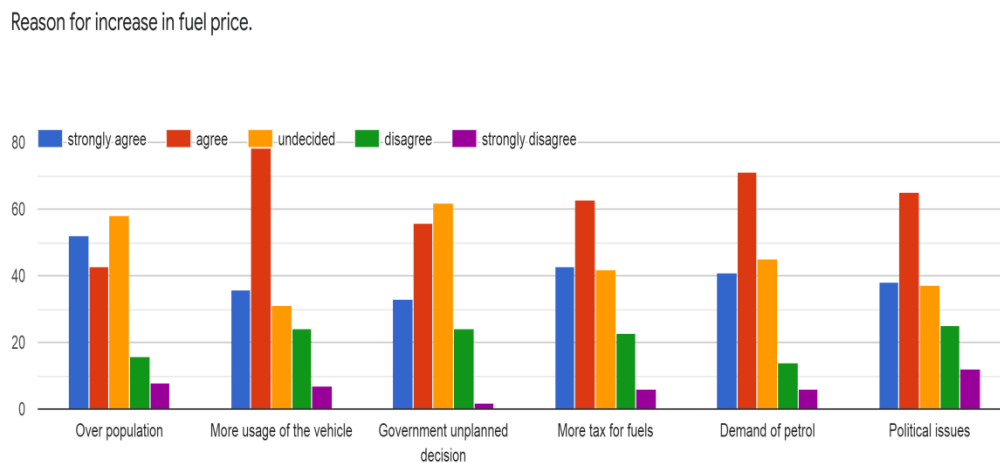
Most of the respondents travel 2times a week (29%) to workplace trip using own transport because after covid now a days corporate only operate for weekly twice a week, otherwise people are working from home. Thus, most of the respondents have selected 2times a week option towards number of workplace trip using own transport.

Most of the respondents travel once a week (45%) as a leisure trip with own transport, it is because now a days people love travel, to spend some time with their family other than being home, so they go to nearby places on weekends instead of spending time at home. Thus, most of the respondents have selected once a week option towards number of leisure trip with transport.

Most of the respondents 2times a week (43.5%) takes personal trip during week days with own transport it is because of some emergencies people take own transport for personal trip during week days. Thus most of the respondents have selected 2times a week towards number of personal trip during week days with own transport.

Most of the respondents once a week (38.4%) use public transport for daily trip, that is because some people take public transport for going to work places once a week. Thus most of the respondents have selected once a week option towards frequency of using public transport for daily trip.

Figure 6 Reason for increase in fuel price.



From the figure 6 reason for rise in fuel price most of the respondents could not decided the reason for (35.0%) for over population, that is because the respondents are not sure whether the reason for increase in fuel price is dependent upon over population. Thus, most of the respondents have selected undecided towards over population for the reason for increase in fuel prices.

Most of the respondents agree (46.9%) that more usage of the vehicle is the reason for increase in fuel price, as people use more vehicle, they use more fuel for vehicle. Thus, most of the respondents are agree towards more usage of the vehicle.

Most of the respondents could not decided whether the (18.6%)government unplanned decision is the reason for rise in fuel prices, because respondents think that it may or may not dependent upon the government decision for fuel prices. Thus, most of the respondents are undecided towards the government unplanned decision.

Most of the respondents agree(35.6%) for more tax for fuels because the fuel price will be 10 or 20 Rs. less when the tax all gets added it comes around 100rs for a litre of petrol. Thus most of the respondents agree towards more tax for fuels.

Most of the respondents agree (40.1%) for demand of petrol because respondents think demand for petrol is the reason for increase in fuel prices. Thus most of the respondents agree towards the demand of petrol.

Most of the respondents agree (36.7%) for political issue, the respondents think political issue is the reason for increase in fuel prices.Thus most of the respondents agree towards the demand of petrol.

❖ **FACTORS INFLUENCING USAGE OF FUEL**

Table 12 factors influencing fuel price.

ANOVA						
	Model	Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	7.661	1	7.661	23.018	.000
	Residual	58.248	175	.333		
	Total	65.910	176			
a. Predictors: (Constant), Demographic profile						
b. Dependent Variable: Factor influence						

Table 13 factors influencing fuel price.

Coefficients

Model		Unstandardized Coefficients		Standardized Coefficients	T	Sig.
		B	Std. Error	Beta		
1	(Constant)	1.652	.137		12.097	.000
	Age	.314	.065	.341	4.798	.000
a. Dependent Variable: Factor influence						

From the table 12 the significant value is less than 0.05, so the factors influencing fuel price having the significant impact on demographic profile. From the table 13 the significant value is less than 0.05. Hence H_0 is rejected, (i.e.) alternative hypothesis (H_1). It is evident that the variables have a significant impact. Thus the factor having strong impact on factor influencing the fuel price. Factors like international prices are high, high demand for fuel in India, oil marketing, companies are fixing high prices and high tax rates have influence on fuel prices in India. And they also have a strong impact on the demographic factors like age, income, designation, gender and vehicle ownership.

❖ **BUYERS BEHAVIOUR AND THE PROBLEMS FACED TOWARDS CHANGES IN INTERNATIONAL GAS PRICES TO DOMESTIC FUEL PRICES**

Table 14 travel pattern of the consumers

ANOVA

Model	Sum of Squares	Df	Mean Square	F	Sig.
1 Regression	39.880	4	9.970	.820	.05
Residual	2091.114	172	12.158		
Total	2130.994	176			
R	.024				
R square	.019				

b. Dependent Variable: travel

From the table 14 the significant value is less than 0.05, so the factors impact of travel pattern during increase in fuel prices on age, income, designation and vehicle ownership of the respondents. From the above table it clearly shows that the regression value of R is .137 (i.e.) there is an impact of travel pattern during increase in fuel prices by age, income, designation and vehicle ownership of the respondents. The coefficient of the relation explain that the R square value is .019; which mean 1.9% of variance are impact the travel pattern during increase in fuel prices and age, income, designation and vehicle ownership of the respondents. From the table 14 the significant value is 0.05. Hence H_1 is accepted, (i.e.) hypothesis is (H_1) accepted. It is evident that the variable has significant impact. Thus the factor travel pattern during increase in fuel prices is not influenced by the variables age, income, designation and vehicle ownership of the respondents.

Table 15 Travel pattern of the consumers

Coefficients

Model	Unstandardized Coefficients		Standardized Coefficients	T	Sig.
	B	Std. Error	Beta		
(Constant)	11.923	1.092		10.918	.000
1 AGE OF THE RESPONDENTS	.019	.286	-.006	6.280	.000
INCOME OF THE RESPONDENTS	.229	.309	.068	3.996	.004
DESIGNATION OF THE RESPONDENTS	.362	.260	.131	2.683	.337
VEHICLE OWNERSHIP	.622	.576	.083	1.079	.004

a. Dependent Variable: travel

From the above table 15 it is observed that the b value is 1.9 for the age of the respondents which is a positive influence for travel pattern. Even income($b=2.3$) and vehicle ownership($b=6.2$) of the respondents have a positive influence on the travel pattern on the consumer. Thus significant value is lesser than 0.05. Hence H_1 is

accepted, i.e., null hypothesis (H_0) is rejected. It is evident that the variable has significant impact. It concludes that there is a significant relationship between age and travel pattern because most of the respondents travel for work, leisure trips, personal trips and using public transport. Income and travel pattern has a significant relationship because when income of the respondents increases people prefer their own transport for travelling. Vehicle ownership and travel pattern has a significant relationship because when people have their own transport to travel, they use them frequently, and they feel convenient to travel more. Thus, the factor travel pattern during increase in fuel prices is influenced by the variable age, income and vehicle ownership of the respondents.

FINDINGS, SUGGESTIONS AND CONCLUSION

CHAPTER V

FINDINGS, SUGGESTIONS AND CONCLUSIONS

FINDINGS

This study analysed the price fluctuations in the fuel prices before and after the implementation of daily revision for fuel prices. Then the factors that influencing the fuel prices from buyers perspective. Buyers behaviour and the problems faced towards changes in international gas prices to domestic fuel prices. And, the Comparative analysis of fuel prices in India with select states. The summary of the major findings that emerged from the analysis are given in the following points:

❖ **Socio economic theory**

- According to the data collected, most of the respondents are in the age group of 18-30.(39%)
- Most of the respondents have 21000-50000 as their income level.(29.9%)
- Most of the respondents are private employees.(40.1%)
- Majority of the respondents are male.(53.7%)
- And, majority of the respondents are own a vehicle.(69.5%)

❖ **The enforcement of automatic fuel pricing mechanism in India.**

- The maximum average amount reached was in the year 2011-2012 which was 111.89 that was before the implementation of automatic fuel price revision that is done on daily basis. But after that till 2021-2022 the price haven't reached to that extent. A paired sample t-test was conducted to evaluate the impact on the crude oil prices before and after the implementation of revision on price on daily basis pre (2013-2017) and post(2017-2022).
- H₁ There is no significant difference between pre and post price in the crude oil price basket before and after the implementation of revision on price on daily basis.

❖ **Factors influencing usage of fuel**

- Most of the respondents selected undecided towards taking part in protest(29.4%).
- Most of the respondents selected likely towards taking car share(41.8%).
- Most of the respondents selected undecided towards buy alternative fuel vehicle(45.8%).
- Most of the respondents selected likely towards use public transport(45.8%).
- Most of the respondents selected undecided towards cut down other expenses(36.7%).
- And, most of the respondents selected likely towards reduce fuel spending(39.5%).
- The significant value is less than 0.05, so the factors influencing fuel price having the significant impact on demographic profile. The significant value is less than 0.05. The factor having strong impact on factor influencing the fuel price. Factors like international prices are high, high demand for fuel in India, oil marketing, companies are fixing high prices and high tax rates have influence on fuel prices in India. And they also have a strong impact on the demographic factors like age, income, designation, gender and vehicle ownership.
- H₂ there is significant relationship between how do act for fuel rise in fuel price and consumer opinion about fuel price revision on daily basis.

❖ **Buyers behaviour and the problems faced towards changes in international gas prices to domestic fuel prices**

- Most of the respondents said that the responders travel 2times a week towards number of workplace strip using own transport(28.8%).
- Most of the respondents said that the responders travel once a week towards number of leisure trio with transport(44.6%).
- Most of the respondents said that the responders travel 2times a week towards number of personal trip during week days with own transport(43.5%).
- And, most of the respondents said that the responders travel once a week towards frequency of using public transport for daily trip(43.5%).

- The significant value is less than 0.05, so the factors impact of travel pattern during increase in fuel prices on age, income, designation and vehicle ownership of the respondents. There is an impact of travel pattern during increase in fuel prices by age, income, designation and vehicle ownership of the respondents.
- The significant value is 0.05. Hence H_1 is accepted, (i.e.) hypothesis is (H_1) accepted. It is evident that the variable has significant impact. Thus the factor travel pattern during increase in fuel prices is influenced by the variables age, income, designation and vehicle ownership of the respondents.
- H_3 there is a significant impact on the factor travel pattern during increase in fuel prices is influenced by the variables age, income, designation and vehicle ownership of the respondents.

❖ **Comparative analysis of fuel prices in India with select states (metro cities).**

- The analysis shows that prices across India are not the same. It also opens the debate on one India, one market. Also, the analysis shows that Mumbai had a peak of 109.98 litres of fuel and again Mumbai had a peak of 94.14 litres of diesel on 2022.

SUGGESTIONS

GOVERNMENTS

- Government seeks to obtain the fuel substitution with actively search for alternative fuels.
- The government should set the fuel price gradually to avoid the increasing price in the other sectors of strategic commodities such as Basic Electricity Tariff (TDL), basic food needs, and transportation tariff with giving subsidies on those commodities.
- The government may reduce the taxes on fuel since it is base for transportation to carry the goods from one place to other place. If there is hike in fuel prices, it will reflect in the price of goods and services.
- State and central government must bring good policy in demand and supply of fuels and also it may take all the efforts to regulate the demand and supply.
- Government should encourage firms to invent alternate for fuels and also they should provide subsidy for their invention.
- Government must come forward for production and distribution of alternate fuels for vehicles and they should allot appropriate for Research&Development to invent fuels.
- Government must try to cooperate with all other countries to import the fuels at better favourable cost for the public.
- Central and state government may be encouraged for electric bikes, electric four wheelers and three wheelers to remove shortage of petrol and diesel.

CONSUMER

- The consumers must be aware of international prices to understand the fuel price changes internationally.
- The consumers may use public transport in order to adjust towards the hike in fuel prices.

- The consumers must to identify the alternate transports like cycle and electrical vehicles in order to cut cost for fuel price.
- The consumers may reduce their number of trips to travel for their travelling.
- Public may use trains for their longer trip. This will reduce the fuel demand. They should share their petrol and carry other persons in their two wheeler in order to reduce the demand of fuels.
- Public should monitor their travelling and their fuel expenses regularly to avoid excess fuel consumption.

CONCLUSION

From the results it is concluded that sectors most affected by the higher of fuel prices is the transport sector whether by land, air and water are also affected enormously from the increase in fuel prices, because vehicles in operate depending on the fuel. This fuel price increase will leads to an increase in transportation tariffs. The electricity sector also primarily impact because of this sector needs fuel in generate electricity which is very large. The increases of fuel price impact to this sector will cause the increases of production costs in generating electricity. The increases in fuel prices also have a major impact on the Manufacture of Chemicals sectors, where petrol is an important component providing chemical materials. The fuel price hike impact on the increasing cost of production in each economic sector will aggregately impact to the increase of the price at each sector, and jointly led the national inflation. Inflation will rise in line with the rise in fuel prices.

ANNEXURE

ANNEXURE:

1. Name:

2. Age:

- 18-30
- 31-40
- 41-50
- 51-60

3. Monthly Income:

- 10000-20000
- 21000-50000
- 50000 or above
- 100000 or above

4. Designation:

- Student
- Private employee
- Government employee
- Retired
- Business

5. Gender:

- Male
- Female
- Other

6. Vehicle ownership

- Own a vehicle
- Do not own a vehicle

7. Factors influencing fuel price?

Questions	strongly agree	agree	undecided	disagree	strongly disagree
International prices are high					
High demand for fuel in India Oil marketing companies are fixing high prices					
High tax rates					

8. How do you act for fuel rise in fuel prices?

Topic	highly likely	likely	undecided	unlikely	highly unlikely
Take part in protest					
Care share					
Buy alternative					

fuel vehicle					
Use public transport					
Cut down other expenses					
Reduce fuel spending					

9. Consumers opinion about fuel price revision on daily basis?

Question	strongly agree	agree	undecided	disagree	strongly disagree
Positive about the policy					
Believe the benefits outweigh any inconvenience					
There should be parity between international and domestic fuel prices					
It increases transparency in fuel price fixation					
It reduces fuel price speculation					

10. Rate your interest of pre-paying plan for fuel.[, , , ,]

Questions	highly interested	interested	undecided	uninterested	highly uninterested
Advance payment for fuel at a guaranteed capped price					
Monthly fee					
Transaction fee					
Redemption at single point					
Fixed maximum ceiling amount					
Fixed time limit					

11. Are you aware of fuel price capitalization?

- Yes
- No

12. Your travel pattern before increase in fuel prices.

Questions	never	once a week	2times a week	3times a week	4times a week	>4times a week
Number of workplaces trip using						

own transport						
Number of leisure trip with own transport						
Number of personal trip during week days with own transport						
Frequency of using public transport for daily trip						

13. Reason for increase in fuel price.

Questions	strongly agree	agree	undecided	disagree	strongly disagree
Over population					
More usage of the vehicle					
Government unplanned decision					
More tax for fuels					

Demand of petrol					
Political issues					

14. How often do you fill your petrol tank?

- Once a day
- Twice a day
- Once a week
- More than once a week

15. Do you get travel allowance from your company?

- yes
- no

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