

**Taming Diesel Subsidy
to
Curtail Inflation
and
Foster Economic Growth**



IRADe Integrated Research and
Action for Development

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Preface

The government has taken a few steps towards viable and sustainable pricing of petroleum products. Gasoline (petrol) price has been decontrolled. Kerosene and LPG prices have also been raised and the quota of LPG cylinders to be limited to six per household in a year has been imposed for subsidized LPG. Although diesel price has been raised a bit, it has not been decontrolled and under-recoveries on this account keep growing. When diesel price increases, the cost of truck transport goes up. This leads to immediate increase in commodity prices in the short term. The Ministry of Finance, the Union Cabinet, the Members of Parliament and various political parties are always concerned about inflation. On the other hand, continuing the present policy of continuing with subsidies is likely to be even more inflationary in the long term and likely to reduce the economic growth rate. Therefore, the trade-offs between short and long term inflation needs to be addressed. The inflation impacts different sections of society differently.

The total under-recoveries for the FY 2012-13 industry as a whole was estimated at nearly Rs. 2,00,000 crore out of which more than half was on account of diesel. After the price increase in September 2012, the under-recoveries on account of diesel are expected to be lower by around Rs 30,000 crore. Due to delayed sanction of budgetary support, oil marketing companies have to resort to borrowings in financial markets which push up their debt/ equity ratio to nearly unsustainable levels. The growing debt/equity ratios of oil PSUs may soon make them unviable and can even lead to disruption in supply of petroleum products. This could have very large economic and social costs. Continuing with the present policy of no change in diesel price is not tenable. The high level of under-recoveries raises the fiscal deficit and distorts monetary policy which has serious macroeconomic implications for growth and inflation over time.

To explore this trade-off between short-term impact and medium-term outcomes, Integrated Research and Action for Development (IRADe) has developed a macroeconomic model to assess the alternative road maps for reforming diesel prices in India. Stakeholders are affected by change in diesel prices and the extent to which they are affected is critical in political decision making. Therefore, the project has assessed the impact on various stakeholders of change in diesel price. Also, the short-term and medium-term trade-offs are not obvious and it was felt that creating a consensus among stakeholders is an important step to pricing reform. As a part of the project IRADe organized a stakeholder consultation workshop on the findings of the study and the final report reflects their feedback.

We hope this report will serve as a valuable resource for all the policy makers, organizations, institutions, agencies and individuals working for rationalizing/reforming diesel prices.

Jyoti Parikh
Executive Director, IRADe

October 29, 2012

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Study Team

Dr Kirit S Parikh, Mentor

Dr Jyoti Parikh

Dr Probal Ghosh

Er. Rajiv Ratna Panda

Dr Arvinder Kaur



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Executive Summary

The Background

The Parikh Committee Report (2010) on “A Viable and Sustainable System of Pricing of Petroleum Products” has recommended that petrol and diesel prices should be deregulated and should be determined by the market at both the refinery gate and retail levels.

The price of petrol has been deregulated but that of diesel has not been. It has been increased only by a small amount over time although its cost has increased substantially. Under-recoveries, i.e., the difference between the cost of supplying diesel based on trade parity price and the revenue from its sale, have grown substantially. For the year 2012-13, in the first quarter under-recoveries reached Rs 47,811 crore and were expected to reach Rs 2,00,000 crore¹ for the whole year before the government raised the price of diesel by Rs. 5 per litre on Sept. 7, 2012. The under-recoveries have put severe financial burden on public sector oil marketing companies (OMCs) whose debt-equity ratios have reached unsustainable levels. The growing debt/equity ratios of OMCs may soon make them unviable and unable to buy petroleum products. Then even supply of petroleum products can be disrupted. This could have very large economic and social costs.

Because of the large price difference between diesel price and petrol price, people are buying more diesel vehicles, which may be more polluting and which commits the country for higher diesel use for many years in future.

When diesel price falls below the price of furnace oil, which is deregulated, diesel is used in place of furnace oil. It has been estimated that 3Mt(Million Tonnes) of diesel has been used in this way in 2011-12.

Diesel is consumed largely as an intermediate product and any price increase leads to increase in other prices. For example, when the price of diesel increases cost of transportation goes up. On the other hand large under-recoveries financed by the government, have their own impact, one way or the other, on the inflation. The under-recoveries persist month after month and their impact may be substantial over time. Larger under-recoveries lead to higher fiscal deficit, which in turn results in higher money supply leading to inflation causing higher interest rates, which lowers the GDP growth rate.

Objectives

Our study objective is to explore the impact on inflation and growth of alternative policies concerning diesel price including not doing anything. Also change in diesel price affects different people differently and we assess these impacts on consumers, farmers, truckers, car owners and telecom towers.

¹1 crore = 10 million

Approach to Assess Macroeconomic Impacts

To explore the macroeconomic trade-offs a Vector Auto-Regression (VAR) model is developed. The model is econometrically estimated to establish quantitatively the relationship among different variables using quarterly data from the 1st quarter (January to March) of 1997 to the 4th quarter of 2010. The variables used are general Wholesale price index (WPI), Gross domestic product (GDP) and Real interest rate (RSBIALR). Each of these variables depends on lagged values of all the three variables as well as on a number of other variables, which are exogenous. We use Whole Sale Price of Diesel (WDP), Money Supply (MS), Rainfall Index (RID), Real Effective Exchange Rate (REER) and Real Total Government Expenditure (TE) as exogenous variables in the VAR. The model takes into consideration the direct impact of diesel price through the WDP variable and the indirect impact of a diesel price rise leading to lower under-recoveries which results in lower fiscal deficit and lower money supply and hence, lower inflation, through the M3 variable. All variables except real interest rate are in logs and appropriate differences are taken to ensure that the series is stationary.

The Scenarios

To analyse the impact of deregulation of diesel prices we analysed four main scenarios. The first was a **no change** scenario where we assume prices are kept at the same level and government continues with its present policies. In the second scenario we considered a **complete deregulation of diesel prices in one go** completely eliminating under-recoveries. In the third we considered a scenario where diesel prices are increased to the level it needs to be for no under-recoveries but in **step by step increase over four quarters**. And in the fourth one we considered a **partial increase of 10%** in diesel price, which is what the government did in September 2012. The changes are made in the 1st quarter of 2012 and simulations are carried out till the 4th quarter of 2015.

The Macroeconomic Impacts

The study found that diesel price policy has significant macroeconomic impact. While diesel price increase leads to a small increase in the rate of inflation; not changing the present policy involves a much higher rate of inflation over time. The trade-off between short-term pain and much larger long term-gain is not just in inflation, it is also for GDP.

- A one shot increase of 30% in diesel price would increase diesel price by Rs.13.5 per litre. This would lead to 2.3 percentage point higher inflation. After five quarters inflation is lower and GDP is higher. In fact the compound growth rate of inflation over the next four years is lower by 1.45 percentage points and GDP growth rate is higher by 0.7 percentage points. Thus, four years down, the Wholesale Price Index (WPI) is 5.66 percent lower and

GDP 3.86 per cent higher. However the short-term inflation is higher, which may fuel inflationary expectations as people may not appreciate the long-term deflationary impact. This would also face strong political opposition.

- A gradual price increase over four quarters may have a smaller immediate inflation. However, each quarterly increase in price would require the same political capital and would face political opposition. The public discontent of any price increase would be given a boost every quarter by the opposition.
- An increase in diesel price by 10% as was done in September, 2012, would still leave substantial under-recoveries. In our scenario diesel price was raised by Rs. 4.5 per litre. This results in marginally higher inflation of maximum 0.8 percentage points for two quarters and smaller thereafter. The compound growth rates over the next four years will be 0.47 percentage point lower for inflation and 0.23 percentage points higher for GDP. Thus WPI at the end of four years would be 1.9 percent lower and GDP will be 1.28 per cent higher.

Impact on Sectoral Prices

The burden on *Aam Aadmi* (common man) of not doing anything is much more than from raising diesel price. To assess the impact of diesel price rise on the household consumers we regressed consumer price index of different commodity groups against its lags and wholesale prices of diesel and its lags.

- When diesel price is increased by 10%, the consumer price for goods consumed by urban industrial consumers increases by different rates. The price of food items increases by 0.5%, of fuel and light by around 2.0% and of miscellaneous goods by 0.4%.
- The impact on rural consumer prices would be even lower as more of their consumption expenditure is based on local products.

Impact on Consumers

This exercise was performed separately for rural and urban areas as the consumer behaviour varies between urban and rural.

- The impact of 10% increase in diesel price on consumer is quite small, amounting to less than Rs.2 per person per month of total monthly consumption expenditure (MPCE) of the poorest deciles rural consumer whose total monthly per capita expenditure was Rs. 347 in 2009-10 and less than Rs. 2.5 per person per month for the poorest deciles urban consumers whose monthly per capita consumption expenditure was Rs. 521 in 2009-10. Even for the consumer in the 5th deciles with MPCE of Rs. 724 and Rs. 1,208 in rural and urban areas respectively, the additional expenditure would be only less than Rs. 4 and Rs. 6 per person per month in rural and urban areas respectively.

-
- The burden on *Aam Aadmi* of not doing anything is much more than from raising diesel price. The 0.5 % increase in his expenditure due to a 10 % increase in diesel price is much smaller in comparison to the loss of income due to lower growth rate and erosion of purchasing power due to higher inflation.
 - Also the long term costs a year or two down, in terms of inflation of no change can be very high and does require some action on the diesel price front. The sooner the better.

Protecting farmers

- The impact on farmers of increase in diesel price is a major concern. However farmers can be protected at very modest cost.
- Agriculture consumes 12% of diesel of which, around 26% is used for tractors and other equipment and remaining for irrigation. Diesel cost is accounted for in setting minimum support price by commission for agricultural cost and prices. However, this would not compensate adequately those who use more diesel than the average farmers, i.e., who have diesel pump sets. There were 4.64 million diesel operated pump-sets in 2005, each consuming 500 litres of diesel per year. If diesel price is raised by Rs. 10/litre, then farmers could be protected by giving Rs. 5,000 per year to each diesel pump-set owning farmer. Assuming that the number of pump-sets has increased since 2005 to 5 million, it will require subsidy of only Rs. 2,500 crore for their consumption.

Impact on truckers

- There were 5.6 million registered goods vehicles on March 31, 2009. Demand of goods movement in the short run is inelastic and truckers can pass on the cost to the consumers. However, if the truckers have long- term freight contracts with fixed rates, they may not be able to do so. They should have contracts in future with diesel cost pass through provision. If raising diesel price is to reduce the inflation a year down the line and increase the GDP, the demand for trucking would grow and would be beneficial to the truckers.
- A measure that can have a lasting impact is to increase the diesel use efficiency of trucks. Many of the trucks operate with low efficiency of 4 km/litre. We are told modern trucks can give 6km/litre. Loans on easy terms can be given to the small truck operators to replace their trucks with higher efficient ones.
- Truckers can easily absorb the increase in diesel price if toll tax barriers are removed, various road development cesses and taxes are rationalized, and national permit fees are lowered and octroi eliminated.

Telecom Towers:

- The nearly 3 lakh telecom towers consume around 2.75 billion litres of diesel per year. Solar power can replace part of this at economically attractive rate. The tower operators may be mandated to do so.

POLICY OPTIONS

- The objectives should be to reduce under-recoveries on account of diesel and also to reduce the gap between the diesel price and other petroleum products.
- The recent diesel price increase by Rs 5/litre and reduction in excise on petrol by Rs 5/litre reduced the gap from Rs 25 to Rs 15. Further reduction is possible by raising excise on diesel by Rs 1 and reducing excise on petrol by Rs 4. Since diesel consumption is four times the consumption of petrol, this would be revenue neutral. The states could do similar things.
- Ideally, the tax rates should be same on diesel and petrol. If higher revenue is required and vehicle owners are considered the best source of revenue, different tax instruments should be used. For example, an annual road tax can provide similar revenues. Given the spread of IT, paying, collecting and monitoring of such road tax should be quite easy. At present diesel driven passengers car owners get a subsidy of Rs. 12,500, Rs. 18,000 and Rs. 31,250 per year for small, medium and large cars. As long as the prices of petrol and diesel are not made comparable, a differential road tax or permit tax of these amounts should be levied on them.
- Yet, a partial price increase without decontrol of diesel price would leave the problem open. However, given the very large increase required for total decontrol at this stage, it was perhaps politically infeasible to remove all subsidies from diesel. Diesel price decontrol

Diesel Price Decontrol with Fixed Subsidy

The government has raised price of diesel by Rs 5/litre. The gain could be neutralized if the world price goes up by \$15/barrel.

It would have been better had the government decontrolled (or freed up or deregulated or liberalized or market driven all these are used synonymously) diesel price along with the Rs 5 increase per litre with a fixed subsidy, say, Rs10/litre. Then, when the world market price changes, the oil marketing companies would change the sale price of diesel to the consumers to reflect the world price. This would involve gradual and automatic change in diesel price, would fix government liability to a predictable level irrespective of how world price changes and also remove uncertainties from the public sector oil companies. Thus, if price increases by \$1.5/barrel, the consumer price would be increased by Rs 0.5/litre and the subsidy would remain at the same level of Rs 10 /litre.

with fixed subsidy would be a better option (see box). With this, if the world market price goes down, the subsidy can be partially reduced and if it goes up, the OMCs could adjust the prices upwards. China, South Africa and Brazil adjust domestic price to world market price.

- As long as the price of diesel is not decontrolled, it should be based on the export parity price as we export substantial quantity of diesel.
- A rational, non-distortionary petroleum products pricing is critical for an efficient economy, for promoting growth and for containing inflation. Both the centre and the states have roles to play here. The centre should lead and hopefully some states could follow.

Taming Diesel Subsidy To Curtail Inflation and Foster Economic Growth

1. Background

India has long maintained price control on four “sensitive” petroleum products i.e., petrol, diesel, liquefied petroleum gas (LPG) and kerosene. Although this is government’s attempt to insulate the consumers of these products from high global prices and price shocks, this has strained India’s own financial and macroeconomic stability. The support provided to consumers may have been offset by the lower growth and higher inflation it may have caused. With rising international prices, there have been few or no upward revisions on the prices of subsidized petroleum products, resulting in an exceedingly large burden on the government finances to maintain these low prices.

Despite the dismantling of the Administered Price Mechanism (APM) in 2002, with the specific aim of decontrolling the prices of these products, the subsidy on LPG and Kerosene was continued in view of the fact that these were chiefly consumed by the “weaker sections of the society”. It was believed that the Diesel and Petrol surpluses would counteract the losses due to LPG and Kerosene. However, this strategy took several blows as the prices of international crude oil began an unprecedented and sharp rise in 2003, effectively ending the price decontrol model. Since 2004, when the international crude prices began a structural appreciation, this controlled price differential between the international parity price and the managed sale price led to a fall and eventual erosion of the profit margins of oil distribution companies (OMCs) and a subsequent escalation in the amount of subsidy needed. Consequently, under recoveries reported by the OMCs worsened as the oil bonds issued by the government failed to tide over their financial losses. Since 2004, oil prices have been rising internationally. Due to no reduction in the State Sales Tax (SST) in comparison to the falling Central Excise Tax Rates, this has resulted in the SST surpassing the Excise since 2005-06. A combination of tax cuts, financial support to the OMCs and minimal retail price increases of petrol, diesel, domestic LPG and PDS kerosene has been applied. Nonetheless, there has been an exponential increase in the consumer subsidies on diesel, domestic LPG and PDS kerosene since April 1, 2005, in tandem with the rise in international market prices.

The rising under recoveries mean that there is a growing burden on the government, especially for diesel, which accounts for 56% of the total under recovery. A US\$ rise in the international price of diesel, when the exchange rate is Rs. 50 to a Dollar, increases under recovery by Rs. 3,500 crore. A single Rupee depreciation in the rupee-dollar exchange rate increase diesel under recovery of diesel by Rs. 8,000 crore annually. Consequently, the government may have to reduce the

subsidies for food, fuel, education and health, needed for a more inclusive growth. Excise collection from Petroleum sector is crucial for the Government. Petroleum is the single largest source of excise collection – increased from 39% in 2001-02 to 54%² in 2010-11.

Reduction in excise tax on petroleum products imply that the government has to rely on other sources for revenue generation. But recently collection of Excise duty on POL products has declined from Rs. 14,548 Crore in Q1, 2011-12 to Rs. 12,825 Crore in Q1, 2012-13 mainly due to reduction in excise duty by Rs. 2.68/ Litre (including education cess) on Diesel effective 25th June 2011. The total tax/duties on Crude oil and petroleum products of central exchequer has declined from Rs. 23,627 Crore in Q1, 2011-12 to Rs. 17,595 Crore in Q1, 2012-13 (26% decline)³. In the last eight years, although government social sector spending has increased nearly five times, the tax revenue from the petroleum sector has gone up only three times.

1.1 The Present Situation :

The Parikh Committee report (2010) on “A Viable and Sustainable System of Pricing of Petroleum Products” has recommended that diesel prices should be deregulated and should be determined by the market at both the refinery gate and retail levels .

The government while accepting the recommendations has not so far deregulated the diesel price. Unfortunately the world market prices of crude oil and petroleum products have gone up and up since then. The price of Indian basket of crude oil, which was around \$70/barrel in January 2010, around the time the report was submitted, became \$110/barrel in April 2011. As a consequence the under recoveries on account of the subsidized petroleum products have gone up steadily. For 2011-12 it was around Rs. 1,38,500 crores as shown in the Table 1.

Table 1 : Reported under recoveries on subsidized petroleum products during year 2011-12

Product	Under Recovery (Rs/Crore, 01 May 12))
Diesel	81,192
PDS Kerosene	27,352
Domestic LPG	29,997
Total	1,38,541⁴

Source: PPAC, <http://ppac.org.in/>

²Presentation made by Dr Basudev Mohanty Senior Advisor, Ministry of Petroleum and Natural Gas On 12 December 2011 on Role of Taxes & Subsidies in Mitigating High Oil Prices.

³PPAC, http://ppac.org.in/writereaddata/Rs_5_Cont_to_Exch.pdf

The price of diesel has increased only by a small amount over time but the cost of it has increased substantially. Under recoveries are worked out on the basis of the indicated retail prices of diesel corresponding to import trade prices. Table 2 indicates retail diesel price and how it is built up before diesel price was raised recently.

For 2012-13, in the first quarter under-recoveries reached Rs. 47,811 crores and was expected to reach Rs. 2,00,000 crores for the whole year. This prompted the government to raise price of diesel by Rs. 5 per litre on Sept 7, 2012.

Some of the margins and costs assumed in the price built up would come down in a competitive market; however, such a market cannot emerge till diesel is regulated.

BOX No-1: Trade Parity Price and Opportunity Cost

In open competitive economy, petroleum products would reflect trade parity prices. A product that is exported in sizeable quantity would have the free on board (FOB) price as that would be the opportunity cost to the producer. He would not sell it to a domestic user at a lower price. If only a small amount is exported, the producer has an opportunity to charge a price above the FOB price up to cost-insurance-freight (CIF) price depending on the price elasticity of domestic demand. This is if the seller has the market power. If the government is setting the price, it can be set at the FOB level as the seller has no other option that is better. On the other hand, a product that is imported should have CIF price of imports. If a higher price is charged, a consumer or another trader can import it. Thus diesel price, substantial quantity of which is exported as we have surplus refining capacity, should be set at the FOB level.

The indicative retail prices of diesel for different levels of world crude prices are given in Table 3. **At present what is called TPP is not really TPP. It is a weighted sum of CIF and FOB price with weights of 0.8 and 0.2 respectively. For diesel we should use as TPP, FOB price, (see Box-1).** As seen in the table on price build up at Delhi, when the FOB price at Arab Gulf of Diesel is 133.6 US \$/ bbl, the CIF price would be Rs. 45.45/litre and FOB price would be Rs. 43.16/litre of diesel. The 80:20 weighted price is Rs. 44.99. **By changing the basis of setting diesel price to true TPP, under-recoveries would go down by Rs. 1.83/ litre.**

⁴Petroleum Planning and Analysis Cell, 1 May 2012, Ministry of Petroleum and Natural Gas, Government of India <http://ppac.org.in/>

Table 2 : Price Build-up of Diesel at Delhi

Sr. No.	Elements	Unit	Effective 1st May'12
1*	FOB Price at Arab Gulf of Gas Oil(Diesel)BS III equivalent	\$/bbl	133.66
2*	Add: Ocean Freight from AG to Indian Ports	\$/bbl	2.30
3	C&F (Cost & Freight) Price	\$/bbl	135.96
	OR	Rs./Litre	43.90
4*	Import Charges (Insurance/Ocean Loss/ LC Charge/Port Dues)	Rs./Litre	0.41
5*	Customs Duty @2.58% (2.50% + 3% Education cess)	Rs./Litre	1.14
6*	Import Parity Price (at 29.5° C) (Sum of 3 to 5)	Rs./Litre	45.45
7*	Export Parity Price (at 29.5° C)	Rs./Litre	43.16
8*	Trade Parity Price (80% of (6)+20% of (7))	Rs./Litre	44.99
9*	Refinery Transfer Price (RTP) for BS-III Diesel (Price Paid by the Oil Marketing Companies to Refineries)	Rs./Litre	44.99
10	Add: Premium recovered for BS-IV Grade over BS-III	Rs./Litre	0.04
11*	Add : Inland Freight and Delivery Charges	Rs./Litre	0.87
12*	Add : Marketing Cost of OMCs	Rs./Litre	0.67
13*	Add : Marketing Margin of OMCs	Rs./Litre	0.82
14	Total Desired Price (Sum of 9 to 13) -Before Excise Duty, VAT and Dealer Commission	Rs./Litre	47.38
15*	Less: Under-recovery to Oil Marketing Companies	Rs./Litre	13.91
16	Price Charged to Dealers (Depot Price) (14-15) - Excluding Excise Duty & VAT	Rs./Litre	33.47
17*	Add : Specific Excise Duty @ Rs.2.06/Litre (Rs.2.00/Litre+ 3% Education cess)	Rs./Litre	2.06
18*	Add : Dealer Commission	Rs./Litre	0.91
19* ⁵	Add : VAT (including VAT on Dealer Commission) applicable for Delhi @ 12.50% and Air Ambience Charges @ Rs.250/KL less rebate of Rs.375/KL.	Rs./Litre	4.46
20	Retail Selling Price at Delhi (Sum of 16 to 19)	Rs./Litre	40.91 ⁶

⁵For * explanation, refer annexure-1

⁶Source = PPAC

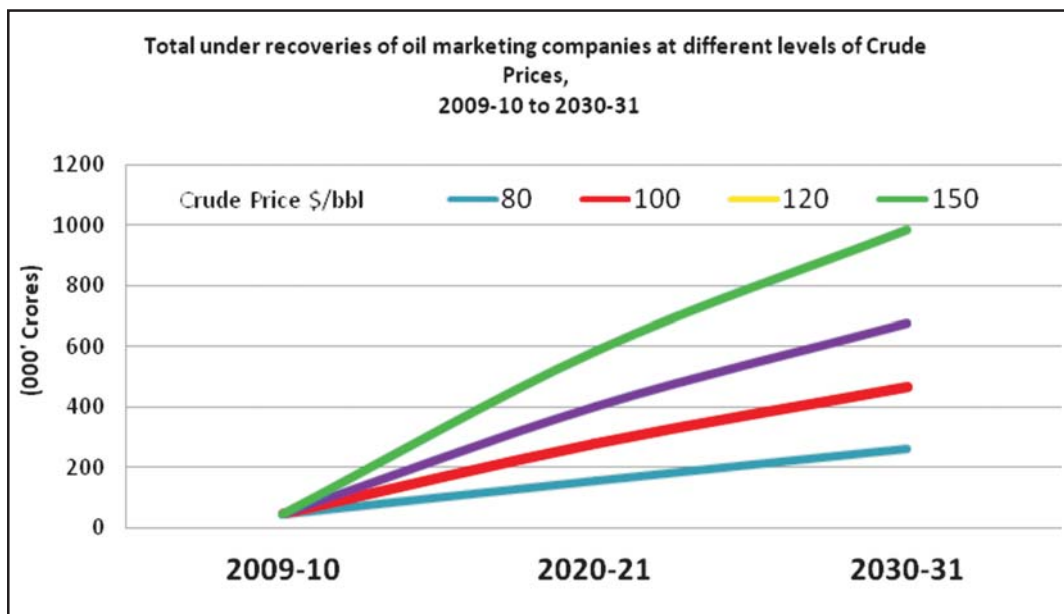
Table 3: Domestic Prices of Petrol, Diesel, Kerosene and LPG derived from different levels of prices of the Indian Basket of Crude Oil.

International Prices					Indicative Retail Selling Price (at Delhi)			
Crude Oil (Indian Basket)	Petrol	Diesel	Kerosene	LPG	Petrol	Diesel	Kerosene	LPG
	(\$/bbl.)			(\$/MT)	(Rs./Litre)			(Rs. / Cyl.)\
60	66	70	72	538	43.75	32.23	23.82	455.42
70	77	81	83	595	47.71	36.08	27.29	495.41
80	88	93	94	652	51.66	39.92	30.76	535.42
90	99	104	106	709	55.61	43.76	34.23	575.42
100	110	115	117	765	59.56	47.61	37.70	615.42
110	121	127	128	822	63.51	51.45	41.18	655.42
120	132	138	140	879	67.46	55.29	44.65	695.43
130	143	149	151	936	71.41	59.13	48.12	735.43
140	154	161	162	993	75.37	62.98	51.59	775.42
150	165	172	173	1,049	79.32	66.82	55.06	815.42
Current Retail Prices					44.72	32.92	9.23	281.20

Source: Parikh Committee Report on “A Viable and Sustainable System of Pricing Petroleum Products”. Exchange rate Rs 47/US\$: Product price based on regression on crude price fitted on data from January '07 to December '09.

Figure 1 shows the different level of under recoveries to OMCs at different level of crude oil prices.

Figure 1: Total Under Recoveries of Oil Marketing Companies at different level of Crude Prices



Assuming an exchange rate of Rs 47/ US \$ Source: MOP&NG (2010), Parikh committee report.

The burden of under recoveries may further change as the volatility in world price of crude oil does not look like stabilizing in the near future; diesel price policy is causing many distortions in the system, some of which have long term implication. Fall of rupee against the dollar has also put huge burden on the OMCs as import has become costlier. For example, recent sharp fall of the rupee against the dollar has adversely affected state owned oil marketing companies as they are borrowing more to meet their import requirements, which affects the debt to equity ratio of oil companies. Further if the OMCs are not supported by government, their cost of borrowing will rise further, thereby further worsening the debt to equity ratio. Current policy of pricing adversely affects the financial position of oil marketing companies combined with the fall of rupee against dollar. The fall of rupee may have been caused by the under recoveries on account of petroleum products. Table 4 shows the rising debt to equity ratio of oil companies.

Table 4 : Oil Companies Debt-Equity Ratio

Oil Companies Debt-Equity Ratio					
	March 2010	March 2011	June 2011	Sept 2011	Dec-2011
IOCL	0.88	0.95	1.31	1.66	1.69
BPCL	1.70	1.35	2.24	2.99	2.27
HPCL	1.84	1.99	2.71	5.12	3.86

1.2 The Consequences and Need to Reform:

Apart from the macro economic impact of rising under recoveries, current policy has other impacts also. The growth rate of domestic sale of diesel has grown higher than that of petrol for the first time in 14 years. Also, the consumption of diesel has grown in 2011-2012 at 7.5%. The 7.5% growth rate cannot be explained only by the growth rate of GDP or by that of diesel driven vehicles.

It is estimated that the direct sale of diesel was nearly 3MT higher in 2011-2012 over what could have been predicted from GDP (Mohanty, 2012). Since diesel price is controlled but furnace oil is free, in December 2011, the retail price of diesel was 48.3/litre, whereas that of furnace oil was around Rs. 53.0/litre. As a result diesel is fed in place of furnace oil.

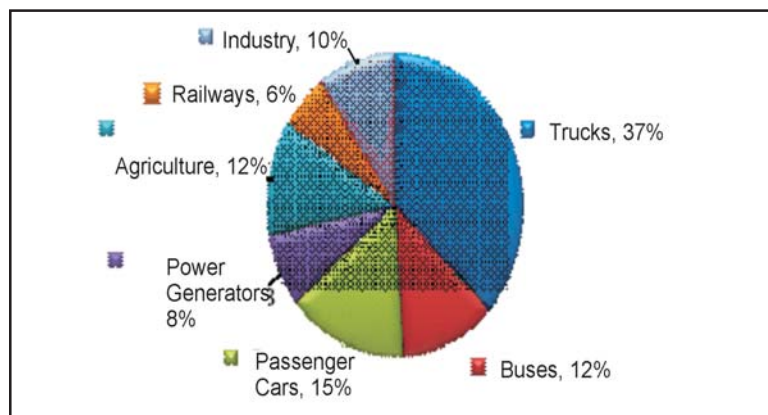
The difference in diesel and petrol price has increased since petrol price deregulation in June 26, 2010. In Delhi, the retail price of petrol has increased by 28% but that of diesel by only 2%. Thus, on February 24, 2012 diesel price was Rs. 40.90 compared to Rs. 65.64 for petrol. As a consequence the share of diesel driven passenger cars have increased and have been reported to exceed 50% in recent months. These cars will demand diesel for many years to come.

It is thus important to reduce distortion in the pricing of petroleum products by raising diesel price, which will also help reduce under recoveries.

1.3 The Dilemma of Reform :

Diesel is used by many types of users. Figure 2 gives the breakup of diesel use by different users.

Figure 2: Users of diesel - 2008-09

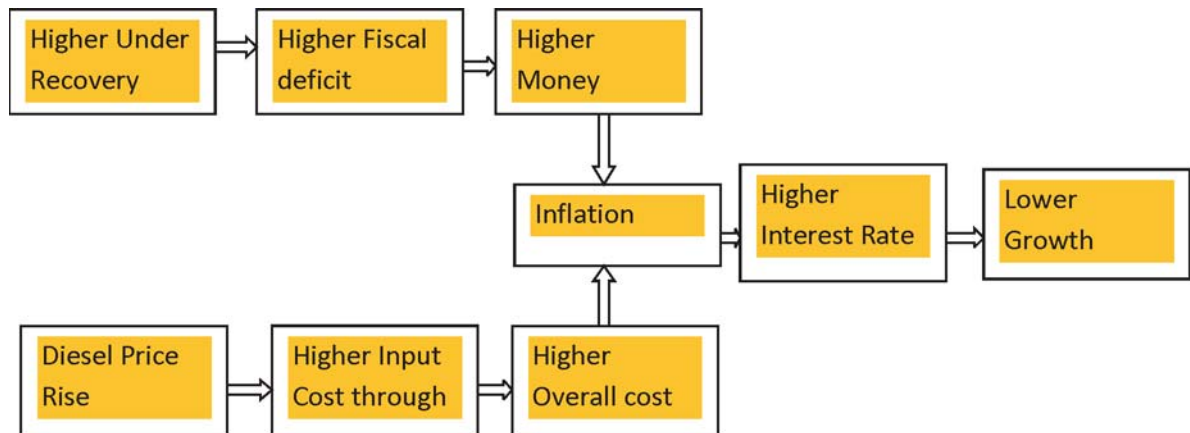


Source: Parikh Committee Report on “A Viable and Sustainable System of Pricing Petroleum Products”

Diesel is consumed largely as an intermediate product and any price increase will lead to increase in other prices. For example, when the price of diesel increases, cost of transportation goes up. On the other hand, when the price of petrol is increased, there is relatively little impact on the price of other goods and services.

Thus there is a dilemma. If diesel price is increased it will add to the already high inflation. On the other hand, large under recoveries financed by the government have their own impact, one way or the other, on inflation. The under recoveries persist month after month and its impact may be substantial over time. Larger under recoveries lead to higher fiscal deficit, which in turn results in higher money supply leading to inflation causing higher interest which lowers growth rate.

Figure 3: Macro Economic Consequences of Diesel Price Policy



The macroeconomic consequences of diesel price are shown schematically in Figure 3. Thus no matter what is done or not done, there will be inflation. The impact of this inflation will depend on how much prices of different commodities increase and who consumes what. It may be pointed out that the consequences of high under recoveries on exchange rate depreciation and higher cost of imports in rupee terms is not shown in the figure. The converse of this that when diesel price is increased, demand goes down, rupee strengthens, cost of imports reduces is also not shown in the figure and not accounted for in our analysis. Had we taken these in to account our conclusions would have been strengthened.

1.4 Objective of the Study:

In this study we examine the following

- 1) How do the inflationary impacts of diesel price increase compare with those of continued under recoveries?
- 2) What is the impact of these price increases on different classes of consumers?
- 3) What is the impact of different classes of consumers of these price increases?
- 4) What is the impact of alternative strategies of diesel price changes?
- 5) What is the impact on other stakeholders of diesel price change?

2. Macro-Impact of Petroleum Pricing

Petroleum products form an important part of the energy consumption of India. Transportation sector is completely dependent on petroleum products like petrol, diesel etc. An increase in the prices of petroleum products increases the cost of transportation for both private and public passenger transport as well as goods transport. This has an indirect effect of increase in cost of production of all goods and services in the economy through an increase in cost of transportation causing overall inflation in the economy. However, in India crude oil is mostly (75%) imported and some of the petroleum products produced from it are sold at prices much below the cost to consumers.

This subsidy has increased substantially over the last few years on account of rising international prices of crude oil as the government has not increased prices of these products in step with international prices, to insulate the economy from inflation. However this has meant that the fiscal burden of subsidy due to petroleum products has gone up rapidly increasing the government's fiscal deficit to a level that is considered dangerous for sustained economic growth. Higher fiscal deficit leads to higher money supply, higher inflation, higher interest rate, lower growth and higher prices as well. Thus, there is possibility of inflation even if the government does not increase the oil prices. While increase in diesel price will increase inflation in the short run, not doing anything would do so over time. In this context there is a need to assess as to in which case inflation is likely to be more severe and more damaging to the economy.

In the study we have used a Vector Auto Regression (VAR) model to explore these trade-offs.

2.1 A VAR Model with Exogenous Diesel Price :

In a conventional econometric model the modeller specifies what causes a particular variable. This specification means a structural relationship. This may be based on economic theory or judgement on part of the modeller. However economic variables are often mutually dependent and also the structure of relationship is not always obvious. This would mean that any specification on part of the modeller carries with it the risk and scope of misspecification. This can have an impact on model estimates and hence bias the results of policy analysis with the estimated model as well as result in higher error in forecasts from the model. In a Vector Auto Regression (VAR) model a set of variables (endogenous variables) is explained as functions of past values of these variables and current and past values of some other variables (exogenous variables). This approach does not require the modeller to explicitly specify any structural relationships and therefore minimises error. Besides, it is easier and less time consuming to estimate a VAR model. VAR models are widely used to assess specific policy questions just like it is the case in the current context. We use a VAR technique to estimate a macro model to assess the impact of increasing diesel prices on inflation and GDP. We estimate a VAR model between real SBI advanced lending

rate as interest rate (RSBIALR) and natural logs of general wholesale price index (LWPI) and seasonally differenced (i.e. difference of GDPs of corresponding quarters of two years, 4th order differencing) gross domestic product (SLGDP). Each of these variables depends on lagged values of all the three variables as well as on number of other exogenous variables. We use whole sale price of diesel (WDP), money supply (M3), rainfall index (RID), real effective exchange rate (REER) and total government expenditure (TE) as exogenous variables in the VAR. All variables except real interest rate are in logs and appropriate differences are taken to ensure that the series is stationary. Quarterly data for all variables are used from the 1st quarter (January to March) of 1997 to the 4th quarter of 2010. The actual data used for estimation and their sources are reported in Annexure-2. The estimated model is shown in Table 5.

Table 5: Estimated VAR Model with Exogenous Variables

		D(LWPI _{t-1})	D(SLGDP _{t-1})	RSBIALR _{t-1}		D(LWPI _{t-2})	D(SLGDP _{t-2})	RSBIALR _{t-2}		D(LWPI _{t-3})	D(SLGDP _{t-3})	RSBIALR _{t-3}
D(LWPI _t)	=	-0.079	0.074	-0.003	+	-0.171	-0.138	0.00080	+	0.149	-0.035	0.002
D(SLGDP _t)	=	-0.931	0.272	-0.009	+	0.123	0.082	0.00007	+	0.290	-0.010	0.003
RSBIALR _t	=	115.894	-7.751	1.202	+	12.582	11.285	-0.1690	+	-2.559	7.158	-0.159

		D(LWDP _t)	D(LM3 _t)	LREER _t	LRID _t	SLTE _t		D(LWDP _{t-1})	D(LM3 _{t-1})	LREER _{t-1}	LRID _{t-1}	SLTE _{t-1}
	+	0.074	0.123	0.071	0	-0.012	+	0	0.200	-0.068	-0.003	-0.017
	+	-0.033	0.010	0.045	0.025	0.003	+	-0.071	0.071	-0.071	0.025	0.020
	+	-7.417	-8.367	-6.592	0.419	1.564	+	-1.366	-15.224	5.829	0.408	1.447

		L04
	+	0.008
	+	0.019
	+	-0.790

LWPI_t = Log of aggregate whole sale price index (WPI) at time t, LGDP_t = Log of Gross domestic product (GDP) at time t,

SLGDP_t = LGDP_t – LGDP_{t-4}, $\pi_t = ((WPI_t - WPI_{t-1})/WPI_{t-1}) * 100$ is the inflation rate

SBIALR_t = Advanced lending rate of SBI at time t, RSBIALR_t = SBIALR_t – π_t , LWDP_t = Log of Wholesale diesel price index (WDP) at time t, LM3_t = Log of broad money supply (WPI) at time t, LREER_t = Log of real effective exchange rate (REER) at time t, LRID_t = log of rainfall index at time t. LTE_t = Log of Total government expenditure (LTE) at time t,

SLTE_t = LTE_t – LTE_{t-4}, L04_t = level shift occurring at 2004-05 Q1. D(X)_t = X_t – X_{t-1}

Diagnostic Statistics for the estimated VAR model

LM-TYPE TEST FOR AUTOCORRELATION with 1 lags

LM statistic: 9.0108

p-value: 0.4363

df: 9.0000

LMF statistic not computed for subset model.

modulus of the eigenvalues of the reverse characteristic polynomial :

|z| = (1.0655 1.4055 1.4055 2.2161 2.2161 2.7557 5.1400 3.7861 2.7955)

2.2 The Scenarios and Analysis:

Using this model we analyse the impact of 4 alternative diesel price policy scenarios.

We consider four scenarios. We assume that the world diesel price will remain as it was in the last quarter of 2011-12. The names of the scenarios are given in bracket. Scenarios are developed for 12 quarters beginning from the 1st quarter of 2012-13.

- 1) No change in diesel price (**No Change**)
- 2) Immediate increase of 30% in diesel price and its deregulation (**One Shot 30**)
- 3) 6.78 % increase every quarters to reach an increase of 30% by the 4th quarter (**4 Quarter**)
- 4) 10% increase in diesel price (**Partial 10**)

In all these scenarios real effective exchange rate is assumed to be at its mean level of 100; rainfall is assumed to be normal and hence rainfall index is 100; and government total expenditure is assumed to grow at its historic growth rate of 3.5%.

- In the no change scenario we assume that the domestic diesel price will remain constant at its current value.
- We have assumed that money supply (M3) increases by 4.5% in the normal circumstance at the historic trend rate.
- In the diesel price change scenarios, diesel consumption falls by 3mt in the first quarter itself as substitution of furnace oil by diesel will cease immediately once diesel price exceeds furnace oil price. Diesel demand will also respond to higher diesel price with an assumed price elasticity of 0.2 (obtained from literature survey).
- We further assume that fiscal deficit goes up by the same amount as the under recoveries. While only a part of the under recoveries are financed by the government, the remaining affects the profitability and borrowing of the oil companies. A fall in these profits is also a fall in government income. Borrowing by them puts the same pressure on money supply as government borrowing. By this argument we take fiscal deficit to increase by the full amount of under recoveries.
- In the diesel price change scenarios, M3 increases when fiscal deficit increases. We use the elasticity of M3 with respect to fiscal deficit estimated by Jadhav et al. They have estimated an elasticity of 0.93 (however, we have used an elasticity of 0.9), that is M3

increases by 0.93% whenever fiscal deficit increases by one percent. This is however an old estimate and so we have done some sensitivity analysis⁷.

- We assume a lag of 4 quarters for the fiscal deficit to impact money supply. The increase in money supply is obtained as a weighted average of the impacts of fiscal deficit over four quarters with weights of 0.4, 0.3, 0.2 and 0.1 for quarter with lags of 4, 5, 6 and 7 respectively.

The increase in diesel price assumed in each scenario is shown in the Table 6 below.

Table 6: Diesel price index as assumed in various scenarios

Quarter	No Change	One shot 30	4 Quarter	Partial 10
11-Q4	166	166	166	166
12-Q1	166	216	178	183
12-Q2	166	216	190	183
12-Q3	166	216	202	183
12-Q4	166	216	216	183
13-Q1	166	216	216	183
13-Q2	166	216	216	183
13-Q3	166	216	216	183
13-Q4	166	216	216	183
14-Q1	166	216	216	183
14-Q2	166	216	216	183
14-Q3	166	216	216	183
14-Q4	166	216	216	183
15-Q1	166	216	216	183
15-Q2	166	216	216	183
15-Q3	166	216	216	183
15-Q4	166	216	216	183

⁷ Generally increasing fiscal deficit leads to higher money supply. However, increase in money supply due to increase in fiscal deficit is not exact in nature. After a survey of literature we found few papers on this subject. Among the few research analysis done for India and other countries, Chimobi & Igwe (2010) finds that for Nigeria a 1% increase in fiscal deficit (as a share of GDP) increases M2 (narrow money supply) by 0.94%. In the case for India, Jadhav & Singh (1990) suggests that "with every one per cent increase in the gross fiscal deficit, broad money stock increases by as much as 0.93 per cent, if enough time is allowed for the adjustment." Hence, we have assumed the elasticity of increase in M3 due to 1% increase in FD to be 0.9.

Thus, in scenario “No Change” the price of diesel is assumed to be same (166) as in the last quarter of 2011-12. This is more like a business as usual policy for India. In the scenario “One Shot 30” we assume a 30% price rise in the first quarter of 2012-13 and then the price continues to be at that increased level (216). The current level of under recovery is around Rs 14 per litre, while the price at which diesel is being sold in the country is around Rs 40. This means the required increase in prices in $(14/40)*100 = 35\%$. However, since we are considering the whole sale price indexes and not the retail prices as such we assume that a 30% price rise is the required price rise to make under recoveries as zero. In the scenario “4 Quarter” we assume that the 30% increase in diesel prices is brought about in a step wise manner in 4 quarters with a 6.77% increase in diesel prices in each quarter from 2012-13 Q1 to 2012-13 Q4 and after that the price remains at that level (216) for the rest of the forecasting period. The last scenario “Partial 10” denotes a 10% increase in diesel prices in 2012-13 Q1 and there after it remains at that level (183).

Based on these price assumptions we compute the probable under recoveries per litre. In the case of diesel demand we assume that the diesel demand is growing at the rate of 7.5% (which is the current observed rate). However we assume that for a 10% increase in the price of diesel, the demand for diesel decreases by 2% due to own price elasticity and further by 3% in the first quarter when diesel price increases as current use of diesel in place of furnace oil will cease (This decrease is assumed only for the first increase in price from the current level. Beyond that there is no further substitution). The under recoveries per litre and diesel demand is given in Table 7 below.

Table 7 : Under recovery per litre of diesel and diesel demand (Crore litres) under each scenario

	UR (Rs per litre)				Diesel Demand (Crore litres)			
	No Change	One shot 30	4 Quarter	Partial 10	No Change	One shot 30	4 Quarter	Partial 10
11-Q4	14.29	14.29	14.29	14.29	1992	1992	1992	1992
12-Q1	14.29	0	11.06	9.53	2029	1850	1961	1929
12-Q2	14.29	0	7.61	9.53	2067	1885	1953	1965
12-Q3	14.29	0	3.93	9.53	2106	1920	1962	2002
12-Q4	14.29	0	0	9.53	2145	1956	1972	2039
13-Q1	14.29	0	0	9.53	2186	1993	2009	2078
13-Q2	14.29	0	0	9.53	2227	2030	2047	2117

13-Q3	14.29	0	0	9.53	2268	2068	2085	2156
13-Q4	14.29	0	0	9.53	2311	2107	2124	2197
14-Q1	14.29	0	0	9.53	2354	2147	2164	2238
14-Q2	14.29	0	0	9.53	2398	2187	2205	2280
14-Q3	14.29	0	0	9.53	2443	2228	2246	2323
14-Q4	14.29	0	0	9.53	2489	2270	2288	2366
15-Q1	14.29	0	0	9.53	2536	2312	2331	2411
15-Q2	14.29	0	0	9.53	2583	2356	2375	2456
15-Q3	14.29	0	0	9.53	2632	2400	2419	2502
15-Q4	14.29	0	0	9.53	2681	2445	2465	2549

The under recoveries per litre of diesel is calculated on the basis of under recoveries on account of diesel of Q4 of 2011-12 and the consumption of diesel. This is suitably modified when diesel price is increased.

The Total Under Recovery (in Rs crores) is obtained as product of under recovery per litre of diesel consumed times the diesel demand in litres. We assume that all other government expenditures and revenue remain the same and fiscal deficit (FD) increases only due to subsidisation of diesel. And the increase in subsidy is on account of paying for the under recoveries of the Oil marketing companies. Thus we assume that FD on account of other factors remains constant at Rs 92,261 Crores (average of 2010-11 Q1 to Q4). And the total FD is 92,261 + Total Under Recoveries (Rs crores). The under recoveries and corresponding rise in fiscal deficit is given in Table 8 below.

Table 8 : Total Under Recovery on diesel and corresponding Fiscal Deficit under each scenario

	UR (Rs per litre)		4 Quarter	Partial 10	FD due to Under recoveries (Rs. crores)			Partial 10
	No Change	One shot 30			No Change	One shot 30	4 Quarter	
11-Q4	28,462	28,462	28,462	28,462	1,20,723	1,20,723	1,20,723	1,20,723
12-Q1	28,996	0	21,689	18,376	1,21,257	92,261	1,13,950	1,10,636
12-Q2	29,540	0	14,866	18,720	1,21,800	92,261	1,07,127	1,10,981
12-Q3	30,094	0	7,715	19,071	1,22,354	92,261	99,975	1,11,332
12-Q4	30,658	0	0	19,429	1,22,919	92,261	92,261	1,11,690

13-Q1	31,233	0	0	19,793	1,23,493	92,261	92,261	1,12,054
13-Q2	31,818	0	0	20,164	1,24,079	92,261	92,261	1,12,425
13-Q3	32,415	0	0	20,542	1,24,676	92,261	92,261	1,12,803
13-Q4	33,023	0	0	20,928	1,25,283	92,261	92,261	1,13,188
14-Q1	33,642	0	0	21,320	1,25,903	92,261	92,261	1,13,581
14-Q2	34,273	0	0	21,720	1,26,533	92,261	92,261	1,13,980
14-Q3	34,915	0	0	22,127	1,27,176	92,261	92,261	1,14,388
14-Q4	35,570	0	0	22,542	1,27,831	92,261	92,261	1,14,803
15-Q1	36,237	0	0	22,964	1,28,497	92,261	92,261	1,15,225
15-Q2	36,916	0	0	23,395	1,29,177	92,261	92,261	1,15,656
15-Q3	37,608	0	0	23,834	1,29,869	92,261	92,261	1,16,094
15-Q4	38,314	0	0	24,281	1,30,574	92,261	92,261	1,16,541

The increase in M3 due to FD and the corresponding M3 level is reported in Table 9 below.

Table 9: Total Under Recovery on diesel and corresponding Fiscal Deficit under each scenario

	Increase in M3 due to FD (Rs Crores)				Broad Money supply (Rs Crores)			
11-Q4					77,50,832	77,50,832	77,50,832	77,50,832
12-Q1					80,99,619	80,99,619	80,99,619	80,99,619
12-Q2					84,64,102	84,64,102	84,64,102	84,64,102
12-Q3					88,44,987	88,44,987	88,44,987	88,44,987
12-Q4					92,43,011	92,43,011	92,43,011	92,43,011
13-Q1	36,774	-19,61,263	-4,66,710	-6,95,041	96,73,656	88,74,442	94,72,263	93,80,930
13-Q2	39,036	0	-5,10,464	26,293	1,01,35,617	86,85,413	95,54,316	96,05,077
13-Q3	41,481	0	-5,74,038	27,341	1,06,27,378	86,84,003	95,08,164	99,17,122
13-Q4	44,109	0	-6,60,334	28,667	1,11,47,182	88,78,657	93,50,923	1,03,18,816
14-Q1	46,917	0	0	30,291	1,16,93,005	92,78,197	94,07,760	1,08,11,976
14-Q2	49,904	0	0	32,228	1,22,66,197	96,95,716	96,41,639	1,13,28,961
14-Q3	53,080	0	0	34,289	1,28,68,173	1,01,32,023	1,00,09,479	1,18,71,074
14-Q4	56,458	0	0	36,481	1,35,00,420	1,05,87,964	1,04,59,905	1,24,39,625
15-Q1	60,049	0	0	38,812	14,16,4,503	1,10,64,422	1,09,30,601	1,30,35,958
15-Q2	63,869	0	0	41,292	1,48,62,067	1,15,62,321	1,14,22,478	1,36,61,462
15-Q3	67,930	0	0	43,930	1,55,94,849	1,20,82,626	1,19,36,490	1,43,17,598
15-Q4	72,249	0	0	46,736	1,63,64,675	1,26,26,344	1,24,73,632	1,50,05,903
CAGR 11-Q4- 15-Q4	4.78	3.10	3.02	4.22				

Figure 4: Plot of Whole sale price index of diesel under various scenarios

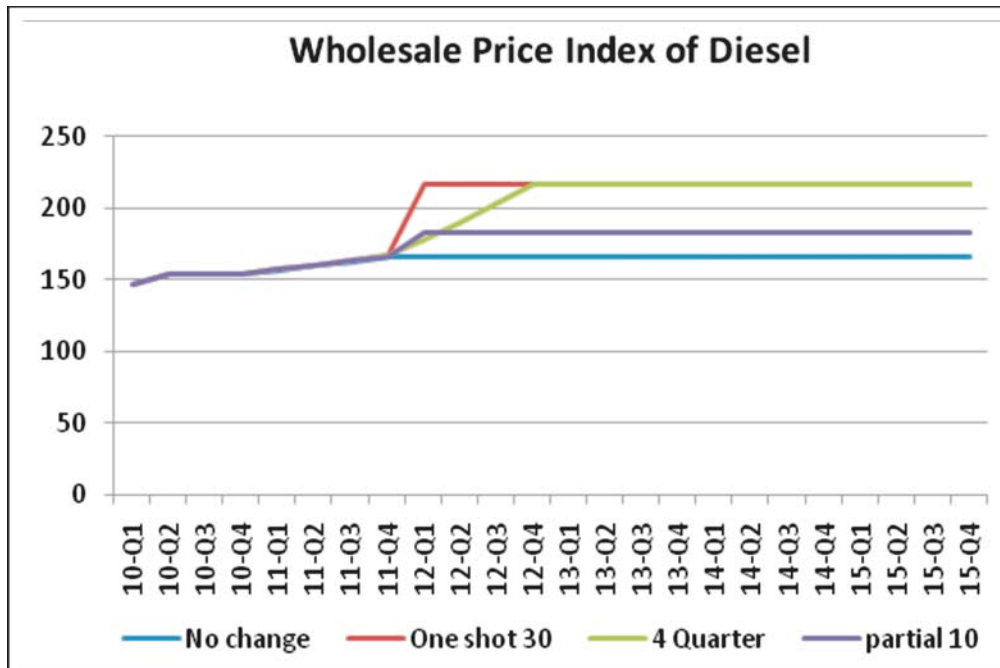
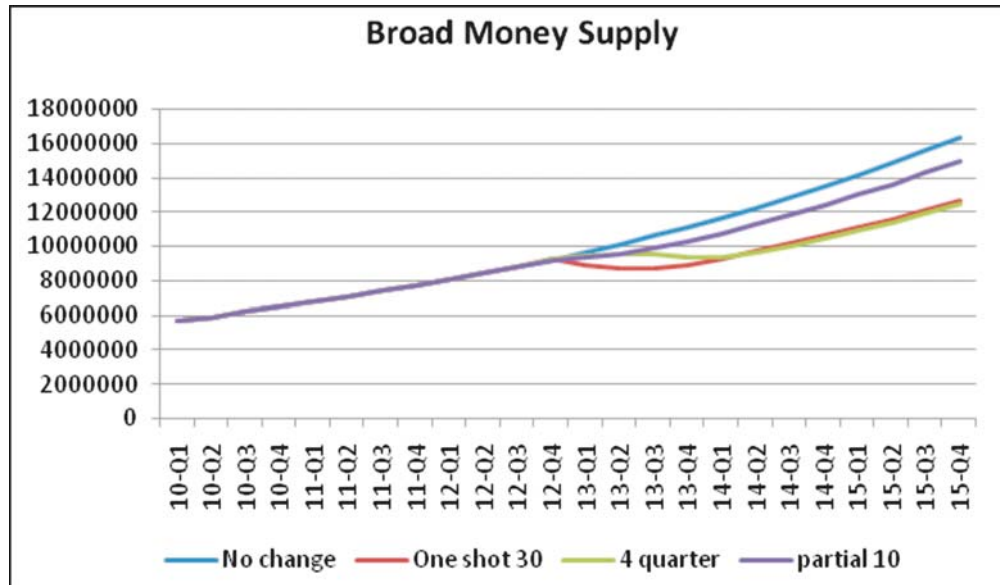


Figure 5: Plot of Broad Money supply under various scenarios



Simulation Results

The main two driving variables, diesel price and M3 are plotted in Figures 4 and 5. Simulations with these values provide us insights into the impact of alternative policies.

2.3 Impact on Inflation:

The Table 10 below gives the forecasts for WPI, which is our variable of interest, under the above explained scenarios. The CAGR of WPI from 2011-12 Q4 to 2015-16 Q4 is reported at the end of Table 10. By comparing the CAGR's across the scenarios it is clear that compared to no price change scenario any increase in price of diesel leads to higher prices immediately but lower price rise in longer run due to lowering of fiscal deficit. The above result is further illustrated in Figures 6-7.

Figure 6: Plot of Whole sale price index under various scenarios

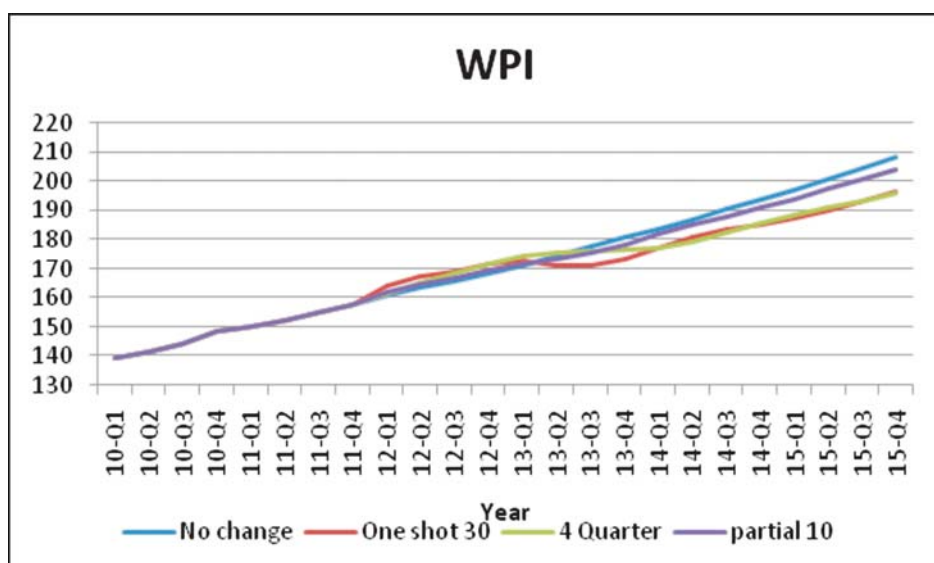


Figure 7: Plot of Relative increase in WPI under different scenarios compared to No change scenario

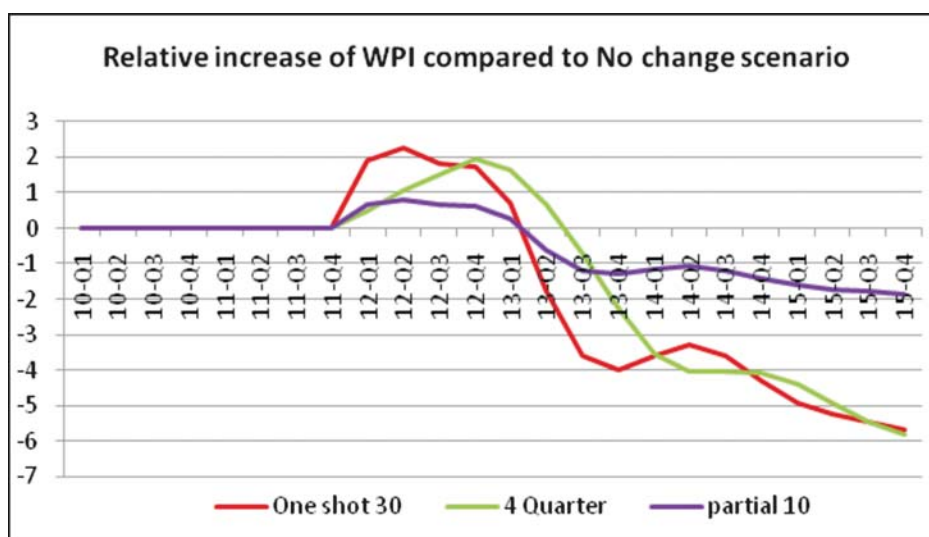


Table 10: Wholesale Price Index under each scenario

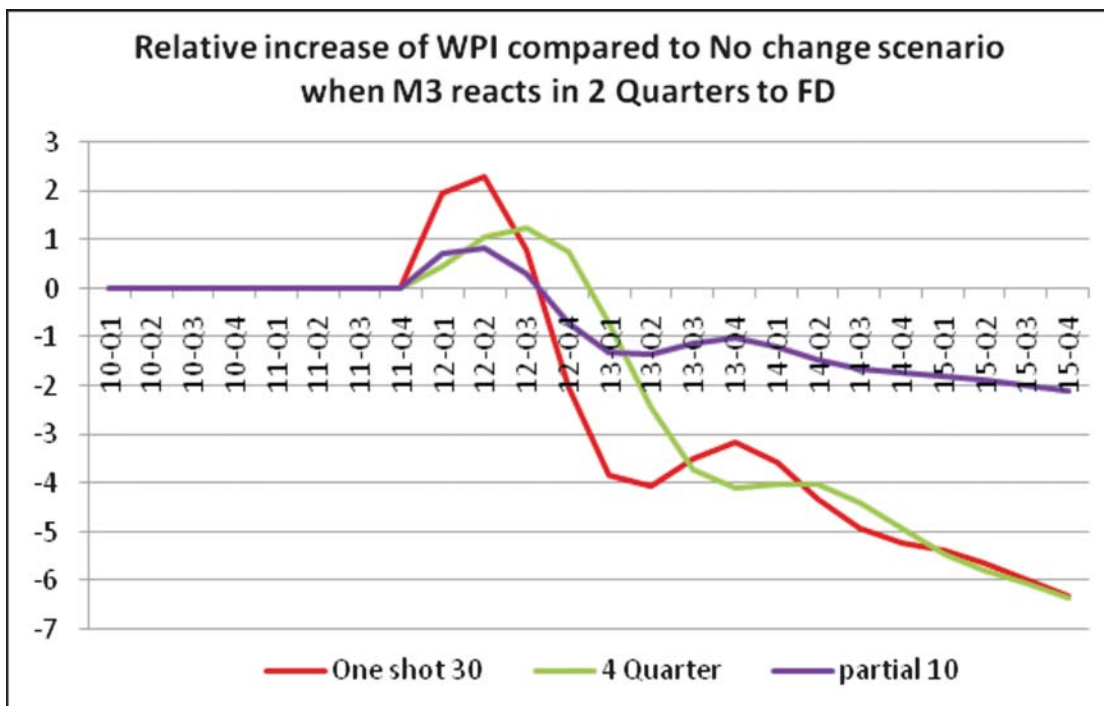
	No Change	One shot 30	4 Quarter	Partial 10
Quarter	WPI	% change compared to no change		
11-Q4	158	0	0	0
12-Q1	161	1.94	0.48	0.70
12-Q2	163	2.28	1.05	0.82
12-Q3	166	1.86	1.52	0.67
12-Q4	169	1.74	1.95	0.63
13-Q1	171	0.75	1.66	0.28
13-Q2	174	-1.75	0.66	-0.60
13-Q3	177	-3.56	-0.71	-1.21
13-Q4	181	-3.97	-2.27	-1.31
14-Q1	184	-3.56	-3.56	-1.15
14-Q2	187	-3.24	-4.05	-1.05
14-Q3	190	-3.59	-4.05	-1.18
14-Q4	194	-4.30	-4.08	-1.43
15-Q1	197	-4.89	-4.39	-1.63
15-Q2	201	-5.22	-4.92	-1.73
15-Q3	204	-5.42	-5.44	-1.80
15-Q4	208	-5.66	-5.81	-1.88
CQGR (11Q4-15Q4)	1.74	1.37	1.36	1.62
CAGR (2011-2015)	7.13	5.68	5.73	6.66

The Compound Annual Growth Rates (CAGR) over 2011 to 2015 shown in the last row of Table 10, are striking. With no change in policy average inflation will be 7.13 %, while with one shot 30 % increase in diesel price, the inflation rate comes down to 5.68 %. Even with the 10% increase in diesel price the inflation rate comes down to 6.66 %. The pain in terms of short term inflation is lower compared to one shot scenario but the long term inflation is higher at 6.66%. However, it is still lower than in the no change scenario and hence some price rise seems to be better than no price rise.

As shown in Figure 7 the prices are higher up to 4 quarters in the case of and one time price rise of 30% and a step wise price rise for 4 quarters. It is seen that by Q2 of 2013-14, WPI is higher in No change scenario than when price is increased by 30 % in one shot. By Q4 of 2015-16 it is 5.7 % higher. The immediate impact of raising price in the case of “One Shot 30” in Q1 of 2012-13, is to raise WPI by 2%, goes up to 2.3% the next quarter and comes down gradually over the next 3 quarters that is till Q4 of 2012-13. In the case of one time price rise of 10% compared to no price rise, the increase in general price index is lower than the other two cases.

It should be emphasized that we have assumed that M3 increases due to fiscal deficit with a lag of 4 quarters. If instead we had taken M3 to react to fiscal deficit in 2 quarters, the inflationary impact of higher diesel price would have persisted only for two quarters. This is seen in Figure 8.

Figure 8: Plot of Relative increase of WPI compared to No Change Scenario when M3 reacts in 2 quarters to FD



2.4 Impact on GDP:

Apart from WPI the other endogenous variable in the VAR model is GDP. It is also affected by diesel price policy. Table 11 shows the value of GDP under the four scenarios. These are also plotted in Figure 9. Figure 10 shows the difference in GDP compared with the No Change Scenario.

Table 11: Gross Domestic Product at factor cost under each scenario

Quarter	No Change GDP Rs. Crores	One shot 30	4 Quarter	Partial 10
		Percentage change compared to no change		
12-Q1	13,36,955	-0.98	-0.25	-0.36
12-Q2	13,51,970	-2.11	-0.78	-0.77
12-Q3	14,79,634	-0.43	-0.88	-0.16
12-Q4	15,44,944	-0.42	-0.99	-0.15
13-Q1	14,49,119	-1.43	-1.10	-0.52
13-Q2	14,65,509	-2.67	-1.24	-0.97
13-Q3	16,03,537	-0.24	-1.20	-0.08
13-Q4	16,73,518	0.58	-0.97	0.20
14-Q1	15,68,746	0.36	-0.54	0.10
14-Q2	15,85,525	-0.51	0.07	-0.23
14-Q3	17,33,968	1.83	0.66	0.61
14-Q4	18,08,842	2.35	1.14	0.79
15-Q1	16,94,888	1.90	1.53	0.61
15-Q2	17,12,305	0.96	1.95	0.26
15-Q3	18,71,858	3.35	2.37	1.11
15-Q4	19,51,939	3.86	2.77	1.28
CQGR (11Q4-15Q4)	1.98	2.23	2.16	2.07
CAGR (2011-2015)	8.23	8.92	8.82	8.46

Figure 9: Plot of GDP under various scenarios

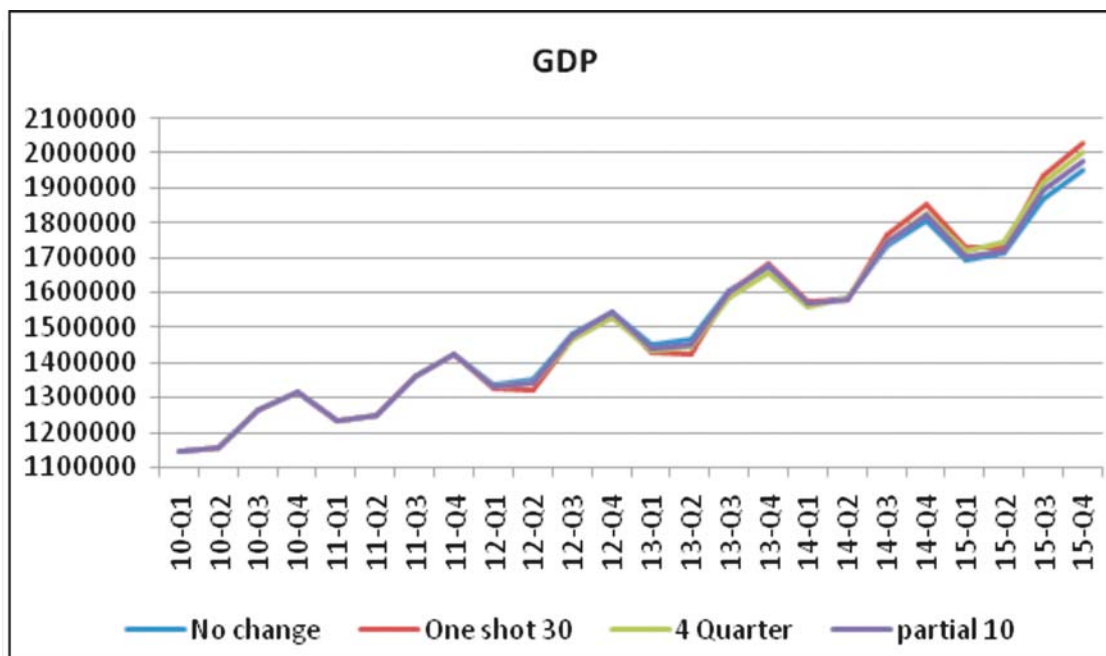


Figure 10: Plot of percentage change in GDP under different scenarios compared to “No Change” scenario

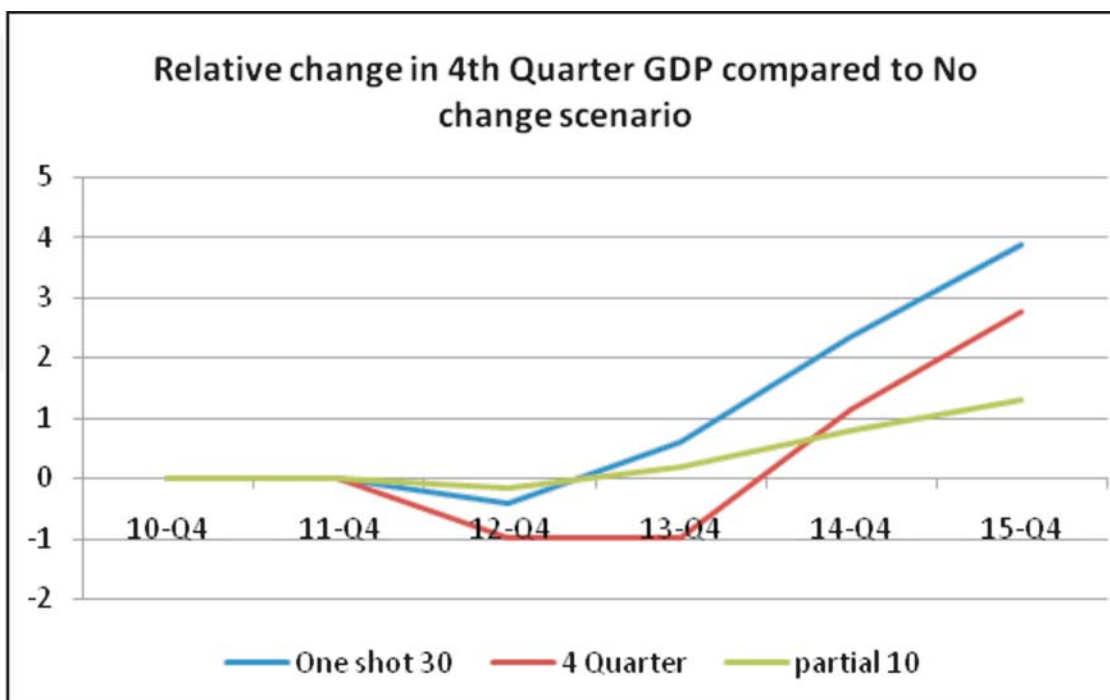


Table 11 and Figure 10 show that the GDP is impacted negatively in the immediate quarters following a price rise of diesel. However as the impact of price rise dissipates and inflation falls (compared to the “no change” scenario) the GDP shows positive impacts. The GDP is lower for six quarters but after that it is higher and by Q4 of 2015-16 it is 3.9 % higher with One Shot 30% price increase. Our results show that if we continue with “no change” in diesel price India will end up with an average annual growth rate of 8.23 % by 2015. However raising diesel price will get us to a higher growth rate of 8.92 % with one shot increase. Even one time increase of 10 % gives a higher growth rate. Thus, diesel price reform can put us back on a higher growth trajectory. The increase in GDP in the longer run in the price rise scenarios compared to “no price rise scenario” is due to lower real interest rate in the longer run. This is explained further in the section below.

2.5 Impact on Real Interest Rate:

Figure 11 shows nominal interest rates in the different scenarios.

Table 12 shows how nominal interest rate changes in different scenarios. From the 3rd to 6th quarter after diesel price increase, the interest rate is higher but falls after that. By Q4 of 2015-16, it is more than 1.6 percentage point lower in One Shot 30 and 4 Quarter scenarios and 0.5 percentage point lower in the partial 10 scenario.

Figure 11: Nominal interest rate under various scenarios

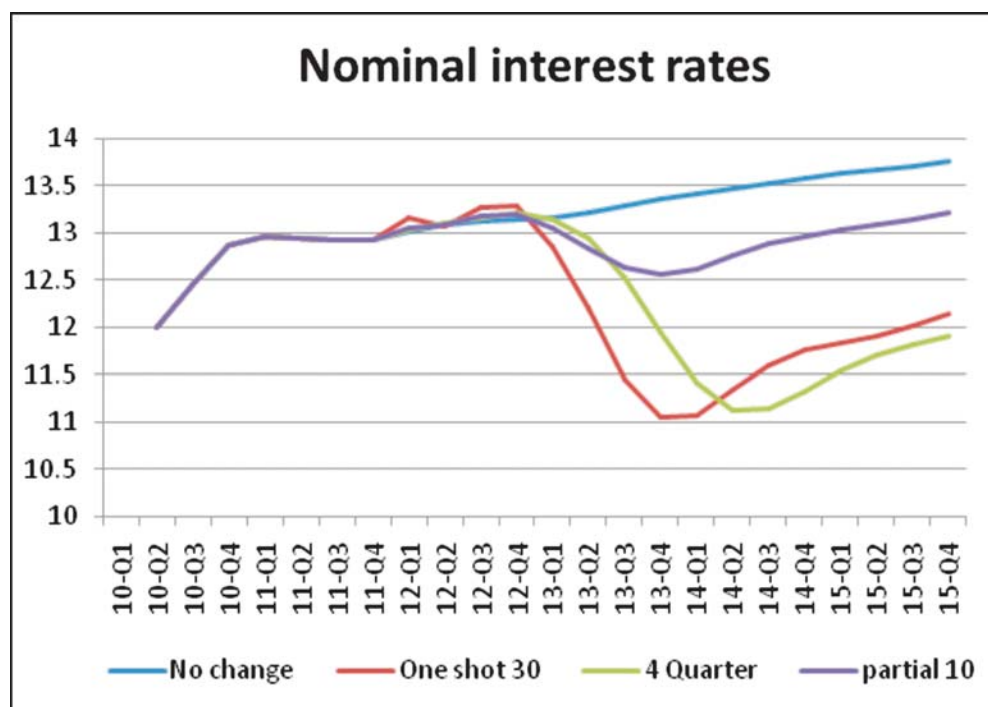


Table 12: Nominal Interest Rate: SBI Lending Rate

	SBILR	Change over No Change		
Quarrter	No change	One shot 30	4 Quarter	partial 10
11-Q4	12.9	0	0	0
12-Q1	13.0	0.14	0.02	0.03
12-Q2	13.1	-0.02	0.01	-0.01
12-Q3	13.1	0.14	0.04	0.05
12-Q4	13.1	0.15	0.08	0.05
13-Q1	13.2	-0.32	-0.02	-0.12
13-Q2	13.2	-1.02	-0.28	-0.39
13-Q3	13.3	-1.82	-0.77	-0.65
13-Q4	13.4	-2.31	-1.41	-0.79
14-Q1	13.4	-2.35	-2.00	-0.79
14-Q2	13.5	-2.13	-2.34	-0.72
14-Q3	13.5	-1.92	-2.38	-0.64
14-Q4	13.6	-1.81	-2.24	-0.61
15-Q1	13.6	-1.78	-2.08	-0.60
15-Q2	13.7	-1.76	-1.96	-0.59
15-Q3	13.7	-1.70	-1.90	-0.56
15-Q4	13.8	-1.62	-1.85	-0.53

2.6 Scenario Analysis and Simulation Summary:

We can summarize the results of these simulations as follows:

1. Diesel price policy has significant macro-economic impact.
2. While diesel price increase leads to a small increase in inflation, not changing present policy involves a much higher rate of inflation over time.
3. If the lag between money supply reacting to fiscal deficit is four quarters, the small increase in inflation lasts for four quarters. On the other hand if the lag is only two quarters, higher prices last for only two quarters.
4. The trade off between short term pain and much larger long term gain is not just in inflation, it is also for GDP.

5. Even a one shot increase of diesel price by 30 %, the WPI is higher in the short term by only 2.3 percentage points but is lower by 10% in the long term.
6. With gradual price increase the increase in WPI is gradual but it persists over a longer period compared to the one shot price increase.
7. With only a 10 % increase in diesel price both the pains and the gains are smaller. Inflationary impact is only 0.8 percentage points in the first two quarter when diesel price is increased and comes down to zero by the end of the 5th quarter.

3. Impact of Diesel Price on Various Consumer Classes

In order to see how prices of different products and commodities are affected by diesel price we analysed monthly prices from March 2004 to Dec 2012. Consumer prices for urban consumers were analysed. For consumer prices we used the data for industrial workers for urban areas. Consumer prices for rural areas are available for agricultural labourers. However, their consumption basket may not be sensitive to diesel prices. Thus, we decided to use urban consumer price changes for rural consumers to get what we think would be an upper bound for rural consumers.

An Auto Regressive Distributed Lag (ARDL) equation is estimated for each price series.

$$P_i(t) = \alpha_i + \sum \beta_{ik} (P_i(t-k)) + \sum \gamma_{ik} P_{diesel}(t-k+1) + \epsilon_i$$

All variables are in logarithms. The summations are over k which denotes the lag. Lags up to 5 months were tried and insignificant ones were dropped. The estimated equations are given in Table 13 for urban consumer prices.

These estimated equations are used to estimate price elasticities through projections of monthly prices from June 2012 for urban consumer, made with two assumptions. Under assumption one, the price of diesel is assumed to remain constant and under assumption two, it is assumed to increase by 10 percent from June 2012 and remain constant at that level. These two give us price increases in individual prices for 10% increase in diesel price over different months. These are summarized in Table 14. Though projections are month-wise, for ease of presentation prices are given for selected months only.

Table 13: Regression Equations for Urban Consumer Expenditure

Sr. No	Commodity group	Model Type	Equation	DW test and R ² Test
1	FOOD GROUP	ARDL	$\text{Log(Food)}=0.013+1.575^{***}\log(\text{food}_{t-1})-0.808^{***}\log(\text{food}_{t-2})+0.228^{**}\log(\text{food}_{t-3})+0.054^{*}\log(\text{HSD})-0.078^{**}\log(\text{HSD}_{t-1})+0.027^{*}\log(\text{HSD}_{t-3})$	DW =1.98 R ² =0.998
2	PAN. SUPARI, TOBACCO & INTOXICANTS	ARDL	$\text{Log(TOBACCO)}=-0.023+1.305^{***}\log(\text{TOBACCO}_{t-1})-0.295^{***}\log(\text{TOBACCO}_{t-2})-0.005^{*}\log(\text{HSD}_{t-2})$	DW = 2.01 R ² =0.9996
3	FUEL & LIGHT	ARDL	$\text{Log(FUEL_LIGHT)}=0.034+1.130^{***}\log(\text{FUEL_LIGHT}_{t-1})-0.144^{**}\log(\text{FUEL_LIGHT}_{t-3})+0.095^{***}\log(\text{HSD})-0.087^{***}\log(\text{HSD}_{t-1})$	DW =1.93 R ² =0.999
4	HOUSING	AR(5)	$\text{Log(HOUSING)}=0.026+0.904^{***}\log(\text{HOUSING}_{t-1})+0.092^{*}\log(\text{HOUSING}_{t-5})$	DW =2.02 R ² =0.995
5	CLOTHING, BEDDING & FOOTWEAR	AR(2)	$\text{Log(CLTHNG,\&FTWR)}=0.002+1.204^{***}\log(\text{CLOTHING,\&FTWR}_{t-1})-0.204^{**}\log(\text{CLTHNG \& FTWR}_{t-2})$	DW = 1. 91R ² =0.998
6	MISCELLANEOUS GROUP	ARDL	$\text{Log(MISC)}=0.007+1.127^{***}\log(\text{MISC}_{t-1})-0.126^{**}\log(\text{MISC}_{t-3})+0.017^{***}\log(\text{HSD})-0.018^{***}\log(\text{HSD}_{t-2})$	DW = 2.18 R ² =0.9998

Note: ***Level of Significance at 1%, ** Level of Significance at 5%, *Level of Significance at 10%

Table 14: Percentage Increase in Urban Consumer Price for Industrial Workers w.r.t. Diesel Price where Diesel Price is raised by 10% in June 2012

Commodity Group	Jun-12	Sep-12	Dec-12	Mar-13	Jun-13
Food Group	0.52	0.10	0.24	0.37	0.49
Fuel & Light	0.91	1.45	1.72	1.95	2.16
Clothing, Bedding & Footwear	0.00	0.00	0.00	0.00	0.00
Miscellaneous Group	0.16	0.40	0.38	0.34	0.31
Pan, Supari, Tobacco & Intoxicants	0.00	-0.11	-0.32	-0.53	-0.76
Housing	0.00	0.00	0.00	0.00	0.00

We use these price changes to assess the impact of 10% increase in diesel price expenditure of consumer belonging to different decile groups using NSS consumer expenditure data of 2009-10, given in Table 15 and 16.

**Table 15: Monthly Per Capita Consumer Expenditure MPCE in (Rs.) - Urban
Consumer-NSS Survey 2009-10 in (Rs.)**

Deciles class of MPCE	Food Articles	Fuel & Light	Clothing, Bedding & Footwear	Pan, Supari, Tobacco & Intoxicants	Housing	Miscella neous Group	Total Expendi- ture
1	326.08	66.52	16.33	11.4	6.01	32.62	521.32
2	426.92	85.25	23.76	15.39	17.89	47.03	722.31
3	490.48	98.1	32.63	16.05	21.78	57.26	869.62
4	556.26	108.04	44.45	18.83	37.11	71.10	1,027.93
5	617.47	120.94	54.77	19.65	57.68	84.03	1,207.69
6	696.47	134.8	81.71	20.00	66.87	102.79	1,420.07
7	782.35	147.77	95.52	20.43	97.84	121.77	1,687.74
8	889.97	170.89	120.78	24.75	146.47	146.86	2,051.45
9	1046.89	198.02	182.1	26.68	209.94	203.29	2,680.52
10	1442.58	297.4	347.66	45.96	516.87	1166.09	5,673.16
All	727.49	142.76	99.95	21.91	117.81	203.17	1,785.81

**Table 16: Monthly Per Capita Consumption Expenditure, MPCE, in (Rs.)-Rural
Consumers-NSS Survey 2009-10**

Decile Class Of MPCE	Food Articles	Fuel & Light	Clothing, Bedding & Footwear	Pan. Supari, Tobacco & Intoxicants	Miscellaneous Group	Total Expenditure
1	250.6	50.2	10.7	9.3	23.4	377.1
2	322.4	60.7	18.1	11.8	31.0	495.8
3	367.0	68.2	22.4	13.5	36.6	575.7
4	403.7	73.4	29.8	16.2	43.1	649.3
5	445.7	80.4	32.3	19.3	48.2	724.0
6	482.5	86.9	45.1	19.2	55.0	808.3
7	529.3	94.4	49.1	23.1	64.1	910.2
8	585.3	103.3	68.5	25.0	78.3	1,053.3
9	672.0	116.3	88.2	29.0	104.8	1,288.8
10	912.6	144.2	183.5	39.7	420.1	2,394.7
All	497.1	87.8	54.8	20.6	90.5	927.7

The additional expenditure for any commodity is the expenditure in Table 15 (Table 16) times the corresponding percentage price increase from Table 14 (Table 15) divided by 100. The additional expenditure for each deciles group is summarized in Table 17 and 18.

It should be emphasised that we have used the consumer price of urban industrial workers, who are not likely to be consumers of diesel. Thus the impacts shown in Tables 19 and 20 for the top three deciles, some of whom may own diesel driven vehicles, are understated.

Table 17 : Increase in Monthly Per Capita Expenditure as a percent of total MPCE of the Urban household where price of diesel is increased by 10% in (June 2012)

Deciles Class of MPCE											
	1	2	3	4	5	6	7	8	9	10	All
	MPCE (Rs.)										
	521	722	870	1028	1208	1420	1688	2051	2681	5673	1786
Jun-12	0.45	0.42	0.40	0.39	0.37	0.35	0.33	0.31	0.28	0.21	0.30
Sep-12	0.27	0.26	0.25	0.23	0.22	0.22	0.20	0.19	0.18	0.18	0.20
Dec-12	0.39	0.36	0.35	0.33	0.32	0.30	0.29	0.27	0.25	0.23	0.27
Mar-13	0.49	0.46	0.44	0.42	0.40	0.38	0.36	0.34	0.31	0.26	0.34
Jun-13	0.59	0.55	0.53	0.50	0.48	0.46	0.43	0.41	0.37	0.30	0.40

Table 18: Increase in Monthly Per Capita Expenditure as a percent of total MPCE of the Rural Household where price of diesel is increased by 10% in (June 2012)(% of MPCE)

Deciles Class of MPCE											
	1	2	3	4	5	6	7	8	9	10	All
	MPCE (Rs.)										
	377	496	576	649	724	808	910	1053	1289	2395	928
Jun-12	0.47	0.46	0.45	0.43	0.43	0.42	0.41	0.39	0.36	0.28	0.38
Sep-12	0.28	0.27	0.26	0.25	0.25	0.24	0.24	0.23	0.21	0.19	0.23
Dec-12	0.40	0.38	0.37	0.36	0.36	0.35	0.34	0.32	0.30	0.26	0.32
Mar-13	0.51	0.49	0.48	0.46	0.45	0.44	0.43	0.41	0.39	0.31	0.40
Jun-13	0.62	0.59	0.57	0.55	0.54	0.53	0.51	0.49	0.46	0.36	0.48

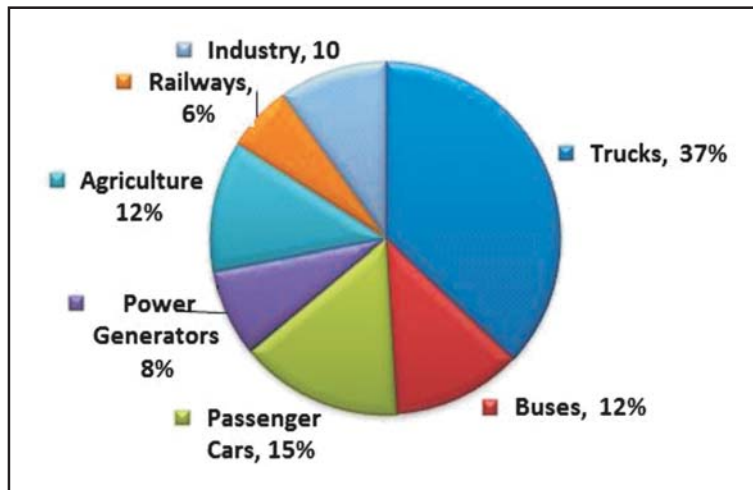
3.1 Impact Results and Implications:

1. The results show that 10% increase in diesel price leads to less than half a percent increase in consumer expenditure of all rural and urban expenditure classes. For the first four quarters this is true. Afterwards, the inflation due to higher fiscal deficit and consequent increase in money supply, when “no change” in diesel price is made, catches up and compared to that consumer would be better off when diesel price is raised by 10 percent.
2. In absolute term the increase in expenditure for the poorest rural consumer expenditure deciles is less than Rs. 2 per person per month and these remains at this level for four quarters.
3. For the poorest urban consumer expenditure (deciles), the additional expenditure would be less than Rs. 2.5 per person, per month.
4. The impact on the richest urban consumer decile is shown to be only around 0.25 percent while in absolute term is less than Rs. 15 per person per month. Of course, as pointed out earlier, this excludes the impact on diesel driven vehicle owners.

4. Impact on Different Stake Holders of Diesel Price Change

Diesel is used by various types of users. According to Petroleum Planning and Analysis Cell (PPAC), share of different users in the consumption of diesel is as follows as shown in the Figure 12.

Figure 12: Diesel Usage Sector wise



Source -Parikh Committee Report on “A Viable and Sustainable System of Pricing Petroleum Products”

4.1 Impact on Truckers:

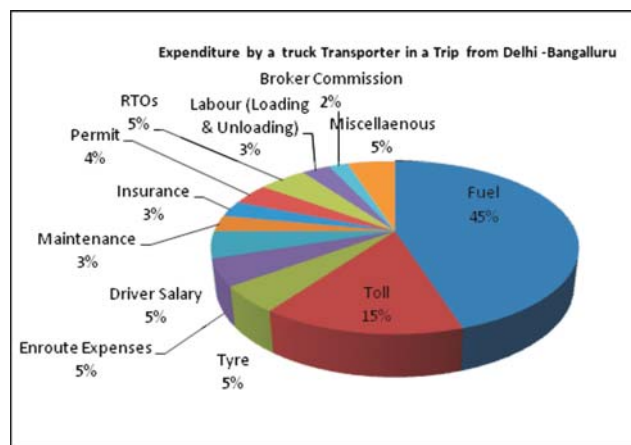
Among commercial vehicle users of diesel, trucks constitute 37%, buses contribute 12% and railways contribute 6%. Trucks are the major consumers of diesel. Since the bulk of trucks are owned by small operators who operate one or two trucks, the impact of diesel price on them is of considerable concern. The numbers of registered goods vehicles on March 31, 2009 were 5.6

million. Demand of goods in the short run is inelastic and truckers can pass on the cost to the consumers. If raising diesel price is to reduce the inflation a year down the line and increase GDP, the demand for trucking would grow and would be beneficial to the truckers.

One may also note that higher price of diesel would incentivise more efficient use of diesel which would reduce cost of truck transport. It would also encourage goods movement by railways which are more fuel efficient compared to trucks.

However the perception among the Truckers Association continues to be that, any price rise is going to affect the truck operators in short term. The transportation business is badly affected by the cost of diesel. The net profit margin in the truck business is affected by the cost of diesel. The diesel cost is 45% for the total cost (Figure 13) in running of vehicles and most of the work is contractual in nature. A correction in freight is highly unlikely due to sudden increase in the diesel price due to contractual obligation. Moreover, given the unorganized nature of this sector and highly competitive market it is not always possible to increase freight every time. If diesel price is linked to international price and is variable, the contracts would provide for a pass through of diesel cost.

Figure 13: Expenditure by a Truck Transporter in a Trip from Delhi -Bangaluru, Source- Trucker Associations



However the overall freight rates not necessarily linked to the diesel prices, rather it depends largely on the demand and supply of trucking which depend on the overall economic activities and GDP growth in the country. Continuing with the current policy of subsidized diesel, negatively impact of GDP growth rate, there by affects the demand and supply of trucking in the country. Transport is a very important sector of the economy; therefore in the long term interest of the Trucking Sector, diesel price increase should be passed on the consumer through the increase in the freight charges. However, it is true that in short term, increase in diesel price does affect the profit margins of the industry. This is where some policy rationalization is required to reduce the burden of increase in diesel price as follows.

- Diesel prices vary from state to state; in Delhi it is ~Rs. 40 and in South it is ~Rs. 47. The transporters are the worst affected by the differential pricing in different states as the vehicles travel throughout the country and at times they have to fill the tanks at a higher price of diesel than what they have quoted to their clients in their home states. Industry suggests Uniform Rate of Diesel across the country.
- The truckers have to pay various taxes and the procedure is tedious, there should be uniform price across the states. The cost of reduced delay can offset change in diesel price.
- Remove toll tax barriers, rationalization of Road Development Cess, Road Tax, Toll Tax and National Permit Fees and eliminate Octroi etc. There are various “informal” expenses at various points.
- Mandate fuel efficiency norms for truck manufactures.
- A measure that can have a lasting impact is to increase the diesel use efficiency of trucks. Many of the trucks operate within low efficiency 3 to 4 km/litre. We are told modern trucks can have 6km/litre. Unfortunately there is no accurate data on fuel use efficiency but some industry sources say it around 3 to 4 km/litre.
- Loans on easy terms can be given to the small truck operators to replace their trucks with higher efficiency one.

4.2 Passenger Cars:

Passenger cars account for 15% of the total diesel usage in the country. It is mainly because of the shift towards diesel cars from the petrol cars due to the difference in price of petrol and diesel. In Delhi, the difference was more than Rs. 25 per litre in August, 2012. After the Rs. 5 per litre increase in price of diesel and lowering of excise on petrol by Rs. 5 per litre announced on September 12, 2012, the total price difference is around Rs 15/litre.

The overall car sales have increased and the sales of diesel cars have increased rapidly. In 2011-12 the diesel cars sales accounted for 49% of the share of total sales. In 2012, 90% of the order is for diesel cars. The diesel cars have higher engine capacity and purchasers are more interested in power of car. Between 2009-10 and 2010-11; diesel car engines below 1400 cc observed 45% growth and more than 2000 cc observed 41% growth. Petrol car sales are higher in small car segment; ~ 87% of petrol cars are below 1200 cc. More than 40% of the diesel cars are above 1500 cc engine capacity. However with large difference in petrol and diesel prices, car manufactures find that the demand for petrol vehicles has fallen dramatically and their production capacity for petrol vehicles, some of the already created, capacity for petrol vehicles lies idle.

The growth of diesel cars has been phenomenal and has increased from 4% in 2000 to almost 50% in 2011. Diesel (C_{12}) fuel has higher carbon (C_8) content than petrol. With each litre of petrol replaced by diesel to run a car the excise earning of the government from a car becomes one seventh times. What is more important is that the high difference between petrol and diesel has

led to the growth diesel car sales in India. This fact has distorted market demand of petrol and diesel vehicles. In case of Maruti Udyog the demand of Diesel vehicle share has increased in few years from 22% (year 2010-11 it was 36%) to 47% in 2011-12. The first quarter Of 12-13, diesel vehicle share is around 56%. This growth to 56% is also limited due to supply constraints. Maruti has invested Rs 500 cores in K series vehicle to produce 3 lakhs car per year. The capacity is under-utilized. Auto sector desire free market, and are not interested in subsidy. Industry desires policy clarity in the parameters affecting their market. Auto industry does not want subsidy and distortion is not good for the industry. The challenge of Auto-sector market is planning for production of vehicle using regulated (Diesel) and deregulated (Petrol) fuels. The ratio of consumer cost of diesel and petrol and the difference in cost is very significant. In addition the kilometre run of diesel vehicle per litre is also high.

- The price difference between petrol and diesel should come down. If the excise on petrol is reduced by Rs. 8 per litre and that on diesel is raised by Rs. 2 /litre, the excise revenue will not be affected.
- In the short term and medium term scenario, if diesel is to be subsidized, a fixed subsidy per litre of diesel will be helpful as industry desires relative price stability on a long term basis.
- Petrol vehicles had 13% growth in 2010-11, while this year it showed negative growth of 19%. Diesel registered 35% growth lastyear and this year it has grown beyond 30%.
- The rush for the Diesel vehicles is due to fact that consumer believes the subsidy on diesel will remain as it is for a long time. This perception drives the growth.
- Considering current distortion in the market, some visibility is to be given to the environment, the refineries should produce low sulphur fuels
- Diesel is a denser fuel, having higher calorific value. Its cost will be ~13% higher than petrol; its price should be more than that of petrol.

Clear difference between excise duties, dealer commission & VAT for diesel and petrol shows that SUV (sports utility vehicle) owners using diesel get disproportionate benefit by lower diesel price than a two wheeler owner using petrol. The difference of nearly Rs. 25/litre between diesel and petrol prices (reduced to Rs. 15 by price and duty change in September, 2012) need to be given attention. Cheap diesel leads to higher rate of growth for big car and SUV segment than small cars. This dieselization undermines the gains from fuel efficiency of small cars.

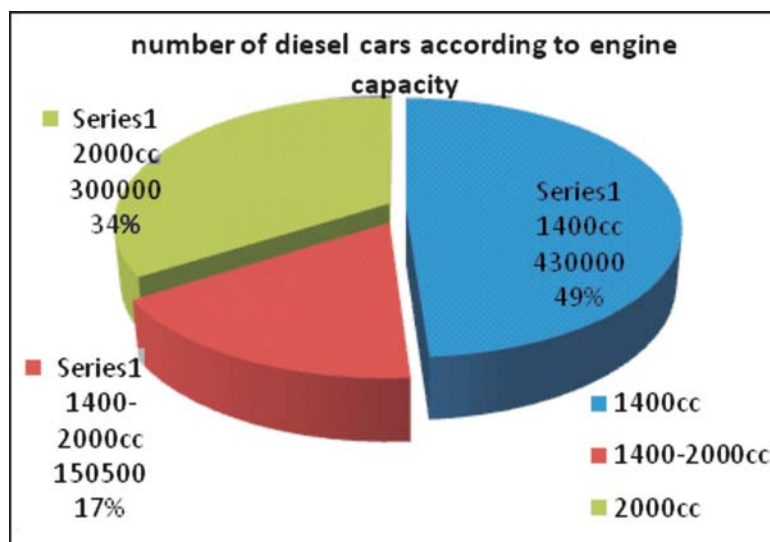
Levying tax on diesel run cars

One alternative is to put additional excise on diesel caps at the point of sale. This should be equal to the present discounted value at 10% over a lifetime of 10 years of a car.

In 2011, the diesel car or SUVs sale was about 8,80,500. Out of it, 4,30,000 cars were sold of less than 1400cc, 1,50,500 cars were sold of capacity between 1400-2000cc and 3,00,000 cars were sold of engine capacity more than 2000cc. Average prices of these cars are rupees 6 lakhs⁸, 10 lakhs and 20 lakhs respectively.

⁸1 lakh = 100,000

Figure 14: Number of diesel cars according to engine capacity in 2011



Source : Industry Estimates

We assume that annual use of car is 15000km, 18000km and 25000km for small medium and large cars respectively. We also assume that the cars give 18km/litre, 15km/litre and 12km/litre and they will consume 833liters, 1200 litres and 2083 litres per year respectively. The excise difference between petrol and diesel is Rs. 17.72 and the subsidy on diesel is Rs. 8 per litre. The price difference between petrol and diesel is Rs. 15 per litre. Thus, diesel vehicle owners avoid excise of around Rs.12,500, Rs. 18,000 and Rs. 31,245 respectively per year.

Based on the annual consumption, an annual permit charge of the rate of Rs. 12,500, Rs. 18,000 and Rs. 31,245 can be levied on small, medium and big diesel cars respectively.

We have two estimates of stock of diesel vehicles. According to SIAM, the stock of diesel cars is 2.3 million and according to PPAC the stock of diesel cars is 4.96 million. The revenue in 2011 would have been Rs. 4,569 crores and Rs. 9,830 crores respectively on the imposition of permit fee on diesel cars as is shown in the Table 19 and 20 respectively.

While the first best policy is to make diesel and petrol prices comparable, imposing an annual permit fee is the second best alternative. This, however, requires getting a consensus among the states. A third best option could be to change full cost of price of diesel in metros. While such a dual price mechanism is inherently full of leakages, it may still capture some diesel driven passengers' car consumers.

Table 19: Additional revenue generated after levying permit fee on already existing stock of diesel cars – stock estimate as per SIAM

SIAM estimates	Number of cars	Km/year	km/litre	litres/year	Excise + subsidy @ 15 Rs./litre	Annual revenue (Rs. Crore)
less than 1400cc	11,25,604	15,000	18	833	12,495	1406
between 1400-2000cc	3,93,961	18,000	15	1,200	18,000	709
above 2000cc	7,85,305	25,000	12	2,083	31,245	2,454
Total	2,304,871*					4,569

*(estimate – SIAM)

Table 20: Additional revenue generated after levying permit fee on already existing stock of diesel cars – Stock estimate as per PPAC

	Number of cars	Km/year	km/liter	liters/year	Excise + subsidy @ 15 Rs./liter	Annual revenue (Rs. Crore)
less than 1400cc	2,421,669	15,000	18	833	12,495	3,026
between 1400-2000cc	8,47,584	18,000	15	1,200	18,000	1,526
above 2000cc	16,89,537	25,000	12	2,083	31,245	5,279
Total	49,58,790*				0	9,830

*(estimate – PPAC)

4.3 Farming Sector:

Agriculture sector consumes 10% of total diesel use. Of this, ~26% of diesel is being used for tractors and other equipments and ~70% is being used for irrigation. The cost of diesel is considered while setting the “minimum support price” (MSP) by the commission for agricultural costs and prices. However, those who use more diesel than average will not be fully compensated. Thus, those who use diesel pumps for irrigation would not be fully compensated. Out of 100 million holdings in 2005, marginal farmers constituted 64.4 million and small farmers 18.8 million. The number of wells with pump sets was 3.58 million for marginal farmers and 1.5 million for small farmers. Of these, diesel operated pumps were 0.6 million for marginal and 0.34 million for small farmers. The total numbers of diesel pumps owned by farmers of all size class were 1.42 for wells and 3.12 for tube wells. The total number of diesel pump sets may have grown to 5 to 6 million by now. The number of hours a pump is used during peak season was six hours per day as per the 2005 agricultural census. Even if we assume that pumps were used for 120 days in year at the same rate, the number of hour of use would be 720 hours per year. A 5 HP pump will consume 0.7

litres of diesel per hour. This would give total consumption of about 500 litres of diesel per year. The total amount needed to provide a subsidy of 10 rupees per litre would be Rs 500 per pump set. 5 million pump set owners, small or large farmers, would require Rs. $5 \times 5000 \times 10^6 = \text{Rs. } 2,500$ crores. Farmers can be protected from diesel price hike of Rs. 10 per litre by giving cash transfer of Rs. 5,000 per diesel pump owning farmer.

Table 21: Irrigation Pump sets: Electrified and Diesel Operated as per Agricultural Census 2005 (in millions)

Irrigation Pump sets: Electrified and Diesel Operated as per Agricultural Census 2005 (in millions)								
Size Class(HA)	Total Holdings	Number of Wells in Use				Number of Tube wells		
			With Pump sets					
	Number	Area	Electric	Diesel	Total	Electric	Diesel	Total
MARGINAL(<1.0)	64.44	25.91	2.98	0.60	3.58	1.42	1.48	2.90
SMALL (1.0 to <2.0)	18.80	26.63	1.16	0.34	1.50	0.91	0.70	1.61
SEMIMEDIUM (2.0 to <4.0)	11.24	30.63	0.90	0.27	1.17	0.96	0.49	1.44
MEDIUM (4.0 to <10.0)	5.35	31.19	0.57	0.17	0.75	0.85	0.34	1.19
LARGE (10 and above)	1.02	17.70	0.13	0.04	0.17	0.28	0.11	0.40
ALL CLASSES	100.85	132.07	5.75	1.42	7.17	4.42	3.12	7.54

Source: Agricultural Census, 2005 website

4.4 Telecom Sector:

The Indian telecommunication industry is one of the fastest growing in the world and India is projected to become the second largest telecom market globally by 2012 with gross revenue exceeding Rs.1,580 billion. Telecom towers required for transmission of signal have themselves become a separate industry. India has presently over 3 lakhs telecom towers. Currently the sector requires 14 billion units of electricity annually to power its growing network infrastructure in order to provide uninterrupted service to its consumer. But out of the current telecom towers, 40% are located in rural or semi urban area where electricity supply is either not available or is irregular. This simply means there is a large dependency on diesel to operate the telecom towers uninterrupted. Assuming 8 hours of operation every day by diesel generator sets, average fuel consumption per tower per year is 8,760 litres of diesel, (Telecom ministry report). The consumption of diesel by the telecom sector currently is around 2.76 billion litres annually. This translates to an operational energy expense for the sector of Rs.11,400 crores, apart from other infrastructural costs, to operate their network towers, especially in off-grid locations. In turn this constitutes around 30% of the sector's revenue from off-grid services. In addition to the high operational expenses

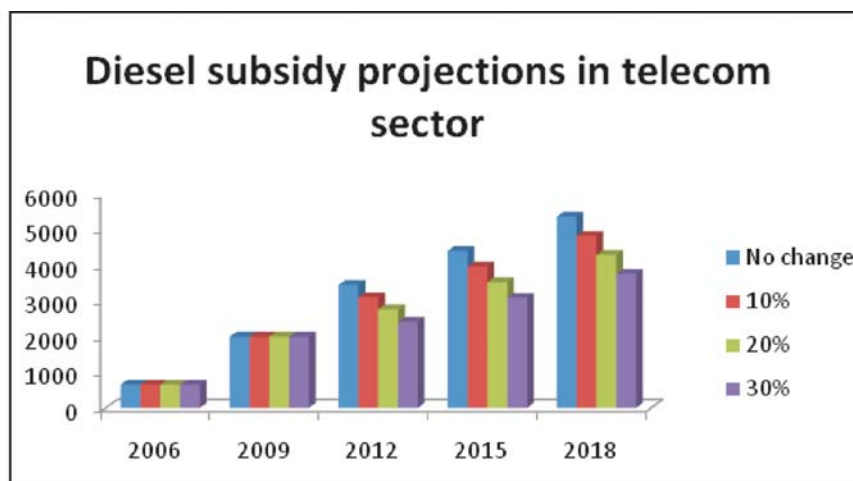
for the sectors, this also results in a loss of around rupees 25 billion to the exchequer, considering the indirect subsidies the sector benefits from in relation to diesel. Moreover the telecom sector in India through its operations powered by diesel is responsible for 5.2 million tonnes of carbon dioxide emissions annually.

Moreover increased consumption of government subsidised diesel by the sector, also translates in to increased losses to the exchequer.

Impact of diesel price hike on telecom sector

In 2015 it is expected that near about 575000 telecom towers will be in operation in India. About 30% growth rate of telecom towers is being considered for the calculations. Currently the telecom sector is consuming nearly 2.76 billion litres per year. In 2015 it is estimated that this figure will jump to 3.52 billion litres in 2015 and 4.3 billion litres by the end of 2018. With such high usage of diesel by telecom towers, a subsidy at Rs 12.53 /litre the under recoveries of oil companies will also grow by Rs. 4,418 crores and Rs.5,379 crores in 2015 and 2018 respectively. See Figure 15. Diesel subsidy enforcement of the TRAI regulation would save more than 540 million litres of diesel on an average annually, and about 3.5 billion litres of diesel, cumulatively, by 2015 as per the recent study titled “Enabling Clean Talking” carried out by Green Peace.

Figure 15: Diesel Subsidy for Telecom Towers



Diesel demand by telecom towers would seem to be inelastic as a tower must have 24x7 power supply. Yet since towers are in remote area, it is reported that a lot of diesel is pilfered. Raising the price of diesel may increase the incentive to pilfer but may also increase supervision to prevent it. Enforcement of the TRAI regulation would save more than 540 million litres of diesel on an average annually, and about 3.5 billion litres of diesel, cumulatively, by 2015 as per the Green Peace study. The cost of generating a unit of electricity from solar is about Rs. 8 - Rs. 12 per kwh where as grid electricity available is around Rs. 4 to Rs. 5 per litre.

Telecom towers running on diesel, the cost of generation is around Rs. 20 per kwh excluding indirect cost and around Rs. 25⁹ including indirect cost per kwh. This shows that solar powered telecom towers have a definite edge over diesel powered telecom towers. However to run a telecom tower totally powered by solar PV system with battery backup, the generating capacity of the PV system has to be at least nine times higher to match the average load of the telecom equipment. For a tower with a load of 3 kilowatts, a PV system with 25 kilowattspeak has to be installed (Source: Green Peace study).

5. Synthesis and Conclusions for Diesel Price Reforms

We can now synthesize various aspects of the analysis in previous sections and draw some conclusions:

5.1 No change in diesel price front is not sustainable:

- Continuing with present policy of no change in diesel price is not tenable. The large under recoveries put a huge strain on government finances with profound consequences for inflation and growth of the economy. It will lead to higher inflation and lower growth in a year's time.
- The growing debt to equity ratios of oil PSUs may soon make them unviable and unable to buy petroleum products. Then even supply of petroleum products can be disrupted. This could have very large economic and social costs.

5.2 No change in diesel price has other consequences:

- When the gap between diesel price and petrol price becomes large, people buy more diesel vehicles, which may be more polluting and which commits the country for higher diesel use for many years in future.
- When diesel price falls below the price of furnace oil, which is deregulated, diesel is used in place of furnace oil. It has been estimated that 3Mt. of diesel has been used in this way in 2011-12. This increases under recoveries on account of diesel unnecessarily. Substitution of diesel in place of electricity is already a well-known use by mobile towers, business offices, hotels etc.

5.3 Macro-economic implications of diesel price:

- When diesel is subsidised the cost of supplying diesel is not covered by the diesel price. These under recoveries have to be financed directly or indirectly by the government. Under recoveries lead to higher fiscal deficit which leads to higher money supply. This results in higher inflation, higher interest rate and lower growth rate.

- Diesel price policy has significant macro-economic impact. While diesel price increase leads to a small increase in the rate of inflation; continuing with diesel subsidy involves a much higher rate of inflation over time.
- If the lag between money supply reacting to fiscal deficit is four quarters, the small increase in inflation lasts for four quarters. On the other hand if the lag is only two quarters, higher prices last for only two quarters.
- The trade-off between short term pain and much larger long term gain is not just in inflation, it is also for GDP.
- A one shot increase of 30% in diesel price would increase diesel price by Rs.13.5 per litre. This would lead to 2.3 percentage point higher inflation. After five quarters inflation is lower and GDP is higher. In fact over the next four years, the inflation rate is lower by 1.45 percentage points and GDP growth rate is higher by 0.7 percentage points. Thus four years down, the wholesale price index (WPI) is 5.66 percent lower and GDP 3.86 per cent higher. However the short term inflation is higher, which may fuel inflationary expectations as people may not appreciate the long term deflationary impact. This would also face strong political opposition.
- A gradual price increase over four quarters may have a smaller immediate inflation. However, each quarterly increase in price would require the same political capital and would face political opposition. The public discontent of any price increase would be given a boost every quarter by the opposition. An increase in diesel price by 10% as was done in September, 2012, would still leave substantial under recoveries. In our scenario diesel price was raised by Rs 4.5 per litre. This results in higher inflation of maximum 0.8 percentage points for two quarters and smaller thereafter. The compound growth rates over the next four years will be 0.47 percentage point lower for inflation and 0.23 percentage points higher for GDP. Thus WPI at the end of four years would be 1.9 percent lower and GDP will be 1.28 per cent higher.

5.4 Impact on sectoral prices:

- When diesel price is increased by 10%, the consumer price for goods consumed by urban industrial consumers increase by different rates. The price of food items increase by 0.5%, of fuel and light by around 2.0% and of miscellaneous goods by 0.4%.
- The impact on rural consumer prices would be even lower as more of their consumption expenditure is based on local products.

5.5 Impact on consumers:

- The impact of 10% increase in diesel price on consumer is quite small, amounting to less than Rs. 2 per person per month of total monthly per capita consumption expenditure (MPCE) of the poorest decile rural consumer whose total monthly per capita expenditure

was Rs. 347 in 2009-10 and less than Rs. 2.5 per person per month for poorest decile urban consumers whose monthly per capita consumption expenditure was Rs. 521 in 2009-10. Even for the consumer in the 5th decile with MPCE of Rs. 724 and Rs. 1,208 in rural and urban areas respectively, the additional expenditure would be only less than Rs. 4 and Rs. 6 per person per month in rural and urban areas respectively.

- The burden on *Aam Aadmi* (common citizens) of not doing anything is much more than from raising diesel price. The 0.5% increase in his expenditure due to a 10% increase in diesel price is much smaller in comparison to the loss of income due to lower growth rate and erosion of purchasing power due to higher inflation.
- Also the long term costs a year or two down, in terms of inflation of no change can be very high and does require some action on the diesel price front. The sooner the better.

5.6 Protecting farmers:

- The impact on farmers of increase in diesel price is a major concern. However farmers can be protected at very modest cost.
- Agriculture consumes 12% of diesel of which, around 26% is used for tractors and other equipment and remaining for irrigation. Diesel cost is accounted for in setting minimum support price by commission for agricultural cost and prices. However, this would not compensate adequately those who use more diesel than the average farmers, which will be those who have diesel pump sets. There were 4.64 million diesel operated pump sets in 2005, each consuming 500 litres of diesel per year. If diesel price is raised by Rs. 10/litre, then farmers could be protected by giving Rs. 5,000 per year to each diesel pump set owning farmers. Assuming that number of pumpsets has increased since 2005 to 5 million, it will require only Rs. 2,500 crores for their consumption.

5.7 Impact on truckers:

- The numbers of registered goods vehicles on March 31, 2009 were 5.6 million. Demand of goods movement in the short run is inelastic and truckers can pass on the cost to the consumers. However if the truckers have long term freight contracts with fixed rates, they may not be able to do it. They should have contracts in future with diesel cost pass through. If raising diesel price is to reduce the inflation a year down the line and increase the GDP, the demand for trucking would grow and would be beneficial to the truckers.
- A measure that can have a lasting impact is to increase the diesel use efficiency of trucks. Many of the trucks operate with low efficiency of 4 km/litre. We are told modern trucks can give 6km/litre. Loans on easy terms can be given to the small truck operators to replace their trucks with higher efficiency ones.
- Truckers can easily absorb the increase in diesel price if toll tax barriers are removed, various road development cesses and taxes are rationalized, and national permit fees are lowered and octroi eliminated.

5.8 Telecom Towers:

- The nearly 3 lakh telecom towers consume around 2.75 billion litres of diesel per year. Solar power can replace part of this at economically attractive rate. The tower operators may be mandated to do so.

5.9 Policy Options:

- The objectives should be to reduce under recoveries on account of diesel and also to reduce the gap between diesel price and other petroleum products.
- The recent diesel price increase by Rs. 5/litre and reduction in excise on petrol by Rs. 5/litre reduced the gap from Rs. 25 to Rs 15. Further reduction is possible by raising excise on diesel by Rs.1 and reducing excise on petrol by Rs. 4. Since diesel consumption is four times the consumption of petrol, this would be revenue neutral. The States could do similar things on their taxes.
- Ideally the tax rates should be same on diesel and petrol. If higher revenue is required and vehicle owners are considered the best source of revenue, different tax instruments should be used. For example, an annual road tax can provide similar revenues. Given the spread of IT, paying, collecting and monitoring of such road tax should be quite easy. At present diesel driven passengers car owners get a subsidy of Rs. 12,500, Rs. 18,000 and Rs. 31,250 per year for small, medium and large cars. As long as the prices of petrol and diesel are not made comparable, a differential road tax or permit tax of these amounts should be levied on them.

Diesel Price Decontrol with Fixed Subsidy

The government has raised price of diesel by Rs. 5/Litre. The Gain could be neutralized if the World price goes up by \$15/Barrel.

It would have been better had the government decontrolled (or freed up or deregulated or liberalized or market driven all these are used synonymously) diesel price along with the Rs. 5 increase per litre with a fixed subsidy say Rs. 10/litre. Then, when world market price changes, the oil marketing companies would change the sale price of diesel for the consumers to reflect the world price. This would involve gradual and automatic change in diesel price, would fix government liability to a predictable level irrespective of how world price changes and also remove uncertainties from the public sector oil companies. Thus, if price increases by \$1.5/ barrel, the consumer price would be increased by Rs. 0.5/litre and the subsidy would remain at the same level of Rs.10 /litre.

Yet a partial price increase without decontrol of diesel price would leave the problem open. However, given the very large increase required for total decontrol at this stage, it was perhaps politically infeasible to remove all subsidies from diesel. Diesel price decontrol with fixed subsidy would be a better option. (See box) With this, if the world market price goes down, the subsidy can be partially reduced and if it goes up, the OMCs could adjust the prices upwards. China, South Africa and Brazil adjust domestic price to world market price. (See box below).

PRICING Policy in Some Comparable Countries

China

The Chinese government launched a fuel tax and reform of the domestic product pricing mechanism in 2009 in efforts to tie retail oil product prices more closely to international crude oil markets. This in turn is likely to attract downstream investment, ensure better profit margins for refiners, and reduce energy intensity caused by lower domestic prices and higher demand. The current oil product pricing system allows the NDRC to adjust retail prices when the moving average of imported crude prices fluctuates outside of a 4 percent range within 22 consecutive working days for diesel and gasoline. When international crude oil prices increased in 2010 and 2011, the NDRC did not increase downstream fuel prices at the same rate, causing refiners, especially NOCs, to incur profit losses on their downstream businesses and increase their fuel product exports. Despite the price alterations, NOCs have experienced negative margins in 2012 and use their upstream and other business segments to offset losses on downstream sales. Volatility in international prices that has occurred in late 2011 and 2012 spurred China to react more quickly with price adjustments. NDRC raised retail oil prices twice at the beginning of 2012 to the highest levels recorded and reversed course by cutting prices three times by about 14 percent in mid-2012 to match dropping international oil prices and economic deceleration. The NDRC plans to revise the pricing regime by shortening the adjustment period to 10 days and lower the 4-percent price boundary. They also plan to add more benchmark crude streams as part of China's basket of international crudes to reflect better the country's shifting sources of imported oil. In November 2011, China also installed an ad valorem resource tax of 5 percent on all oil and gas production, including unconventional resources output, in an attempt to increase revenues for local and regional governments and encourage more efficient hydrocarbon production. The resource tax was extended in 2012 to projects involving joint ventures (JVs) of international and Chinese firms.

Source: <http://www.eia.gov>

South Africa

The price of petroleum products in South Africa is regulated by government and consists of two broad elements: the basic fuel price (BFP) and the domestic influences on price. Changes in oil prices in the international market are therefore beyond the control of the South African government; increases and declines in the oil price are averaged and incorporated into the domestic fuel price. Thus users bear the full cost. Daily changes to the BFP are monitored and recorded on a unit rate schedule where a financial record is kept and used in the determination of the BFP after the month of review. The price fluctuations are averaged in order to account for any over or under recovery during the month. In addition, the BFP is also influenced by the \$/Rand exchange rate. As such the price of fuel is adjusted according to what the BFP was set at and what consumers were paying over the period of review.

Source: Department of National Treasury, Republic of South Africa, Petroleum Products Pricing Policies and Strategies in South Africa, <http://www.treasury.gov.za>

Brazil

In Brazil Petrobras, the world's third largest oil company (market value) with government as the majority shareholder plays a central role in the field of Petroleum. Petrobras is the owner of all major Brazilian refineries and thus has a monopoly on wholesale oil sales. The company does not technically subsidize its products but rather sets its prices according to the market conditions. It does not generally react to quick market changes and the prices are considered as subject to non-official government approval. Retail sale of gasoline is totally free-market operation with various major players (Shell, Cosan, and Petrobras). There are no products that are regulated by the Government, either raw (oil and gas) or by-products. The ANP (Agência Nacional do Petróleo), the Brazilian Petroleum Agency presents a forecast of the prices which are used as a sort of bench-mark, but it does not exercise any control over the prices. The current methodology of pricing of petrol, diesel, kerosene and LPG is based on market-determined pricing. Source: Embassy of India Brasilia

- As long as the price of diesel is not decontrolled, it should be based on export parity price as we export substantial quantity of diesel.
- A rational, non-distortionary petroleum products pricing is critical for an efficient economy, for promoting growth and for containing inflation. Both the centre and the states have roles to play here. The centre should lead and hopefully some states could follow.

Annexure-1

Element wise explanation of Price Build-up of Diesel		
Sr. No.	Elements	Description
1	FOB Price	FOB (Free on Board) daily quotes of Gasoline at Arab Gulf including premium /discount published by Platts and Argus publications are averaged for previous fortnight.
2	Ocean Freight	Ocean freight from Arab Gulf to destination Indian ports as per WorldScale freight rate adjusted for AFRA.
4	Import Charges	Insurance charges, Ocean Loss, LC Charges & Port dues applicable on import of product.
5	Customs Duty	Customs duty on diesel is 2.50% + 3% Education cess.
6	Import Parity Price (IPP)	IPP represents the price that importers would pay in case of actual import of Diesel at the respective Indian ports.
7	Export Parity Price (EPP)	EPP represents the price which oil companies would realize on the export of diesel i.e. FOB price of the product (serial no. 1) Plus Advance License benefit (ALB) (for duty free import of crude oil pursuant to export of refined products). Consequent to the abolition of Customs Duty of Crude oil effective 25.06.2011, the ALB is currently NIL.
8	Trade Parity Price (TPP)	Trade Parity Price is 80% of IPP & 20% of EPP effective 16.6.2006 as per recommendations of the "Rangarajan Committee Report".
9	Refinery Transfer Price (RTP)	RTP based on the Trade Parity Price is the price paid by the Oil Marketing Companies to domestic refineries for purchase of diesel at refinery gate.
11	Inland Freight & Delivery charges	It comprises of average freight from ports to inland locations and delivery charges up to Retail Outlet.
12	Marketing Cost	Marketing Cost & Margin is as per Marketing Cost Study Report, Nov.2006 by Cost Accounts Branch, MoF.
13	Marketing Margin	
15	Under recovery to OMCs	Difference between Desired Price and Actual selling price (excluding Excise Duty, VAT and dealer commission), represents under-recoveries to OMCs.
17	Excise Duty	Excise duty on diesel is Rs. 2.00/ Litre as Road Cess + Education Cess@ 3%.
18	Dealer Commission	Dealer commission on diesel is Rs.912/KL (effective 01-July-2011) as fixed by MoP&NG.
19	VAT (Sales Tax)	VAT at applicable rate in respective State. It varies from state to state. Currently in Delhi, State Taxes on Diesel is VAT @ 12.50% + Aircharges Ambience Rs.250/KL less Rebate of Rs.375/KL. ¹ (Footnotes)

Annexure-2

Year	Quarter	WPI	GDP	RSBIALR	WDP	M3	REER	RID	TE
1997-98	Q1	69.99	4,44,141	6.54	34.75	724347	100.23	100.59	47011
	Q2	70.59	4,15,782	10.04	38.00	744252	102.23	102.07	44395
	Q3	71.25	5,11,145	9.43	44.41	768304	100.33	157.11	50997
	Q4	71.82	5,24,205	10.47	44.28	821332	100.67	104.17	89059
1998-99	Q1	73.87	4,74,453	1.76	42.45	854466	94.59	104.20	58925
	Q2	75.18	4,50,319	5.87	42.05	901150	92.53	104.60	61570
	Q3	75.97	5,41,763	8.83	42.04	923698	90.66	146.80	58905
	Q4	75.47	5,55,409	15.62	38.77	980960	93.25	80.42	99936
1999-00	Q1	76.29	5,08,031	7.99	40.93	1010682	95.80	95.50	58655
	Q2	77.20	4,77,729	7.24	41.48	1050431	95.31	95.98	116427
	Q3	78.34	5,75,680	6.10	56.31	1095461	95.68	118.80	65668
	Q4	78.66	5,90,747	10.36	57.39	1124174	95.85	100.43	107851
2000-01	Q1	81.22	5,34,015	-1.79	57.56	1177524	100.37	94.35	57083
	Q2	82.11	5,09,576	7.24	58.24	1203254	99.04	92.40	73032
	Q3	84.50	6,01,040	0.38	69.23	1272412	100.62	52.67	74706
	Q4	84.80	6,01,253	10.32	69.42	1313220	99.75	69.68	120790
2001-02	Q1	85.64	5,58,398	7.55	69.81	1384395	102.03	94.06	65089
	Q2	86.26	5,36,359	8.59	69.81	1407906	100.92	91.67	79126
	Q3	86.63	6,41,663	9.77	71.02	1450506	100.23	113.15	86413
	Q4	86.12	6,39,936	13.88	69.96	1498355	99.93	88.62	130813
2002-03	Q1	87.20	5,86,721	5.96	69.99	1609476	98.59	83.97	75715
	Q2	89.04	5,65,198	2.59	74.80	1640398	98.31	80.85	86735
	Q3	89.46	6,52,312	8.91	76.41	1682014	98.43	67.42	93047
	Q4	90.58	6,63,301	5.74	82.89	1717960	97.06	108.39	157467
2003-04	Q1	92.58	6,18,382	1.78	82.49	1802324	98.16	98.45	76722
	Q2	93.06	6,16,131	8.42	80.01	1831608	100.81	104.94	140379
	Q3	94.32	7,26,041	5.07	82.11	1896318	99.80	107.68	99202
	Q4	95.84	7,17,159	3.83	89.41	2005676	98.87	107.24	171296

2004-05	Q1	97.93	6,95,045	1.50	90.27	2063158	100.22	97.71	89691
	Q2	100.10	6,90,774	1.40	97.33	2089590	99.54	87.27	105882
	Q3	100.90	7,81,082	7.05	105.10	2144718	99.53	88.94	131218
	Q4	101.17	8,04,564	9.19	108.07	2245677	100.55	125.65	170891
2005-06	Q1	102.70	7,60,412	4.19	109.13	2346586	102.02	96.86	93584
	Q2	104.33	7,52,534	3.89	119.07	2469655	104.22	98.52	117399
	Q3	105.27	8,56,505	6.67	125.30	2515565	101.41	110.02	121516
	Q4	105.57	8,84,765	9.11	125.30	2719519	101.76	83.85	152090
2006-07	Q1	108.80	8,31,321	-1.67	127.40	2774582	96.98	100.68	131470
	Q2	111.50	8,26,243	0.99	133.70	2941688	96.38	99.37	120474
	Q3	112.50	9,36,709	7.41	132.30	3005860	99.73	78.87	131777
	Q4	112.60	9,71,738	11.52	127.37	3310068	100.50	81.40	199665
2007-08	Q1	114.67	9,12,135	5.41	125.10	3381174	108.63	99.14	179900
	Q2	115.90	9,05,075	8.45	125.00	3585036	109.63	105.01	137992
	Q3	116.60	10,26,552	10.33	125.00	3705541	109.10	67.83	156361
	Q4	119.33	10,55,198	3.16	127.20	4017883	106.35	92.40	238479
2008-09	Q1	124.97	9,84,293	-6.63	133.73	4107165	102.15	94.59	168939
	Q2	128.67	9,74,497	1.41	142.20	4283545	100.30	97.87	180142
	Q3	126.70	10,86,506	19.49	139.50	4444030	95.54	69.26	248135
	Q4	123.73	11,17,212	21.62	127.83	4794812	92.84	60.85	286740
2009-10	Q1	125.90	10,46,307	5.25	125.70	4958599	91.76	74.55	196971
	Q2	129.37	10,58,778	0.74	133.90	5120569	92.26	77.31	251877
	Q3	132.43	11,66,082	2.27	133.90	5245346	95.82	107.63	258692
	Q4	135.57	12,22,574	2.29	138.37	5602731	99.61	74.20	316947
2010-11	Q1	139.17	11,43,590	1.13	146.20	5710606	103.02	99.26	242208
	Q2	141.37	11,53,270	5.68	153.50	5899292	100.27	102.19	295769
	Q3	144.23	12,63,428	4.33	153.57	6225207	102.40	121.30	248875
	Q4	148.53	13,17,553	0.95	153.60	6499548	102.66	82.72	412067

Sources of Data:

The data for GDP was obtained from national account statistics. Wholesale prices of all commodities and for diesel have been taken from the website of office of the Economic Adviser to the Government of India, Ministry of Commerce and Industry. The data on rainfall index was obtained from Directorate of Economics and Statistics, Department of Agriculture and Cooperation. The data on money supply, real exchange rate, advanced lending rate and total government expenditure has been taken from the RBI website



C-80, Shivalik, Malviya Nagar, New Delhi – 110017

Telephone: +91 11 2667 6181

+91 11 2667 6180

+91 11 2668 2226

Website: www.irade.org