Goods and Services Tax in the Context of Petroleum and Natural Gas

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Preface

The study on 'Goods and Services Tax in the Context of Petroleum and Natural Gas' was undertaken by the National Institute of Public Finance and Policy (NIPFP) at the request of the Petroleum Federation of India, New Delhi. The study analyses the impact of keeping crude petroleum, natural gas, motor spirit, high speed diesel and aviation turbine fuel out of the Value Added Tax (VAT) tax scheme. Specifically, the study finds that keeping these items out of the input tax credit mechanism (either partially or fully) would have high distortionary effects. It proposes more appropriate method of taxing petroleum products under the Goods and Services Tax regime.

This study was carried out by Dr. Sacchidananda Mukherjee, Assistant Professor at NIPFP under the supervision of Dr. R. Kavita Rao, Professor, NIPFP. The views expressed in the report are that of the author and the members of the Governing Body of the institute are no way responsible for them.

M. Govinda Rao

Director

1. Introduction

Various taxes, duties, levies and cesses on petroleum products and natural gas generate substantial revenues to the Central and State Governments. The contribution of tax revenue from petroleum sector varies across the States depending on their production and consumption base of petroleum products and the prevailing tax rates.[1] The tax on petroleum products and corresponding change in prices generates both direct and indirect effects across the sectors. Petroleum products directly enter as a factor of production for a large number of economic activities (e.g., transport, electricity generation, fertilisers etc.). Apart from such direct uses, there are number of indirect uses as well; for instance, since most commodities need to be transported for use by the final consumer, petroleum products enter into the picture here as well. Similarly, inputs require for the production of end products and supplies of services could be using petroleum products as fuel or as an input. Therefore, changes in prices (or taxes) of petroleum products have substantial impact on the economy both through direct impact and indirect or cascading impact.

The VAT regime in India at the State level has worked by keeping both crude petroleum and natural gas out of the purview of Input Tax Credit (ITC) of VAT and not allowing ITC against purchase of a segment of refined petroleum products (petrol, diesel and aviation turbine fuel). Since crude petroleum and natural gas are exempted from Central Excise Duty, there are no provision for ITC against Central Taxes paid on input goods and services. For refinery products, a large number of States in India (Andhra Pradesh, Bihar, Gujarat, Haryana, Jharkhand, Karnataka, Kerala, Madhya Pradesh, Maharashtra, Orissa, Tamil Nadu, Delhi, Uttar Pradesh and West Bengal) allow input tax credit of VAT on inputs. Since refinery products attract Central Excise Duty, the ITC against input goods and services is adjusted against CENVAT. The first discussion paper of Goods and Services Tax (GST) proposes a similar design of tax for this sector (The Empowered Committee of State Finance Ministers, 2009) where neither the crude petroleum sector nor the natural gas sector get credit for input taxes paid – these get embedded in their costs of production (see Annexure I). Since ITC against purchase of Motor Spirit, High

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[1] If not specifically mentioned, by petroleum products we mean all petroleum products (Motor Spirit, High Speed Diesel, Aviation Turbine Fuel and other petroleum products), crude oil and natural gas.

Speed Diesel and Aviation Turbine Fuel is not allowed; it increases the costs of production and distribution of goods and services. The sectors which use crude petroleum and/or natural gas as their inputs of production are not allowed to avail off their ITC against purchase input crude oil and natural gas. Non-inclusion of crude petroleum, natural gas and refined petroleum products under GST system would have spirals of cascading impacts across the sectors. The present study assesses the impact of distortionary effects of taxes on different sectors in the economy (under the present regime and alternative regime of taxation of petroleum products) and identifies suitable methods of taxation for inclusion of petroleum products under GST.

By using Input-Output framework, this paper attempts to capture the extent of cascading across the sectors. The approach adopted in this study explicitly incorporates the non-rebatable components of the tax into the Input-Output framework and derives the extent of cascading across sectors. This paper builds up alternative scenarios and estimates the direct and total tax incidence across the sectors for each of the scenarios.

Following the traditional logic of a value added tax, the keeping out petroleum sector out of GST cannot be considered desirable. International experience on taxation of this sector proposes a levy of GST on these products along with a traditional excise which would be non-rebatable. This study attempts to assess the impact of these alternative strategies.

In the next section, we provide a brief summary on pricing mechanism of petroleum products. Reform in the taxation of this sector is constrained by the excessive dependence of the Central and State Governments on this sector for their revenues. Section 3 provides the revenue contribution of petroleum sector in Central and State Government exchequers. Section 4 describes the methodology and data sources for analysing the impact of the alternative tax strategies, and section 5 summarises the results. This is followed by concluding remarks in section 6.

2. Pricing of Petroleum Products

Since, prices of petroleum products are administered in India,[2] the oil companies cannot freely change the market prices of the petroleum products in response to volatility of international crude oil prices and/or their other costs of production.[3] Therefore, domestic market prices of petroleum products do not necessarily reflect either the international crude oil prices or the costs of production (excluding the international crude oil prices),[4] which results in periodic adjustments in domestic market prices to compensate in part the loss incurred by the oil companies. Whenever there is a need to adjust fuel prices in the country, any Government has options whether to transfer the entire burden of price hike to the consumers or cut tax rates and share a burden in terms of tax revenue loss or to finance, in part, the under recoveries in prices of petroleum products. Therefore, any attempt to decontrol the prices of petroleum products could increase the retail price. If not, then Government could compensate the oil companies by incurring a cost of foregoing of indirect tax revenue. In India, Governments have used both the options to reduce the inflationary pressure in the domestic market prices caused by uncertain international crude oil prices induced loss to the oil companies. Since, petroleum products are used by all the economic activities – either directly or indirectly, any change in prices of petroleum products will have direct and indirect pressure on the costs of production across the sectors and therefore results in general price inflation. Therefore, the response of tax cut and corresponding loss to the Government exchequer is mainly to reduce inflationary pressures on a short run basis. The volatility of exchange rate is another factor which also contributes to the changes in the costs of import of crude oil. Unlike other inputs of production, electricity and petroleum products (as a source of energy) have both direct and indirect impacts on the costs of production of other goods and services (Mukherjee and Rao, 2009).

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[2] Under administered pricing, prices of petroleum products are controlled at four stages - production, refining, distribution and marketing - on the principle of compensating normative cost and allowing a pre-determined return on investments to the oil companies (dominated by public sector companies).

[3] Even if petrol price is decontrolled, the price is neither entirely linked to international crude oil prices nor linked to domestic costs of production (including taxes). Periodic revision of price of petrol depending on the under-recoveries of the oil companies is still in practice.

[4] Cost of production also includes refinery margin, taxes, levies, transportation costs and dealer's margin.

The pricing mechanism of natural gas is different from petroleum products and it can be better explained as follows:

"The Ministry of Petroleum & Natural Gas (MOP&NG) has been regulating the allocation and pricing of gas produced by ONGC and OIL by issuing administrative orders from time to time. The gas produced by the JVs and by NELP operators is governed by the respective production sharing contracts (PSC) between the Government and the producers." (Source: http://petroleum.nic.in/ng.htm, Accessed on 7 October 2011.)

3. Revenue Generation from Petroleum Products

The contributions of petroleum products in Central Government exchequer (indirect tax revenue) are through customs duties, cess on crude oil, excise duty and service tax charged on input of services. The contributions to the State Government exchequer (indirect tax revenue) are through sales tax/ VAT, central sales tax, octroi and entry tax.

The estimated contribution of indirect tax revenue from petroleum products to the Central Government exchequer has gone up from Rs. 46,533 Crore in 2002-03 to Rs. 99,928 crore in 2010-11(Provisional) (Table 1). Central excise duty and customs duty collection from oil companies constitute the major share in total indirect tax collection from petroleum companies to the Central Government. For State Government exchequer, the revenue collection from petroleum companies has gone up from Rs. 30,493 Crore in 2002-03 to Rs. 84,340 Crore in 2010-11(P). Sales tax collection from petroleum companies constitutes the major share in total indirect tax revenue collection for State Governments.

Table 1: Estimated Contribution of Petroleum Products to Central and State Government Exchequer through Indirect Taxes (in Rs. Crore)*

	2002-03	2003-04	2004-05	2005-06	2006-07	2007-08	2008-09	2009-10	2010-11 (P)
Central Exchequer									
Customs Duty	7,953	9,552	11,697	9,157	10,043	12,626	6,299	4,563	24,136
Cess on Crude Oil	5,213	4,766	4,891	4,884	6,899	6,924	6,758	6,559	6,810
Excise Duty	32,964	35,364	38,150	47,180	51,922	54,761	54,117	62,480	68,040
Others (includes service tax)	403	425	439	347	666	944	870	982	942
Sub total	46,533	50,107	55,177	61,568	69,530	75,255	68,044	74,584	99,928
State Exchequer									
Sales Tax	29,166	32,080	38,935	46,667	53,949	56,445	63,349	64,999	78,689
Octroi and Others (includes Entry Tax)	1,327	1,440	2,047	2,368	2,416	2,788	2,466	3,717	5,651
Sub total	30,493	33,520	40,982	49,035	56,365	59,233	65,815	68,716	84,340
Total	77,026	83,627	96,159	1,10,60	1,25,89	1,34,48	1,33,85	1,43,30	1,84,268

Notes: (P) – Provisional Figure; *- Royalties and direct taxes (corporate tax, tax on dividend) are excluded
Data Source: PPAC (2010, 2009, 2008)

The average share of central excise collection from petroleum sector during 2002-03 to 2010-11 was 45.7 per cent of total Central excise duty collection (last Column in Table 2). During the same period, the average share of collection of customs duty from crude petroleum and petroleum products was 14.2 per cent of total collection of customs duties. The average share of sales tax collection from crude petroleum and petroleum products during 2002-03 to 2010-11 was 33.1 per cent of total sales tax collection of the States. The average collection of Central excise duty and sales tax together was Rs. 101,029 crore during 2002-03 to 2010-11. In 2006-07, total Central excise duty and sales tax collection from petroleum sector was Rs. 105,871 crore. The collection of taxes and duties from petroleum sector under cess on crude oil, Central excise duty, others (includes service tax), sales tax, octroi and others (includes entry tax) constitutes 2.94 per cent of GDP in 2006-07 (Table 2).

Given the revenue importance of the sector and having substantial environmental consequences of consumption of petroleum products, the sector attracts different tax treatment both from Central and State Governments. However, this is not an exception in India only; petroleum sector attracts differential tax treatment across the world (Gupta and Mahler, 1995). There are several factors that drive taxation of petroleum

products (see Gupta and Mahler, 1995) – charging for benefits and costs (e.g., road use, congestion, the environment), income distribution, revenue generation, foreign exchange and strategic considerations, domestic taxation of petroleum products in oil exporting countries, resource conservation/rent etc. Apart from these, price inelasticity of demand for petroleum products is the major factor that makes possible to put a high tax on petroleum products for policy makers. The civil society organisations working on environmental conservations and public health often argue in favour of high tax rates on petroleum products to discourage use or to provide incentives to use alternative fuels (e.g., CNG, LPG and electric cars). Combustion of petroleum products (gasoline, diesel etc.) generates a cocktail of pollutants which is the main source of ambient air pollution for cities and towns in India (Government of India, 2002). Therefore, from environmental and public health stand point, petroleum products are seen as 'sin' products. This provides one explanation for the high rates of tax on petroleum products. Apart from local impact on environment, combustion of fossil fuel generates Green House Gases (GHGs) like carbon monoxide, carbon dioxide. Therefore to comply with international environmental commitments, in future we may have to reduce our emissions of GHGs from sectors where petroleum consumption is high (e.g., transport sector).

Table 2: Revenue Collection from Petroleum Products & Natural Gas (Rs. Crore)

Revenue from Petroleum Sector	2002-03	2003-04	2004-05	2005-06	2006-07	2007-08	2008-09	2009-10	2010-11 (P)	Average: 2002-11
Central Excise Duty Collection from Petroleum Products	32,964	35,364	38,150	47,180	51,922	54,761	54,117	62,480	68,040	49,442
Customs Duties Collection from Petroleum Products	7,953	9,552	11,697	9,157	10,043	12,626	6,299	4,563	24,136	10,670
Sales Tax Collection from Petroleum Products	29,166	32,080	38,935	46,667	53,949	56,445	63,349	64,999	78,689	51,587

General Revenue Collection (Rs. '000 Crore)	2002-03	2003-04	2004-05	2005-06	2006-07	2007-08	2008-09	2009-10 (RE)	2010-11 (BE)	Average: 2002-11
Total Union Excise Duty Collection	82.3	90.8	99.1	111.2	117.6	123.6	108.6	102.0	132.0	107.5
Total Customs Duty Collection	44.9	48.6	57.6	65.1	86.3	104.1	99.9	84.5	115.0	78.4
Total General Sales Tax Collection	83.8	98.0	116.2	136.5	162.3	167.7	190.8	210.2	248.1	157.1
Gross Domestic Product (at Current Prices) (2004-05 Series)	2,332.1	2,617.5	2,967.6	3,402.3	3,941.9	4,541.0	5,228.7	5,868.3	7,307.0	4,245.1

Percentage Shares	2002-03	2003-04	2004-05	2005-06	2006-07	2007-08	2008-09	2009-10 (RE)	2010-11 (BE)	Average: 2002-11
Collection of Central Excise Duty from Petroleum Products as % of Total Collection of Central Excise Duty	40.0	39.0	38.5	42.4	44.1	44.3	49.8	61.3	51.5	45.7
Collection of Sales Tax from Petroleum Companies as % of Total Sales Tax Collection	34.8	32.7	33.5	34.2	33.2	33.7	33.2	30.9	31.7	33.1
Collection of Customs Duties from Import of Petroleum Products as % of Total Customs Duty Collection	17.7	19.6	20.3	14.1	11.6	12.1	6.3	5.4	21.0	14.2
Collection of Cess on Crude Oil, Excise Duty, Others (includes service tax), Sales Tax, Octroi & Others (includes Entry Tax) (Rs. '000 Crore)	69.1	74.1	84.5	101.4	115.9	121.9	127.6	138.7	160.1	110.4
Collection of All Taxes & Duties from Petroleum Products as % of GDP	2.96	2.83	2.85	2.98	2.94	2.68	2.44	2.36	2.19	2.69

Data Source: Ministry of Finance (2011), PPAC (2010, 2009, 2008), CSO (Gross State Domestic Product)

4. Methodology and Data Sources

To capture the economy-wide cascading impacts of any change in prices (or taxes) of petroleum products, we estimated the direct and total tax incidence for each of the sectors under alternative policy scenarios to address the issue of taxation of petroleum products in India. We adopted Input – Output (I-O) Analysis Framework to address the issue of limited pass through under VAT system. Given the tax rates, we constructed different scenarios to suit the present and proposed tax regimes on petroleum sector. Under each scenario, we suitably capture the input tax credit pass through mechanisms by constructing a matrix by using I-O framework. By this framework, we capture the direct, total and cascading impacts under each scenario.

The Central Statistical Organisation (CSO) has released the Input flow (Absorption) Matrix, also known as the Commodity x Industry Matrix, and Output flow (Make) Matrix, also known as the Industry x Commodity Matrix for 2006-07, and covers 130 items.[5] For the purpose of this study, these 130 items are clubbed into 46 sectors. By using these two basic matrices, Commodity x Commodity Matrix, also known as Input-Output Transaction Table or balanced matrix, is constructed for 2006-07 before clubbing 130 items under 46 sectors (for methodology - see Appendix 2 of Input – Output Transaction Table for 2003-04 in CSO, 2008). The Input-Output Coefficient Matrix (Commodity x Commodity) is derived from the Input – Output Transaction Table (see methodology provided below). Each cell in Input – Output Coefficient Matrix (Commodity x Commodity), say a_{ij}, shows the amount (in Rs.) of ith good requires to produce Re. 1 value of jth good.

The methodology used to construct the I-O Coefficient Matrix from I-O Transaction Table (Commodity x Commodity) is as follows:

$$\sum_{i=1\forall j}^{130} X_{ij} + NIT_j + GVA_j = TO_j \, \forall j$$

Where, X_{ij} is the input flow from ith commodity to jth commodity in Rs. Lakh

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[5] Weblink: http://www.mospi.nic.in/mospi_cso_rept_pubn.htm (last accessed on May 15, 2011)

$\sum_{i=1}^{130} X_{ij}$ is the total input/ commodity used by the jth commodity (in Rs. Lakh)

NIT_j is the Net Indirect Taxes of the jth commodity (in Rs. Lakh)

GVA_j is the Gross Value Added by the jth commidity (in Rs. Lakh)

TO_j is the Total Output of the jth commodity (in Rs. Lakh)

V_j is the value added vector for the jth commodity, where $V_j = GVA_j/TO_j$

First, we sum up X_{ij} across j at given i to combine 130 items under 46 sector and get X_{ij^*}. Then, we sum up X_{ij^*} across i at given j* to get the input flow matrix for 46 sectors, i.e., $X_{i^*j^*}$. Similarly, we also get the GVA_{j^*} and TO_{j^*} for 46 sectors. We estimate the I-O Coefficient Matrix for the 46 sector by dividing $X_{i^*j^*}$ for given j* by TO_{j^*} and get $a_{i^*j^*}$.

Therefore, $a_{i^*j^*} = X_{i^*j^*|j^*} / TO_{j^*}$

4.1 Methodology for Estimation of Direct and Total Tax Incidences

We consider a model for six sectors to understand the process of cascading of taxes on natural gas, crude petroleum and petroleum products under the present and proposed tax regimes. The sectors considered are natural gas, crude petroleum, petroleum products, electricity, exempted goods and services and other goods and services which are taxed. The model is then extended to cover 46 sectors of the economy. Briefly, the present regime of taxation keeps natural gas and crude petroleum beyond the purview of input tax credits both at the Central and State level. There is no tax credit available for exploration and production companies of these products for any input taxes they may have to bear. Further, any taxes on these commodities cannot be setoff when these commodities are used as inputs in the production of any other commodity or in providing of services. However, in case of petroleum products, limited input tax credit is allowed and refineries avail off the ITC both for Central (CENVAT) and State Taxes (VAT) depending on which State they are operating. But no ITC is allowed against purchase of petroleum products as inputs. In other words, no CENVAT or VAT credit is available for MS, HSD and ATF to manufacturers/ intermediate consumers or service providers, e.g., taxi operators etc. However, ITC on petroleum products other than

Motor Spirit (MS), High Speed Diesel (HSD) and Aviation Turbine Fuel (ATF) is allowed, however the information on commodity-wise (130 Items) consumption of petroleum products into two baskets – basket a) MS, HSD & ATF and b) other petroleum products – is not available from secondary sources and it restricts us to accommodate the same into the present I-O framework.[6] Both for Central and State Governments, a few goods and services are exempted from taxation which implies that inputs tax paid by those exempted sectors cannot demand input tax credit (e.g., agriculture sector cannot claim ITC against their purchase of goods and services). In the present study we have considered agriculture and allied activities (including fishing), forestry and logging, water supply, education and R&D, public administration, social security and health & social work as exempt goods and services. The prices for each of the sectors can be represented as follows. Since consumption of goods within the factory of production cannot usually be subject to a tax (intra-sector transactions), there is no tax associated with a_{ij}s where i=j. The system of price equations for the sectors can be written as:[7]

$$P_g = P_g a_{11} + (P_c+\beta) a_{21} + (P_p+\gamma) a_{31} + (P_e+\delta) a_{41} + P_{oe} a_{51} + (P_{ot}+\tau) a_{61} + V_g$$

$$P_c = (P_g+\alpha) a_{12} + P_c a_{22} + (P_p+\gamma) a_{32} + (P_e+\delta) a_{42} + P_{oe} a_{52} + (P_{ot}+\tau) a_{62} + V_c$$

$$P_p = (P_g+\alpha) a_{13} + (P_c+\beta) a_{23} + P_p a_{33} + (P_e+\delta) a_{43} + P_{oe} a_{53} + (P_{ot}+\mu\tau) a_{63} + V_p$$

$$P_e = (P_g+\alpha) a_{14} + (P_c+\beta) a_{24} + (P_p+\gamma) a_{34} + P_e a_{44} + P_{oe} a_{54} + (P_{ot}+\tau) a_{64} + V_e$$

$$P_{oe} = (P_g+\alpha) a_{15} + (P_c+\beta) a_{25} + (P_p+\gamma) a_{35} + (P_e+\delta) a_{45} + P_{oe} a_{55} + (P_{ot}+\tau) a_{65} + V_{oe}$$

$$P_{ot} = (P_g+\alpha) a_{16} + (P_c+\beta) a_{26} + (P_p+\gamma) a_{36} + (P_e+\delta) a_{46} + P_{oe} a_{56} + P_{ot} a_{66} + V_{ot}$$

Where

Prices

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[6] The present study is based on Input – Output table as released by the Central Statistical Organization (CSO) under Ministry of Statistics and Programme Implementation. The present form of I-O table provides information for 130 items in which there are three items, Item No. 28: Natural gas, Item No. 29: Crude petroleum and Item No. 63: Petroleum products, related to the petroleum sector. I-O table provides item-wise information on various inputs required to produce output of a sector. To spilt the petroleum products into two baskets – a) MS, HSD, ATF and b) Other petroleum products – in the input-output table, we need item-wise information on combinations of petroleum products (under two baskets) used as input across 130 commodities, which is not available from the present I-O table or any other alternative sources. Apart from input side information we also need information on Net Indirect Taxes, Total Output, Private Final Consumption Expenditure, Government Final Consumption Expenditure, Gross Fixed Capital Formation, Change in Stock, Export and Import of petroleum products separately for two baskets. In absence of this information, the present study cannot accommodate separate tax treatments for two baskets of petroleum products.

[7] Though intra-sector inter-companies transactions are subject State taxes, for simplicity, we exempted such transactions from taxation

P_g: Producers' price of *natural gas*

P_c: Producers' price of *crude petroleum*

P_p: Producers' price of *petroleum products*

P_e: Producers' price of *electricity*

P_{oe}: Producers' prices of *other goods and services which are exempted from taxes*[8]

P_{ot}: Producers' prices of *other goods and services which are taxed*

Input-Output Coefficient

a_{ij}: to produce Re. 1 value of output in the jth sector, input requirement from the ith sector

Taxes

α: tax on natural gas (i.e., State sales tax etc.)

β: tax on crude petroleum (i.e., State sales tax etc.)

γ: tax on petroleum products (e.g., Central excise duty and State sales tax etc.)

δ: tax on electricity (e.g., State electricity duty)

τ: tax on goods and services (other than on natural gas, crude petroleum, petroleum products and electricity) (e.g., Central excise duty and State sales tax etc.)

μ: the percentage of tax (τ) which is not setoff as input tax credit. For example, if 60 per cent of ITC is availed off, $\mu = 0.40$.

Value added vectors

V_g: gross value added per unit of output of natural gas

V_c: gross value added per unit of output of crude petroleum

V_p: gross value added per unit of output of petroleum products

V_e: gross value added per unit of output of electricity

V_{oe}: gross value added per unit of output of tax exempted other goods and services

V_{ot}: gross value added per unit of output of other taxed goods and services

In matrix notation, we could write the above set of price equations as follows:

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[8] The exempted goods and services are - agriculture and allied activities (including fishing), forestry and logging, water supply, education and R&D, public administration, social security and health and social work

$$\begin{pmatrix} P_g \\ P_c \\ P_p \\ P_e \\ P_{oe} \\ P_{ot} \end{pmatrix} = \begin{pmatrix} a_{11} & a_{12} & a_{13} & a_{14} & a_{15} & a_{16} \\ a_{21} & a_{22} & a_{23} & a_{24} & a_{25} & a_{26} \\ a_{31} & a_{32} & a_{33} & a_{34} & a_{35} & a_{36} \\ a_{41} & a_{42} & a_{43} & a_{44} & a_{45} & a_{46} \\ a_{51} & a_{52} & a_{53} & a_{54} & a_{55} & a_{56} \\ a_{61} & a_{62} & a_{63} & a_{64} & a_{65} & a_{66} \end{pmatrix}' \bullet \begin{pmatrix} P_g \\ P_c \\ P_p \\ P_e \\ P_{oe} \\ P_{ot} \end{pmatrix} + \begin{pmatrix} V_g \\ V_c \\ V_p \\ V_e \\ V_{oe} \\ V_{ot} \end{pmatrix}$$

$$+ \begin{pmatrix} 0 & a_{12} & a_{13} & a_{14} & a_{15} & a_{16} \\ a_{21} & 0 & a_{23} & a_{24} & a_{25} & a_{26} \\ a_{31} & a_{32} & 0 & a_{34} & a_{35} & a_{36} \\ a_{41} & a_{42} & a_{43} & 0 & a_{45} & a_{46} \\ a_{51} & a_{52} & a_{53} & a_{54} & 0 & a_{56} \\ a_{61} & a_{62} & \mu a_{63} & a_{64} & a_{65} & 0 \end{pmatrix}' \bullet \begin{pmatrix} \alpha \\ \beta \\ \gamma \\ \delta \\ 0 \\ \tau \end{pmatrix}$$

$$\Rightarrow P = A' \bullet P + V + \widehat{A}' \bullet t$$

$$\Rightarrow P = (V + t \bullet \widehat{A}') \bullet (I - A')^{-1}$$

$$\Rightarrow P = V \bullet (1 - A')^{-1} + t \bullet \widehat{A}' \bullet (I - A)^{-1}$$

where P is the price vector, A is the input coefficient matrix, V is the value added vector, t is the tax vector and $\widehat{A}$ is A matrix where certain elements are zero. To estimate the total revenue from a sector, we need to multiply the price vector with the final demand vector (FD). Within this framework,

$$\text{Direct Tax Incidence} = t \bullet \widehat{A}' \bullet FD$$

$$\text{Total Tax Incidence} = t \bullet \widehat{A}' \bullet (I - A')^{-1} \bullet FD$$

It is to be mentioned here that Input Flow Matrix provides information for 130 items on Private Final Consumption Expenditure (C), Government Final Consumption Expenditure (G), Gross Fixed Capital Formation (I), Export (X) and Import (M). According to national accounting framework, the output (Y, final demand) or Total Final Use is determined by Y (or F) = C+I+G+(X-M). We adopted the same framework and found that a few sectors having substantial import and Y is negative for those sectors. To get final demand for 46 sectors from 130 sectors we have followed the same methodology as discussed above.

Input-Output (I-O) framework adopted for the study does not allow us to calculate the revenue for Central Government and State Governments separately. Therefore the Revenue Neutral Rates (RNRs) are estimated based on the alternative scenarios where consolidated indirect tax collections of the Central and State Governments' are taken into consideration. In this study by revenue we mean the revenue stream that we have estimated by using the tax rates and final consumption demands (as discussed above) for 46 sectors. It is expected that the estimated revenue will reflect the consolidated indirect tax revenue streams of the Central and State Governments together, though not perfectly match the same, in absence of exemptions (other than those considered here), thresholds, differential tax rates, other taxes (other than those considered here), distortions in tax policies and inefficiency in tax administrations. The present study considers alternative scenarios which are in line with on-going discussions on the introduction of GST in India (see Annexure I for underlying rationale behind the scenarios).

4.2 Discussion on Scenarios

Scenario I (Baseline Scenario): Natural Gas, Crude Petroleum, Petroleum Products and Electricity are out of GST. There are exempted goods & services.

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\widehat{A}'_1 = \begin{pmatrix} 0 & a_{12} & a_{13} & a_{14} & a_{15} & a_{16} \\ a_{21} & 0 & a_{23} & a_{24} & a_{25} & a_{26} \\ a_{31} & a_{32} & 0 & a_{34} & a_{35} & a_{36} \\ a_{41} & a_{42} & a_{43} & 0 & a_{45} & a_{46} \\ a_{51} & a_{52} & a_{53} & a_{54} & 0 & a_{56} \\ a_{61} & a_{62} & \mu a_{63} & a_{64} & a_{65} & 0 \end{pmatrix}' \qquad t_1 = \begin{pmatrix} \alpha \\ \beta \\ \gamma \\ \delta \\ 0 \\ \tau \end{pmatrix}
$$

and

This is the baseline scenario which resembles the present structure of indirect taxation prevalent in India. For tax exempted goods and services there is no input tax credit is admissible. Intra-sector transactions are exempted from taxations. There is limited ITC admissible for refineries which is captured through μ.

Scenario II: Natural Gas and Electricity are under GST, Crude Petroleum and Petroleum Products are out of GST. There are exempted goods and services.

$$\hat{A}'_2 = \begin{pmatrix} 0 & a_{12} & a_{13} & 0 & a_{15} & 0 \\ a_{21} & 0 & a_{23} & a_{24} & a_{25} & a_{26} \\ a_{31} & a_{32} & 0 & a_{34} & a_{35} & a_{36} \\ 0 & a_{42} & a_{43} & 0 & a_{45} & 0 \\ a_{51} & a_{52} & a_{53} & a_{54} & 0 & a_{56} \\ 0 & a_{62} & \mu a_{63} & 0 & a_{65} & 0 \end{pmatrix}' \qquad t_2 = \begin{pmatrix} \tau \\ \beta \\ \gamma^* \\ \tau \\ 0 \\ \tau \end{pmatrix}$$

and

This is an improvement over the baseline scenario. Since a substantial part of natural gas goes to electricity sector, keeping natural gas out of GST will only add additional costs for electricity sector. The inclusion of natural gas under GST also help the fertiliser sector also as a considerable part of natural gas is used as feed stock and fuel for fertiliser sector, for which no input tax credit is admissible to fertiliser industries which adds on additional subsidy burden on the Government. Since natural gas and electricity is under GST, they will attract standard GST rate ($\alpha=\delta=\tau$). However, for natural gas, since the final consumption demand is negligible, the tax rate becomes immaterial as it enters as intermediate input in production. The companies dealing with natural gas and electricity will get input tax credits (full) for their input goods and services (except for goods and services which are not under the VAT/GST system, e.g., crude oil, petroleum products, exempted goods and services). The sectors which are under the GST system also avail off ITC credit against their input of natural gas and electricity. In this scenario, the companies dealing with petroleum products will continue to get partial ITC for their input goods and services (except items which are out of GST). To move from Scenario I (Baseline Scenario) to Scenario II, the revenue foregone by the Government in terms of allowing ITC for natural gas and electricity sectors and also allowing sectors under GST to avail off full ITC for their input natural gas and electricity, could be compensated by an additional tax on petroleum products and the tax would be the same like present tax on petroleum products. In other words, if present tax on petroleum products is γ, the new tax would be γ^* which will include an additional tax on top off γ.

Scenario III: Natural Gas, Crude Petroleum, Petroleum Products and Electricity are under GST with additional excise duty on Petroleum Products. There are exempted goods and services.

$$\hat{A}'_4 = \begin{pmatrix} 0 & 0 & 0 & 0 & a_{15} & 0 \\ 0 & 0 & 0 & 0 & a_{25} & 0 \\ a_{31} & a_{32} & 0 & a_{34} & a_{35} & a_{36} \\ 0 & 0 & 0 & 0 & a_{45} & 0 \\ a_{51} & a_{52} & a_{53} & a_{54} & 0 & a_{56} \\ 0 & 0 & 0 & 0 & a_{65} & 0 \end{pmatrix}' \quad t_4 = \begin{pmatrix} \tau \\ \tau \\ \gamma^{**} \\ \tau \\ 0 \\ \tau \end{pmatrix}$$

and

This is substantial improvement over the baseline scenario. Since a significant part of crude petroleum goes to petroleum refineries, by taking crude petroleum and petroleum products under GST, the system will help refineries to get full ITC against their input crude petroleum. Refineries will further get their *full* ITC against other goods and services which are not exempted under GST.[9] By not allowing refineries to get ITC against input crude petroleum and full ITC against input goods and services, the present system puts additional cost to the refineries which they cannot pass off to consumers under the present system of administered pricing mechanism prevalent for a majority of petroleum products. Under this scenario, all the four policy sectors (natural gas, crude petroleum, petroleum products and electricity) will get input tax credits for their input goods and services which are under GST system and other sectors (those are not exempted from GST system) will get full input tax credits against their purchase of inputs from the policy sectors. Under this scenario, except petroleum products, other sectors - natural gas, crude petroleum and electricity - will attract a standard GST rate $(\alpha=\beta=\delta=\tau)$. The inclusion of the policy sector under GST will result in substantial revenue loss to the Government (in terms of payments for input tax credits) and this could be compensated with *an additional regulatory levy* (non-rebatable) on top off the standard GST rate on petroleum products. The combine tax rate is represented by γ^{**} which combines both Central and State taxes an additional regulatory levy on top the standard GST rate. The rate of the regulatory levy could vary across the States depending on their revenue protection.

Scenario IV: Natural Gas, Crude Petroleum and Petroleum Products are under GST, and Electricity is out of GST. There is additional excise duty on Petroleum Products and there are exempted goods and services.

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[9] At present refineries get *partial* ITC against their input goods and services.

$$\tilde{A'}_s = \begin{pmatrix} 0 & 0 & 0 & a_{14} & a_{15} & 0 \\ 0 & 0 & 0 & a_{24} & a_{25} & 0 \\ a_{31} & a_{32} & 0 & a_{34} & a_{35} & a_{36} \\ a_{41} & a_{42} & a_{43} & 0 & a_{45} & a_{46} \\ a_{51} & a_{52} & a_{53} & a_{54} & 0 & a_{56} \\ 0 & 0 & 0 & a_{64} & a_{65} & 0 \end{pmatrix}' \quad t_5 = \begin{pmatrix} \tau \\ \tau \\ \gamma^{\#} \\ \delta \\ 0 \\ \tau \end{pmatrix}$$

and

This scenario is an alternative to scenario III. Though keeping electricity out of GST is not desirable, to explore the alternatives, we have considered this as an option. Under this scenario, it is expected that the rate of the additional regulatory levy on top off the standard GST rate on petroleum products would be lower than that for the scenario III. The Government could opt for this scenario as an interim measure to include petroleum and natural gas sector under GST.

Scenario VI: Natural Gas (5), Crude Petroleum (5A), Petroleum Products (17) and Electricity (32) are under GST with addl. Excise duty on Petroleum Products. There are no exempted goods and services.

$$\tilde{A'}_s = \begin{pmatrix} 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 \\ a_{31} & a_{32} & 0 & a_{34} & a_{35} & a_{36} \\ 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 \end{pmatrix}' \quad t_6 = \begin{pmatrix} \tau \\ \tau \\ \gamma^{@} \\ \tau \\ \tau \\ \tau \end{pmatrix}$$

and

This is the most desirable scenario under the GST system. However, it is expected that the rate on additional regulatory levy on petroleum products could be prohibitively high under this scenario which could be a constraint to go for this scenario.

4.3 Effective Tax Rates and Assumptions

This study concentrates mainly on two taxes (Central excise duty and State sales tax) on petroleum products which will be subsumed under GST regime and GST will be levied by Central and State Governments concurrently on all goods and services. The other taxes which the sector attracts, such as customs duty, levies & cess thereof, specific cess, entry tax, octroi or entry tax (in lieu of octroi), Central Sales Tax (CST) will either

continue and remain outside the GST system or will be submerged with Central and/or State GST (e.g., entry tax – in lieu of octroi and CST).

4.3.1 Rationale behind Effective Tax Rates

Petroleum companies (refineries), except Exploration and Production (E&P) companies, are allowed to avail off the Input Tax Credit (ITC) against Central Taxes (Central Excise Duty and Service Tax). Table 3 shows that percentage of ITC claimed against Central Taxes during 2010-11 vary across companies depending on their input and output baskets. The highest percentages of ITC claimed by the companies are ESSAR, IOCL, BPCL and GAIL. Since Crude Oil and natural Gas are exempted from Central Excise Duty, there are no provision for E&P companies to avail off ITC against Central Taxes paid on input goods and services. Table 3 shows that, for all companies, 61.4 per cent of the ITC is claimed against Central Taxes.

Table 3: Company-wise details of Input Tax Credit Claimed against Central Taxes (Rs. Crore): 2010-11

Name of the Company (1)	Value of Purchase of Goods & Services (2)	Excise Duty (ED) / Service Tax (ST) Charged (3)	CENVAT setoff of Excise Duty/ Service Tax (4)	Excise Duty/ Service Tax setoff (%) (5)=(4)/(3)*100	Weighted ED/ ST Setoff*(%)
IOCL	20,801	1,505	1,376	91.4	30.8
BPCL	9,822	1,092	975	89.2	14.2
ONGC	18,214	1,876	126	6.7	2.0
RIL	8,885	953	552	57.9	8.3
ESSAR	3,820	322	304	94.3	5.8
GAIL	143	10	9	88.0	0.2
ADANI GAS	35	10	1	9.0	0.0
Total	61,719	5,769	3,342		61.4

Note: *-Weights are based on share in Total Value of Purchase (Column 2)
Source: Compiled from the Company-wise Information provided by Petroleum Federation of India, New Delhi.

Andhra Pradesh Bihar, Gujarat, Haryana, Jharkhand, Karnataka, Kerala, Madhya Pradesh, Maharashtra, Orissa, Tamil Nadu, Delhi, Uttar Pradesh and West Bengal allow petroleum companies to avail off the ITC against their State purchases of inputs (goods). The company-wise details of value of purchase and VAT and CST paid to State

Governments are presented in Table 4. The percentage of setoff availed by the companies vary depending on the States where the companies are operating and their input and output baskets. For HPCL, BPCL and IOCL, the shares are higher than others. In summary, 47.6 per cent of the State taxes that the companies paid are availed off as ITC.

Table 4: Company-wise details of Input Tax Credit Claimed against State Taxes (Rs. Crore): 2010-11

Company (1)	Value of Purchase (Rs. Crs) (2)	VAT & CST Paid (Rs. Crs) (3)	ITC Claimed (Rs. Crs) (4)	VAT Setoff (%) (5) = (4)/(3)*100	Weighted VAT Setoff*(%) (6)
IOCL	1,006.3	62.2	46.3	74.4	7.5
BPCL	896.9	67.4	58.8	87.3	7.8
HPCL	1,300.1	105.0	99.1	94.4	12.3
RIL	422.9	28.9	8.1	28.1	1.2
ESSAR	3,501.8	129.3	55.8	43.2	15.1
CAIRN	291.8	11.9	0.0	0.0	0.0
ONGC	2,128.0	96.0	17.0	17.7	3.8
ADANI	456.1	64.4	0.0	0.0	0.0
Total	**10,004.0**	**565.1**	**285.2**		**47.6**

Note: *-Weights are based on share in Total Value of Purchase (Column 2)
Source: Compiled from the Company-wise Information provided by Petroleum Federation of India, New Delhi.

From Table 3 and 4, we could conclude that petroleum companies on an average claim 60 per cent of the taxes paid to Central and State Governments as ITC, the rest is their stranded costs (Table 5).

Table 5: Weighted average of combined Central and State Taxes set off

Description	Central Taxes	State Taxes	Total
Value of Purchase (Rs. Crore)	61,719	10,004	71,723
Taxes & Duties Charged (Rs. Crore)	5,769	565	6,334
Taxes Setoff	3,342	285	3,627
Weighted Effective Tax Rate (%)	61.4	47.6	
Final Weighted Effective Tax Rate (%)*	52.8	6.6	59.5

Note: *-Weights are based on share in Total Value of Purchase (Column 4)

Effective Tax Rate on Crude Oil

The estimated effective tax (State taxes) rate on crude oil is presented in Table 6. The table is based on company-wise information provided by the PetroFed. The estinmated effective tax rate (ETR) on crude oil is 1.93 per cent of which 0.94 per cent is the ETR of VAT/ Sales Tax, 0.17 per cent is the ETR of Entry Tax (in lieu of Octroi) and 0.05 per cent is the ETR of CST. In estimation of ETR we did not take into consideration the Entry (paid to Bombay Municipal Corporation and Government of Maharashtra) as it will continue under GST regime.

Table 6: Company-wise Effective Tax Rate on Crude Oil: 2010-11

Company (1)	Value of Purchase (Rs. Crs) (2)	VAT / Sales Tax (Rs. Crs) (3)	Entry Tax (in lieu of Octroi) (Rs. Crs) (4)	Entry Tax* (5)	CST (Rs. Crore) (6)	Total (9)=(3+4+6)	Effective Tax Rate (%) (10)=(9)/(2)*100	Weighted Effective Tax Rate** (%) (11)
IOCL	1,58,798.88	779.50	518.47					
BPCL	40,261.24	490.63		1,097.23		1,297.97	0.82	0.43
HPCL	46,044.27	320.40		564.48		490.63	1.22	0.16
RIL	7,954.92				159.10	320.40	0.70	0.11
ONGC	46,115.00	1,227.00				159.10	2.00	0.05
Total	2,99,174.31	2,817.53	518.47	1,661.71	159.10	1,227.00	2.66	0.41
						3,495.10		0.76
Effective Tax Rate (%)		0.94	0.17		0.05			1.93

Note: *-Entry Tax paid on both indigenous and imported crude oil purchase to Bombay Municipal Corporation and duty paid on imported crude in Maharashtra
**-Weights are based on share in Total Value of Purchase (Column 2)
Source: Compiled from the Company-wise Information provided by Petroleum Federation of India, New Delhi.

4.3.2 Estimation of Effective Tax Rate of State Taxes on Petroleum and Natural gas

Company-wise effective tax rates are estimated based on State-wise, company-wise information shared by the Petroleum Federation of India on value of sales of petroleum products and sales tax and cess paid by the companies. Sales made in a State as percentage of total sales of a company (sum of sales across the States) is considered as weight to estimate the weighted effective tax rate for a company. The company-wise weighted effective tax rates are further weighted based on the share of the company in

total sales (across all sales all companies) and final weighted effective tax rate is estimated (see Annexure II). The weighted effective tax rates are estimated separately for a) Motor Spirit (MS) + High Speed Diesel (HSD) + Aviation Turbine Fuel (ATF), b) Petroleum Products other than MS, HSD & ATF, c) All Petroleum Products and d) Natural Gas and the effective tax rates are 19.43, 7.20, 16.71 and 12.15 per cent respectively (Table 7).

Table 7: Product-wise Effective Tax Rates of State Sales Tax: 2010-11

	Value of Sales (Rs. Crs)	VAT / Sales Tax (Rs.Crs)	State Cess (Rs.Crs)	VAT/ Sales Tax/ State Cess (Rs. Crore)	Weighted Effective Tax Rate (WETR)(%)*
Motor Spirit, High Speed Diesel & Aviation Turbine Fuel	3,72,451.97	70,616.41	1,756.30	72,372.71	19.43
Other Petroleum Products	1,06,453.03	7,642.91	20.28	7,663.19	7.20
All Petroleum	4,78,905.00	78,259.32	1,776.58	80,035.90	16.71
Natural Gas	45,767.56	5,559.96	-	5,559.96	12.15

Note: *- Share in Value of Sales is taken as weight
Source: Estimated based on Company-wise Data Shared by Petroleum Federation of India. The company-wise information is presented in Annexure II

Company-wise, product-wise effective tax rate of CST and Entry Tax are also estimated and it is presented in Annexure II. The ETR of the CST for petroleum products is 1.78 per cent and that for MS+HSD+ATF is 2.29 per cent and other petroleum products is 1.25 per cent. The ETR of the CST for natural gas is 1.75 per cent (Table 8). We have taken into consideration these ETRs in calculation of ETR for the petroleum products and natural gas (see Table 11). The ETR of the Entry Tax for petroleum products is 3.29 per cent and that of natural gas is 2.78 per cent (Table 9).

Table 8: Product-wise Effective Tax Rate of Central Sales Tax (CST): 2010-11

	Value of Sales (Rs. Crs)	CST (Rs.Crs)	Weighted Effective Tax Rate (WETR)(%)*
Motor Spirit, High Speed Diesel & Aviation Turbine Fuel	65,583.48	1,499.60	2.29
Other Petroleum Products	62,398.54	777.15	1.25
All Petroleum Products	1,27,982.01	2,276.75	1.78
Natural Gas	9,783.21	170.86	1.75

Note: *- Share in Value of Sales is taken as weight
Source: Compiled from the Company-wise Information provided by Petroleum Federation of India, New Delhi. The company-wise information is presented in Annexure II

Table 9: Product-wise Effective Tax Rate of Entry Tax: 2010-11

	Value of Sales (Rs. Crs)	Entry Tax (Rs.Crs)	Weighted Effective Tax Rate (WETR)(%)*
Motor Spirit, High Speed Diesel & Aviation Turbine Fuel	51,974.96	1,734.72	3.34
Other Petroleum Products	9,727.29	292.67	3.01
All Petroleum products	61,702.25	2,027.39	3.29
Natural gas	2,693.55	74.99	2.78

Note: *- Share in Value of Sales is taken as weight
Source: Compiled from the Company-wise Information provided by Petroleum Federation of India, New Delhi. The company-wise information is presented in Annexure II

4.3.3 Estimation of Effective Tax Rate of Central Excise Duty

Company-wise effective tax rates of Central Excise Duty (Basic Excise Duty, Additional Excise Duty and Special Additional Excise Duty) are estimated based on the data shared by the Petroleum Federation of India. The final effective tax rate is estimated based on the weights assigned to companies based on their share in total production of petroleum products. The effective tax rates are estimated separately for a) Motor Spirit (MS) + High Speed Diesel (HSD) + Aviation Turbine Fuel (ATF), b) Other Petroleum Products and c) All Petroleum Products and the estimated weighted effective tax rates are 22.44, 9.38 and 17.72 per cent respectively. The company-wise details of taxes and the effective tax rates are presented in Annexure-II

Table 10: Estimation of Effective Tax Rate of Central Excise Duty as on 2010-11

Name of the Company	Value of Production (Rs Crores)	Central Taxes (Rs Crores)				Weighted Effective Tax Rate (WETR) (%)*
		Basic Excise Duty	Additional Excise Duty	Spl. Additional Excise Duty	Total	
Motor Spirit, High Speed Diesel and Aviation Turbine Fuel	2,18,784.56	33,752.43	8,179.74	7,160.02	49,092.19	22.44
Other Petroleum Products	1,23,112.80	11,547.15	1.06	0.39	11,548.61	9.38
All Petroleum Products	3,41,897.36	45,299.59	8,180.80	7,160.41	60,640.80	17.72

Note: *- Share in Value of Sales is taken as weight
Source: Compiled from the Company-wise Information provided by Petroleum Federation of India, New Delhi. The company-wise information is presented in Annexure II

The effective tax rates for natural gas, crude petroleum, petroleum products and other goods and services are presented in Table 11. The estimated ETRs are taken into

consideration for the estimation of consolidated revenues of the Central Government and State Governments across scenarios.

Table 11: Tax Rates as on 2010-11 and Assumptions[#]

Sl. No.	Description	Central Excise Duty*	State Sales Tax**	Central Sales Tax	Entry Tax	Total	Remarks
1	Natural Gas	Nil	12.15%	1.75%	2.78%	16.68% Approximately 17.00%	Effective State Sales Tax Rate is estimated based on data shared by the Petroleum Federation of India.[##]
2	Crude Petroleum	Nil	0.94	0.05	0.17	1.93 Approximately 2.00%	See Table 3 above
3	Petroleum Products	17.72%	16.71%	1.78%	3.29%	39.5% Approximately 40.00%	The effective tax rates are estimated based on data shared by the Petroleum Federation of India.[##]
4	Electricity	Nil	5.00%	--	--	5.00%	Statutory tax rate on electricity (as electricity duty) across the States is 5.00%.
5	Other Goods and Services (other than Sl. No. 1-4)	10.00%	10.00%	--	--	20.00%	The effective tax rate on goods and services is taken as 20.00% with equal share of Central Excise Duty and State Sales Tax.

Notes: #- please note that taxes are on output. However, outputs going as inputs for other sectors the same tax rate will apply.

*-includes basic excise duty, additional excise duty and special additional excise duty

**- includes State sales tax and State cesses on all petroleum products

##-The procedure for estimation of effective tax rates are discussed above

Source: Computed & Estimated

5. Results and Discussion

Since, the State Governments and the Central Government are dependent on the revenues from this sector, it is important to understand, what a change from Scenario I (Baseline) to an alternative scenario would entail, if the revenue requirements are not to be compromised. In the present scenario, we estimate the revenue neutral rate of additional regulatory levy on

petroleum products required in compensating the revenue forgone due to inclusion of petroleum products under GST.[10] The revenue neutral rate of excise duty on petroleum products is calculated by taking into consideration the difference between total tax incidence under Scenario I and alternative scenarios. The rationale behind this is that under Scenario I, where natural gas, crude petroleum, refined petroleum products and electricity are kept out of GST system, the total tax incidence across sectors will be higher as compared to the alternative scenarios, where gradually natural gas, crude petroleum, petroleum products and electricity are taken under GST system. However, to derive the rate of additional regulatory levy on petroleum products we have considered that ITC is not allowed against input petroleum products across all goods and services. For intermediate input, ITC on petroleum products will be allowed up to standard GST rate and additional regulatory levy will be non-rebatable. In order to derive a "Revenue Neutral Tax Rate" on petroleum products, the total revenue (indirect and direct) for all the sectors from Scenario I is sought to be generated through alternative scenario. By revenue, we mean the indirect tax revenue stream that we have estimated through our I-O framework and estimated effective tax rates which is supposed to resemble the actual consolidated (Central and State Government taken together) indirect tax revenue stream. The present exercise estimates the rates and presented the same in Table 12. In scenario I to IV, the input tax costs borne by goods and services exempted from VAT or GST is considered as stranded costs resulting to revenues to the Government.

To move baseline scenario to scenario II, an additional 7 per cent tax on petroleum products is required for revenue protection of Central and State Governments. Please note that the tax on petroleum products will be same as prevalent at present. To move from baseline scenario to scenario III, an additional regulatory levy of 33.00 per cent (non-rebatable) on petroleum products is required on top off the standard GST rate of 20.00 per cent to protect the revenues of the Governments. To move from baseline scenario to scenario IV, an additional regulatory levy of 27.00 per cent on petroleum products is required on top off the standard of GST rate to protect the revenues of the Governments. However, the rate of the regulatory levy will vary across the States depending on their present revenue collection from petroleum products. For a few States in India, we have estimated the consolidated (Central and State Government

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[10] The Revenue Neutral Tax Rates are estimated for this study are based on the total indirect tax revenue stream that are estimated under different scenarios based on the tax rates and final demand vector as we have explained in the methodology section.

together) revenue neutral rates corresponding to scenario IV and presented in section 5.

Table 12: Alternative Scenarios and Revenue Neutral Rates#

Scenario	Description of the Scenario##	Natural Gas (%)	Crude Petroleum (%)	All Petroleum Products* (%)	Electricity (%)	Tax exempted Goods & Services (%)	Other Goods & Services (%)
Scenario I (Baseline)	In GST: Other Goods and Services Out of GST: Natural Gas, Crude Petroleum, Petroleum Products & Electricity	17.00	2.00	40.00	5.00	0.00	20.00
Scenario II	In GST: Other Goods and Services, Natural Gas & Electricity Out of GST: Crude Petroleum & Petroleum Products	20.00	2.00	47.00 (RNR)	20.00	0.00	20.00
Scenario III	In GST: Other Goods and Services, Natural Gas, Crude Petroleum, Petroleum Products & Electricity	20.00	20.00	53.00 (RNR)	20.00	0.00	20.00
Scenario IV	In GST: Other Goods and Services, Natural Gas, Crude Petroleum & Petroleum Products Out of GST: Electricity	20.00	20.00	47.00 (RNR)	5.00	0.00	20.00
Scenario V	In GST: Other Goods and Services, Natural Gas, Crude Petroleum, Petroleum Products & Electricity There are no exempted goods & services	20.00	20.00	76.00 (RNR)	20.00	20.00	20.00

Notes: # - Tax rates presented and estimated here are all effective tax rates except for electricity.

- Except for Scenario V, all Scenarios include exempted Goods and Services as defined/ classified in the text.

*-Petroleum Products includes Motor Spirit, High Speed Diesel and Aviation Turbine Fuel and all other Petroleum Products. Separate Revenue Neutral Tax Rates are not calculated for the following two baskets – a) MS, HSD & ATF and b) other petroleum products. Input tax credit availed by refineries are taken into consideration in this analysis.

Source: Computed

5.1 Estimation of Revenue Neutral Rates: Consolidated Centre and States Together

Scenario I (Baseline) to Scenario II: To move from present scenario to scenario II where both natural gas and electricity are taken under GST, the revenue loss to the Governments' exchequer is compensated by an additional tax on all petroleum products. The estimated tax rate is 47.00 per cent and the tax is just like the present tax on petroleum products. The benefit of this scenario is that it will reduce the stranded taxes on sectors which use natural gas as an input (e.g., fertiliser companies and electricity companies) and also help the natural gas sector to get input tax credit for their manufacturing inputs. By keeping electricity under GST, the system will allow the electricity companies to get their inputs tax credit (other than those goods and

services which are either exempted or kept out of GST system) and also reduce stranded costs across the sectors for their input tax payment for their purchase of electricity.

Scenario I (Baseline) to Scenario III: To move from present scenario to scenario IV where natural gas, crude petroleum, petroleum products and electricity are taken under GST, the revenue loss (in terms of payments for ITC) to the Governments' exchequer is compensated by an additional regulatory levy (non-rebatable) on petroleum products. The estimated tax rate is 53.00 per cent and the tax is cascading type but the companies producing crude petroleum and petroleum products could claim their input tax credits. If the standard GST rate is 20.00 per cent then additional regulatory levy on petroleum products would be 33.00 per cent, and this will be applied on top off the standard GST rate. This scenario will reduce the cascading effect across the sectors. Apart from the above benefits that discussed above, the additional benefits from this scenario would be accrued to downstream petroleum (E&P) companies where they could claim for their input tax credits which are presently stranded costs for them. Any benefit to downstream companies could be beneficial for upstream petroleum companies also as their inputs will be free from stranded (hidden) costs. Benefits also be reaped by all the sectors which use crude petroleum and petroleum products - directly and/or indirectly (through petroleum products imbedded in goods and services) - as there will be no stranded costs for the petroleum companies.

Scenario I (Baseline) to Scenario IV: To move from present scenario to scenario IV where natural gas, crude petroleum and petroleum products are taken under GST and electricity is kept out of GST, the revenue loss to the Governments' exchequer is compensated by an additional regulatory levy on all petroleum products. The estimated rate of additional regulatory levy on petroleum products is of 27.00 per cent and it will be on top off the standard of GST rate of 20.00 per cent to protect the revenues of the Governments. Under this scenario, the petroleum companies – both upstream and E&P companies - could claim their input tax credits. Other goods and services sectors (other than those which are not exempted or kept out of GST) could claim their input tax credits against purchase of petroleum products up to 20.00 per cent - relating to standard GST rate - but cannot claim ITC against additional regulatory levy payable (i.e., 27.00 per cent) on top off the standard GST rate for petroleum products. Under this scenario the electricity sector cannot claim for their input tax credits and also other sectors which are using electricity as an input cannot claim for the electricity duty they pay.

Scenario I (Baseline) to Scenario V: To move from present scenario to scenario V where natural gas, crude petroleum, petroleum products and electricity are taken under GST and all

goods and services are brought under the tax net (that implies there are no exempted goods and services or sectors out of GST), the revenue loss to the Governments' exchequer is compensated by an additional regulatory levy on petroleum products. The estimated tax rate is 76.00 per cent and the tax is cascading type but the companies producing petroleum products could claim their input tax credits. Under the scenario, exempted goods and services which were not used to get the input tax credit for their consumption of taxed inputs will be getting input tax credit. The revenue loss to the Governments (in terms of payment for input tax credit) is compensated through an additional regulatory on petroleum products on top off the standard GST rate. The estimated rate of additional regulatory levy is 56.00 per cent which is very high.

Among all the scenarios explored above and analysed their tax implications, a move from the present scenario to Scenario III, where all petroleum items (natural gas, crude petroleum and petroleum products) and electricity are taken under GST and the present exemption on goods and services continue, could be an ideal move. However, the move demands an additional 33.00 per cent regulatory levy (non-rebatable, cascading type) on all petroleum products on top of the standard GST rate to protect the consolidated revenue of the Central and State Governments. For an interim measure, the move from present scenario to Scenario IV, which has all the features of the Scenario III except that electricity is kept out of GST, could be suggested as it demands a lower additional regulatory levy of 27.00 per cent on all petroleum products on top off the standard GST rate of 20.00 per cent. To achieve Scenario V could be a long term vision for GST in India.

If the revenue loss due to switchover to proposed GST regime (Scenario IV),[11] from the present VAT system (Scenario I), is compensated by an additional tax on all goods and services (including crude oil, natural gas and refined petroleum products), the additional tax rate on all goods and services will be 5.04 per cent. This scenario is generated by taking the final demand for consumption (C+G) of all goods and services as tax base to meet the revenue stream corresponding to Scenario I (i.e., the total tax incidence under scenario I. The estimated tax rate is high because we have excluded the tax incidence on change in stock or investment (I) and international trade (X-M) which also constitute to GDP and contribute consolidated indirect tax revenue of the Central and State Governments.

The present study not only estimates the tax cascading for petroleum sector (natural gas, crude petroleum and petroleum products) but also for

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[11] As proposed by the Department   First
Discussion Paper on GST in India (Department of Revenue,
Commission's Task Force on GST (Thirteenth Finance Commission, 2009)

sector as input both directly and indirectly. By using I-O framework the present study estimates the direct and total tax incidence and the difference between direct and total tax incidence is the cascading impact and it is presented in Table 13.

In Table 13, the ratio of *direct tax incidence* and total tax incidence shows the degree of cascading.[12] Lower the ratio (that implies Total Tax Incidence > Direct Tax Incidence) higher the cascading. The cascading effect is higher in Scenario I where all the tax rates are positive as compared to Scenario IV or Scenario V. Again cascading goes up in scenario VI. While total tax incidence as well as direct tax incidence for all the sectors other than the petroleum sector would increase with a shift from Scenario I to Scenario IV, the impact on the former is much lower than that on the latter. In other words, we would be in a more transparent tax regime as compared to the present system where hidden taxes contribute a much larger share to total tax revenues. This however, does not mean that there would be no cascading in the system. Cascading would remain since there would be some non-rebatable taxes in place.

Table 13 shows that among manufacturing sectors - manufacturing of foods and beverages, manufacturing of tobacco products, textiles (including apparels), leather products, wood & wood products (excluding furniture), publishing and printing, fabricated metal products, manufacturing of machinery, manufacturing of electrical machinery, manufacturing of radio, TV and communication equipments, manufacturing of medical instruments, watches & clocks, manufacturing of motor vehicles, manufacturing of transport equipments, manufacturing of furniture and other manufacturing (n.e.c.) – and among services – construction, retail and wholesale trade, hotels and restaurants, other transport activities, real estate activities, computer and related activities and other business activities and other services have substantial cascading effects.

There are two broad implications of the above numbers:

1. Depending on composition of economic activities, different States will have different impacts of taxation on fuels. States having larger share in sectors with greater cascading impacts will have larger impacts.

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[12] By 'direct tax incidence' we mean that total indirect taxes that are collected from the final consumption of goods and services. The term 'direct tax incidence' is not related to direct taxes (personal income tax, corporation income tax) as is generally understood.

2. For economic activities which are vertically integrated, a large chunk of taxes on fuels could be evaded. Therefore, keeping out of petroleum products from GST will create distortions in the market. This clearly, is not the intent of the regime.

5.2 Estimation of Revenue Neutral Rates: State-wise Impacts

Since Input-Output Table for States are not available for 2006-07, we have taken All India Input-Output Table to estimate state specific RNRs. The assumption behind this is that the States exhibit the same structure of production - that means choice of technology and input intensity of production is same for All India and States. By using State-wise GSDP at factor cost (1999-00 series) at current prices by industry of origin as final demand, we estimate the revenue neutral rate for a few States selected on the basis of their production and consumption base of petroleum products (Table 14). Since, sector-wise GSDP data released by the CSO does not provide information on manufacturing of refined petroleum products separately, we use the Annual Survey of Industries (ASI) Data for 2005-06 (Government of India, 2009) to get State-wise share of manufacturing of refined petroleum products in total manufacturing gross value added. We used the same share to assign the GSDP for manufacturing of refined petroleum products (Table 14). We replicate the Input – Output Analysis (as described above) with 16 sectors (one sector is manufacturing of refined petroleum products) and get the revenue neutral rate for each of the States. In calculation of state-specific RNRs, we assumed that agriculture, forestry & logging, fishing and public administration are exempted from taxation and electricity, gas and water supply are out of GST. The constructed scenario the best represents the Scenario IV as we have discussed above. Table 15 shows that states having higher share in production of refined petroleum products (Col. C) (e.g., Assam, Gujarat and Maharashtra) need to have higher excise duty on refined petroleum products to meet the revenue needs. Please note that the RNRs are estimated based on the consolidated indirect tax revenue of the concerned State and the Central Government (based on estimated

Table 14: GSDP at Current Prices (1999-2000 Series): 2006-07 (Rs. Lakh)

Sector	Assam	AP	Gujarat	Karnataka	Kerala	MP	MH	Rajasthan	TN	Bihar
Agriculture	15,538	57,181	38,162	29,830	19,561	34,489	61,299	35,725	33,425	25,657
Forestry & logging	629	1,789	737	2,273	1,514	1,976	3,519	2,495	1,245	1,583
Fishing	1,384	7,141	2,255	942	2,644	333	1,642	125	2,802	1,323
Mining & quarrying	4,833	12,014	7,998	2,932	610	5,262	3,361	3,697	1,976	80
Manufacturing	2,978	30,784	57,484	35,000	10,406	13,953	79,126	19,252	53,835	6,206
Petroleum Products	3,483	2,195	26,798	1,481	1,091	50	25,798	239	1,324	(1,328)
Construction	3,477	24,765	16,802	20,081	20,539	11,854	35,116	21,719	27,865	8,910
Electricity, gas and water supply	1,001	6,274	7,668	4,184	2,647	4,535	7,724	4,453	3,522	1,150
Railways	1,260	3,161	1,639	1,308	614	2,654	3,470	1,352	2,411	1,982
Transport by other means (including storage)	1,938	13,501	9,825	8,498	9,758	4,284	25,483	5,241	15,007	2,364
Communication	980	4,992	4,511	3,520	3,433	2,030	11,748	2,706	5,337	1,126
Trade, Hotels and Restaurants	10,239	37,273	42,753	31,436	31,867	18,404	92,414	21,982	51,575	23,260
Banking & insurance	1,935	12,463	13,748	13,336	7,036	5,406	59,801	5,927	18,708	3,521
Real estate, ownership of dwellings and business services	2,142	25,325	13,179	29,110	14,350	9,714	58,822	9,742	22,480	4,973
Public administration	3,625	12,136	7,122	7,805	6,632	5,815	17,157	6,343	11,832	6,121
Other services	8,987	26,292	12,042	14,049	12,309	12,315	30,980	12,346	23,574	12,650
GSDP Total	64,429	2,77,286	2,62,723	2,05,784	1,45,009	1,33,073	5,17,459	1,53,344	2,76,917	99,579

Source: CSO (Gross State Domestic Product) & ASI

Table 14: State-wise Estimation of Revenue Neutral Rate of Taxation of Petroleum products

	Gross Value Added (Rs. Lakh)		Percentage Share of Petroleum Products in All Manufacturing (%)	Revenue Neutral Rate (%)
	Manufacturing of Refined Petroleum Products (NIC 04-3 Digit Code: 232)	All Manufacturing		
State	(A)	(B)	(C)=(A)/(B)*100	(D)
Assam	221,523	410,918	53.9	55.0
Andhra Pradesh	139,286	2092,933	6.7	47.0
Gujarat	1834,240	5768,839	31.8	59.0
Karnataka	99,218	2443,272	4.1	47.0
Kerala	49,647	523,307	9.5	47.0
Madhya Pradesh	3,064	857,366	0.4	46.0
Maharashtra	2066,866	8406,208	24.6	53.0
Rajasthan	11,793	960,316	1.2	46.0
Tamil Nadu	81,065	3378,260	2.4	47.0
Bihar	-18,232	66,941	-27.2	44.0

Source: Col. A&B have been taken from Government of India (2009) and Col. C&D have been estimated

6. Conclusions

The present analysis shows that as an input of production, any change in prices (or tax rates) of petroleum products will have both direct and indirect (cascading) impacts across the sectors. The economy wide impacts of taxes on petroleum products have been captured in our analysis and we have shown that impacts will vary across the sectors. Sectors having larger direct impact have larger tax incidence. Depending on composition of economic activities across States, different States will have different tax incidence. Non-inclusion of fuels under GST regime will result in non-payment or partial payment of input tax credit to the companies, as a result of which the costs of production will go up. While this may be part of the design in a regime which would like to encourage sustainable development, it is far from clear whether there are additional benefits to be obtained by not allowing for input tax credit for inputs going into the production of these fuels as well. The paper attempts to present case where the same total revenue impact and the deterrent through non-rebatable taxes on petroleum products can be introduced without the need for cascading of the input taxes into petroleum sectors as well. In these cases, the extent of cascading seems to be distinctly lower, which recommends this approach even for a policy advocating sustainable development. This study explores alternative scenarios and identifies a suitable method of taxation under the Goods and Services Tax (GST) Regime. A move from present scenario to scenario III is recommended, where all petroleum related items (natural gas, crude petroleum and petroleum products) and electricity are taken under GST system and *status quo* on exempted goods and services continues. To move from present scenario to the proposed scenario, an additional State specific regulatory levy could be levied on all petroleum products which will be on top off the standard GST rate.

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Table 13: Sector-wise Direct and total Tax Incidence and cascading Effect (Rs. Crore)

Description of the Sectors	Scenario-I		Scenario-II		Scenario-III		Scenario-IV		Scenario-V		Scenario-VI		Scenario-I	Scenario-IV	Scenario-V	Scenario-VI
	Direct Tax Incidence (DTI)	Total Tax Incidence (TTI)	Direct Tax Incidence (DTI)	Total Tax Incidence (TTI)	Direct Tax Incidence (DTI)	Total Tax Incidence (TTI)	Direct Tax Incidence (DTI)	Total Tax Incidence (TTI)	Direct Tax Incidence (DTI)	Total Tax Incidence (TTI)	Direct Tax Incidence (DTI)	Total Tax Incidence (TTI)	DTI/TTI	DTI/TTI	DTI/TTI	DTI/TTI
Agriculture and allied activities (incld. Fishing)	19,684	29,616	21,130	30,758	19,770	29,886	21,399	30,931	19,993	29,734	6,137	15,035	0.66	0.69	0.67	0.41
Forestry and Logging	337	425	351	444	322	429	357	448	344	430	131	260	0.79	0.80	0.80	0.50
Mining of coal and lignite																
Extraction of natural gas																
Extraction of crude petroleum																
Mining of metal ores	50	108	51	96	33	87	55	97	53	109	80	141	0.46	0.56	0.49	0.57
Other mining & quarrying																
Mfg. of foods and beverages	1,266	9,809	1,359	10,018	889	9,461	1,452	10,128	1,358	9,906	2,121	9,598	0.13	0.14	0.14	0.22
Mfg. of tobacco products	45	401	49	414	32	387	53	419	49	407	77	472	0.11	0.13	0.12	0.16
Textiles (incld. apparels)	1,439	7,796	1,337	7,199	874	6,644	1,428	7,307	1,501	7,831	2,086	9,538	0.18	0.20	0.19	0.22
Leather products	58	484	60	481	39	449	64	487	63	489	93	542	0.12	0.13	0.13	0.17
Wood and wood products (excld. Furniture)	2	12	2	11	1	10	2	11	2	12	2	14	0.14	0.14	0.15	0.17
Pulp and paper products																
Publishing and printing	32	301	29	280	19	256	31	284	34	304	46	400	0.11	0.11	0.11	0.11
Mfg. of refined petroleum pdts.	814	2,540	932	2,601	9,027	10,342	0	1,107	39	1,210	0	1,602	0.32	0.00	0.03	0.00
Mfg. Chemicals	320	818	308	760	201	696	328	772	300	767	480	1,086	0.39	0.43	0.39	0.44
Rubber and plastic products	216	1,160	217	1,074	141	985	230	1,088	226	1,135	336	1,480	0.19	0.21	0.20	0.23
Non-metallic mineral products																
Mfg. base metals																
Fabricated metal products (excld. machinery)	216	1,135	183	927	120	845	196	939	208	1,102	286	1,355	0.19	0.21	0.19	0.21
Mfg. of machinery	700	5,392	674	4,564	441	4,164	720	4,627	726	5,297	1,052	6,663	0.13	0.16	0.14	0.16
Mfg. of electrical machinery	267	1,989	270	1,721	176	1,571	288	1,745	286	1,961	421	2,507	0.13	0.16	0.15	0.17
Mfg. radio, TV, and comm. Equipments	127	1,563	120	1,348	78	1,231	128	1,368	137	1,551	187	1,961	0.08	0.09	0.09	0.10
Mfg. of medical instruments, watches and clocks	40	263	35	234	23	214	37	238	42	265	54	340	0.15	0.16	0.16	0.16
Mfg. motor vehicles	295	2,278	261	1,912	171	1,747	279	1,939	315	2,266	408	2,767	0.13	0.14	0.14	0.15
Mfg. transport equipments	199	1,169	169	945	110	863	180	959	211	1,166	263	1,378	0.17	0.19	0.18	0.19
Mfg. furniture & others manufacturing n.e.c.	34	392	35	370	22	336	36	372	35	388	52	522	0.09	0.10	0.09	0.10
Electricity, gas etc. supply	2,964	4,774	1,124	2,197	735	2,003	1,200	2,228	3,078	4,861	1,753	3,233	0.62	0.54	0.63	0.54
Water supply	280	392	302	400	301	395	303	401	281	393	8	85	0.71	0.76	0.71	0.10
Construction	32	186	33	172	22	157	36	174	34	187	52	245	0.17	0.20	0.18	0.21
Retail and wholesale trade	841	2,891	951	3,038	622	2,781	1,015	3,087	909	2,957	1,483	4,412	0.29	0.33	0.31	0.34
Hotels and restaurants	693	4,855	716	4,880	469	4,611	765	4,933	749	4,926	1,118	4,644	0.14	0.16	0.15	0.24
Land transport	25,521	32,591	29,844	36,675	19,524	33,566	31,883	37,318	27,865	33,702	46,574	53,993	0.78	0.85	0.83	0.86
Water transport	99	257	115	267	75	245	123	271	108	260	179	381	0.38	0.45	0.42	0.47
Air transport	224	342	263	380	172	348	281	387	244	351	410	559	0.65	0.73	0.70	0.73
Other transport activities	107	505	85	436	56	399	91	443	114	518	133	635	0.21	0.20	0.22	0.21
Post and telecommunications	80	275	75	228	49	209	80	232	86	280	117	333	0.29	0.35	0.31	0.35
Financial intermediaries, Banking and financial services	93	272	106	281	70	258	114	286	101	279	166	406	0.34	0.40	0.36	0.41
Insurance and pension services	102	270	109	262	71	240	116	266	111	277	170	375	0.38	0.44	0.40	0.45
Real estate activities	1	10	0	9	0	8	0	9	1	10	0	11	0.05	0.03	0.05	0.04
Renting machinery and equipments	0	1	0	1	0	1	0	1	0	1	0	2	0.00	0.00	0.00	0.00
Computer and related activities	7	718	0	678	0	635	0	686	7	724	0	735	0.01	0.00	0.01	0.00
Education and R&D	2,368	2,977	2,404	3,056	2,352	2,991	2,415	3,069	2,380	2,999	237	1,129	0.80	0.79	0.79	0.21
Other business activities	35	363	8	271	5	249	9	275	36	367	13	372	0.10	0.03	0.10	0.03
Public administration, social security and health & social work	11,751	14,784	11,870	14,761	11,694	14,481	11,905	14,813	11,791	14,691	796	4,779	0.79	0.80	0.80	0.17
Other Services (incld. Municipal services)	32	399	25	365	17	333	27	369	34	400	39	521	0.08	0.07	0.08	0.08
Total Tax Collected (Rs. Lakh)	71,370	1,34,514	75,601	1,34,514	68,723	1,34,514	77,624	1,34,514	73,851	1,34,514						

Note: Highlighted cell having negative numbers implies that Final Demand Vector is negative for the corresponding sector that implies import (M) is substantially higher than domestic production and export (C+I+G+X)

Source: Computed

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Annexure I: Scenarios and Rationale

Scenario	Rationale	Background
Scenario II	**Cascading** Both crude oil and petroleum products are kept out of GST Decision on Natural Gas – Not decided	*"Tax on Petroleum Products: As far as petroleum products are concerned, it was decided that the basket of petroleum products, i.e. crude, motor spirit (including ATF) and HSD would be kept outside GST as is the prevailing practice in India. Sales Tax could continue to be levied by the States on these products with prevailing floor rate. Similarly, Centre could also continue its levies. A final view whether Natural Gas should be kept outside the GST will be taken after further deliberations."* – First Discussion Paper on GST
Scenario III	**Limited Cascading** Crude oil is under GST and petroleum products are out of GST Decision on Natural Gas – Not decided	*"....the industrial fuels should be subjected only to GST (both Central and State) with the benefit of input credit like any other intermediate good."*- Report of the Thirteenth Finance Commission's Task Force on GST The Task Force classified the petroleum products as – (i) industrial inputs or fuels such as crude oil; (ii) transportation fuels comprising of HSD, MS and ATF; and (iii) household fuels comprising of kerosene and LPG.
Scenario IV	**Limited Cascading – Limited pass through** Both crude oil and petroleum products are under GST, with additional excise duty on petroleum products which is not credited (cascading type) Decision on Natural Gas – Not decided	*"We also recommend that the industrial fuels should be subjected only to GST (both Central and State) with the benefit of input credit like any other intermediate good."*- Report of the Thirteenth Finance Commission's Task Force on GST *"....the Task Force recommends a dual levy of GST and excise on the entire range of emission fuels. As a general rule, no input credit will be allowed to any person in respect of GST on the emission fuels since emission fuels are predominantly used in final consumption and has the potential for creating a flourishing market in trading of invoice and input tax credit.*

Scenario	Rationale	Background
		However, this general rule should be relaxed in the case of consumption of transportation fuels by the Ministry of Railways, the State Road Transport Corporations, the Airlines, truckers, taxi operators and a dealer trading in these goods on the consideration that the consumption is essentially intermediate in nature and the unlikelihood of these entities indulging in purchase of bogus invoices. However, in the case of truckers and taxi operators, the benefit of input tax credit has the potential of misuse and therefore credit may be allowed through the abatement mechanism only. Further, no input tax credit in respect of excise would be allowed to any other person." - Report of the Thirteenth Finance Commission's Task Force on GST Transportation fuels (HSD, MS & ATF) and kerosene collectively referred as "emission fuels".

Source: Computed

Annexure II

Table A1: Company-wise, Product-wise Effective Tax Rates of the Central Taxes

Name of the Company	Value of Production (Rs Crore)	Central Taxes (Rs Crore)				Effective Tax Rate (ETR) (%)	Weighted Effective Tax Rate (WETR) (%)*
		Basic Excise Duty	Additional Excise Duty	Spl. Additional Excise Duty	Total		
Motor Spirit, High Speed Diesel and Aviation Turbine Fuel							
Bharat Petroleum Corporation Limited	39,523.18	5,109.45	2,776.51	1,899.91	9,785.87	24.76	4.47
Essar Oil Limited	22,728.06	2,599.70	1,546.84	695.35	4,841.89	21.30	2.21
Hindustan Petroleum Corporation Limited	26,555.80	3,976.38	1,475.86	1,623.60	7,075.84	26.65	3.23
Indian Oil Corporation Limited	1,00,246.61	18,914.12	1,860.60	910.26	21,684.98	21.63	9.91
Reliance Industries Limited	29,730.91	3,152.78	519.92	2,030.91	5,703.61	19.18	2.61
Sub Total	**2,18,784.56**	**33,752.43**	**8,179.74**	**7,160.02**	**49,092.19**		**22.44**
Other Petroleum Products							
Adani Gas Limited	601.97	39.05	0.78	0.39	40.23	6.68	0.03
Bharat Petroleum Corporation Limited	15,095.65	2,185.18	0.28	-	2,185.46	14.48	1.78
Essar Oil Limited	4,778.08	373.01	-	-	373.01	7.81	0.30
Hindustan Petroleum Corporation Limited	14,597.21	1,327.74	-	-	1,327.74	9.10	1.08
Indian Oil Corporation Limited	52,635.87	4,573.04	-	-	4,573.04	8.69	3.71
Reliance Industries Limited	24,559.90	2,572.81	-	-	2,572.81	10.48	2.09
GAIL (India) Limited	2,325.50	154.08	-	-	154.08	6.63	0.13
Oil and Natural Gas Corporation (ONGC) Limited	8,518.60	322.24	-	-	322.24	3.78	0.26
Sub Total	**1,23,112.80**	**11,547.15**	**1.06**	**0.39**	**11,548.61**	**-**	**9.38**
All Petroleum Products							
Adani Gas Limited	601.97	39.05	0.78	0.39	40.23	-	-
Bharat Petroleum Corporation Limited	54,618.84	7,294.64	2,776.79	1,899.91	11,971.33	21.92	3.50
Essar Oil Limited	27,506.14	2,972.71	1,546.84	695.35	5,214.90	18.96	1.53
Hindustan Petroleum Corporation Limited	41,153.01	5,304.12	1,475.86	1,623.60	8,403.58	20.42	2.46
Indian Oil Corporation Limited	1,52,882.48	23,487.16	1,860.60	910.26	26,258.02	17.18	7.68
Reliance Industries Limited	54,290.82	5,725.59	519.92	2,030.91	8,276.42	15.24	2.42
GAIL (India) Limited	2,325.50	154.08	-	-	154.08	6.63	0.05
Oil and Natural Gas Corporation (ONGC) Limited	8,518.60	322.24	-	-	322.24	3.78	0.09
Total	**3,41,897.36**	**45,299.59**	**8,180.80**	**7,160.41**	**60,640.80**	**-**	**17.72**

Note: *- Weights are the share in Total Value of Production (Column 2)
Source: Computed based on data shared by the Petroleum Federation of India, New Delhi.

Table A2: Company-wise Product-wise Effective Tax Rates for State Taxes

Company	Value of Sales (Rs. Crs)	VAT / Sales Tax (Rs.Crs)	State Cess (Rs.Crs)	VAT/ Sales Tax/ State Cess (Rs. Crore)	Effective Tax Rate (ETR) (%)	Weighted Effective Tax Rate (WETR) (%)*
Motor Spirit, High Speed Diesel & Aviation Turbine Fuel						
IOCL	1,79,079.44	34,384.28	992.20	35,376.48	19.75	9.50
BPCL	96,372.29	17,588.78	421.60	18,010.38	18.69	4.84
HPCL	82,087.27	15,552.57	272.62	15,825.19	19.28	4.25
ONGC	52.72	7.40	-	7.40	14.04	0.00
RIL	6,691.94	1,465.12	27.46	1,492.58	22.30	0.40
ESSAR	7,711.16	1,505.03	42.41	1,547.44	20.07	0.42
SHELL	457.16	113.23	0.01	113.24	24.77	0.03
Sub Total	**3,72,451.97**	**70,616.41**	**1,756.30**	**72,372.71**		**19.43**
Other Petroleum Products						
IOCL	45,833.52	3,149.27	4.82	3,154.10	6.88	2.96
BPCL	21,397.01	1,575.97	3.98	1,579.95	7.38	1.48
HPCL	21,269.01	2,050.26	0.44	2,050.70	9.64	1.93
ONGC	8,412.68	213.73	-	213.73	2.54	0.20
RIL	1,946.69	80.35	-	80.35	4.13	0.08
ESSAR	2,803.83	84.95	11.03	95.98	3.42	0.09
GAIL	2,247.06	128.12	-	128.12	5.70	0.12
CASTROL	2,543.24	360.25	-	360.25	14.17	0.34
Sub Total	**1,06,453.03**	**7,642.91**	**20.28**	**7,663.19**	**-**	**7.20**
All Petroleum products						
IOCL	2,24,912.96	37,533.55	997.03	38,530.58	17.13	8.05
BPCL	1,17,769.29	19,164.74	425.58	19,590.33	16.63	4.09
HPCL	1,03,356.28	17,602.83	273.06	17,875.89	17.30	3.73
ONGC	8,465.40	221.13	-	221.13	2.61	0.05
RIL	8,638.63	1,545.48	27.46	1,572.93	18.21	0.33
ESSAR	10,514.98	1,589.99	53.44	1,643.43	15.63	0.34
SHELL	457.16	113.23	0.01	113.24	24.77	0.02
GAIL	2,247.06	128.12	-	128.12	5.70	0.03
CASTROL	2,543.24	360.25	-	360.25	14.17	0.08
Total	**4,78,905.00**	**78,259.32**	**1,776.58**	**80,035.90**	**-**	**16.71**
Natural Gas						
IOCL	2,982.67	149.36	-	149.36	5.01	0.33
BPCL	1,182.59	156.31	-	156.31	13.22	0.34
HPCL	354.19	46.59	-	46.59	13.15	0.10
ONGC	13,077.74	1,763.32	-	1,763.32	13.48	3.85
OIL	852.69	83.60	-	83.60	9.80	0.18
RIL	2,408.58	349.24	-	349.24	14.50	0.76
CAIRN	572.92	84.27	-	84.27	14.71	0.18
GAIL	23,693.98	2,842.81	-	2,842.81	12.00	6.21
ADANI GAS	642.20	84.47	-	84.47	13.15	0.18
Total	**45,767.56**	**5,559.96**	**-**	**5,559.96**	**-**	**12.15**

Note: *-weights are the share in Total Value of Sales for the corresponding segment (Column 2)
Source: Compiled from the Company-wise Information provided by Petroleum Federation of India, New Delhi.

Table A3: Company-wise, Product-wise Effective Tax Rate of Central Sales Tax

Company	Value of Sales (Rs. Crs)	CST (Rs. Crs)	Effective Tax Rate (ETR)	Weighted Effective Tax Rate (WETR) (%)*
Motor Spirit, High Speed Diesel & Aviation Turbine Fuel				
IOCL	11,172.73	386.27	3.46	0.59
BPCL	2,416.82	62.35	2.58	0.10
HPCL	1,569.01	42.82	2.73	0.07
ONGC	52.72	0.55	1.04	0.00
RIL	29,131.91	582.64	2.00	0.89
ESSAR	21,239.21	424.96	2.00	0.65
SHELL	1.08	0.02	2.00	0.00
Sub Total	65,583.48	1,499.60		2.29
Other Petroleum Products				
IOCL	26,184.97	400.69	1.53	0.64
BPCL	3,989.37	87.31	2.19	0.14
HPCL	4,676.24	99.54	2.13	0.16
ONGC	8,262.63	14.67	0.18	0.02
OIL	46.53	0.91	1.96	0.00
RIL	12,173.19	69.51	0.57	0.11
ESSAR	4,757.55	59.67	1.25	0.10
GAIL	2,110.57	40.89	1.94	0.07
CASTROL	197.50	3.95	2.00	0.01
Sub Total	62,398.54	777.15	-	1.25
All Petroleum Products				
IOCL	37,357.70	786.96	2.11	0.61
BPCL	6,406.19	149.65	2.34	0.12
HPCL	6,245.25	142.36	2.28	0.11
ONGC	8,315.35	15.22	0.18	0.01
OIL	46.53	0.91	1.96	0.00
RIL	41,305.10	652.15	1.58	0.51
ESSAR	25,996.76	484.64	1.86	0.38
SHELL	1.08	0.02	2.00	0.00
GAIL	2,110.57	40.89	1.94	0.03
CASTROL	197.50	3.95	2.00	0.00
Total	1,27,982.01	2,276.75	-	1.78
Natural Gas				
IOCL	172.67	3.25	1.88	0.03
BPCL	422.08	8.36	1.98	0.09
ONGC	1,230.20	0.08	0.01	0.00
RIL	7,859.72	157.19	2.00	1.61
GAIL	98.55	1.97	2.00	0.02
Total	9,783.21	170.86	-	1.75

Note: *-weights are the share in Total Value of Sales for the corresponding segment (Column 2)
Source: Compiled from the Company-wise Information provided by Petroleum Federation of India, New Delhi.

Table A4: Company-wise, Product-wise Effective Tax Rate of Entry Tax

	Value of Sales (Rs. Crs)	Entry Tax (Rs.Crs)	Effective Tax Rate (ETR)	Weighted Effective Tax Rate (WETR)(%)*
Motor Spirit, High Speed Diesel & Aviation Turbine Fuel				
IOCL	26,097.80	841.08	3.22	1.62
BPCL	12,958.89	420.93	3.25	0.81
HPCL	11,885.31	430.63	3.62	0.83
RIL	669.88	14.33	2.14	0.03
Essar	43.55	2.18	5.00	0.00
Shell	319.54	25.57	8.00	0.05
Sub Total	**51,974.96**	**1,734.72**		**3.34**
Others				
IOCL	5,642.50	138.80	2.46	1.43
BPCL	1,774.00	76.74	4.33	0.79
HPCL	1,873.49	64.42	3.44	0.66
Castrol	437.31	12.71	2.91	0.13
Sub Total	**9,727.29**	**292.67**	-	**3.01**
Total				
IOCL	31,740.30	979.89	3.09	1.59
BPCL	14,732.89	497.67	3.38	0.81
HPCL	13,758.79	495.04	3.60	0.80
RIL	669.88	14.33	2.14	0.02
Essar	43.55	2.18	5.00	0.00
Shell	319.54	25.57	8.00	0.04
Castrol	437.31	12.71	2.91	0.02
Total	**61,702.25**	**2,027.39**	-	**3.29**
Natural gas				
BPCL	23.72	0.53	2.24	0.02
GAIL	2,669.83	74.46	2.79	2.76
Total	**2,693.55**	**74.99**	-	**2.78**

Note: *-weights are the share in Total Value of Sales for the corresponding segment (Column 2)
Source: Compiled from the Company-wise Information provided by Petroleum Federation of India, New Delhi.