

# Global Demand Dynamics: Determinants and Policy Issues

By Bassam Fattouh

Senior Research Fellow Oxford Institute for Energy Studies

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# The Battle of the Stories

- “But what if stories themselves move markets? What if these stories of over-explanation have real effects? What if themselves are a real part of how the economy function?...The stories no longer merely explain the facts; they are the facts”

*Akerlof and Shiller; Animal Spirit, p.54*

- Discourses of oil debate dominated by two opposing views
  - Tight future market fundamentals, “likely return to oil shortages”, energy crisis
  - Elements of the story
    - Limited non-OPEC supply growth (peak oil, over-ground constraints)
    - Limited investment and weak supply growth in OPEC countries (willingness, capability, geopolitical)
    - Rapid growth in global oil demand fuelled by non-OECD countries
- New story emerging: possibility oil demand may be peaking before supply
  - Convergence of three main drivers
    - New environment of high and volatile oil prices
    - Growth of efficiency gains in transport sector
    - Impact of government policies driven by energy security concerns and climate change

# Challenges in the Post Financial Crisis World

- Uncertain environment creates three types of interrelated challenges for oil exporters
  - Short term challenge related to impact of price swings and price volatility on the development of domestic economies
  - A challenge related to decision to invest in new capacity in uncertain world
  - Long term challenge related to potential risks on oil demand

# Rebalancing the Debate

- Policy debate biased
  - Main focus on issues of supply security & ‘underinvestment’ in oil sector (consumer perspective & contradictory signals)
    - Push for higher investment in oil sector
    - *“Will government policies break the vicious circle of price volatility by reducing reliance on oil?”*
  - Demand dynamics receives much less attention
    - Growth in demand taken for granted

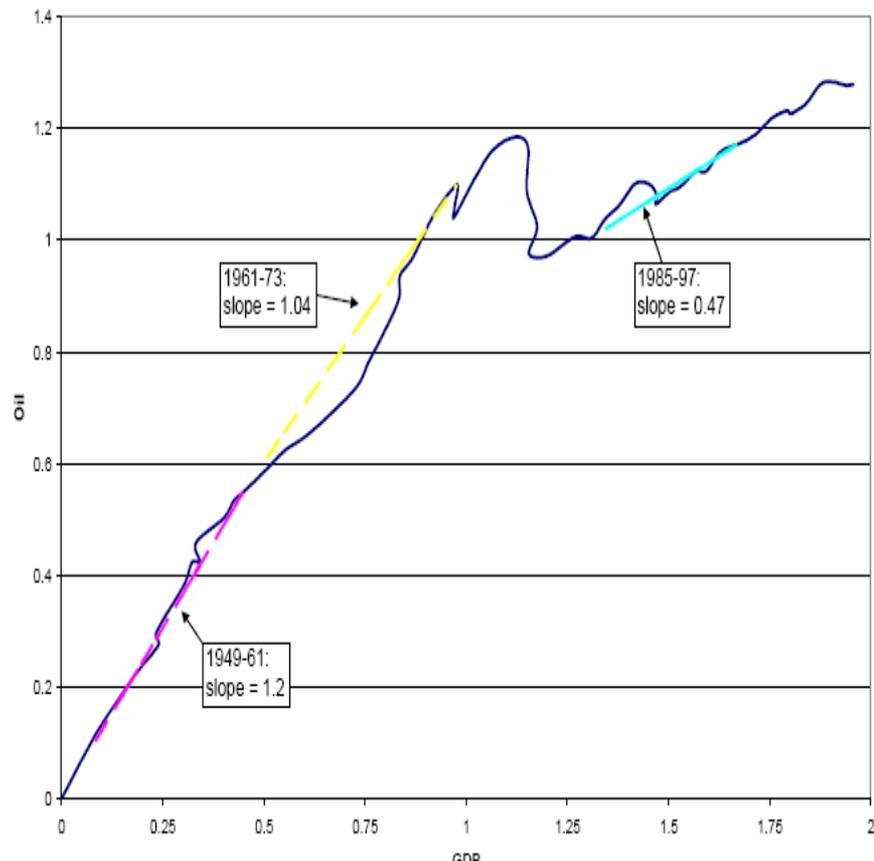
# Understanding Demand Dynamics

- Key Determinants of oil demand
  - Economic activity: Non-linear effects
    - [OECD](#)
    - [NON-OECD](#)
  - Price effects
    - [Price level](#); relative price in energy mix; price volatility; swings
  - [Factors outside oil market](#) such as financial fragility and regulatory failures can have a drastic and ever lasting impact on oil demand
  - Non-price determinants could have lasting impact on oil demand
    - Policy measures driven by energy security & climate change concerns; Convergence between energy security and climate change
    - Technology
    - Policy measures & technology should not be analysed in isolation of oil price
    - [Features of Efficiency](#) measures

# OECD Oil Demand Dynamics

- Declining income elasticity implies total expenditure on oil as percentage of household income declines
  - Higher resistance of households to oil price increases
- Other things not equal: Price effect
  - Given short run price elasticity of demand increase in the oil price induces a smaller percentage change in quantity of oil demanded
  - Expenditure share on oil out of total budget will increase as prices increase

## Changes in U.S. real GDP and oil consumption, 1949-2006



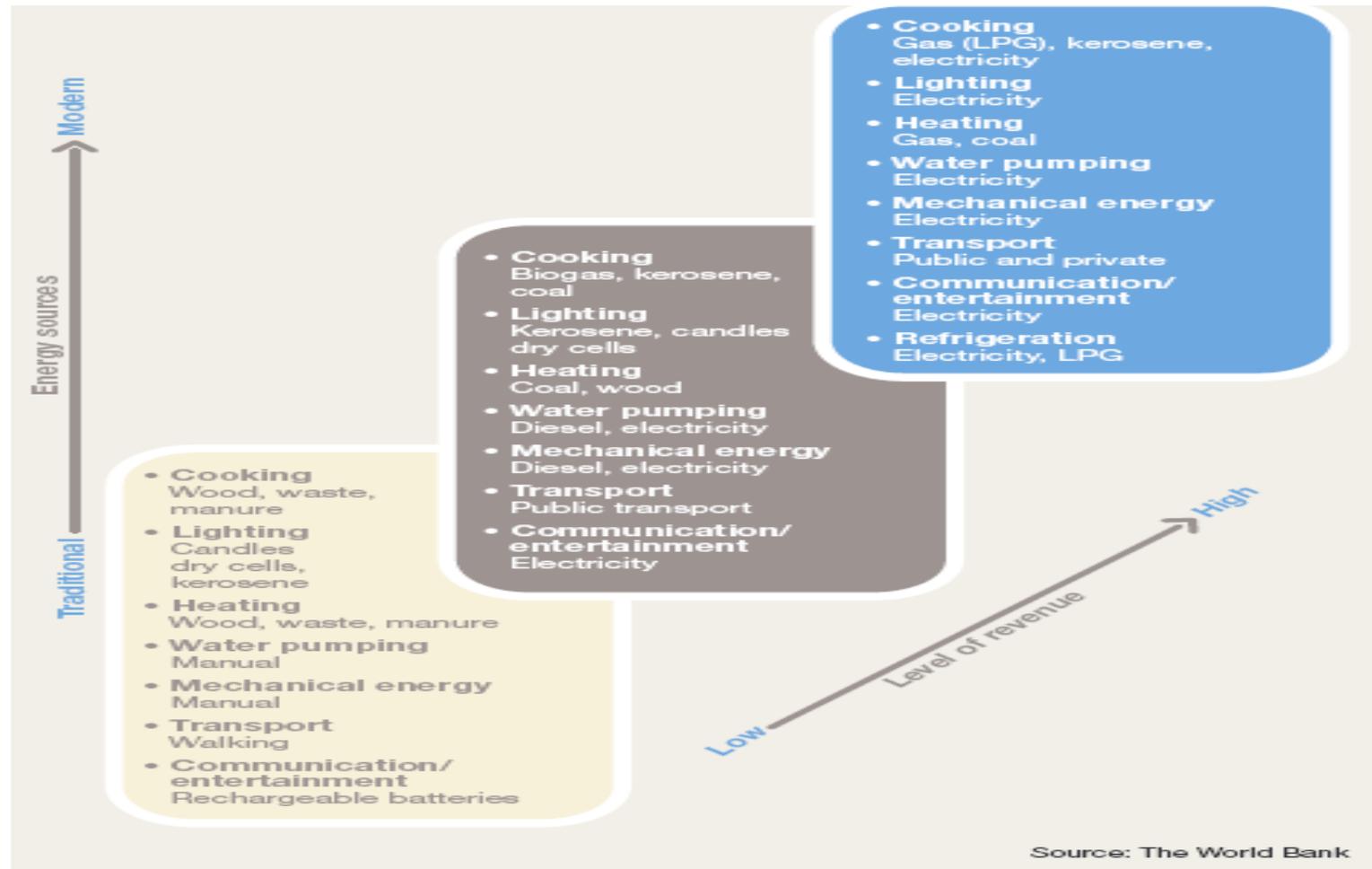
# Implications on OECD Demand

- Threshold price effects
  - Threshold price above which a small change in oil price can induce a substantial reduction in oil demand in OECD
- Share of energy expenditure out of households' total budget key factor that determines change in behaviour
  - Oil producers need to monitor this factor very closely
- Unlike latest price boom expect a faster reaction of OECD demand to oil price rises this time
  - Share of oil expenditure in household's budget higher today than at beginning of previous price boom
  - Slower growth in individual incomes

# Non-OECD Oil Demand Dynamics

- Poverty and energy poverty often go hand in hand
- Reliance on traditional fuels such as biomass and wood
  - Time consuming
  - Health consequences
  - Low productivity and poor quality output
  - Vicious circle
- Improved access to energy services one of underlying conditions for achieving Millennium Development Goals
- Energy ladder and per capita income
  - As incomes rise, households tend not only to consume more of the same fuel but also move up the energy ladder towards higher quality fuels

# Climbing Up the Energy Ladder



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# Income per capita and Vehicle Ownership

**Table 1: Household ownership of vehicles by Decile group in Sri Lanka (2006-2007)**

Decile Group	Motor		Motor		Buses/ Lorries	No vehicle
	Bicycles	bicycles/ Scooters	Three- wheelers	cars/ Vans		
Total	41.1	20.2	4.5	5.8	1.6	44.3
First	25	2	0.1	-	-	73.8
Second	34.8	3.6	0.2	0.1	-	63
Third	39.3	7	0.6	-	0.1	57
Fourth	41	12.2	1.2	0.4	0.2	52.2
Fifth	43.2	15.8	3.6	0.8	0.3	45.4
Sixth	46.5	22	4.8	1.4	0.6	40.2
Seventh	46.6	25.8	7.7	3.3	1.1	36.5
Eighth	45	33.6	7.7	5.7	1.9	31.7
Ninth	46.7	39.6	9.9	11.7	3.3	25.2
Tenth	42.9	40.5	9.4	34.4	8.3	18.2

Source: Household Income and Expenditure Survey - 2006/07 Department of Census and Statistics

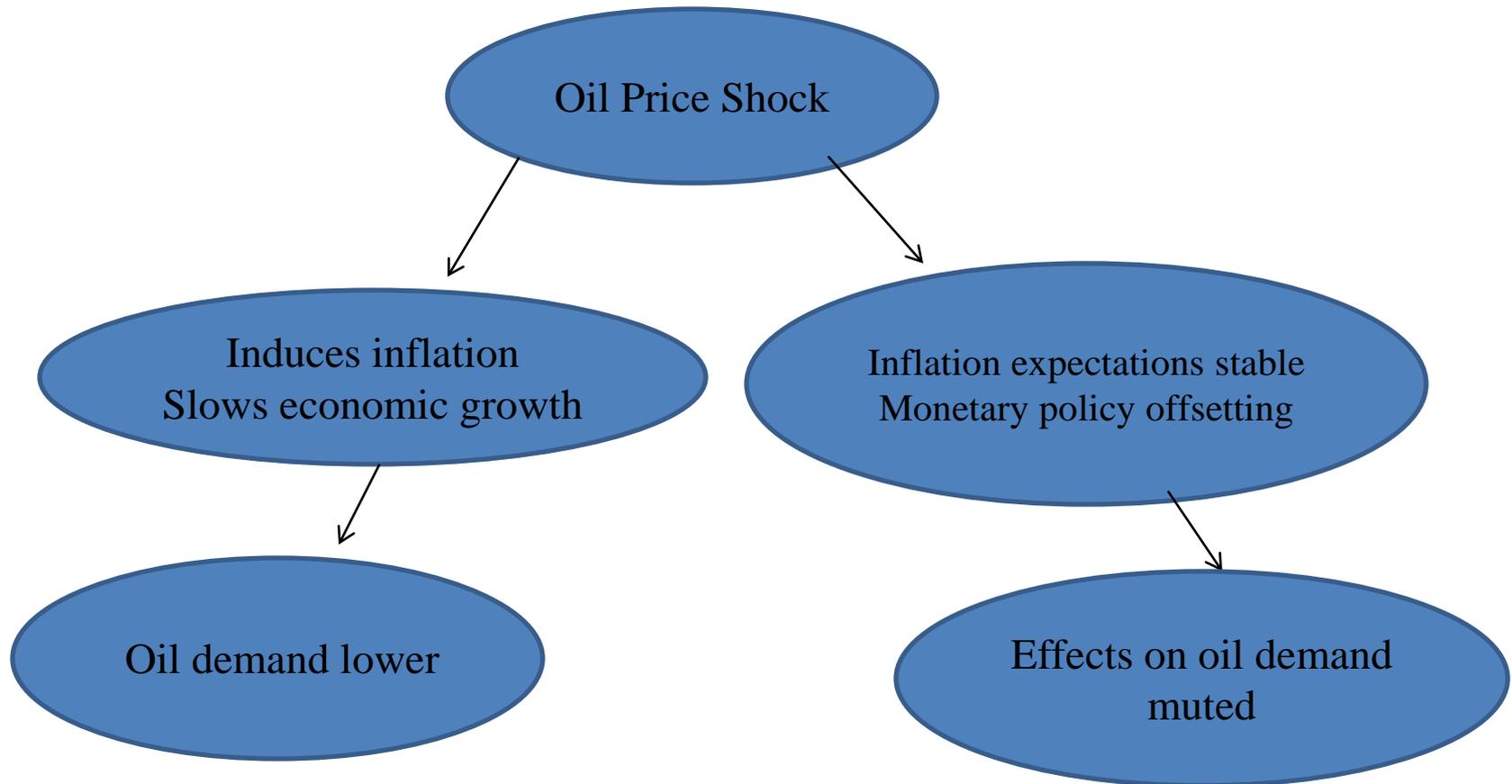
**Expenditure Share on Transport by Income Group in Sri Lanka (2006-2007)**

Income Group	Expenditure Share
First	2.94%
Second	3.52%
Third	3.93%
Fourth	4.56%
Fifth	5.33%
Sixth	5.82%
Seventh	6.57%
Eighth	7.57%
Ninth	9.02%
Tenth	11.63%

# Implications

- As income reaches a certain threshold, a group of new consumers will enter the market exerting additional demand on modern fuels
- Share on expenditure on energy out of the total budget tends to rise at early levels of economic development
  - In non-OECD percentage growth in income is likely to be associated with larger percentage growth in oil demand
- An increase in petroleum products prices will have a big impact on demand; Two effects working in the same direction
  - Share of energy expenditure out of household budget increasing
  - Financing this share becoming more costly
  - Non-OECD demand response to changes in oil prices expected to be much faster and stronger in absence of subsidies
- Most likely consuming countries would abolish fuel subsidies & an increasing trend towards raising revenues by imposing fuel taxes

# The Impact of Oil Price Shocks on Growth: Two Views



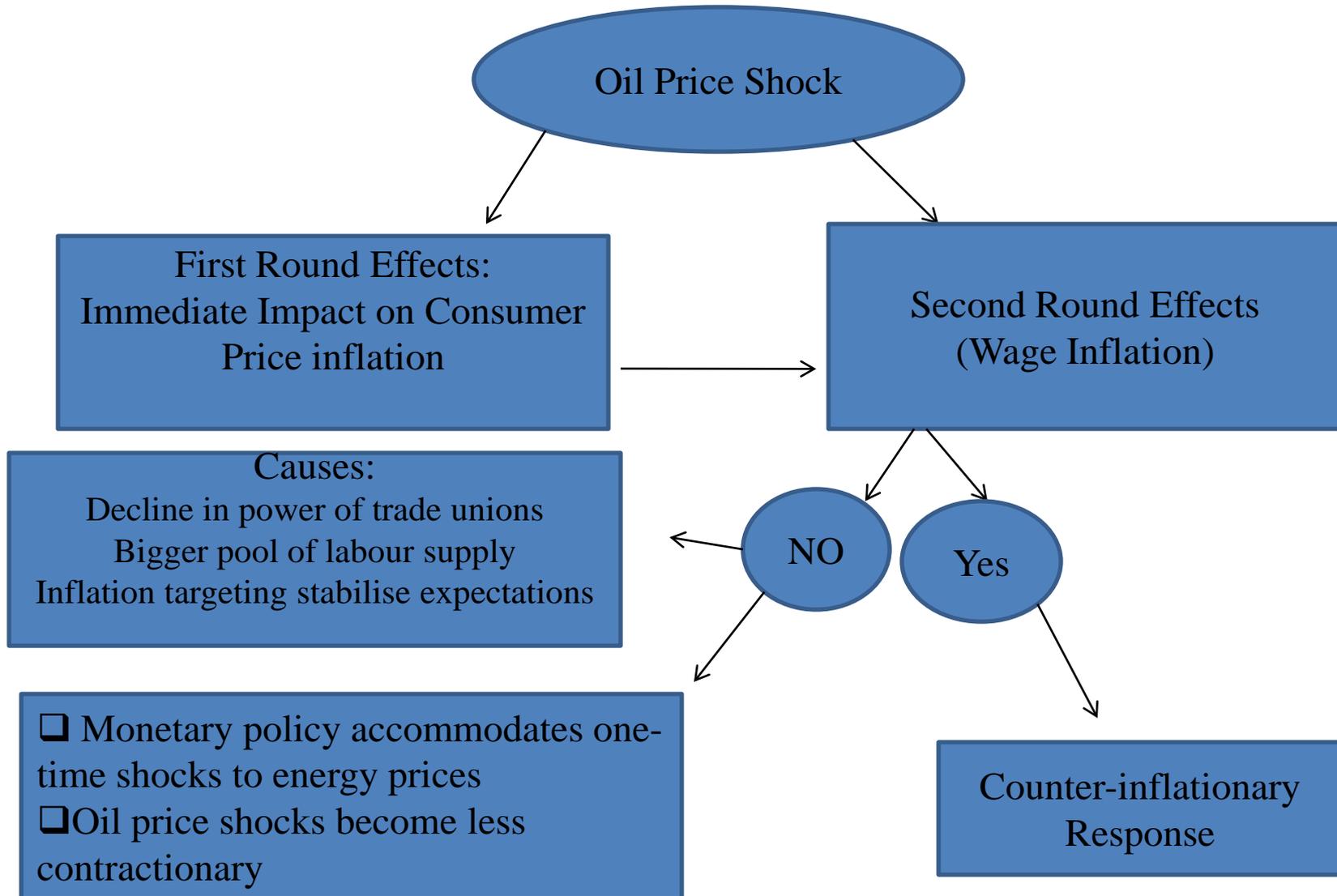
# View 1: Oil Shocks Matter a Great Deal

- An inverse relationship between oil price changes & economic activity
- Amplified by monetary policy response
  - Oil price shock => lower GDP growth & higher inflation
  - Counter-inflationary policy can aggravate GDP losses
- Asymmetry
  - Rising oil prices slows economic activity more than falling oil prices stimulate economic activity
- Recession induced by oil price shock but through different channels
  - Acts like a tax
  - Affects key industries: Motor industry
    - Domestic auto industry vulnerable to higher gasoline prices
  - Affects consumer spending
  - Affects consumer sentiment
  - Can make some capital stock redundant
  - Postpone investment and consumption decisions due to uncertainty

## View 2: Oil Price Shocks Are Not Special

- Oil shocks just like many other things that hit the economy
- Indirect tax analogy
  - Lowers real disposable income and lowers real consumption
  - Deflationary effect
  - Ultimate impact depends on how tax is used (saved or spent)
- Offsetting policy responses
  - Monetary policy response if no change in inflationary expectations
  - Budget deficits

# Monetary Policy: No One Single Way to Deal with Oil Price Shocks



# Implications

- Implication of View 1
  - Oil price shocks impact on growth generate a strong feedback to eliminate excess demand for oil
  - Most important cure in absence of an oil supply response
  - Series of oil price shocks and recessions to rationalize demand
- Series of booms and busts raise raises the question
  - Is oil a reliable source for energy?
  - Would policy measures intensify?
- Implication of View 2
  - Global economy can grow in a high oil price environment
  - Alters market expectations

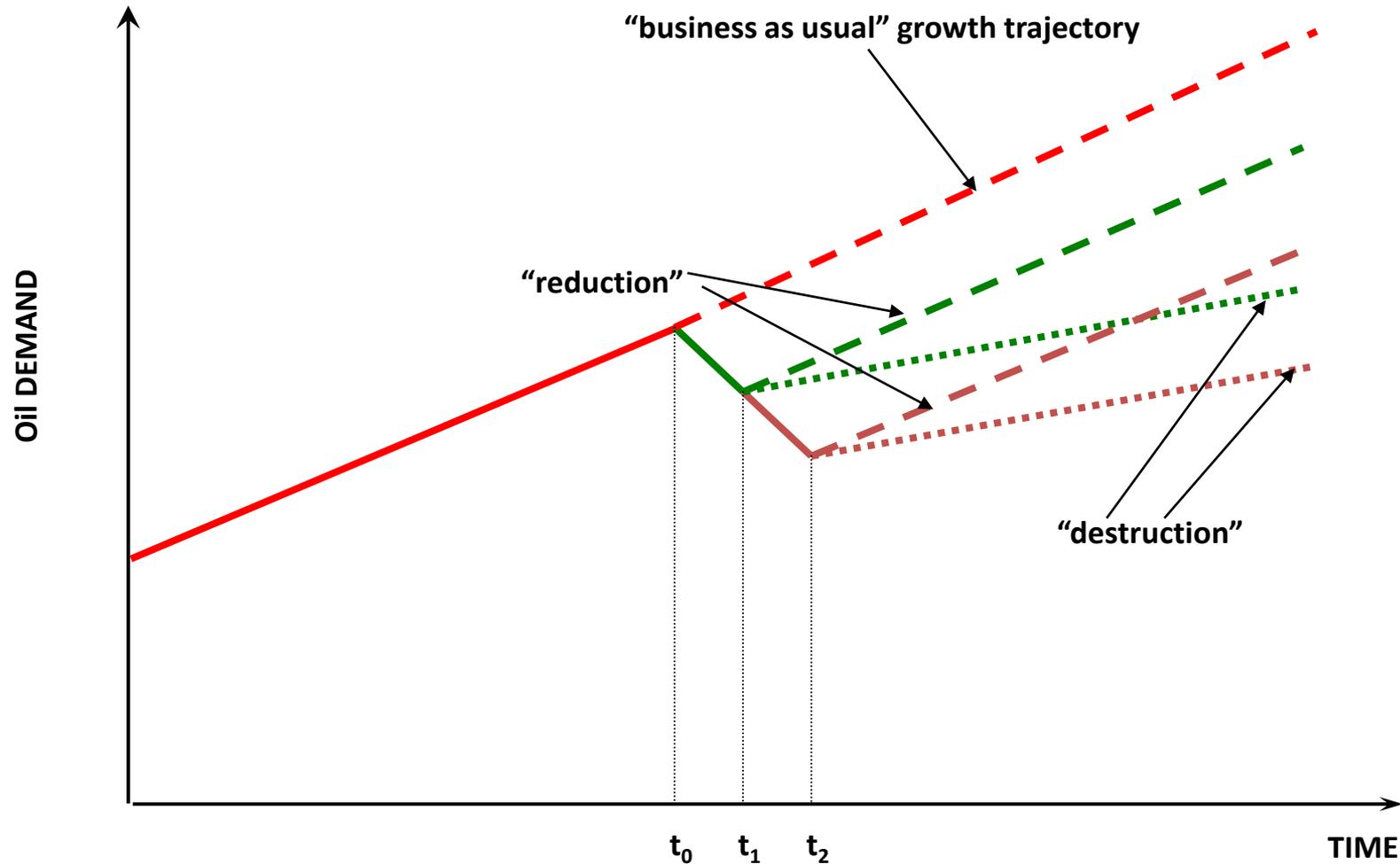
# Relative Prices

- Relative prices affect energy mix by substitution on the margin
  - When relative price of fuel goes down, its consumption and production increase and its relative share in the fuel mix rises
- But relative prices of particular fuels can stay low only if increased demand can be satisfied by an elastic supply response
  - Case of bio-fuels: Supply is less inelastic (especially based on first generation)
- If supply response is inelastic
  - Decrease in relative price of bio-fuel increases demand for bio-fuels
  - But if limited supply response then price of bio-fuels rises
  - Then relative prices of bio-fuels may increase and other fuels could become more attractive
  - Subsidies and carbon tax can change these dynamics
- Case of coal and gas: supply is more elastic
- An increase in demand for these two energy sources will not necessarily change much their relative prices in the energy mix
- Coal and gas not direct competitors for oil can no longer be ignored in the transport sector with entry of electric vehicle and compressed natural gas (CNG) cars

# Shocks from Outside the Oil Market

- Regardless of shape, recessions often involve a ‘step down’ in GDP or output loss which can be substantial
- Occurs through various channels
  - Financial crises may reduce the participation in the *labour force*
  - Increase in underlying (“structural”) unemployment rate
  - Financial crisis may depress investment and slow down capital accumulation
- Empirical evidence
  - Path of output tends to substantially and persistently lower following financial crises
  - Growth returns to its pre-crisis rate
- Links with oil demand

## Step-downs in GDP and Oil Demand

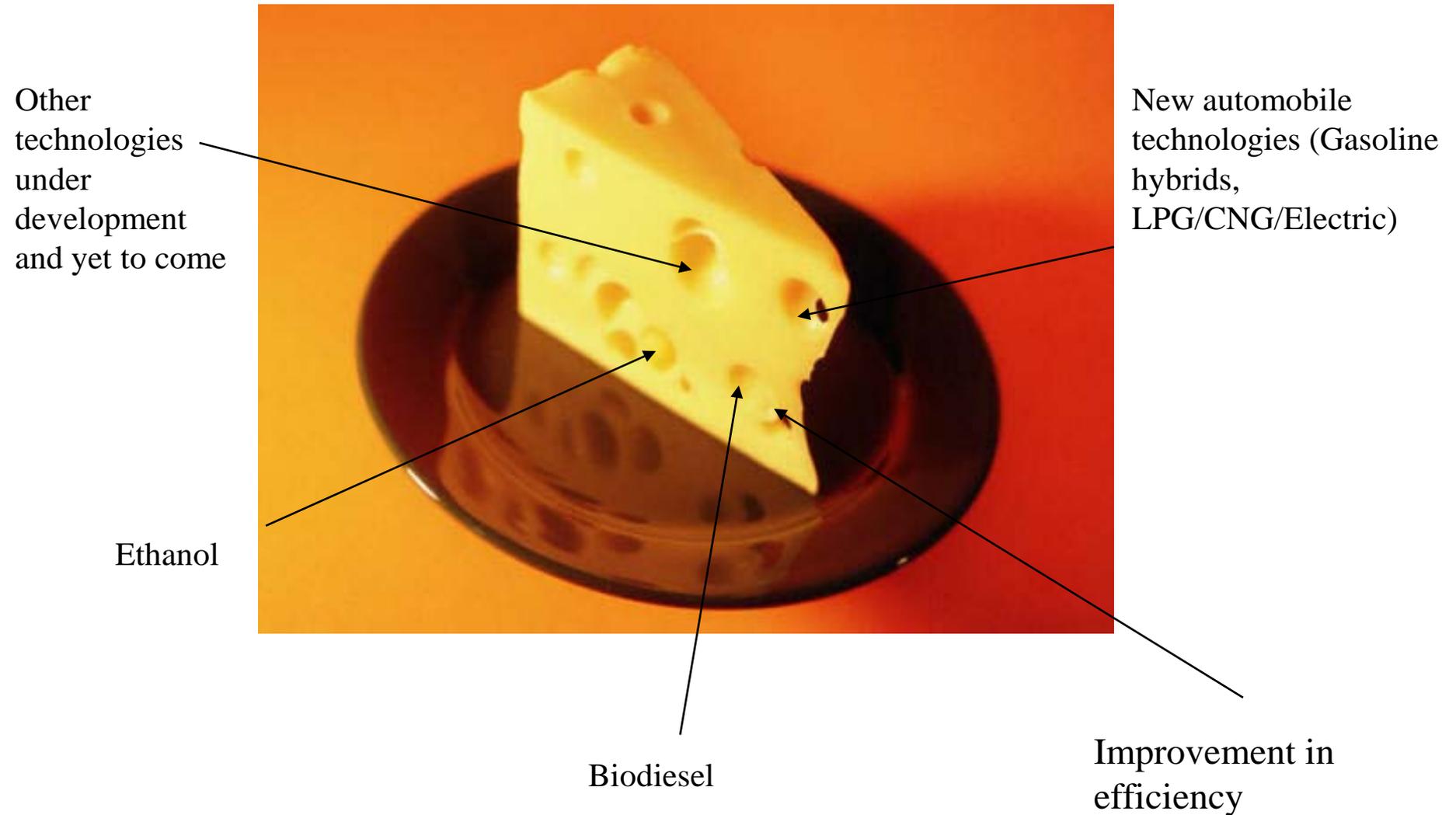


Series of shocks originating from outside oil market can result in substantial oil demand losses which may take few years for the oil market to recover

# Fuel Efficiency

- Drive for improved fuel efficiency would continue unabated
- Growth of efficiency asymmetric to price changes
  - Already set in motion & unlikely to be reversed by oil price declines
  - A increase in oil price, its volatility, concerns about its future availability can accelerate the growth in efficiency
- Technological innovation and government policy not exogenous and affected by developments inside oil market
- Pursuit for improved efficiency occur both in developed and developing economies
- Potential cooperation at international level on key areas such as advancement of electric car technology will consolidate over time
- Oil continue to be dominant fuel in transportation sector for years to come but other sources of energy such as coal, gas, and ethanol started to compete at margin
  - Competition will only intensify over time;
- Technological innovations and government policies effects on oil demand both cumulative and irreversible

# Inroads into Transport Fuels



Other technologies under development and yet to come

New automobile technologies (Gasoline hybrids, LPG/CNG/Electric)

Ethanol

Biodiesel

Improvement in efficiency

# Policy Lessons

- Pricing Policy
  - Policy of maintaining low oil prices ineffective
  - Impact of an increase in oil price on economic activity generally lower than increased uncertainty about future direction of prices and volatility
- Investment Policy
  - Uncertainty has effect of increasing value of option to wait
    - Delaying investment decisions until arrival of new information
  - Tight market conditions due to underinvestment produce 3 outcomes : An accelerated rise in oil price; More frequent price spikes in response to shocks; higher price volatility
  - Maintain current policy of ensuring oil market well supplied and maintain certain level of spare capacity in face of potential disruptions
- Economic Policy
  - Economic policies have direct impacts on oil market both in short and long term
  - Shaping policies through active participation in policy discussions & continuous assessment and monitoring of the long term impacts of such policies
- Domestic demand
  - Rapid increase in energy demand in oil exporting country is not without its cost and should be analysed within the context of the country's international energy policy