

# Impacts of Oil Prices on New Zealand Tourism: An Economic Framework

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# Chapter 1

## Introduction

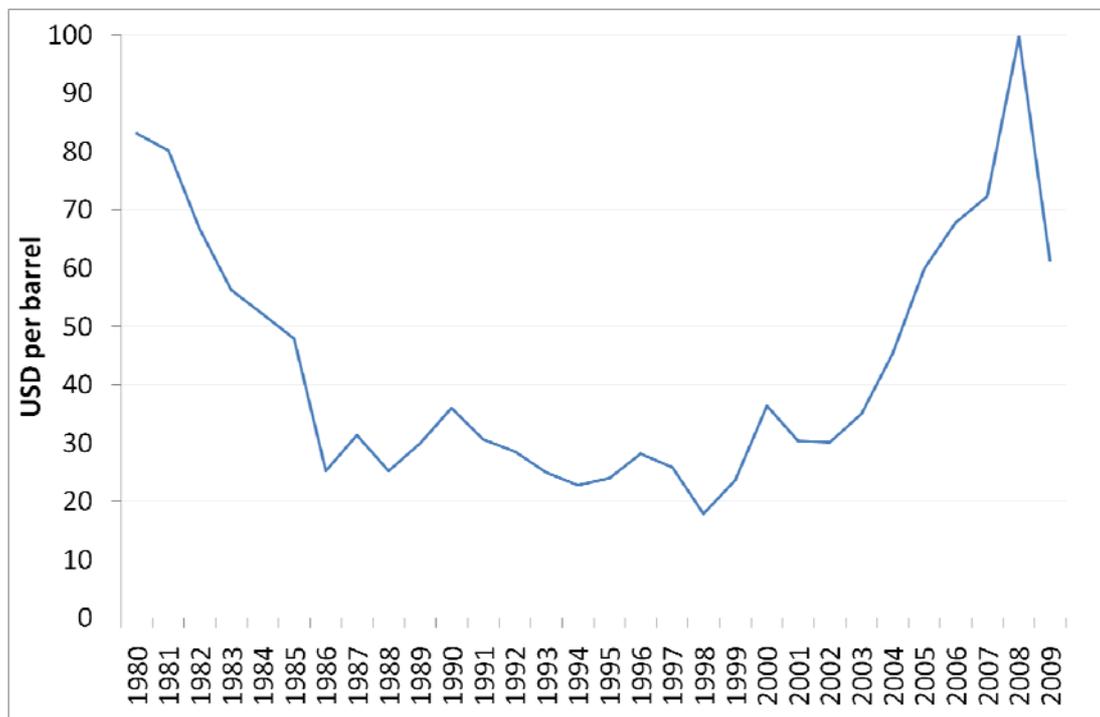
This paper provides an economic framework for understanding the effects of higher oil prices on tourism, with reference to New Zealand tourism. Oil prices have generally increased over the last decade (see Figure 1) and global supply and demand forces are expected to cause real oil prices to continue to rise. Given the importance of oil as an input for the tourism industry, and the relative lack of substitution options for oil as an energy source in the near term, it is crucial to understand the implications of higher oil prices for the tourism sector. This study focuses on long-term effects and does not consider the repercussions of short-term oil price shocks, for example as a result of political sanctions, accidents or other temporary shortages in supply.

Our framework is hierarchical and considers effects at three different levels: global, destination, and in-country. At the global level we discuss how higher oil prices affect economic activity, incomes and prices in oil importing and exporting countries. At the destination level we examine how changes in incomes and prices of travel affect tourists' decisions about which destinations to visit. Finally, at the in-country level we examine how individual tourism businesses within a country are affected and what factors determine the extent to which they are exposed to risks from higher oil prices.

The framework summarises the economic linkages between oil prices and tourism. It shows how higher oil prices flow through economies and the tourism sector, and highlights the factors that increase or decrease the exposure of the tourism sector as a whole, and individual businesses within that sector, to higher oil prices. This is intended to serve as a guide for policymakers and other stakeholders in the tourism industry for understanding the effects of higher oil prices. We illustrate these effects using data about the New Zealand tourism sector.

The remainder of this paper is organised as follows. Chapter 2 briefly discusses the key drivers of oil prices, i.e. the drivers of global demand and supply of oil. Although the mechanisms through which oil prices are determined is not the main focus of this paper, Chapter 2 provides an important background for our discussion. Chapter 3 then introduces our tourism-specific framework and discusses each of the three levels of analysis outlined above. Chapter 4 discusses the implications of our findings, and Chapter 5 briefly concludes with some suggestions for further research.

**Figure 1**  
**Real crude oil prices (2007 dollars)**



Source: Energy Information Administration, *International Energy Outlook (2009)*

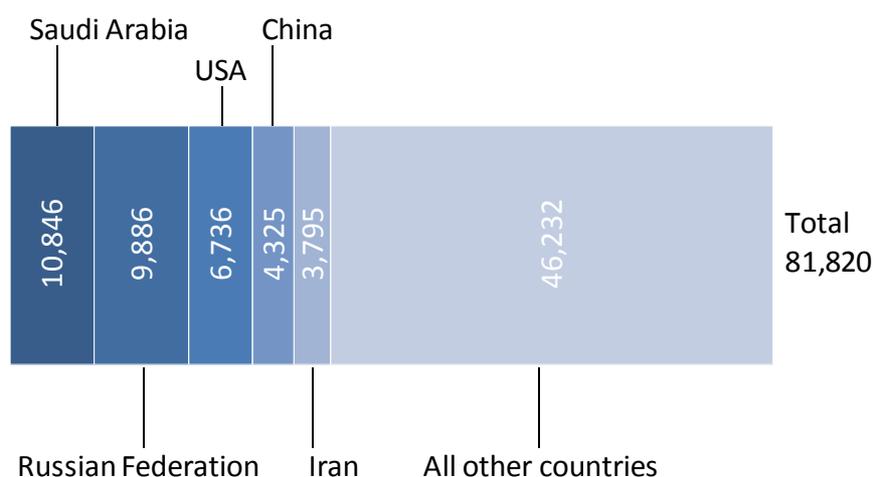
## Chapter 2

### Drivers of Oil Prices

Oil prices are set in global markets and over the medium to long term prices are driven by world oil supply and demand. In the shorter term, speculative activity introduces volatility into oil prices that is not directly related to immediate changes in supply and demand, although it may reflect expectations about future supply and demand conditions. Other factors, such as short term events and disruptions also cause volatility of the oil price. In this section we briefly discuss drivers of oil prices, focussing on long-run supply and demand factors.

Figure 2 shows the distribution of current global oil production across countries. The top five producers generate about 43% of the world's oil supply, with the remainder coming from a relatively large number of smaller producers, mainly in the Middle East. New Zealand is a net importer of oil and petroleum products (e.g. aviation fuel). In 2007, New Zealand oil imports amounted to 326 petajoules of energy compared with an energy content of 98 petajoules for New Zealand's oil exports (Ministry of Economic Development, 2008).

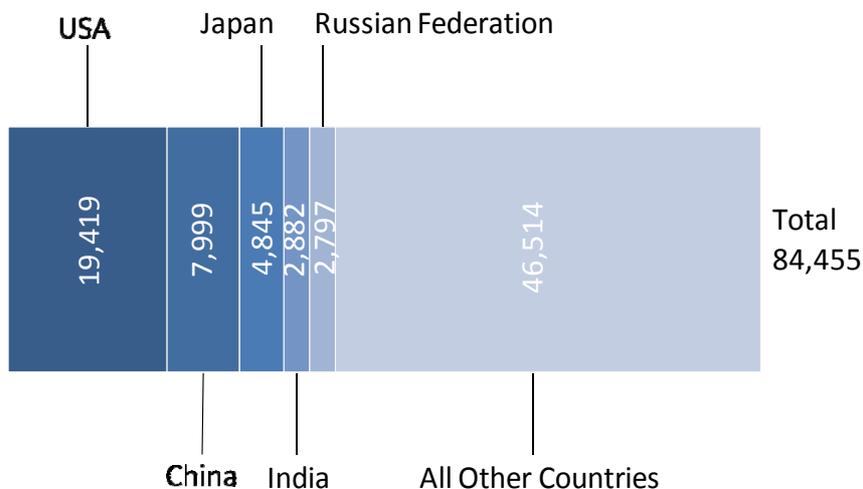
**Figure 2**  
**Global oil production 2008 (thousand barrels per day)**



Source: *BP Statistical Review of World Energy 2009*

The distribution of oil consumption across countries is quite different from production, as shown by Figure 3, with the USA representing about 23% of total world consumption and China almost 10%. Given the geographic mismatch between supply and demand, prices for oil are set in international markets, and depend on a complex mixture of supply and demand conditions in a large number of countries. In particular, demand is mainly driven by economic conditions in the USA, China and other industrialised nations, while supply is, among other things, affected by political stability in the major oil producing regions. Supply can also be constrained by the OPEC cartel that controls the output of 12 oil producing nations, which together account for about one third of current production and two thirds of the world's oil reserves (BP Statistical Review of World Energy 2009).

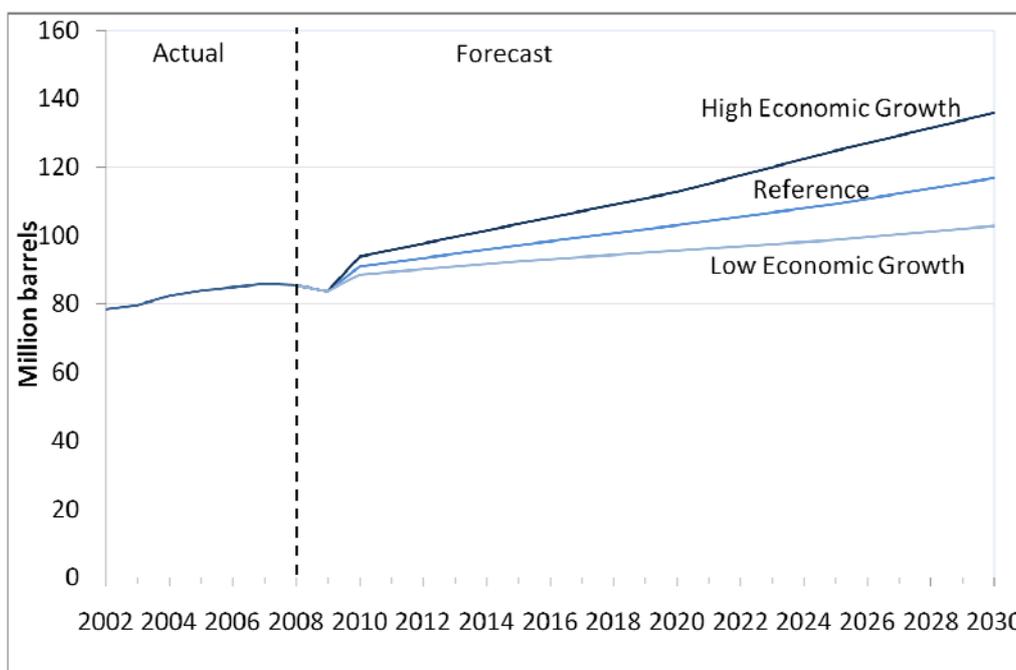
**Figure 3**  
**Global oil consumption 2008 (thousand barrels per day)**



Source: BP Statistical Review of World Energy 2009

In spite of recent adverse economic events, oil consumption is forecast to continue to rise in the coming decades. Figure 4 shows oil consumption forecasts under different economic growth scenarios. Demand is expected to recover in 2010 and 2011 from a trough in 2009 caused by the global recession. This growth in demand will continue to drive oil prices upwards, as it will be increasingly expensive to extract the remaining conventional sources of oil and to develop unconventional sources such as oil sands and shales (UK Energy Research Centre, 2009) to meet the growth in demand.

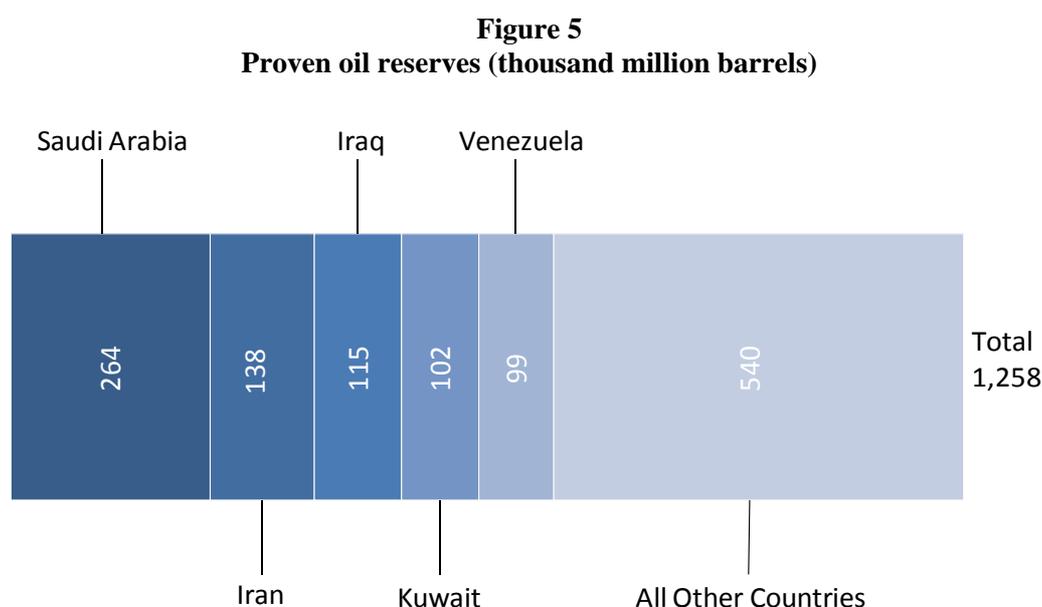
**Figure 4**  
**Global oil consumption and forecast**



Source: Energy Information Administration, International energy outlook (2006) and Short term energy outlook (2009))

A central question in the debate about oil is how much there is in total and how much of it has been used already. The so-called ultimately recoverable resources have been estimated by a number of sources. Estimates range from around 2,000 to 4,300 giga barrels (Bentley, 2002; UK Energy Research Institute, 2009). These numbers are based on different sets of data (some of which are more or less controversial) and different assumptions on factors such as field sizes, reserve growth and decline rates. The estimates for depletion, i.e. how much of the available oil has been produced, vary accordingly with the lowest estimates being around 28% and the highest being 56%.

Figure 5 shows global proven oil reserves based on information provided by BP. Proven reserves exclude future reserve growth and ‘yet to be found’ resources (for more details see UK Energy Research Institute, 2009). At 2008 consumption levels, these reserves are sufficient to last for about 40 years (BP, 2009). As consumption levels are expected to increase every year (except for 2009) the reserves are expected to last less than 40 years. New oil reserves continue to be discovered, although new discoveries are expected to be small in comparison with existing reserves. In addition, technological improvements mean that greater volumes of oil can be extracted from existing reserves, and new sources of oil (such as oil sands) become economic to exploit at higher oil prices. In general, however, these additional sources are increasingly expensive to exploit, which puts upwards pressure on oil prices.



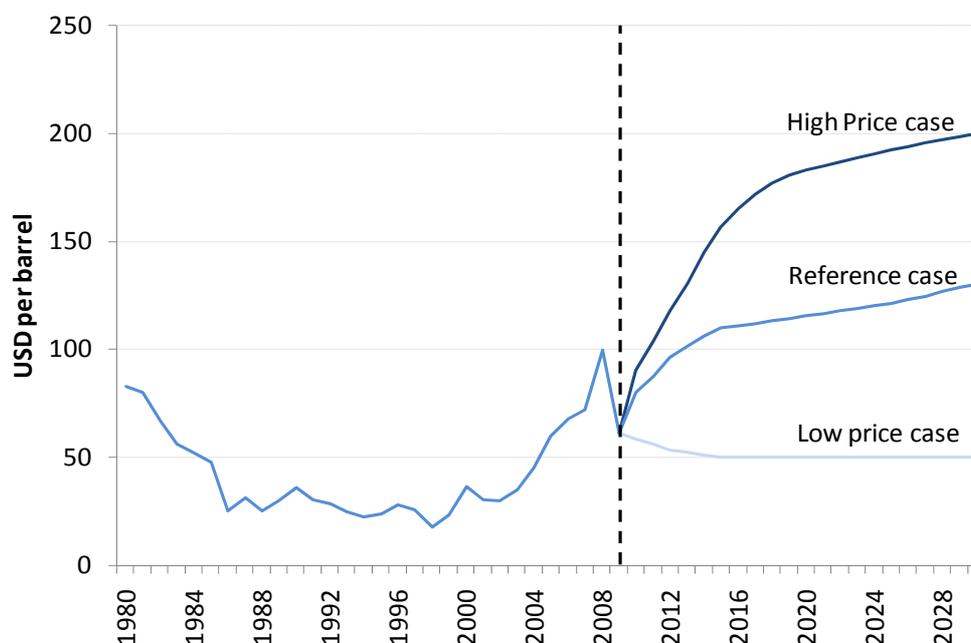
Source: *BP Statistical Review of World Energy 2009*

Over time, and when prices become high enough, economic incentives will cause a shift towards alternative energy sources<sup>1</sup>, and this may see the price of oil stabilise or even decline at some point in the future. Nevertheless, the immediate outlook is for higher oil prices, as shown in the EIA forecasts presented in Figure 6, and also represented in New Zealand’s assessment of trends as provided in the Energy Outlook 2009 (Ministry of Economic Development, 2009). These forecasts show relatively large price increases in the high price and reference scenarios, and even in the low scenario the price of oil is not expected to drop

<sup>1</sup> The implementation of alternatives will take some time and Hirsch et al. (2005) in their “Peaking of World Oil Production: Impacts, Mitigation & Risk Management” report noted that even one or two decades are a very short time frame to replace oil as a major energy source without major social disruption. The speed of substitution will depend among other things on the relative price of oil, investment levels, technology and the cost of infrastructure conversion.

below 50 US dollars per barrel, which is relatively high compared to prices that prevailed for most of the 1980s and 1990s. It should also be noted that there is considerable variation in the forecasts across the three scenarios, representing the high level of uncertainty about how prices will change over time.

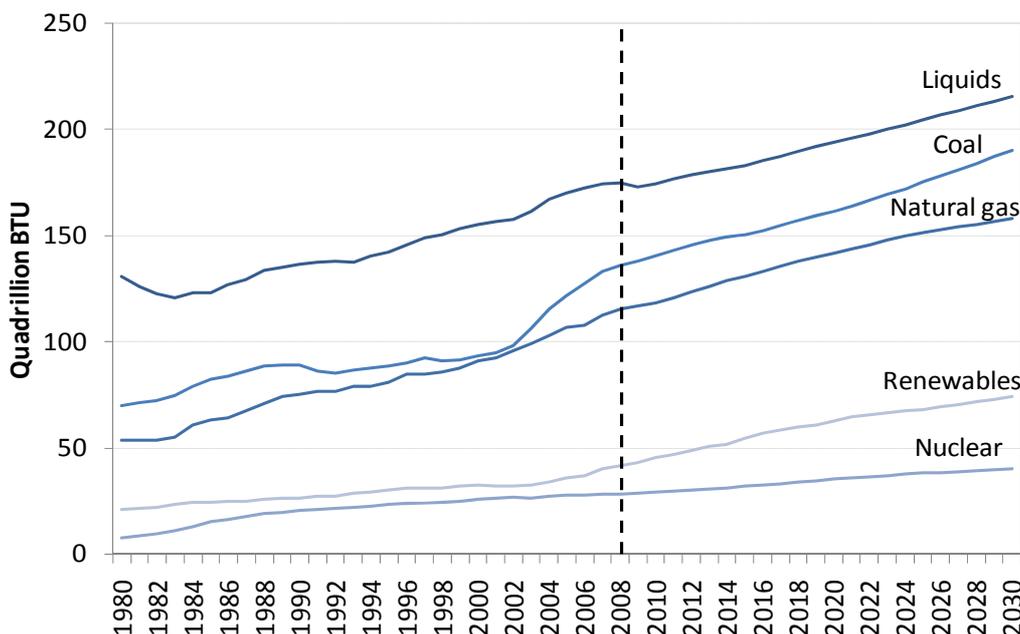
**Figure 6**  
**Historic and forecast real prices for light sweet crude (2007 dollars)**



Source: Energy Information Administration, *International Energy Outlook (2009)*

Over time higher oil prices are expected to drive substitution towards alternative energy sources. Individual countries will differ in their ability to do so, depending on the natural resources available to them and their ability to develop renewable and nuclear energy sources. This is illustrated in Figure 7. While liquid fuels are expected to increase as an energy source in absolute magnitude, the share of liquids in total energy supply has been falling and is expected to continue to do so. Between 2009 and 2030, total global energy use is forecast to increase by 36%, while energy from liquid sources is forecast to increase by only 25%. This means that liquids are forecast to fall from 35% of total energy in 2009 to 32% in 2030. In 1980, liquids contributed 46% of total energy supply. The ongoing dominance of fossil fuels in 2030 is a concern in relation to climate change and contradicts current attempts to sharply reduce the consumption of greenhouse gas emitting energy sources as agreed on in the Copenhagen Accord in December 2009.

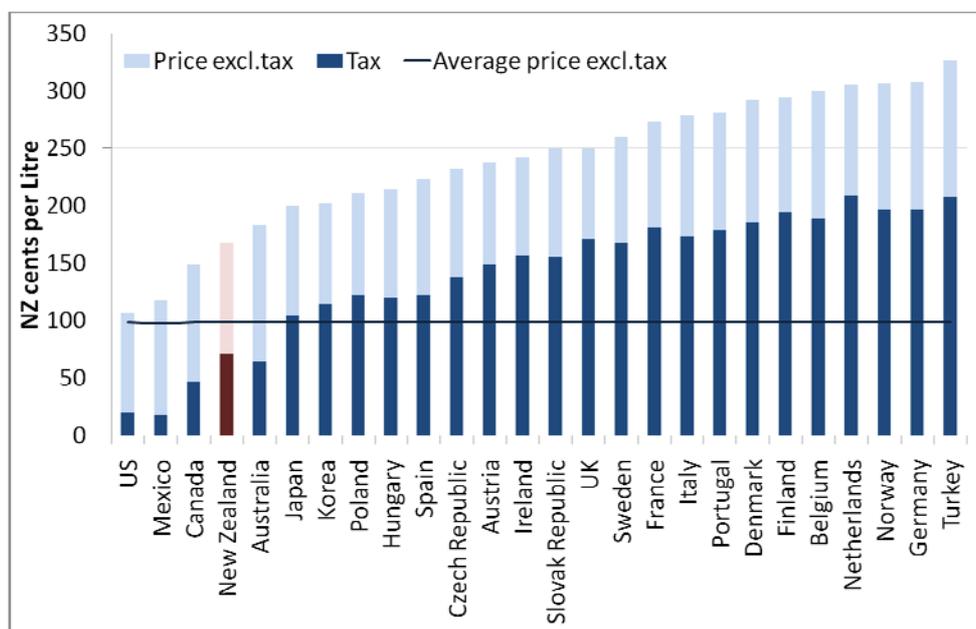
**Figure 7**  
Actual and forecast global energy sources



Source: Energy Information Administration, International Energy Outlook (2009)

Finally, it should be noted that world supply and demand conditions are not the only factor that affects oil prices faced by consumers. In particular, domestic policies play an important role, and taxes and subsidies can drive a large wedge between the price of oil in international markets and the retail prices faced by consumers. This is illustrated by Figure 8 which shows average retail petrol prices and the proportion of this accounted for by government taxes in OECD countries. Taxes range from 15% of the retail price (Mexico) to 69% (UK).

**Figure 8**  
Petrol prices & taxes in OECD countries – June Quarter 2009



Source: Ministry of Economic Development (2009)



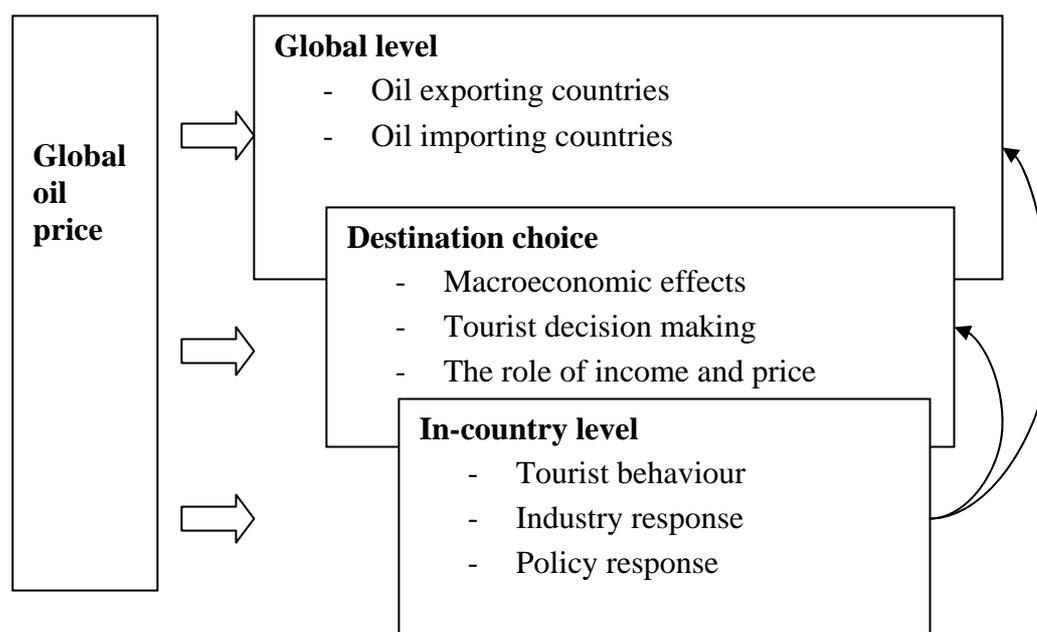
## Chapter 3

### Impacts of Higher Oil Prices

In this section we discuss the effects of higher oil prices on tourism in general and the New Zealand tourism industry in particular. Our objective is to provide a framework for determining which tourism businesses or products may be ‘at risk’ from higher oil prices, in the sense that the higher prices will have a material negative impact on their long-term viability. Although we focus on the New Zealand tourism industry and use specific facts related to it, the general framework we develop is applicable to any country.

In line with decision making models discussed in the tourism literature (e.g. Woodside & King, 2001), our framework is hierarchical in nature. There are three different levels: macroeconomic impacts at the global level, the choice of destination by international tourists, and in-country impacts given tourists’ local travel choices (Figure 9).

**Figure 9**  
**Hierarchical framework for oil price increase impacts on tourism**



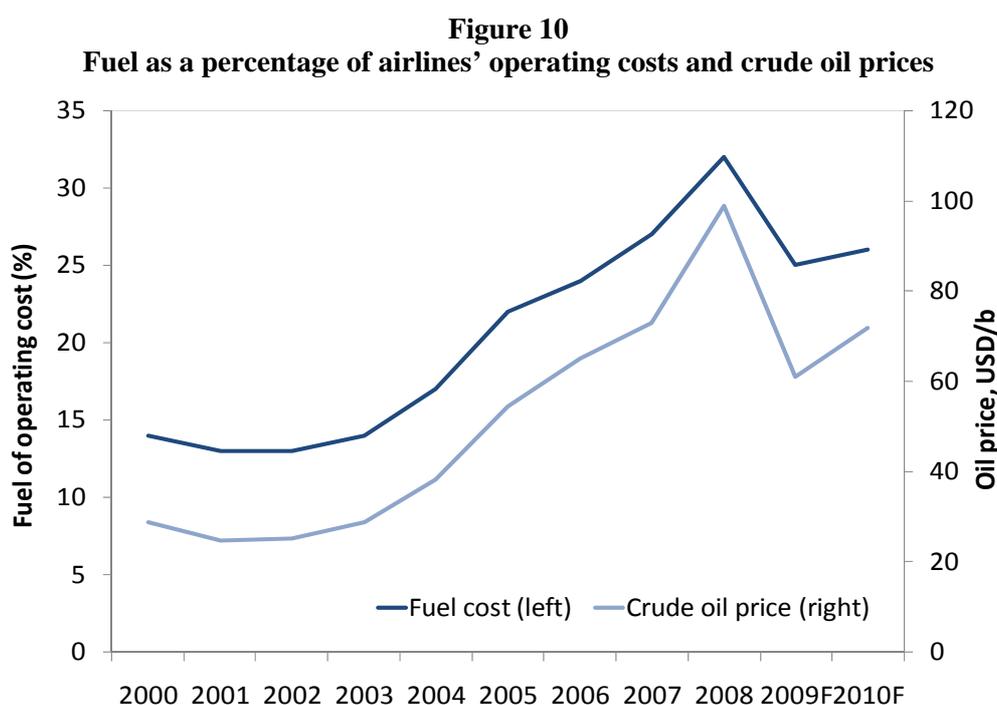
In general, the economic effects of oil price changes come from changes in people’s incomes and changes in relative prices<sup>2</sup>. The primary use of oil is as an input to production of other goods and services. Higher oil prices will lead to higher prices for goods and services that use oil as an input (directly or indirectly). This will lead to relative price changes throughout the economy, with oil-intensive goods and services becoming relatively more expensive, and in response consumers will substitute away from these and towards consumption of goods and services that are less oil-intensive, to some extent, depending on substitution possibilities and consumer preferences. Changes in the price of oil will also lead to changes in consumers’ incomes through the effect of the oil price on the overall level of economic activity. For many

<sup>2</sup> These also include wider effects as a result of changes in terms of trade.

countries, higher oil prices are expected to lead to lower economic activity (at least in the short to medium term), everything else equal, and this will flow through into lower incomes for consumers relative to a scenario where oil prices were lower.

The extent of the price increase of oil-intensive goods and services will depend on the extent to which oil can be substituted for other inputs in production and the extent to which energy efficiency of production can be increased. In the tourism industry, the ability to substitute oil for other sources of energy is relatively low (except in the accommodation sector), and while energy efficiency gains are possible, they are not likely to be large enough to fully offset oil price increases. This is particularly true in aviation, where technological improvements and changes to operational procedures (such as reducing air traffic control congestion) will lead to incremental increases in energy efficiency, but the price of oil will still be a major cost driver for airlines and therefore a key determinant of the price of air travel for the foreseeable future. Other transport modes also have relatively low ability to reduce the intensity of oil use over the medium term, although there is an increasing interest in electric cars (New Zealand Government, 2009).

The importance of the oil price for the tourism sector is illustrated in Figure 10, which shows fuel costs as a percentage of commercial airlines' operating costs and crude oil prices. Over the past decade, fuel has approximately doubled as a percentage of airline operating costs, in line with the change in oil prices over the same period. The close relationship between fuel costs and crude oil prices reflects the limited ability of airlines to reduce their fuel usage over the short to medium term. Fuel costs as a percentage of an airline's operating cost are disproportionately high for long haul flights, for example in the order of 30% compared with 17% for short haul flights (Ringbeck et al., 2009). Hence, under high oil price scenarios carriers based in long haul destinations such as New Zealand are likely to be impacted more by higher oil prices. Over the longer term technological improvements will lead to greater fuel efficiency, but oil prices will continue to be an influential driver of airlines' costs and therefore the prices faced by tourists.



*Source: International Air Transportation Association (2009)*

The effects on tourism of oil price changes follow from tourists' responses to changes in incomes and relative prices that result. In this section we first discuss the global macroeconomic effects of higher oil prices, and the implications for tourism demand, as well as the prices of tourism products. We examine how these changes will affect the destination choices of international tourists in general, and their choice of New Zealand as a destination in particular. Finally, we examine effects on the consumption behaviour of tourists within a country, in terms of changes in the goods and services that they choose to consume, and the ability of tourism operators to respond to cost increases due to higher oil prices.

### 3.1 Macroeconomic Impacts

Given the importance of oil as an input to production, an oil price increase will influence key macroeconomic variables including real GDP, inflation, employment, balance of trade and exchange rates. Effects in the short and long run will differ, as in the long run consumers and producers will have greater opportunities to adjust their behaviour in response to higher prices.

Countries that are net importers of oil will experience negative economic effects from higher oil prices. The magnitude of the negative effect on such countries depends on characteristics such as:

- The share of oil costs in national income, and the intensity of use of oil in production.
- The availability of alternative energy sources and the ability to substitute to these (Peersman & Robays, 2009), as well as the effect on prices of non-oil energy sources.
- Efficiency of the use of oil in production and opportunities for efficiency improvements.
- Flexibility of the labour market to respond to changes in real wages.

The general immediate effects of an oil price increase on net oil importing countries are (IEA, 2004):

- General inflation as oil is a direct or indirect input in the production of many goods and services; reduced demand for relatively oil-intensive goods and services; and lower investment.
- Tax revenue collection reduces and government budget deficits increase, which drives up interest rates.
- Wage rigidities can lead to higher unemployment.

A report prepared by the IEA (2004) showed that OECD countries were vulnerable to oil price increases despite the reduction in the degree of oil dependency in their economies over time<sup>3</sup>. The IEA report used a world economy model to assess the aggregate macroeconomic effects of a long-run (i.e. permanent) increase in the oil price (as opposed to a one-off price

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3 Oil imports of OECD countries fell by 14% and the amount of oil used to produce one dollar of real GDP halved between 1973 and 2002.

shock caused by a temporary supply or demand shock). In the baseline scenario, oil prices were assumed to remain constant at \$25 per barrel over the projection period from 2004 to 2008. This was contrasted with a scenario where oil prices were \$10 per barrel higher for the whole projection period. In this scenario, the costs of oil imports by OECD countries were estimated to account for 1% of GDP in 2003. In contrast, the oil importing developing countries, in particular the poorest countries, suffer the most from higher oil prices – the IEA estimated their real GDP would fall by 1.6% when the oil price increased by \$10 per barrel compared to the base case model. This is because the dependency of oil in these countries is higher and energy-intensive manufacturing accounts for a large share of GDP. Such countries use more than twice as much oil to produce one unit of economic output as developed countries. India, for example, uses 288 units of primary oil per unit of GDP, compared with an average of 100 across OECD countries (IEA, 2004).

Table 1 shows the results of the IEA's modelling for all OECD countries. The oil price increase reduces GDP by about 0.4% relative to the base case, leads to about a 0.5% increase in consumer prices, and increases unemployment slightly.

**Table 1**  
**Estimated immediate effects of a \$10 oil price increase on key macroeconomic variables of all OECD countries**

<b>OECD Countries</b>	<b>2004</b>	<b>2005</b>
GDP (%)	-0.4	-0.4
CPI (%)	0.5	0.6
Unemployment rate	0.1	0.1
Current account (\$billion)	-32	-42

*Source: IEA (2004).*

Table 2 shows the IEA's estimated effects on developing countries. In general the GDP and inflation impacts are larger than for OECD countries, for the reasons discussed above.

**Table 2**  
**Estimated immediate effects of a \$10 oil price increase on key macroeconomic variables of developing countries**

	<b>Real GDP</b>	<b>Inflation</b>
<b>Asia</b>	-0.8	1.4
China	-0.8	0.8
India	-1.0	2.6
Malaysia	-0.4	2.0
Philippines	-1.6	1.6
Thailand	-1.8	0.8
<b>Latin America</b>	-0.2	1.2
Argentina	-0.4	0.2
Brazil	-0.4	2.0
Chile	-0.4	2.0
Highly indebted poor developing countries	-1.6	n.a.

*Source: IEA (2004).*

For oil exporting countries, the IEA's analysis found that the positive impact on GDP only occurs in the first year of their projection period. In most cases, a decline in GDP growth sets in after two or three years as the result of a decline in exports of other goods and services to oil importing countries.

The IEA estimated the initial loss of global GDP to be 0.5% in the first year of their projection period. The size of the initial loss depends on how OPEC and other oil exporting countries spend their revenues from oil exports. According to IMF estimates, since 2002, oil exporters have been spending smaller amounts of their additional revenues from oil price hikes on imports compared to the first oil price shock in 1970s. The marginal propensity to spend on imports in OPEC countries was 0.42 and 0.24 for 1978 – 1981 and 2003 – 2005, respectively (IMF, 2006). The greater the marginal propensity of oil producing countries to save those revenues, the greater the loss of the initial real GDP, although lower consumption of imports may be offset by higher foreign investment. The long run impact on the global economy is estimated to be negative, because the boost to economic growth in oil exporting countries is not enough to compensate the loss of economic growth in oil importing countries. Huntington (2005) reviewed the results of US studies that attempted to quantify the impact of an oil price increase on the economy. Empirical results from these studies showed on average real GDP would decrease by 0.5%, prices would increase by 0.4%, and unemployment would increase by 0.2% following a \$10 per barrel increase in the oil price. The \$10 increase assumed in these studies is an increase from \$30 to \$40 per barrel.

A recent study by Lutz and Meyer (2009) examines the importance of the share of exports in international trade for a quick recovery from an oil price increase. They considered a permanent \$50 increase in the oil price from \$80 to \$130 per barrel. They showed that for a country such as Germany (exports are 53% of GDP), the higher oil price initially causes a reduction in GDP due to negative domestic effects, but eventually leads to a small increase in real GDP due to higher incomes in oil-exporting countries that buy the products that Germany exports.<sup>4</sup> In the short run, under the same scenario, oil exporters such as OPEC countries and Russia experience large gains in their real GDP of 17.1% and 10.4% respectively. However, oil importers such as China, Japan, UK, Germany and US all suffer a loss in their real GDP initially.

There are a number of studies looking at the effects of oil price *shocks* on the macroeconomic variables of industrialised countries. These studies analyse one-off temporary shocks, as opposed to a sustained increase in the oil price over time. As such, the value of these studies for estimating the macroeconomic effects of permanent long-run oil price changes may be limited. For one thing, people's responses to higher prices may differ if they expect the shock to be temporary versus permanent – there is less incentive to make costly behavioural or technological changes in response to a temporary shock. In addition, a greater range of adjustments to higher oil prices is available over a longer period of time.

Blanchard and Gali (2007) examined the effects of high oil prices in two different episodes of oil shocks: the 1970s and 2000s. Empirical models incorporating structural vector autoregressions were estimated for the period between 1973 – 2005 for the US, France, Germany, UK, Italy and Japan. The study found that the negative effects of oil price shocks became smaller over time. This was explained by the quicker adjustment process of real wages due to more flexible labour markets and the responsiveness of monetary policy in these countries in response to recent oil price shocks compared to earlier shocks. The result is

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4 Real GDP is the sum of consumption, investment, government spending and net exports. Increases in investment and net exports may compensate for the loss in consumption due to higher oil prices. Germany's main export products are motor vehicles, radios, televisions, communication equipment, and machinery, which have a relative high share in imports of oil exporting countries, and in the long run the higher net exports cause Germany's real GDP to rise.

broadly consistent with the IEA study; the lower dependency on oil can also partly explain the smaller impact of more recent oil price hikes on macroeconomic variables of these six industrialised economies. Kilian (2009) found similar effects.

Finally, a study by Peersman and Robays (2009) provides a detailed analysis of the economic effects of oil price shocks and seeks to explain the differences in the effects across countries. The study analysed a set of industrialised countries that are different in terms of size, labour market characteristics and the role of oil and other forms of energy in the economy: US, Euro Area, Japan, UK, Canada, Switzerland, Norway and Australia. The study found that the net oil and energy importing countries (US, Euro Area, Japan and Switzerland) all face a permanent reduction in economic activity and a significant rise in inflation, whereas the long run output response in the oil and energy exporting countries (Australia, Canada, UK and Norway) is insignificant or even positive (see the table below for more detail).

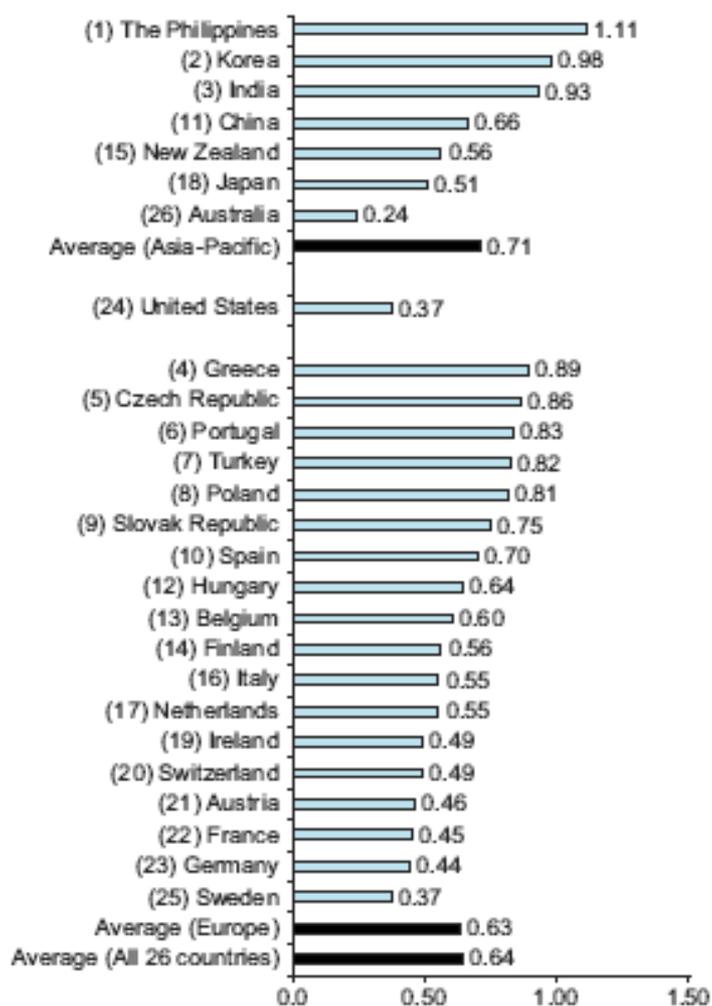
Integrating seven factors that influence a country's vulnerability to oil shocks and prices, Gupta (2008) developed an oil vulnerability index for 26 net-importing countries – the higher the index the higher the vulnerability. Developing economies such as the Philippines, Korea and India were found to be most vulnerable, whereas most developed countries appeared less vulnerable. Countries with a high ratio of domestic oil production to oil imports, such as Australia and the United States, were least vulnerable. New Zealand was also characterised by relatively low vulnerability (Figure 11).

**Table 3**  
**Estimated long run (20 quarters) median impulse responses to an oil supply shock that raises oil prices by 10%**

	Impact on GDP			Impact on CPI		
	1975-1985	1986-2008	change	1975-1985	1986-2008	change
United States	-0.96	-0.31	0.65	0.45	0.35	-0.10
Euro Area	-1.35	-0.32	1.03	1.48	0.58	-0.90
Japan	-0.50	-0.40	0.10	-0.66	0.10	0.76
Switzerland	-0.55	-0.29	0.26	-0.53	0.88	1.41
United Kingdom	-1.57	0.02	1.59	1.46	-0.29	-1.75
Canada	-1.07	0.12	1.19	1.07	0.08	-0.99
Australia	-1.30	0.00	1.30	1.54	-0.40	-1.94
Norway	-1.16	0.26	1.42	1.70	-0.22	-1.92

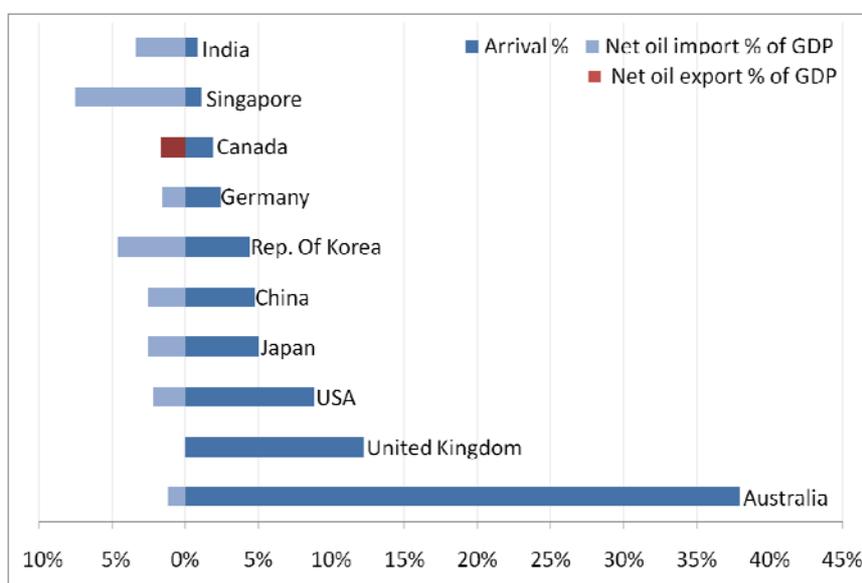
Source: Peersman and Robays (2009)

**Figure 11**  
**Oil vulnerability index for 26 countries (higher index implies higher vulnerability) (Source: Gupta, 2008).**



The above discussion generally shows that higher oil prices lead to lower incomes for net oil importing countries and possibly higher incomes for net oil exporting countries. These findings are relevant for international tourism to New Zealand. Figure 12 shows the top ten countries of origin for international visitor arrivals to New Zealand and the percentage of net oil imports or exports in their GDP. Only Canada is a net oil exporter. All other countries are net oil importers, although the UK's net oil balance of trade is almost nil. In terms of oil imports as a percentage of GDP, the Asian countries are the most exposed and therefore potentially most likely to be affected by income effects of higher oil prices. It is important to note that income effects are not necessarily evenly distributed across the population and that potentially there are systematic effects that mean that some market segments are more affected than others. It is not known whether those tourists travelling to New Zealand are represented by models that seek to understand average income effects in a given country.

**Figure 12**  
**Top 10 countries of origin for New Zealand international visitors**  
**and importance of oil in GDP**



Source: NZ Ministry of Tourism, UN Comm. Trade

The effect of income changes from higher oil prices depends on the income elasticity of demand for tourism. In general tourism is a luxury good and is therefore relatively income-elastic (Davis & Mangan, 1992; Mervar & Payne, 2007). Table 4 summarises the results of income elasticity estimates found in various studies. All estimated elasticities are greater than one, indicating that income changes have quite a large effect on the demand for international tourism.

**Table 4**  
**Summary of empirical results on income elasticity of demand for international tourism**

Study	Destination	Origin(s)	Estimated income elasticity
Munoz and Amaral (2000)	Spain	World	2.07
Dritsakis (2004)	Greece	Germany	2.16
Dritsakis (2004)	Greece	Great Britain	6.02
Munoz (2007a)	Spain	Germany	5.40
Bonham <i>et al.</i> (2009)	Hawaii	US	3.50
Bonham <i>et al.</i> (2009)	Hawaii	Japan	2.23
Davies and Mangan (1992)	all	United Kingdom	2.10 (4.0 for low income households and 1.5 for wealthy ones)

The importance of available discretionary income and consumption behaviour for tourism demand was confirmed in a study that found a strong correlation between consumption spending in origin markets and tourist arrivals to New Zealand (Small & Sweetman, 2009). However, very little research has been undertaken on the relative importance of tourism expenditure and possible substitution between tourism consumption and other discretionary consumption. A recent Australian study by Crouch *et al.* (2007) found that tourism attracts about 21% of discretionary income, and that an increase in income would result in a proportional increase of expenditure on tourism. There was no evidence of larger scale cross-substitutions between tourism and other consumption categories. This study only looked at a one-off increase in available income and did not examine the effects of a longer-term decrease in income as would be the case for consumers in oil-importing countries as a result of increasing oil prices.

### 3.2 Impacts on Destination Choices of Tourists

The previous section showed that higher oil prices lead to lower incomes for most major countries of origin for international visitors to New Zealand, and also that prices of tourism products increase. This section discusses how these changes affect the choice of destination of international tourists.

There is a comprehensive body of literature on tourism demand, both explanatory modelling and forecasting (e.g. Crouch, 1994, 1995; Witt & Witt, 1995; Lim, 1997). Most empirical models assume that tourist arrivals (or other measures such as expenditure) depend on the tourist's income, the price of the service, the prices of related goods (substitutes and complements), and other demand shifters (Mervar & Payne, 2007). Thus, income and prices are the most commonly used variables to explain tourism demand. As already discussed above, income is very important with respect to the propensity to travel and the amount of money that consumers allocate to it. Income is also an important variable in other travel choices. A study by Fleischer and Rivlin (2008) reported that higher incomes amongst Israeli households lead to increased demand for tourism which is evenly split between more holidays (i.e. more days away from home) and better quality (e.g. shift from 3 star to 5 star). Importantly, tourists with higher incomes also seem to be less sensitive to travel distance and are more likely to travel long haul (Nicolau, 2008). Lim *et al.* (2008), for example, observed that as incomes increase for the Japanese market, outbound tourism shifts from short haul to longer haul destinations.

Tourist prices affect travel between origins and destinations<sup>5</sup> and consumption at the destination. The relevance of transportation costs has been demonstrated for air travel, although different market segments show different sensitivities to price. For example, business travellers are less sensitive than leisure travellers and short haul travel is more elastic than long haul travel (Gillen, 2004; Brons et al., 2002). In terms of destination prices, both the differential relative to the tourists' origin as well as exchange rate effects are relevant (Dwyer et al., 2001; Njegovan, 2005). To better capture tourism-specific changes in price (e.g. as a result of higher oil prices), some studies use Tourism Price Indices that reflect typical tourist consumption bundles at the destination (e.g. Becken et al., 2008).

Prices are important factors in tourist decision making, but not the only ones. In fact, destination choice is a "complex and often messy process involving the consideration of a bundle of tangible and intangible attributes" (McKercher et al., 2008). Earlier consumption models in general (Gross, 1987) and tourist destination choice models in particular were largely based on a positivist paradigm where the consumer would – depending on external stimuli and internal factors – arrive at a final decision that maximised utility through combinations of monetary resources, goods and services, and time.

In the case of tourist destination choices it was thought that a range of potential destinations (an "evoked set", Um & Crompton, 1990; Woodside and Lysonski, 1989) are evaluated first and then a final destination is selected from this set. Later models (e.g. Woodside & King 2001) added details such as the influence of situational or psychographic variables, but were still largely based on the idea that the tourist makes rational and well-informed choices (Ross, 1994; Decrop, 1999). In these models, travel costs entered the decision making process as the tourist learns about the product (e.g. through marketing exposure or active information search) and as he/she develops an attitude towards a specific destination (Decrop, 1999). Costs can then act as an inhibitor (e.g. "Travel to X is too expensive") or be offset by other important destination attributes such as a positive image (e.g. "Travel is expensive but worthwhile") or emotional attachment.

More recently, these "homo economicus" models have been criticised as a simplification of what is rather emotional, opportunistic and hedonic behaviour (Hyde 1999). Consumers may lack cognitive competence to fully evaluate all possible tourist destinations in a cost-benefit sense, and they are also faced by incomplete access to information (i.e. resulting in "bounded rationality" at best, Decrop, 1999). In fact, tourists' information search is less intensive and more incidental than previously thought and some tourists seem to enjoy a certain level of risk as they purposely delay decision making (Hyde 1999).

The above discussion indicates that economic variables such as tourists' income and the price of tourism are important but their manifestation is far from deterministic. For example, McKercher, Chan and Lam (2008) found that international tourist flows generally follow the theory of distance decay. This means that the further away a destination the fewer tourists go there, as distance represents monetary and personal costs. However, this decay does not apply to all countries of origin and it may also take different shapes. Similarly, Nicolau (2008) confirmed that the existence of a so-called Ulysses factor, where certain types of tourists feel a need to explore beyond the known and hence travel larger distances than other tourists. The same study found that the travel motive of visiting friends and relatives results in longer distances travelled compared with other travel purposes. Hence, some destinations will be in a

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5 There are a number of studies that could not establish clear links between visitation and the price of transportation (e.g. Small & Sweetman, 2009; Mervar & Payne, 2007).

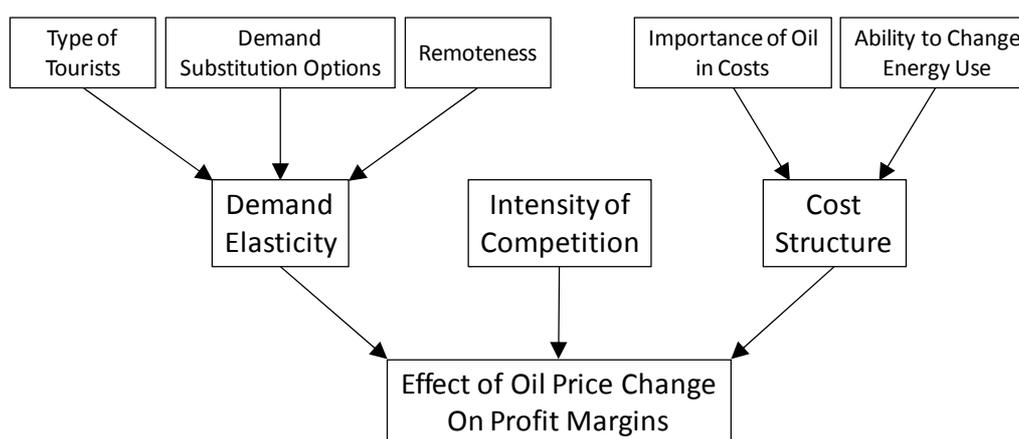
better position to offset potentially inhibiting influences of lower incomes and higher prices, at least for certain types of tourists.

New Zealand is a long distance destination for most of its markets (except Australia, which made up 39.7% of all arrivals in 2008, Ministry of Tourism, 2009) and based on the discussion above it is therefore more dependent on high-income tourists from origin countries than destinations that can draw on large markets close by (e.g. European destinations). Higher airfares are also likely to act as a constraint to some extent but less so than income, especially for those tourists who are drawn by the fact that New Zealand is ‘at the end of the world’ or those who travel to visit friends and relatives. Other positive attributes of New Zealand as a destination, for example its clean and green image, may also play an important role in tourists’ decision making.

### 3.3 In-Country Effects

In addition to the effects on the overall demand for tourism discussed in the previous two sections, higher oil prices will lead to cost increases for tourism businesses within a country. In this section we discuss the factors that will determine the vulnerability of a given tourism business, product or destination within a country to changes in the oil price. We take as given the demand effects discussed previously. We frame the discussion in terms of tourism businesses, but the same theory could be applied to specific tourism products, or a sub-national destination. For tourist destinations, regional responses and strategies for oil supply, as explored for Canterbury, New Zealand (McChesney, 2009) are relevant and can potentially reduce vulnerability. Figure 13 summarises the framework that we apply in this section.

**Figure 13**  
**Summary of factors determining the effect on profits of a change in oil prices for tourism businesses**



In general, oil prices feed into the variable costs of tourism businesses, that is, the costs that vary with the volume of output produced, such as the number of customers served. Higher variable costs necessarily mean lower profitability. The question is whether the effect on profitability will pose a significant risk to the business, that is, whether the business is no longer able to generate an adequate return on the capital invested in it and is forced to exit the industry. It is possible that there will be potential winners that achieve to increase their profitability despite higher oil prices, as these might be offset by reduced costs for other inputs such as labour. Given decreased arrivals, winners in tourism are likely to be only fairly

specific types of operations and not entire industries. A business that is not too energy-intensive, not located in a remote destination and is strongly focussed on domestic tourism would be a strong candidate to be better off in a high oil price scenario.

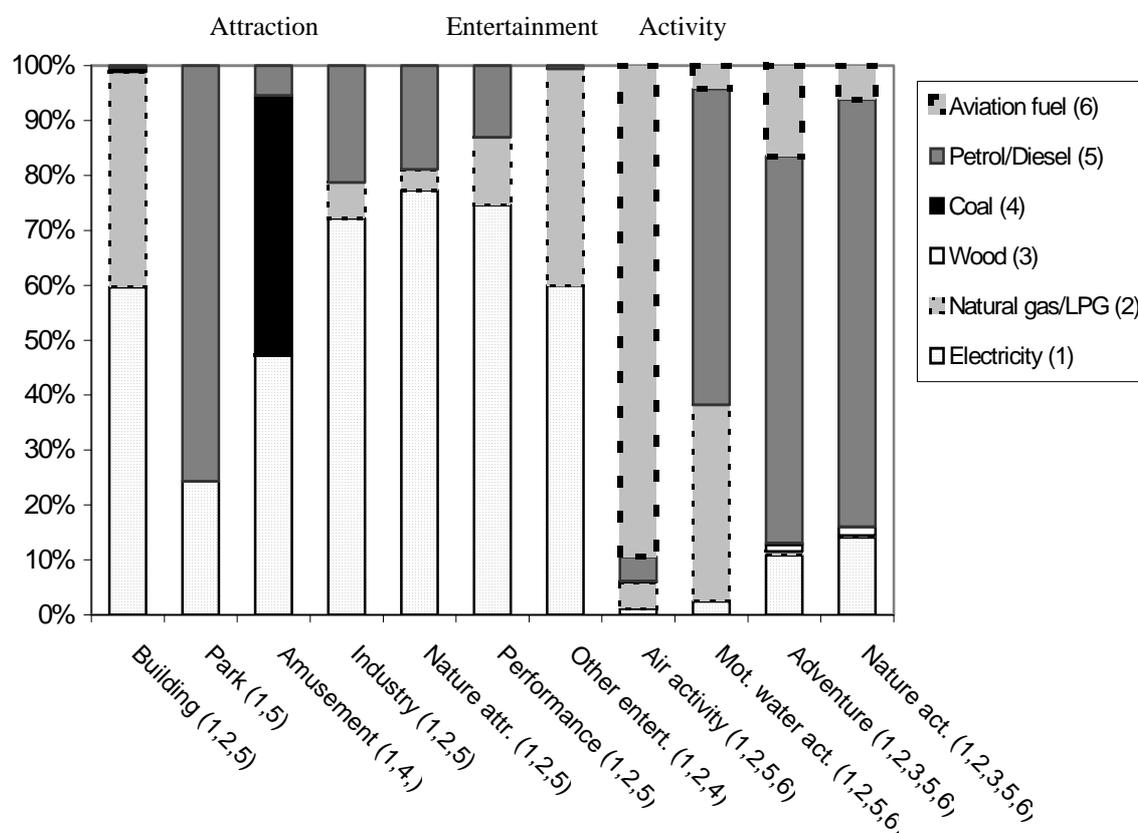
Obviously, the greater the importance of oil in the costs of a tourism business, the more exposed it is to higher oil prices, everything else equal. A recent survey of tourism businesses in New Zealand provided some information on the cost of energy as a percentage of operating revenue. While the sample sizes were relatively small the results indicate that this proportion is in the order of 5-8%, depending on the type of business (Table 5). The differences between the means and medians indicate that there are a number of businesses that are characterised by particularly high energy use proportions. For example, transport businesses include both rental car companies and coach operators. The former operate offices and are responsible for maintaining their fleet, but they are not paying for the fuel consumed as a result of driving (the tourist pays). In contrast, transport service providers such as coaches or boats bear the cost of their energy consumption themselves and in those cases energy is a significant factor in terms of operational costs. Further analysis would be useful, but the small sample sizes prevent segmentation into finer categories.

**Table 5**  
**Energy cost as a percentage of gross operating revenue by category**  
**(Becken & Carboni, 2008)**

Category	Number of respondents (N)	Percentage of gross operating revenue: median (mean in brackets) (%)
Accommodation	147	8.3 (11.2)
Attraction/Activity	48	5.0 (7.6)
Transport	26	5.5 (10.1)
Other	32	1.3 (3.2)

It also has to be noted that Table 5 shows all energy costs, including electricity. While electricity prices are likely to be influenced by global oil prices the relationship is somewhat indirect. This is particularly relevant for the accommodation sector that largely relies on electricity for their energy needs (Becken et al., 2001). Research on the energy use of New Zealand tourist attractions revealed that stationary attractions (e.g. museums) and entertainment providers (e.g. theatres) consumed comparatively little energy (and mainly electricity) compared with activity providers who largely relied on motorised products, e.g. scenic flights, boat trips or land transport (Becken & Simmons, 2002) (Figure 14).

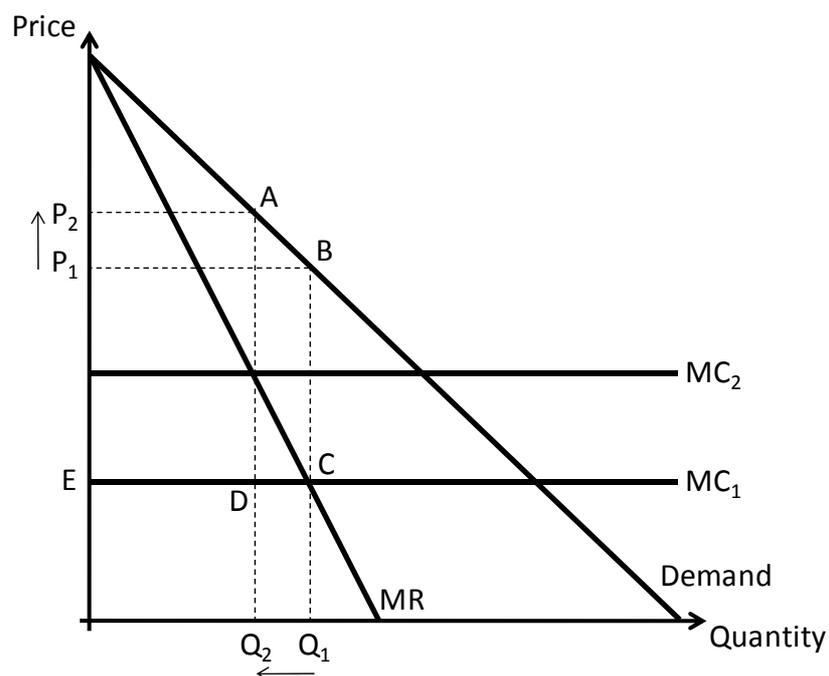
**Figure 14**  
**Proportion of fuel types for tourism sub-categories. The numbers on the horizontal axis indicate the main energy sources (Becken & Simmons, 2002)**



The effects of the direct increase in variable costs on profitability depend on the intensity of competition that the firm faces, as well as the nature of demand for its products or services (assuming operators behave rationally, which is not necessarily the case). Firms that face intense competition will have relatively low profit margins already, and will find it difficult to absorb cost increases. In the long run, the impact on profits of tourism businesses of higher oil prices depends on their ability to absorb the cost increase by passing the cost increase on to consumers, modifying their cost structure, and accepting lower margins. We consider each of these ways of adapting in turn.

First, all profit-maximising firms will respond to an increase in marginal costs by raising their prices to some extent. The degree to which the cost increase is passed through to prices depends partly on the intensity of competition that a firm faces from its rivals. If competition is intense, pass-through will be higher, everything else equal. For example, in the extreme of perfect competition, price equals marginal cost, so a cost increase will be fully passed through. In contrast, a monopoly firm will typically choose to pass through less than the full cost increase, and will accept lower profits.

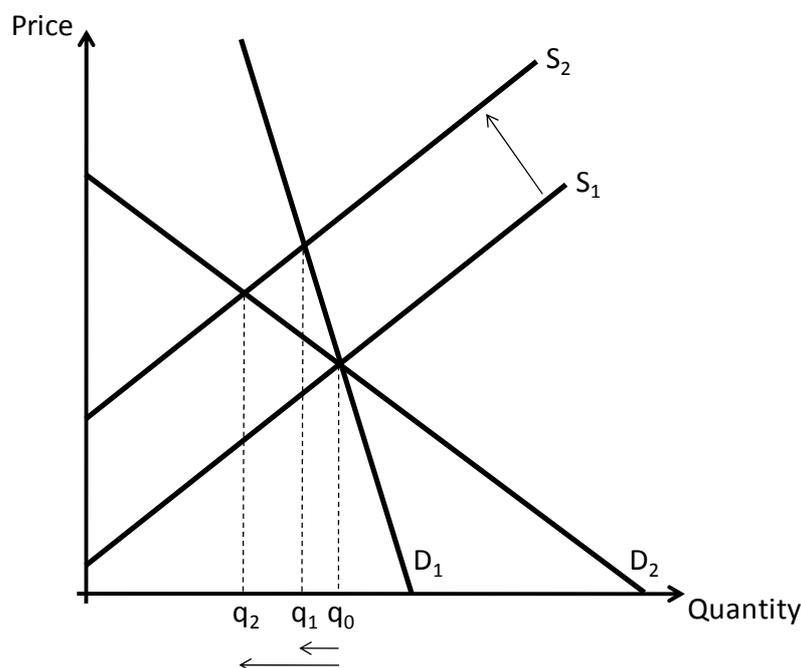
**Figure 15**  
**Pass-through of higher marginal costs to prices, and the effect on profits**



The pass-through mechanism is illustrated for a single firm in Figure 15. A firm maximises profits at the output level where its marginal revenue equals its marginal cost. Starting from marginal cost  $MC_1$ , when marginal cost increases the firm will choose to reduce output from  $Q_1$  to  $Q_2$ , which corresponds to a price increase from  $P_1$  to  $P_2$ . This causes a decrease in profits from area  $P_1BCE$  to area  $P_2ADE$ .

The effect of higher prices depends crucially on the elasticity of demand for the firm's product(s). This is illustrated in Figure 16 for a perfectly competitive market. The demand curve  $D_2$  is relatively more elastic than the curve  $D_1$ . An increase in costs causes a contraction of the supply curve from  $S_1$  to  $S_2$ . With the relatively elastic demand curve  $D_2$ , quantity sold in the market reduces from  $q_0$  to  $q_2$ , compared to  $q_0$  to  $q_1$  with the demand curve  $D_1$ . For any given cost increase, the more elastic is the demand, the greater will be the quantity reduction in response to the price increase. This is true for all markets, even if they are not perfectly competitive as in this illustration.

**Figure 16**  
**Effect of demand elasticity on market quantity following a cost-induced supply contraction**



The larger demand response to the price increase when demand is more elastic means that there will be a larger impact on profitability of a cost increase. It is therefore necessary to understand what determines demand elasticity in order to assess the risks to tourism businesses of higher oil prices. The following factors are relevant:

- The type of tourists served: Tourists who are more budget-conscious and/or have lower incomes will be more sensitive to price increases. Therefore, in general, businesses whose customers are young, budget travellers, or from countries with lower incomes, are likely to face more elastic demand. A recent study of visitors to New Zealand found that Asian visitors were generally relatively more price sensitive than visitors from other origins (Schiff & Becken, 2009). This could be explained by lower incomes, but potentially other factors, such as the maturity of the market, cultural aspects or the kinds of businesses involved in the market (e.g. Asian wholesalers).
- Substitution options available to tourists: If tourists have many good substitutes for the products or services provided by a business then they will be able to change their consumption patterns relatively easily in response to a price change, and demand will be relatively more elastic. In contrast, a product or service that is unique will have relatively inelastic demand.
- Remoteness: An attraction in a remote location will involve more time and expense for visitors to reach, and higher oil prices will also affect the costs of travel to and from the location. Relatively remote attractions will therefore face relatively elastic demand, everything else equal. Note that it is not straightforward to define which destination is remote and which one is not, as this depends on typical tourist itineraries and other attractions nearby that – even though geographically remote – form a cluster that provides sufficient attractiveness for tourists to justify travel distance.

The extent to which a tourism business is exposed to higher oil prices also depends on its ability to modify its cost structure in order to offset the effects of higher prices. As discussed already, in the short-run such opportunities may be limited, and are likely to only involve idling capacity or relatively minor changes to operating methods. Over the longer term, businesses can look to alternative sources of energy and new transport systems that are more energy efficient or use alternative forms of energy.

In general, businesses will respond to higher oil prices by substituting away from oil-intensive technologies and towards alternatives, to the extent that this is possible. These substitution possibilities will differ greatly across different types of businesses. Airlines and other transport operators will have relatively limited immediate substitution possibilities, and will depend on efficiency gains due to technological improvements over time.

Finally, businesses will be more at risk from higher oil prices if they have lower profit margins to begin with. The more intense competition a business faces from rivals with that provide close substitutes and have similar cost structures, the lower its profit margin will be. When margins are lower, there is less ability to absorb cost increases and greater adjustments (in the form of higher prices and/or technological changes) are required. In very competitive markets, we would expect that some firms would exit the market in the long run in response to higher oil prices if they are no longer able to provide an adequate return on capital.

## Chapter 4

### Discussion

Oil prices have been characterised by extreme volatility with a general underlying trend of increasing prices. Given expected growth in demand and constraints in increasing supply, global oil prices are expected to continue to rise in the medium to long term. The recent global recession resulted in a temporary reduction of demand, resulting in a sharp fall in oil prices in 2009, but prices are expected to continue to rise in the coming years. This only highlights the volatility of oil prices as they react quite dramatically to changes in market conditions.

Analysis of historic oil crises and increases in prices shows that negative economic impacts on oil importing countries are evident, at least in the short term but in some cases permanently. Several studies have demonstrated that the effects of oil price changes are reduced GDP, inflation and loss of employment. Effects are more severe in countries with high production oil intensities (e.g. China), high dependency on oil imports, and less flexible labour markets. Oil exporting countries, such as Canada and Norway, are likely winners from increased oil prices, although in the long run this also depends on how the economies of their trading partners fare. Most tourist generating countries for New Zealand are net oil importers and therefore vulnerable to global oil price increases.

Reductions in GDP generally result in lower incomes and less discretionary income available for consumption, including tourism. The tourism literature clearly demonstrates that income is a key, if not the most important, variable in determining tourist travel. This is not only true in terms of trip generation, but also with respect to level of expenditure, length of stay and type of trip. Long distance destinations are more dependent on high-income tourists than short-haul destinations. New Zealand will have to overcome this barrier to continue to attract tourists from far-away origins under high oil price and lower-income scenarios. Factors such as tourists' specific desire to see distant and exotic destinations as well as emotional travel reasons (e.g. visiting friends and relatives) are positive factors that overcome financial inhibitors, at least for certain types of tourist. In the context of higher oil prices, the importance of Australia as a source for tourists to New Zealand becomes even more evident. Also, domestic tourism will likely increase in importance and provides a promising avenue to compensate for potential losses in international tourism.

Higher oil prices will also drive up transport costs, in particular for aviation where fuel constitutes a substantial proportion of operating costs, and where substitution options are very limited, particularly in the short term. Studies of price elasticity provide information about the extent to which tourist demand for travel will change given specific price changes. Again, it is important to distinguish different market segments and types of tourists. For example, business travel has been found to be less price-sensitive to transportation costs than leisure travel. Similarly, long distance travel is less price elastic than short haul travel. While this is relatively positive for a long distance destination such as New Zealand, it does not negate the fact that there will be some price effect which will manifest in reduced tourist arrival numbers. This has implications for how many tourists will visit New Zealand but also for future market shares of different tourist types.

Just as tourists respond to higher transport prices to get to their destination, they are also likely to adjust travel behaviour and consumption at their destination if prices for tourism

products and services increase. Energy, and in particular oil, is an important input into tourism production and increases in global oil prices will be reflected in higher in-country prices for tourism. Oil-intensive products (e.g. helicopter flights) will likely to be more affected than those that rely only to a small extent on oil-related inputs. The accommodation sector, for example, is largely a user of electricity and as such not directly affected by oil price changes; however, it is important to note that increased global oil prices will also affect gas prices and as a result electricity prices. The greater ability a business has to reduce its consumption of energy (and specifically oil) and improve its fuel efficiency (i.e. economic output per unit of energy input) the lower its vulnerability to changing oil prices. The degree to which costs can then be passed on to customers depends on the level of competition, the type of tourists demanding a service, and the characteristics of the service (e.g. remoteness). As indicated above, tourist decision-making is complex and price is only one factor among other determinants.

Hence, for a tourism business (or destination) the impacts of higher oil prices can be separated into those that affect the country as a whole (i.e. as a result of reduced consumption) or the business specifically. The latter impact depends on the specific business situation, its geographic location, customer base, production structure and ability to adjust. As such there is some level of control on the part of the business to reduce its vulnerability to higher oil prices. In general, businesses, tourism products or local destinations within a country will be better placed to adjust to higher oil price if the demand they face is less elastic, if there is less intense competition with other operators or substitute products or destinations, and if oil is less important in the cost structure or there are more opportunities to adjust the production technology to make more use of alternative energy sources or reduce energy use. Understanding the macroeconomic effects that might occur globally is an important piece of information that needs to be included in a business' decision making and strategic planning.

## **Chapter 5**

### **Conclusion**

This report explored the vulnerability of tourism to increasing global oil prices, and provided a hierarchical framework to understand the effects at a macroeconomic level, in relation to destination choice and in-country travel behaviour. Higher oil prices are likely to affect tourists' income and propensity to travel. In particular long-distance destinations, such as New Zealand, will be affected by such changes. There are other important factors in tourists' destination choice that might act in favour of New Zealand, for example its positive image and strong emotional ties by a large proportion of visitors. Businesses and destinations that rely on price-sensitive markets will be most affected, as well as businesses that have high energy inputs, remote locations, intense competition and few substitution opportunities for oil as a source of energy. Long-term planning and understanding of both the macro and microeconomic effects may assist businesses and other tourism stakeholders to reduce vulnerability to increasing oil prices.



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