

Oil, the Global Economy and Tourism

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Structured abstract

Purpose

The availability and price of oil are intimately linked to the global economy and as a result to tourism. This paper presents the results from research on tourism and oil, undertaken with a particular focus on New Zealand as a long haul destination in the light of dwindling global oil resources.

Methodology

The findings of four distinct research phases will be reported in an integrative analysis.

Findings

The results highlight that economic prosperity in countries of origin, and in particular tourists' income, is of critical importance for outbound tourism, especially to long haul destinations. The econometric analysis of in-country behaviour, such as consumption and regional dispersion, reveal that variables such as country of origin, travel purpose or length of stay are currently more important determinants of travel behaviour than fuel prices.

Implications

Coupled with differentiated oil vulnerabilities by different countries and different levels of price elasticity, the importance of market mix becomes evident. Tourism businesses can reduce their oil vulnerability by addressing a range of risk factors. Government policy and industry initiatives can support these micro economic adaptation processes.

Originality

Little research is available on the importance of oil shocks for tourism and this paper is an attempt to address this gap. The findings are specific to New Zealand but will be of interest to other long-haul destinations. The analysis integrates across a range of research methods.

Keywords: oil shocks, elasticity of demand, macro-economic impacts, oil vulnerability, energy use

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1. Introduction

The availability and price of oil are intimately linked to the global economy and as a result to tourism. Tourism in itself relies heavily on oil, not only for its transportation components but also for many other parts of the tourism product, for example, accommodation, recreational activities and hospitality. Global demand for oil has been growing steadily and oil prices have been highly volatile, dating back to the oil crises in the 1970s. There is increasing concern about global peaking of oil production and “the risks presented by global oil depletion deserve much more serious attention by the research and policy communities” (UK Energy Research Centre, 2009: 171). Increased scarcity will lead to higher prices, and rising oil prices will have both macro- and micro-economic effects which are significant to tourism.

New Zealand is a long-distance destination for most of its markets (except for Australia and the South Pacific Islands) and as such depends heavily on air transportation (Becken, 2008). Moreover, the tourism product within New Zealand is based on ‘touring holidays’ that, again, rely strongly on the availability of – increasingly individualised – transport systems. Growth in New Zealand tourism, as elsewhere in the world, has been made possible on the basis of cheap and abundant oil, and concerns are growing what effects oil shocks or shortages might have on the ability of people to travel. Research in Scotland indicated that very large shocks on oil and other energy prices (500% over a decade for oil) on the Scottish economy, would reduce tourism demand from a forecast 4% p.a. to 2.2% p.a. (Yeoman et al., 2007).

This paper presents the results from research on tourism and oil, undertaken with a particular focus on New Zealand as a long haul destination. The findings from four different research phases will be integrated to obtain a holistic view of tourism’s vulnerability to oil shocks.

2. Methodology

The contribution of this paper is the integration of research results from four different research phases in a three-year project on tourism and oil in New Zealand. The four phases are:

1. Fact finding analysis (2007)
2. Importance of oil to parts of the tourism system (2008)
3. Impacts of oil price changes on the whole tourism system and the New Zealand economy (2008-09)
4. Addressing oil vulnerability (2010).

In each of these research phases, a range of sub-projects were carried out to address specific research objectives (Table 1). Phase 1 involved a literature review, stakeholder interviews and a tourist survey. These were carried out to obtain an overview of what different tourism actors know about oil, whether they are concerned about future oil shocks, and whether their decision making and behaviour is influenced by these prospects.

Phase 2 involved detailed, econometric analyses of various aspects of tourism demand (arrivals, elasticities, and transport behaviour) and tourism supply. Data on tourism demand were available through the International Visitor Survey (1997 to 2007). The findings from this research were vital inputs into the Computational General Equilibrium (CGE) model developed in Phase 3. Results from the CGE model in combination with the findings of the earlier research phases were then communicated to stakeholders with the goal of informing decision making and policy development (Phase 4). Both the government and industry bodies actively sought this input as part of relevant programmes. This paper focuses on the three research phases, although a brief summary of policy recommendations will be provided in the conclusion.

Table I Overview of individual projects and methods carried out within the four phases		
Phase	Method	Research Objectives
1	Literature Review	Overview of relationship between oil and tourism, and price sensitivity of tourists
	Stakeholder Interviews (N=10)	Understand perception of oil and possibly supply challenges held by tourism stakeholders
	Campervan Tourists Survey (N=1121)	Explore tourists' perceptions of oil and reactions to higher oil prices with respects to travel in New Zealand
2	Tourism Arrivals Model	Econometric analysis to relate oil prices to tourist arrivals by market
	Elasticity Analyses	Econometric modelling to understand elasticities of 18 segments
	Distance Models	Econometric modelling to analyse transport and petrol prices in relation to transport behaviour in New Zealand
	Business Energy Survey (N=417)	Understand operators' perceptions of energy use and saving initiatives
3	Computable General Equilibrium Model	CGE model to assess effects of changes in oil price on the New Zealand economy
4	Dissemination and Communication	Engagement with industry and policy makers to inform decision making and assist energy saving initiatives

3. Results

3.1. Importance of oil for tourism

While there is a considerable body of literature on oil shocks and macro-economic consequences (e.g. International Energy Agency, 2004; Korhonen and Ledyeva, in press), as well as on 'peak oil' (e.g. Greene et al., 2006), only two articles could be identified that specifically address tourism and oil (Becken, 2008; Yeoman et al., 2007). The lack of academic research is not mirrored by the concern that New Zealand tourism stakeholders expressed in the interviews. Interviewees placed 'peak oil' ahead of climate change, because, "most tourists still make their travel decisions based on financial and not on ethical considerations". One manager summarised the challenge by saying "the era of cheap travel is over". It was generally believed that New Zealand is a very vulnerable destination due to its long-distance markets; however, there was a wide range of opinions on which markets will be affected most, and which products and destinations within New Zealand would be particularly at risk. One tourism expert pointed to the opportunity of new product development, such as a 'carbon zero bike trail' or Maori-based products that show tourists the unity of people and land in a bicultural society.

Campervan tourists expressed great concern about the environment, but the analysis of travel behaviour showed that this did not translate into fuel saving, for example by driving less distance (Becken and Wilson, 2008). The perception of fuel prices differed for the different markets of origin (depending on how expensive fuel is in tourists' home country), although this did not have a measurable effect on travel distance. Finally, surveyed campervan tourists

indicated that in the light of higher fuel prices they would first reduce spending on items such as restaurant visits or accommodation before they compromised the transport component of their holiday in New Zealand. This inelastic behaviour towards individualised transport is confirmed in the wider literature on transport demand (Graham and Glaister, 2002).

3.2 Tourism demand – responses by different market segments

A comprehensive review of the economic literature highlighted that not all countries will be equally affected by oil shocks. Oil importing countries (i.e. most Western countries that constitute tourism source countries) are more vulnerable than oil exporting countries, such as countries in the Middle East, Australia, Canada, Norway, Russia, and to some extent Brazil. However, it was also found that while oil-exporting countries might benefit from higher oil prices in the short term, their economies would also suffer in the long term due to a weakened global economy (Gupta, 2008; Becken et al., 2010). Further, several international analyses show that developing countries (including the Asian economies) are more vulnerable than developed countries. This is partly due to their high oil-intensity relative to Gross Domestic Product (GDP) output (IEA, 2004), but also other factors such as limited access to alternative technology. The more vulnerable a country to oil shocks the more likely it is to face an economic downturn, with consequences for GDP, employment and income. Lower incomes have been found to affect tourism substantially (Dritsakis, 2004), not only in terms of a reduced propensity to travel, but also with respect to destination choice (less long haul), and type of holiday (e.g. 3 star instead of 5 star). Research into tourist destination choice also shows, however, that many other factors in addition to income (and also the price of travel) are relevant (Nicolau, 2008).

Our econometric models confirmed the importance of income related variables in tourists' home countries in relation to tourist arrivals to New Zealand (Small and Sweetman, 2009). Macro-economic parameters such as GDP (alongside exchange rate) were found more often than oil prices or airfares to have a statistically significant relationship with tourist arrivals for most market segments. Our findings contradict somewhat the tourism literature that provides a range of values for price elasticities for air travel (e.g. Brons et al., 2002). Our models only provided significant results for airfares for various Australian market segments, and German tourists. Other segments, especially the Asian ones and tour group visitors from the USA, were only found to be sensitive to the total price of tourism (i.e. airfares plus in-country component), and for some market segments we were unable to estimate any statistically significant price elasticity (Schiff and Becken, accepted) (Table 2).

Table II NZ visitor arrivals price elasticity estimates (based on Schiff and Becken, accepted) for those segments where a statistically significant relationship could be established		
Segment	Price Measure	Price Elasticity
South Korea all	Total price	-1.75
China FIT	Total price	-1.65
Japan Tour	Total price	-1.55
China Tour	OTG prices	-1.09
Australia FIT VFR	Airfare	-1.05
Germany all	Airfare	-0.87
USA Tour	Total price	-0.78
UK Holiday	Total price	-0.52
Australia Tour	Airfare	-0.31
USA FIT Holiday	Total price	-0.29
Australia FIT Holiday	Airfare	-0.26

Note: FIT means free independent traveller; Tour stands for tour group visitors; VFR means visiting friends and relatives; for more information on the tourist segments please see Becken et al., 2008.

Besides the impact of prices on tourist arrivals, our research also investigated the impact of higher prices of New Zealand tourism products. Prices were believed to increase, depending on the oil price scenario and an industry's reliance on oil. The price of domestic air travel, for example, was observed to have increased faster than the general Consumer Price Index for the period between 1997 and 2007¹. In contrast, tourist accommodation increased in line with the CPI. Again, the econometric analysis revealed that the Asian markets were most sensitive to price increases within New Zealand. This manifested in reduced consumption at times of higher prices. Australian tourists, on the other hand, did not display any sensitivity to price changes within New Zealand (Becken et al., 2008).

3.3 Destinations within New Zealand

One hypothesis at the beginning of our research was that different destinations within New Zealand might be differently affected by higher oil prices. This was assumed to be due to changes in market composition or as a result of changed transport behaviour across markets. We focused on transport behaviour and developed a model to understand a) tourists' propensity to travel by car or by plane and b) distance travelled by car or plane, given that a tourist decided to travel by these modes (Becken and Schiff, in press). Historic data from 1997 to 2007 were used to construct the 'distance model'. The results were slightly surprising. Despite significantly higher oil prices over time (reflected in transportation costs) tourists showed very limited sensitivity: only the propensity to travel by car for Australians and travel

¹ Other factors may have contributed to this trend; international aviation, for example, has increased slower than CPI, indicating that a wide range of drivers influence airfares.

distance by car by British and Japanese tourists was significantly negatively affected by fuel prices.

The model revealed that a range of other parameters are significant in explaining transport behaviour. These include country of origin, travel purpose, travel style, month of travel, length of stay, and repeat visitation. These findings indicate that changes in the composition of arrivals (i.e. different countries and markets) are more likely to influence how far tourists travel and which modes they chose, than actual transportation costs. The campervan tourist survey had also indicated that fuel prices are relative and that travel within New Zealand constitutes a small cost compared with the price tourists pay for their air travel to New Zealand.

In summary, our research did not support the concern that tourist destinations and businesses that are located in more remote areas are more at risk from increasing oil prices than those located in central locations. It also has to be noted that 'remoteness' is a relative concept in tourism, as places that are geographically remote could become 'central' to tourism when they are in proximity to major tourist routes. Te Anau, for example, would be considered 'remote'; however its location on the route between Queenstown and Milford Sound makes it an important gateway town for over 400,000 visitors of Fiordland National Park.

3.4. Vulnerability of Products and Businesses

A survey of tourism businesses showed that the majority of businesses take energy consumption seriously, as it presents a major cost to business. Depending on the type of business, energy makes up in the order of 5-10% of operating revenue (Becken and Carboni, 2008). The data revealed that some industries are systematically more energy intensive than others. For example motels are relatively more energy intensive than hotels, which are characterised by a higher service (and therefore labour) component in their cost structure compared with energy. Many tourism businesses depend on electricity in the first instance, which reduces their vulnerability to oil shocks. However, energy systems are interrelated and higher oil prices will flow on to gas prices and as a consequence affect the cost of electricity production.

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)

Note: Transport includes both transport providers and rental car companies

Our research identified the following risk factors for tourism businesses with respect to higher oil prices:

- **Exposure:** a business that is very energy intensive and particularly dependent on oil is more exposed than energy efficient businesses that largely rely on electricity;
- **Substitution options:** A business can decrease vulnerability by substituting away from oil, for example replacing a diesel generator by a solar panel. Substitution potential depends on both technological options as well as investment capital;
- **Market mix:** One of the most important factors that determine business vulnerability relates to the kinds of tourists that demand the particular product. The propensity to travel to New Zealand under high oil price scenarios is as relevant as tourists' price sensitivity for specific tourism products and services;
- **Diversification:** A business that heavily relies on one product is more vulnerable than one with a diverse portfolio, especially when the portfolio contains a range of energy-efficient activities;

- Geographic location: Remoteness is not necessarily a risk factor, unless the location is far away from main tourist routes; further research in this area would be beneficial;
- Competition: Higher competition (intra- and inter-industry) means lower profit margins and a potentially higher impact of increasing operating costs (due to higher energy costs).

3.4 Impacts of higher oil prices on the New Zealand economy

A CGE model for tourism in New Zealand was constructed with two main goals: (a) to understand the macroeconomic impacts of oil shocks on tourist origin countries and so the effect on tourism demand from these countries, and (b) to analyse the changes in relative prices between countries and of different goods and services imported to and exported from New Zealand. The detailed methodology is described in Lennox and Schiff (2009) and Lennox (in press); however in summary the model is designed to capture how the New Zealand economy responds to an oil shock by reaching a new long term economic equilibrium. Major outputs of the model are changes in New Zealand's Gross Domestic Product (GDP), exports (including tourism), the value of tourism and also changes in the economic contribution of 18 different tourism market segments.

The analysis of a 100% increase in global oil prices relative to levels in 2006 reveals that real values of tourism exports decline by 4.6%. The real price of tourism exports increases 1.9%, partly offsetting the 6.4% decline in quantity. By contrast, both the real price and quantity of accommodation output falls: 1.2% and 2.9% respectively. Accommodation can be seen as a good indicator industry for other tourism industries, such as attractions. The macroeconomic impacts are significantly smaller than the tourism-specific impacts: GDP is reduced by 1.25%. Sensitivity analysis shows that the income effects in origin markets strongly affect tourism exports and to a slightly lesser extent (thanks to the offsetting response of domestic tourism) accommodation sector output. The impacts on GDP and RGNDI are changed by approximately 0.1% in each case.

The tourism sector impacts are driven primarily by the substantially higher cost of air transport and to a lesser extent, of using cars and campervans. The higher cost of international air travel is sufficient to reduce aggregate demand of international tourists within New Zealand. Conversely, it increases aggregate domestic leisure tourism demand as New Zealand residents substitute away from outbound international tourism. The higher domestic leisure tourism demand partly offsets the lower inbound international tourism demand for accommodation and other non-fuel-intensive services.

The effect of the high oil price on consumption of New Zealand tourism differs considerably by market. In all cases, the real price of New Zealand tourism as seen by inbound tourists rises. However, the real value of consumption may fall substantially (e.g. -9.9% for South Korea) or may even rise slightly (e.g. 0.3% for Japan FIT holiday tourists). In the latter cases, the real exchange rate effect is dominating both the negative price and income effects. The effects may equally differ even between markets with the same origin countries. For example, UK Holiday declines 7.4% while 'UK VFR and Other' declines only 3.4%. This is due to the different elasticities of demand for New Zealand tourism, of substitution between international air travel and in-country consumption, and different cost shares of these different elements.

4. Conclusion

The availability of affordable oil is incredibly important for the world economy and as a result for tourism. Research undertaken as part of the New Zealand Tourism and Oil project confirms that economic prosperity and in particular tourists' income is of critical importance for outbound tourism, especially to long haul destinations. Increases in oil prices not only affect people's ability to travel but also lead to an increase in prices for many tourism goods and services, including those related to transportation. Again, these impacts will pose a challenge for long distance destinations, although for some market segments our research could not establish strong links between airfares (or oil prices) and tourist arrivals for historic prices. Our results aligned to some extent with a 2006 UNWTO study on tourism and oil which found that historic 'shock' had only small and short lived impacts on global tourism. This could change once oil prices reach much higher levels and thresholds of price sensitivity are reached. More

research in this area is required, in particular given that this present research was unable to include the oil shock effects of mid-2008.

Tourists are also likely to change their consumption behaviour at the destination (e.g. by reducing consumption due to higher prices), however, we were unable to establish clear links between fuel price and transport behaviour. At present, variables such as country of origin or length of stay are more important determinants of travel behaviour. Coupled with differentiated oil vulnerabilities by different countries and different levels of price elasticity, the importance of market mix becomes evident.

Businesses themselves can be described by a range of risk factors when assessing their vulnerability to oil shocks. These factors relate to both tourism demand and supply of the particular product. Overall, the effects of higher oil prices globally have been shown to be relatively detrimental to the New Zealand tourism sector (by means of a CGE model), although negative effects on the economy as a whole were less pronounced.

Policies to address the risks to New Zealand tourism posed by higher oil prices should include those related to tourism marketing, business management and product development, and transport systems. More specifically, the government may choose to deliberately integrate a range of risk factors, including oil, in the development of their marketing strategies. Assistance for businesses to reduce oil vulnerability may be most effective in the form of a public-private partnership, such as the current Tourism Energy Efficiency Project undertaken jointly by the Energy Efficiency and Conservation Authority and the Tourism Industry Association. Finally, a long term view of tourism and transport will require investment into alternative transport systems, for example electricity based ones. Here cooperation between a number of government agencies (e.g. Transport, Tourism, Economic Development etc.) would be beneficial to facilitate research, investment and implementation.

5. References

- Becken, S. (2008), 'Indicators for managing tourism in the face of peak oil', *Tourism Management*, Vol. 29, pp. 695-705.
- Becken, S. & Carboni, A.J. (2008), '*Managing Energy Use in Tourism Businesses – Survey Results*', LEaP Report 4, September 2008. Lincoln University. Available <http://www.leap.ac.nz/site/section.asp?bid=24&SectionID=1038>
- Becken, S. & Wilson, J. (2008), '*Environmental attitudes and fuel saving behaviour by KEA Campers Customers*', Report No 6. Available at <http://www.lincoln.ac.nz/Research-Centres/LEaP/Publications/>
- Becken, S. A. Carboni, S. Vuletich & A. Schiff (2008), '*Analysis of tourist consumption, expenditure and prices for key international visitor segments*', LEaP Report 8, November 2008. Available at (20/01/09) www.leap.ac.nz
- Becken, S. & Schiff, A. (2010), 'Distance Models for New Zealand International Tourists and the Role of Transport Prices', Accepted *Journal of Travel Research*. Available online.
- Becken, S., Ngyen, M. & Schiff, A. (2010), '*Developing an Economic Framework for Tourism and Oil*', LEaP Report 12. Available at www.lincoln.ac.nz/leap
- Brons, M., Pels, E., Nijkamp, P. & Rietveld, P. (2002), 'Price elasticities of demand for passenger air travel: a meta-analysis', *Journal of Air Transport Management*, Vol. 8, pp. 165-175.
- Dritsakis, N. (2004), 'Cointegration analysis of German and British tourism demand for Greece', *Tourism Management*, Vol. 25, pp. 111 – 119.
- Graham, D. J., & Glaister, S. (2002), 'The demand for automobile fuel. A survey of elasticities', *Journal of Transport Economics and Policy*, Vol. 36, No. 1, pp. 1-26.
- Greene, D. L., Hopson, J. L. & Li, J. (2006), 'Have we run out of oil, yet? Oil peaking analysis from an optimist's perspective', *Energy Policy*, Vol. 34, pp. 515-531.
- Gupta, E. (2008), 'Oil vulnerability index of oil-importing countries', *Energy Policy*, Vol. 36, pp. 1195-1211.
- International Energy Agency (2004), '*Analysis of the impact of high oil prices on the global economy*', Downloaded from www.iea.org/papers/2004/High_Oil_Prices.pdf

- Korhonen, I. & Ledyeva, S. (in press), 'Trade linkages and macroeconomic effects of the price of oil', *Energy Economics*.
- Lennox, J. & Schiff, A. (2008), 'Oil Price and Tourism in a Computable General Equilibrium Framework', Presented at the New Zealand Tourism and Hospitality Research Conference, 3-5 December, Hanmer Springs. Available at <http://www.lincoln.ac.nz/Research-Centres/LEaP/Climate-Change-Peak-Oil--Society/Projects/Tourism--Oil/>
- Lennox, J. (in press), '*The New Zealand Tourism General Equilibrium Model (NZTGEM): Technical Documentation*', LEaP Report 14. In press. Available at <http://www.lincoln.ac.nz/Research-Centres/LEaP/Publications/>
- Nicolau, J. L. (2008), 'Characterizing Tourist Sensitivity to Distance', *Journal of Travel Research*, Vol. 47, pp. 43-52.
- Schiff, A. & Becken, S. (accepted), 'Demand Elasticities for Tourism in New Zealand', *Tourism Management*.
- Small, J. & Sweetman, C. (2009), '*New Zealand Tourist Arrivals*', Covec Research Report. Available at <http://www.lincoln.ac.nz/Research-Centres/LEaP/Climate-Change-Peak-Oil--Society/Projects/Tourism--Oil/>
- UK Energy Research Institute (2009), '*Global Oil Depletion. An assessment of the evidence for a near-term peak in global oil production*', London.
- United Nations World Tourism Organisation (2006), 'The Impact of Rising Oil Prices on International Tourism', *Special Report Number 26*. Madrid.
- Yeoman, I., Lennon, J., Blake, A., Galt, M., Greenwood, C. & McMahon-Beattie, U. (2007), 'Oil depletion: What does this mean for Scottish tourism?', *Tourism Management*, Vol. 28, pp. 1354-1365.