

How deep are scuba divers' pockets?

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More than 60,000 divers annually visit Sodwana Bay in KwaZulu-Natal, South Africa, one of the world's top diving sites. A survey was conducted during March and April 2012 to identify factors that influence the spending behaviour of divers. Data from 402 questionnaires provided information about spending per person, socio-demographic profile, diving behaviour and motives, and environmental awareness. A quantile regression approach was used to analyse the determinants of spending. The inclusion of environmental awareness as a factor that might influence spending behaviour is an advance on previous studies of determinants of spending, and this factor was found to increase spending significantly. Knowledge about the relationship between environmental awareness and spending could be valuable for policy aimed at both economic and ecological sustainability.

Keywords: tourist spending; marine tourism; quantile regressions; scuba diving; Sodwana Bay

Scuba diving is a steadily growing tourist activity. Leeworthy *et al* (2005) note that the USA alone has 3.34 million scuba divers, and that, while snorkelling is on the decline, scuba diving is likely to continue to grow. This will lead to greater competition between diving destinations. Leeworthy and Wiley (2001) and Pendleton and Rooke (2006) observe that scuba diving contributes significantly to marine tourism, and Cline Group Advertising claim that the US scuba diving industry is worth US\$2.6 billion (cited by Greafe and Todd, 2001). In general, studies find that divers' daily expenditure is between US\$100

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and US\$200. In a study in Barbados, Schuhmann *et al* (2008) found that between 30,000 and 50,000 divers visit the country and if each diver participates in only one dive per visit this could create a 10% additional economic value that as a total could be as high as US\$306,000. In the case of Sodwana Bay in KwaZulu-Natal, South Africa, Saayman and Seymour (2012) found that scuba divers' annual direct spend is approximately R200 million (\pm US\$30 million).

However, simply knowing how much tourists, or divers in this case, spend is not sufficient for planning and marketing purposes (Saayman and Saayman, 2012); what is important is to identify what determines this spending. Jang *et al* (2004) emphasize that the determinants of spending are useful for understanding expenditure patterns and determining market segments. The complexity of this type of research is highlighted by Craggs and Schofield (2006), who note that a range of socio-demographic and behavioural determinants influences tourist expenditure. Frechtling (2006) goes so far as to say that tourist expenditure is one of the most critical variables when analysing a tourist destination, since it directly determines the profitability for a destination's businesses and organizations.

This study therefore aimed to identify the determinants of scuba divers' spending at one of the world's top 20 diving sites, Sodwana Bay (Figure 1). Every year more than 60,000 divers descend on Sodwana Bay, where a wide selection of diving spots or reefs offer a variety of dives for beginners to advanced divers. This site is in the iSimangaliso Wetland Park, which in December 1999 became South Africa's first listed World Heritage Site. Sodwana Bay is also home to the endangered coelacanth, discovered here by divers in 2000.

Literature review

Schuhmann *et al* (2008) state that diving tourism in places such as Barbados has taken its toll of the reefs. Davis and Tisdell (1996) and Schleyer and Tomalin (2000) confirm that the growing popularity of scuba diving has overcrowded diving sites, which has contributed to the degradation of these sites. Waddell and Clarke (2008) note that in the Caribbean only 25% of the reefs are in good health. CoRIS (2005) estimate that 10% of all coral reefs globally are degraded beyond recovery, while about 30% are in critical condition. Although diving tourism cannot be held solely responsible for all the degradation, it is apparent that pressure on reefs is on the increase, so there is particular cause for concern about the risks to pristine reefs such as Sodwana Bay (Schleyer and Tomalin, 2000). This risk is exacerbated by the fact that coral reefs are advertised by tourism destinations as a major attraction in addition to other tourism offerings (Asafu-Adjaye and Tapsuwan, 2008). Schuhmann *et al* (2008) stress that reefs provide economic benefits over and above ecological and recreational benefits, creating jobs, and generating income and tax revenue for the region. Another major benefit is that most of these reefs or diving sites are located in rural as well as conservation areas and thus play an important developmental role for rural communities (Mograbai and Rogerson, 2007).

Destinations are therefore competing for 'scuba dollars' and this implies that

marketers and planners would prefer to attract those divers that spend the most. As Saayman and Saayman (2006) put it, it is preferable to have 10 tourists spending US\$100 each than 100 tourists spending US\$10 each. This is especially important for environmentally sensitive areas such as reefs. Kruger (2009) states that determinants of spending are an essential input in order to manage or achieve sustainable growth. The literature furthermore shows that there are several benefits to be derived from identifying the determinants of spending:

- high yielding markets can be identified;
- planners and marketers can understand spending behaviour;
- policy formulators can be informed; and
- product developers can learn where resources should be allocated so as to increase spending, and thus make better product development decisions (Wilton and Nickerson, 2006; Kruger, 2009; Saayman and Saayman, 2006, 2012).

Although several studies have been conducted on the topic of scuba divers and specifically their economic value (Greafe and Todd, 2001; Arin and Kramer, 2002; Pendleton and Rooke, 2006; Asafu-Adjaye and Tapsuwan, 2008; Stoeckl *et al*, 2010), none has looked at the broader question of whether environmental awareness makes any contribution to spending – an important question now that diving spots and reefs are under increasing pressure.

A review of the tourism literature revealed several socio-demographic and behavioural determinants of spending. How spending is measured also differ substantially between authors. Total spending per trip is a common measure for spending (see, for example, Mok and Iverson, 2000; Seiler *et al*, 2003; Jang *et al*, 2004; Skuras *et al*, 2006), while total spending on a specific category is investigated by authors such as Letho *et al* (2004). Per person expenditure is also regularly used (Jones *et al*, 2009; Kruger *et al*, 2009; Saayman and Saayman, 2012; Saayman *et al*, 2012), while per person per day spending is also a popular choice as a measure of spending (Lee, 2001; Thrane, 2002; Cannon and Ford, 2002; Pouta *et al*, 2006; Mehmetoglu, 2007). Although this complicates the comparison of studies, it is still worthwhile presenting an overview of their findings.

In terms of the variables that influence spending, some analyses of socio-demographic determinants found that age had a positive relationship with spending (Mok and Iverson, 2000; Thrane, 2002; Saayman and Saayman, 2006, 2012; Jones *et al*, 2009; Saayman and Krugell, 2010), and some found the reverse (Pouta *et al*, 2006; Mehmetoglu, 2007). The effect of marital status was inconclusive (Saayman *et al*, 2007). The effect of gender was also inconclusive: Thrane (2002) and Jones *et al* (2009) found that men spend more, whereas Letho *et al* (2004) and Craggs and Schofield (2006) found that women spend more. The effect of travel party or group size was also inconclusive: Lee (2001), Thrane (2002) and Seiler *et al* (2003) found a positive relationship, whereas Saayman and Saayman (2008) and Jones *et al* (2009) found the opposite.

Length of stay has a positive effect, as one would expect (Seiler *et al*, 2003; Jones *et al*, 2009; Kruger, 2009; Saayman and Krugell 2010). The same applies for income (Saayman *et al*, 2007; Jones *et al*, 2009), distance travelled (Cannon and Ford, 2002) and place of origin (Skuras *et al*, 2006; Saayman and Saayman,

2008; Streicher, 2009; Saayman *et al*, 2012). In a multilingual society, certain language groups were also found to spend more than others (Kruger *et al*, 2012; Saayman and Saayman, 2012), which might indicate cultural differences that influence spending behaviour. An interesting determinant was identified by Kruger *et al* (2012), who found that for ecotourists the type of media used to advertise a destination had a positive relationship on spending. The literature on behavioural determinants revealed that the reason for travel or travel motives played a significant role where spending was concerned (Mok and Iverson, 2000; Kruger *et al*, 2009; Saayman and Krugell, 2010; Saayman and Saayman, 2012). Finally, a comparison of the spending of first-time visitors and repeat visitors showed that first-time visitors spend more (Jang *et al*, 2004; Pouta *et al*, 2006), while other studies found the opposite (Gyte and Phelps, 1989; Saayman and Krugell, 2010).

Methodology

Study area

Sodwana Bay is situated on the Indian Ocean coastline of South Africa in northern KwaZulu-Natal, within the boundaries of the iSimangaliso Wetland Park, a World Heritage Site (Figure 1). The Bay contains a vast reef complex of high-latitude reefs (Riegl *et al*, 1995; Celliers and Schleyer, 2002). These reefs are one of South Africa's most diverse ecosystems, boasting at least 130 species of coral and about 400 species of fish, including sharks (Ramsay, 1996; Schleyer, 1999), and dolphins and whales are of course major tourist attractions of the Bay. There are four main reefs: Two-mile Reef, Four-mile Reef, Seven-mile Reef and Nine-mile Reef, all named after the approximate distance to the reef, in nautical miles, from the boat launch site for dive charters and vessels. With the variety of coral and marine species to be seen, it is not surprising that recreational diving in Sodwana grew from 20,000 divers in 1987 to 100,000 in 1993 (Schleyer, 1995). A peak of 120,000 divers in 1996 raised concern about the sustainable use of the reefs and a series of biological assessments revealed that there has been considerable damage (Schleyer and Tomalin, 2000). A scientifically based model of the zonation of the reefs was developed and implemented for their sustainable use (Schleyer and Celliers, 2005; Celliers and Schleyer, 2008). To date, Sodwana Bay remains a popular scuba diving attraction (Mograbi and Rogerson, 2007), supporting 60,000 to 80,000 divers annually since 2005 (iSimangaliso Wetland Park Authority, 2012) and ranking 20th among the top 100 dive sites in the world (Meyer and Holland, 2008; Scuba Travel, 2012).

Survey and questionnaire

A total of 402 self-administered, structured questionnaires were handed out to divers selected at random on the beach and in the campgrounds of Sodwana Bay during the Easter holidays between the 31 March and 7 April 2012. The questionnaire was based on the questionnaires used by Celliers and Schleyer (2008), Catlin and Jones (2010) and Saayman and Saayman (2012) and on

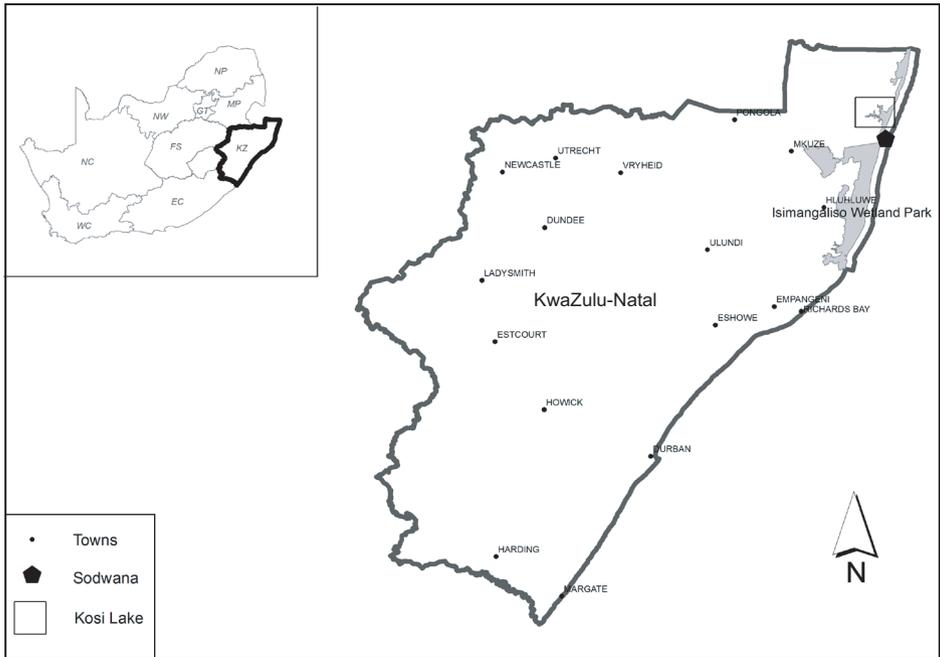


Figure 1. Study area, Sodwana Bay in KwaZulu-Natal, South Africa.

information obtained from these authors' research. Saayman and Saayman (2012) provided insight into socio-demographic and behavioural aspects, while Celliers and Schleyer (2008) and Catlin and Jones (2010) offered data on environmental aspects, awareness and perceived vulnerability of the reefs.

The first part of the questionnaire elicited the divers' socio-demographic characteristics, such as gender, age, province/country of residence, level of education and income. The second part asked about their spending behaviour and motives for visiting Sodwana to dive. A five-point Likert scale (ranging from 1 = not important at all to 5 = extremely important) was used to assess the divers' motives, and a four-point Likert scale to assess their understanding of actions that could harm the reef ecosystem (ranging from 1 = heavy impact to 4 = no impact). The potentially damaging actions listed for their appraisal were: accidental and deliberate contact with coral; walking on the sandy bottom; taking photographs; shore diving; night and day diving; wearing gloves and using sunscreen. In the third part of the questionnaire the divers were asked to indicate the perceived vulnerability of each of the four reefs at Sodwana Bay.

Variables

The dependent variable for the analysis is spending per person per day. This was derived from the questionnaire data by taking total spending and dividing it by the number of people the respondent was *paying* for and the number of days spent at Sodwana Bay. The questionnaire assessed the spending of divers on 10 different spending categories *during their visit to Sodwana Bay*. The spending categories included among others accommodation, transport, diving expenses, food, restaurants and conservation fees. The total spending was derived

as the sum of the various individual spending categories. All respondents were considered, even those who indicated zero spending (since it might be due to someone sponsoring their trip). The independent variables are as follows.

- *Gender* – a dummy variable is included if the respondent is a male.
- *Age* – age of the respondent as determined from their year of birth.
- *English* – to capture cultural differences in South Africa specifically, a dummy variable for English-speaking individuals is included since English is one of the predominant languages spoken by the sample of divers. This variable therefore takes the value of one when the respondent is English-speaking, otherwise zero.
- *Married* – a dummy variable to distinguish married couples from single or divorced visitors.
- *Place of residence* – represented by three dummy variables: *KwaZulu-Natal (KZN)* (since it is postulated that locals spend less because their transport and accommodation costs are lower); *Gauteng* (since previous research in South Africa reveals that this is normally a high-spending province); and *international visitors (Foreign)*.
- *Degree* – divers with some post-school education are compared to those with only school education or less with a dummy variable.
- *Income* – income level 1 represents income less than R50,000 (note that US\$1 was approximately R8.00) per year and is the reference dummy variable. The other income dummy variables are Income 2 (R50,001–100,000), Income 3 (R100,001–200,000), Income 4 (R200,001–500,000), Income 5 (>R500,000).
- *Size* – only represents the number of people that the respondent is financially responsible for; in general, larger groups lead to cost sharing.
- *Nights (spent)* – it is postulated that those who stay longer spread their spending over a couple of days.
- *Times* – represents the effect of repeat visitation on spending.
- *Motives* – included after data reduction using principal components (described below).
- *Environment* – based on the average of divers' assessments of how various diving actions affect the environment. Note that high awareness delivers a low score according to the coding of the scale. An additional environmental awareness variable included is the perceived vulnerability of the various reefs at Sodwana Bay.

Data analysis

The data were captured in Microsoft® Excel® and the statistical analyses were performed using IBM's Statistical Program for Social Sciences (SPSS, 2010) and EViews 7 for the various regressions. Since the independent variables are mainly dichotomous and the dependent variable included zeroes, natural logarithms were not taken.

The motivational statements were subjected to a principal component analysis using SPSS. Bartlett's test of sphericity is significant at a 1% level of significance, and the Kaiser–Meyer–Olkin measure of sample adequacy is above 0.8 at 0.816, indicating some relationships between the statements; therefore

a principal component analysis can be performed on the data (Field, 2009, p 647). To ensure a complete dataset, only respondents who answered at least two-thirds of the motivational questions were included in the principal component analysis, and missing values were replaced with mean values. The final number of respondents used in the analysis was 378.

The components for the analysis were extracted using the Varimax method of orthogonal rotation, which leads to more interpretable clusters of factors. The factor scores were then calculated using the Anderson–Rubin method. Factor scores determined according to this method are uncorrelated and standardized with a mean of 0 and a standard deviation of 1 (Field, 2009, pp 635, 644).

The regression analysis aimed to determine the extent to which the different socio-demographical, behavioural and motivational variables influence spending. In addition, the influence of environmental awareness was included as a determinant of spending. Since there are a large number of variables to be tested for inclusion, a stepwise regression was performed first, to identify the variables that best explain the variance in spending per diver per day. The results of the stepwise regression indicated the mean value of the dependent variable for a given set of independent variables – thus it explained the conditional mean of spending per person per day. The errors were tested for heteroscedasticity, using White's test and no heteroscedasticity was found.

To obtain a more comprehensive picture of the relationship between these identified variables and spending per person per day, quantile regressions were used. In quantile regressions, the differences between the reactions of low-spending and high-spending respondents become more apparent. The coefficient obtained thus indicates how some quantile (or percentile) of respondents react to changes in the independent variables (Cornell University, 2007). The data were therefore ranked from low to high on the basis of the values of the dependent variable.

Quantile regressions estimate the linear relationship between a number of independent variables and a certain quantile (or percentile) of the dependent variable, for example the median (50th percentile), 25th percentile or 95th percentile. These regressions therefore offer a robust method of modelling relationships without the strict distributional assumptions (QMS, 2007, p 259).

The regressions were performed in EViews 7, which uses the simplex algorithm to solve the linear programming problem and obtain the coefficients (QMS, 2007, p 271). The goodness of fit is measured by the pseudo R^2 , which is analogous to the conventional R^2 (QMS, 2007, p 278).

Results

Principal component analysis results

The principal component analysis identified four factors with Eigenvalues greater than unitary. Together these factors explain 55.8% of the variance. The factors are shown in Table 1 and it is evident that all the statements, except 'feeling of success', load clearly onto a specific factor.

The factors were labelled as follows, on the basis of their composition. The first factor is labelled *exploration* since it captures motives such as 'explore a new

Table 1. Results of principal component analysis.

Motivational statement	Factor			
	(1) Exploration	(2) Enjoyment	(3) Appreciation	(4) Loyalty
Explore new destination	0.694			
Spend time with friends	0.510			
Acquire new skills	0.626			
New experience	0.636			
Overcome fear	0.643			
An expedition	0.728			
Get away from routine		0.470		
Relax		0.692		
It's fun		0.819		
I'm crazy about diving		0.781		
World class diving spot		0.555		
Search for new species			0.606	
Learn about marine life			0.473	
Share challenge of diving			0.446	
Photograph marine life			0.656	
Always dive here				0.701
Annual activity for me				0.753
Feeling of success	0.394		0.343	0.394
Mean values	3.28	4.08	3.23	3.16

destination', 'new experience', 'acquire new skills' and 'overcome fear'. This factor has the second highest mean value (3.28), indicating its relative importance as a motive. The second factor, which has the highest mean value (4.08), is labelled *enjoyment* because it encompasses the motives 'crazy about diving', 'it is fun', 'it is relaxing' and 'it is a world class diving spot'. Factor 3, the third most important motivational factor, with a mean value of 3.23, includes the motives 'photograph marine life', 'learn about marine life' and 'new species' and is therefore labelled *appreciation*. Factor 4 is labelled *loyalty* because it captures the regular and loyal diver, but it has the lowest mean value (3.16).

Regression analysis results

The stepwise regression identified 13 variables that explain spending per person per day at Sodwana Bay (the first column in Table 2). As expected, the high income category (income greater than R300,000 per year) is a key determinant of spending per diver. Other demographic variables that are identified as explaining variance in spending behaviour are place of residence (including the provincial and international visitor dummy variables) and language spoken by the respondent. What is interesting is that age does not play a role in divers' spending behaviour.

The travel behaviour variables identified by the stepwise procedure include the size of the travel party, the number of nights spent at Sodwana Bay and the number of times the diver has visited Sodwana. In terms of diving behaviour, only diving at Seven-mile Reef is identified as a determinant of spending

Table 2. Regression analysis results.

	Mean	0.25	0.5 (Median)	0.75
C	1,500.82 [6.379]***	647.46 [2.723]***	1,345.88 [5.811]***	1,894.68 [7.297]***
ENVIRONMENT	-209.54 [-2.843]***	-116.40 [-2.217]**	-217.23 [-3.462]***	-265.11 [-2.849]***
SIZE	-34.04 [-3.254]***	-25.47 [-1.055]	-30.59 [-0.545]	-25.83 [-5.333]***
NIGHTS	-1.554 [-1.612]*	-0.61 [-1.218]	-1.15 [-1.228]	-2.39 [-4.088]***
KZN	-424.66 [-2.641]***	-69.686 [-0.501]	-333.35 [-2.152]**	-280.84 [-1.993]**
GAUTENG	-190.41 [-1.735]*	-137.72 [-1.429]	-267.24 [-2.703]***	6.65 [0.057]
INCOME4	350.52 [2.819]***	299.48 [2.448]***	203.34 [1.739]*	210.96 [1.408]
INCOME5	189.32 [1.931]**	213.78 [2.499]***	142.74 [1.428]	56.00 [0.518]
ENJOYMENT	-70.24* [-1.636]	20.49 [0.662]	31.32 [0.667]	-114.74 [-1.682]*
LOYALTY	-102.26 [-2.319]**	-31.67 [-0.643]	-109.05 [-2.220]**	-167.78 [-3.663]***
TIMES	0.81 [2.115]**	0.46 [0.801]	0.61 [1.109]	1.22 [4.206]***
ENGLISH	84.94 [0.972]	-14.57 [-0.184]	168.16 [1.851]	94.43 [0.844]
FOREIGN	-173.91 [-0.780]	-278.96 [-1.044]	-237.86 [-1.285]	-327.68 [-2.054]**
7-MILE	-69.11 [-1.322]	-24.11 [-0.578]	-36.15 [-0.688]	-103.35 [-1.728]*
R^2	0.170			
Adjusted R^2	0.126	0.045	0.073	0.092
Pseudo R^2		0.093	0.120	0.138
F-statistic	3.878***			
Quasi-LR statistic		34.372***	51.422***	59.163***

Notes: t -values are in brackets; p -values are in parentheses. ***Significant at 1% level; **significant at 5% level; *significant at 10% level.

(although it is not significant). Two motives are also identified as influencing divers' spending behaviour of: *enjoyment* and *loyalty*. The stepwise procedure identifies a significant relationship between environmental awareness and spending, with greater awareness associated with higher spending.

The mean equation, estimated using ordinary least squares (column 2 in Table 2), shows that higher income, repeat visits and greater environmental awareness are associated with higher spending levels. Cost sharing and distribution fixed expenses (such as transport cost) over time are associated with a

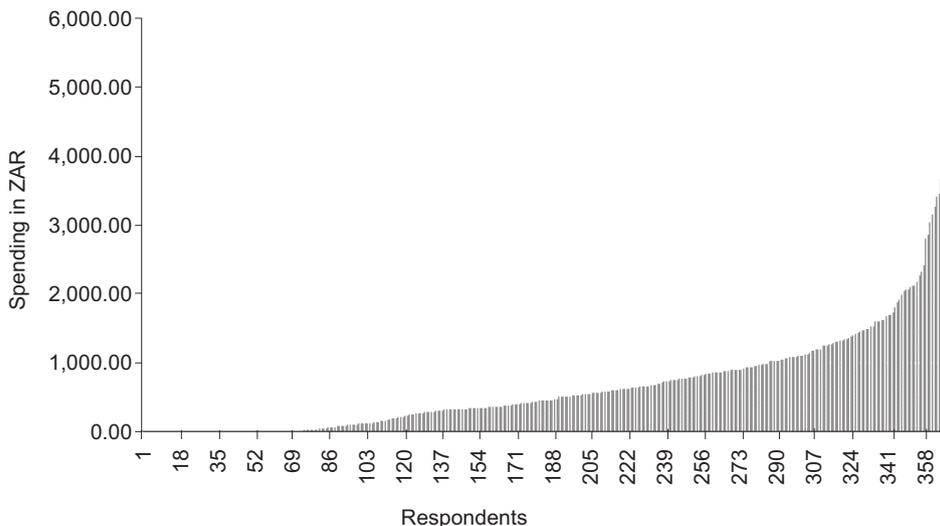


Figure 2. Ranked spending per person per day.

lower level of spending per person per day, as expected. What is interesting is that divers from both KwaZulu-Natal and Gauteng spend less than divers from other provinces of South Africa and the same is true for international visitors. This distinguishes diving from other sporting and cultural events in South Africa, where residents from Gauteng tend to spend more than their counterparts in other provinces (Saayman and Saayman, 2012). Finally *loyalty*, motive 4, also shows a significant negative relationship with spending.

Figure 2 shows the ranked distribution of spending per person per day and it is evident that a large portion of the respondents are very low spenders. In order to investigate the differences in spending behaviour of different parts of the sample, quantile regression analysis was used. Table 2 shows the results of the 25th quantile, the 50th quantile (or the median regression – indicated with the black line in Figure 2) and the 75th quantile.

The results of the quantile regressions show that environmental awareness plays an increasing role in influencing spending, while the role of income declines in explaining different spending behaviour as more high-spenders are included. The travel behaviour variables, party size and number of nights spent do not influence the spending behaviour of the lower spenders, but they have a definite negative impact on spending per day for the higher spenders. *Loyalty* also increases in importance as a deterrent of spending as spending per person increases.

The median regression compares well to the mean regression, although some coefficients are overstated in the mean regression. Most notably, the size of the travel party, the KwaZulu-Natal dummy and income level 4 are overstated in the mean regression, while the international visitor dummy is understated in the mean regression. Figure A1 in the Appendix illustrates the median regression coefficients relative to the mean equation coefficients and the over- and under-statement of the influence of some variables in the mean equation is clearly visible.

Discussion

Socio-demographic determinants

Here only three variables were significant: income, place of residence and language. A reason for this could be that since scuba divers are a niche market they tend to differ more in terms of behavioural than socio-demographic variables, as explained by Kruger *et al* (2012). This corroborates the findings by Saayman *et al* (2007) and Jones *et al* (2009) that higher income is associated with increased spending per person. However, it seems that this is only true if income exceeds a certain minimum level – in this case an annual income exceeding R300,000. In this regard, Thailing and Ditton (2003) found that sport divers tend to earn an above average household income, and Musa *et al* (2011) confirm that higher income-earning divers tend to dive more frequently.

As regards the respondents' place of residence, the result is as expected for KwaZulu-Natal, with local divers spending less than divers from other parts of South Africa. However, contrary to our expectation and the findings of other research (Saayman and Saayman, 2008; Streicher, 2009) residents from Gauteng, as well as international visitors (Skuras *et al*, 2006), spend less than those from other parts of South Africa. Furthermore, since South Africa is a multicultural society with 11 national languages, language plays a central role in identifying cultural groups. Hence, language was identified as a determinant of spending, which corroborates findings by Kruger *et al* (2012). The results showed that English-speaking South Africans tend to spend more than the respondents from other language groups. None of the other socio-demographic variables, for example, age, education level, marital status or gender, explain variance in spending per diver, which is contrary to the findings of several studies discussed in the literature review above.

Behavioural determinants

The study found that divers' travel behaviour had a significant effect on spending, and was more important in explaining differences in divers' spending patterns than socio-demographic characteristics. Size of the travel party, number of nights spent and repeat visitation were all significant variables. As expected, the effect of the first two was negative due to cost sharing and spreading of the cost over more days. The relationship between spending and repeat visitation corroborates findings by Gyte and Phelps (1989) and Saayman and Krugell (2010), but contradicts findings by Jang *et al* (2004) and Pouta *et al* (2006).

Motivational determinants

Four motives were identified by the principal component analysis: *exploration*, *enjoyment*, *appreciation* and *loyalty*. However, only two of these, *enjoyment* and *loyalty*, explain the variance in spending per diver, the former having the highest mean value and the latter the lowest. In both instances a higher value given to the motive is associated with declined spending. The motive *loyalty* means the diver knows the area and dives regularly. The same applies to repeat visitation, as discussed above. Divers who are loyal to the site and visit often

will know their way around and will use the value-for-money accommodation, restaurants, and so on, and as regular divers they will own the necessary diving equipment, thus saving the cost of renting equipment. This motive is supported by *enjoyment*, since this motive shows that divers dive regularly as a way to relax and escape everyday routine.

Environmental awareness

Divers' environmental awareness was consistently a strong determinant of spending with greater awareness being associated with higher spending. It was the first determinant identified by the stepwise procedure, indicating that it explained variance in spending better than the socio-demographic and behavioural determinants. The majority of the sample perceived Two-mile Reef and Four-mile Reef to be the most vulnerable, with Seven-mile Reef and Nine-mile Reef being less susceptible to damage. The same was found by Schleyer and Tomalin (2000). Divers who thought Seven-mile Reef was more vulnerable also spent more. The explanation for this is that Seven-mile Reef and Nine-mile Reef are further from the shore and deeper than Two-mile Reef and Four-mile Reef, and can only be accessed by advanced divers. These are likely to be the more dedicated divers, who are prepared to spend more to access a marine environment that is different from that of the closer reefs. This finding needs to be explored further, since no other research has considered environmental awareness as a determinant of spending.

There are two important implications of this study. First, marketers can use the identified variables to plan their marketing campaign so as to attract the high-spending divers. This should lead to greater income for the region and thus help to grow the economy and address poverty. Second, given the importance of environmental awareness and the fact that this diving site is a protected area, park management must maintain a high standard of conservation for the area. Therefore the conservation policy should address this aspect and also include a greater focus on interpretation of what divers can expect to see and experience. In addition, the conservation agency could also use this aspect to promote and create a greater awareness among the diving fraternity. If this is done properly, the area will benefit for years to come, because as diving sites across the globe come under pressure from increased visitor numbers, the unspoilt sites will remain in high demand. In order to promote conservation, park management should ensure that divers are aware of the need to conserve the reefs by means of a briefing before the dive, and they could even consider implementing a system of price discrimination for the different reefs.

Conclusion

The purpose of this research was to identify the determinants of spending by scuba divers at Sodwana Bay. The literature review showed that this is an aspect of diving tourism that has not received much attention from researchers. This paper therefore makes a contribution to the literature on determinants of spending by divers, specifically, and to the tourism literature in general.

Among the findings of this study is that although income is a key determinant of spending by scuba divers, it only becomes significant from a particular level

(<R300,000) upwards. Spending by divers with lower income levels is not significantly different from that of very low-income earners (>R50,000 per year). The reason for this could be that, in the South African context, an income exceeding R300,000 is associated with 'high income earners' and this therefore represents a clear shift from low to high income. When the results are compared to literature, there is no consistent difference in the results found using spending per person per day with the results from studies using other measures of spending.

An interesting finding is that behavioural variables play a more important role in explaining variance in spending than socio-demographic variables. This finding contradicts several studies in the tourism literature and can be explained by the fact that scuba divers can be regarded as a niche market.

Perhaps this study's most important contribution is the inclusion of environmental awareness as a variable that could influence spending behaviour. The results clearly show that environmental awareness is significantly associated with higher spending by scuba divers. This implies that it is not only socio-demographic and behavioural variables that play a role in determining spending behaviour – environmental awareness counts as well. This also means that there is a concern about the condition of the environment (the reefs) and that divers are willing to pay for a pristine environment. The typical high-spending scuba diver is therefore one who earns more than R300,000 per year, speaks English, lives in provinces other than KwaZulu-Natal and Gauteng, has dived a number of times before, is probably a more advanced diver who travels with a small group, and further, is one who is aware of the environmental damage that divers can cause. This last characteristic merits further research. A limitation of the research is that it considers only divers at Sodwana Bay during a specific time of the year (the Easter holiday), and further research is recommended to confirm that the spending pattern and results found are valid for other seasons as well.

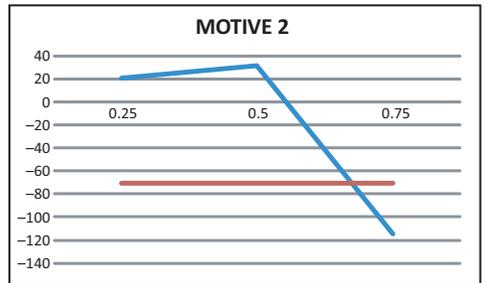
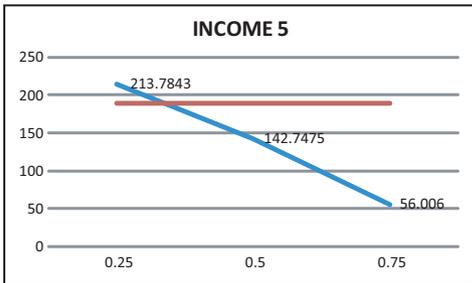
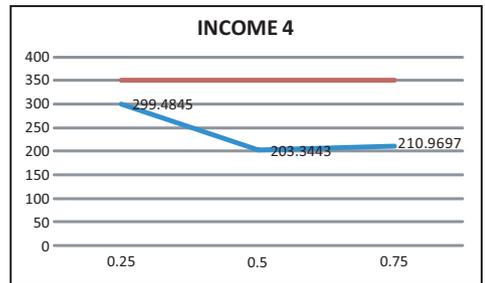
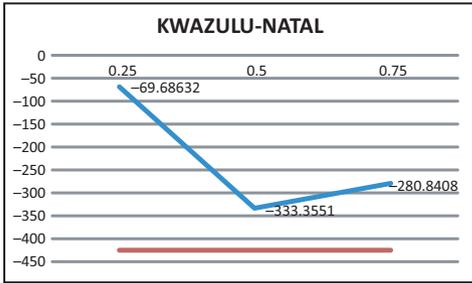
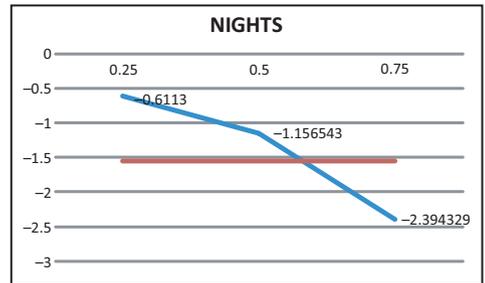
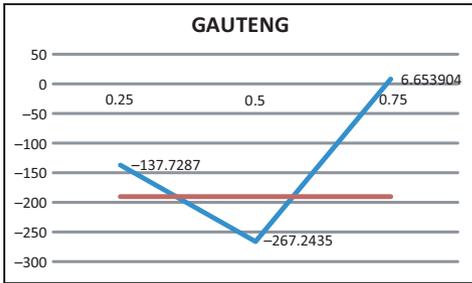
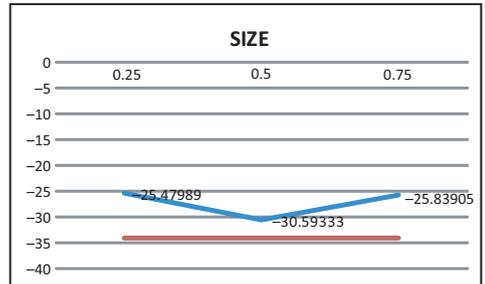
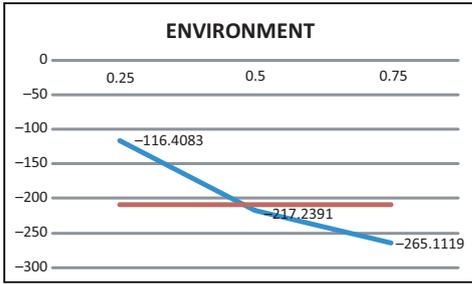
References

- Arin, T., and Kramer, R.A. (2002), 'Divers' willingness to pay to visit marine sanctuaries: an exploratory study', *Ocean and Coastal Management*, Vol 45, No 2–3, pp 171–183.
- Asafa-Adjaye, J., and Tapsuwan, S. (2008), 'A contingent valuation of scuba diving benefits: case study in Mu Ku Marine National Park, Thailand', *Tourism Management*, Vol 29, No 6, pp 1122–1130.
- Cannon, T.F., and Ford, J. (2002), 'Relationship of demographic and trip characteristics to visitor spending: an analysis of sport travel visitors across time', *Tourism Economics*, Vol 8, No 3, pp 263–271.
- Catlin, J., and Jones, R. (2010), 'Whale shark tourism at Ningaloo Marine Park: a longitudinal study of wildlife tourism', *Tourism Management*, Vol 31, No 3, pp 386–394.
- Celliers, L., and Schleyer, M.H. (2002), 'Coral bleaching on high-latitude marginal reefs at Sodwana Bay, South Africa', *Marine Pollution Bulletin*, Vol 44, No 12, pp 1380–1387.
- Celliers, L., and Schleyer, M.H. (2008), 'Coral community structure and risk assessment of high-latitude reefs at Sodwana Bay, South Africa', *Biodiversity and Conservation*, Vol 17, No 13, pp 3097–3117.
- Coral Reef Information System (CoRIS) (2005), 'What are corals and coral reefs?' (<http://www.coris.noaa.gov/about/what-are/what-are.html>, accessed November 2006).
- Cornell University (2007), 'StatNews #70: quantile regressions' (<http://www.cscu.cornell.edu/news/statnews/stnews70.pdf>, accessed 3 August 2010).
- Craggs, R., and Schofield, P. (2006), *Expenditure Segmentation and Visitor Profiling: Regenerating the Quays in Salford, UK*, University of Salford, Salford.
- Davis, D., and Tisdell, C. (1996), 'Economic management of recreational scuba diving and the environment', *Journal of Environmental Management*, Vol 48, pp 229–249.

- Field, A. (2009), *Discovering Statistics Using SPSS*, 3rd edn, SAGE, London.
- Frechtlng, D.C. (2006), 'An assessment of visitor expenditure methods and models', *Journal of Travel Research*, Vol 45, No 1, pp 26–35.
- Grafe, A.R., and Todd S.L. (2001), 'Economic impacts of scuba diving on New York's Great Lakes', paper presented at the North Carolina Coastal Plains Paddle Trails Initiative Conference, Fall 2001 (<http://www.underwaterdesigndevelopment.com/images/NYEcoImpactsofScubaDiving.pdf>, accessed 20 May 2014).
- Gyte, D., and Phelps, A. (1989), 'Patterns of destination repeat business: British tourists in Mallorca, Spain', *Journal of Travel Research*, Vol 28, No 1, pp 24–28.
- iSimangaliso Wetland Park Authority (2012), *Diving Stats, Sodwana Bay*, iSimangaliso Wetland Park Authority, St Lucia.
- Jang, S., Bai, B., Hong, G.S., and O'Leary, J.T. (2004), 'Understanding travel expenditure patterns: a study of Japanese pleasure travellers to the United States by income level', *Tourism Management*, Vol 25, No 3, pp 331–341.
- Jones, T., Wood, D., Catlin, J., and Norman, B. (2009), 'Expenditure and ecotourism: predictors of expenditure for whale shark tour participants', *Journal of Ecotourism*, Vol 8, No 1, pp 32–50.
- Kruger, M. (2009), 'Spending behaviour of visitors to the Klein Karoo National Arts Festival', MA dissertation, North West University, Potchefstroom.
- Kruger, M., Saayman, M., and Saayman, A. (2009), 'Socio-demographic and behavioural determinants of visitors at the Klein Karoo National Arts Festival', *Event Management*, Vol 13, No 1, pp 53–68.
- Kruger, M., Saayman, M., and Manners, B. (2012), 'Determinants of visitor expenditure at the Tsitsikamma National Park', *Journal of Economics and Financial Sciences*, Vol 5, No 1, pp 11–30.
- Lee, H. (2001), 'Determinants of recreational boater expenditure on trips', *Tourism Management*, Vol 22, No 6, pp 659–667.
- Leeworthy, V.R., and Wiley, P.C. (2001), *National Survey on Recreation and the Environment 2000*, US Department of Commerce, National Oceanic and Atmospheric Administration, Special Projects, Silver Spring, MD.
- Leeworthy, V.R., Bowker, J.M., Hospital, J.D., and Stone, E.A. (2005), *Projected Participation in Marine Recreation: 2005 and 2010*, NOAA, SEA Division, National Ocean Service, Silver Springs, MD.
- Letho, X.Y., Cai, L.A., O'Leary, J.T., and Huan, T. (2004), 'Tourist shopping preferences and expenditure behaviours: the case of the Taiwanese outbound market', *Journal of Vacation Marketing*, Vol 10, No 4, pp 320–332.
- Mehmetoglu, M. (2007), 'Nature based tourists: the relationship between their trip expenditures and activities', *Journal of Sustainable Tourism*, Vol 15, No 2, pp 200–215.
- Meyer, C.G., and Holland, K.N. (2008), 'Spatial dynamics and substrate impacts of recreational snorkelers and SCUBA divers in Hawaiian Marine Protected Areas', *Journal of Coastal Conservation*, Vol 12, No 4, pp 209–216.
- Mograbi, J., and Rogerson, C.M. (2007), 'Maximizing the local pro-poor impacts of dive tourism: Sodwana Bay, South Africa', *Urban Forum*, Vol 18, No 2, pp 85–104.
- Mok, C., and Iverson, T.J. (2000), 'Expenditure based segmentation: Taiwanese tourists to Guam', *Tourism Management*, Vol 21, No 3, pp 299–305.
- Musa, G., Seng, W.T., Thirumoorthi, T., and Abessi, M. (2011), 'The influence of scuba divers' personality, experience, and demographic profile on their underwater behaviour', *Tourism in Marine Environments*, Vol 7, No 1, pp 1–14.
- Pendleton, L.H., Rooke J. (2006), 'Understanding the potential economic impact of scuba diving and snorkeling: California' (<http://www.dfg.ca.gov/mlpa/pdfs/binder3diii.pdf>, accessed 17 September 2012).
- Pouta, E., Neuvonen, M., and Sievänen, T. (2006), 'Determinants of nature trip expenditures in Southern Finland: implications for nature tourism development', *Scandinavian Journal of Hospitality and Tourism*, Vol 6, No 2, pp 118–135.
- QMS (Quantitative Micro Software) (2007), *EViews6 User's Guide II*, Quantitative Micro Software, Irvine, CA.
- Ramsay, P.J. (1996), 'Quaternary marine geology of the Sodwana Bay continental shelf Northern KwaZulu-Natal', *Bulletin of the Geological Survey of Southern Africa*, Vol 117, pp 1-86.
- Riegl, B., Schleyer, M.H., Cook, P.J., and Branch, G.M. (1995), 'Structure of Africa's southernmost coral communities', *Bulletin of Marine Science*, Vol 56, No 2, pp 676–691.

- Saayman, A., and Saayman, M. (2006), 'The sociodemographics and visitation patterns of arts festivals in South Africa', *Events Management*, Vol 9, No 4, pp 211–222.
- Saayman, M., and Saayman, A. (2008), 'Socio demographic and behavioural determinants of visitor spending at a national arts festival: a panel data analysis', *World Journal on Events*, Vol 1, No 1, pp 28–33.
- Saayman, M., and Saayman, A. (2012), 'Determinants of spending: an evaluation of three major sporting events', *International Journal of Tourism Research*, Vol 14, No 2, pp 124–138.
- Saayman, M., and Krugell, W. (2010), 'Determinants of visitor spending to the Wacky Wine Festival', *Journal of Economic and Financial Sciences*, Vol 3, pp 153–170.
- Saayman, M., and Seymour, K. (2012), 'A social and environmental impact analysis of scuba diving activities at Sodwana Bay', unpublished report, Tourism Research in Economic Environments and Society, North West University, Potchefstroom.
- Saayman, M., Krugell, W., and Van der Merwe, P. (2007), 'The determinants of spending by biltong hunters', *South African Journal of Economics and Management Sciences*, Vol 10, No 2, pp 184–194.
- Saayman, M., Saayman, A., and Joubert, E. (2012), 'Expenditure-based segmentation of visitors to the Wacky Wine Festival', *Tourism Recreation Research*, Vol 37, No 3, pp 215–226.
- Schuhmann, P., Casey, J., and Oxenford, H.A. (2008), 'The value of coral quality to scuba divers in Barbados', paper presented at the 11th International Coral Reef Symposium, Fort Lauderdale, FL, pp 1149–1152.
- Schleyer, M.H. (1995), 'South African coral reef communities', in Cowan, G.I., ed, *Wetlands of South Africa*, Department of Environmental Affairs and Tourism, Pretoria, pp 137–146.
- Schleyer, M.H. (1999), *A Synthesis of KwaZulu–Natal Coral Research (Special publication No. 5)*, SAAMBR, Durban.
- Schleyer, M.H. and Celliers, L. (2005), 'Modelling reef zonation in the Greater St Lucia Wetland Park, South Africa', *Estuarine, Coastal and Shelf Science*, Vol 63, No 3, pp 373–384.
- Schleyer, M. H., and Tomalin, B.J. (2000), 'Damage on South African coral reefs and an assessment of their sustainable diving capacity using a fisheries approach', *Bulletin of Marine Science*, Vol 67, No 3, pp 1025–1034.
- Scuba Travel (2012), '100 best dive sites in the world' (<http://www.scubatravel.co.uk/topdiveslong.html>, accessed 21 September 2012).
- Seiler, V.L., Hsieh, S., Seiler, M.J., and Hsieh, C. (2003), 'Modelling travel expenditures for Taiwanese tourism', *Journal of Travel and Tourism Marketing*, Vol 13, No 4, pp 47–59.
- Skuras, D., Dimara, E., and Petrou, A. (2006), 'Rural tourism and visitors' expenditure for local food products', *Regional Studies*, Vol 40, No 7, pp 767–779.
- SPSS (2010), 'SPSS® 20.0 for Windows, Release 20.0.0', SPSS Inc, Chicago, IL.
- Streicher, H. (2009), 'Profiling participants of the Cape Argus Cycle Tour', MCom dissertation, North West University, Potchefstroom.
- Stoeckl, N., Birtles, A., Farr, M., Mangott, A., Curnock, M., and Valentine, P. (2010), 'Live-aboard dive boats in the Great Barrier Reef: regional economic impact and the relative values of their target marine species', *Tourism Economics*, Vol 16, No 4, pp 995–1018.
- Thailing, C.E., and Ditton, R.B. (2003), 'Demographics, motivations, and participation patterns of sport divers in the Flower Garden Banks National Marine Sanctuary', paper presented at the 54th Gulf and Caribbean Fisheries Institute, British West Indies, Gulf and Caribbean Fisheries Institute, pp 338–348.
- Thrane, C. (2002), 'Jazz festival visitors and their expenditures: linking spending patterns to music interest', *Journal of Travel Research*, Vol 40, No 3, pp 281–286.
- Waddell, J.E., and Clarke, A.M. (eds) (2008). *The State of Coral Reef Ecosystems of the United States and Pacific Freely Associated States: 2008*, NOAA Technical Memorandum NOS NCCOS 73, NOAA/NCCOS Center for Coastal Monitoring and Assessment's Biogeography Team, Silver Springs, MD.
- Wilton, J.J., and Nickerson, N.P. (2006), 'Collecting and using visitor spending data', *Journal of Travel Research*, Vol 45, No 1, pp 17–25.

Appendix



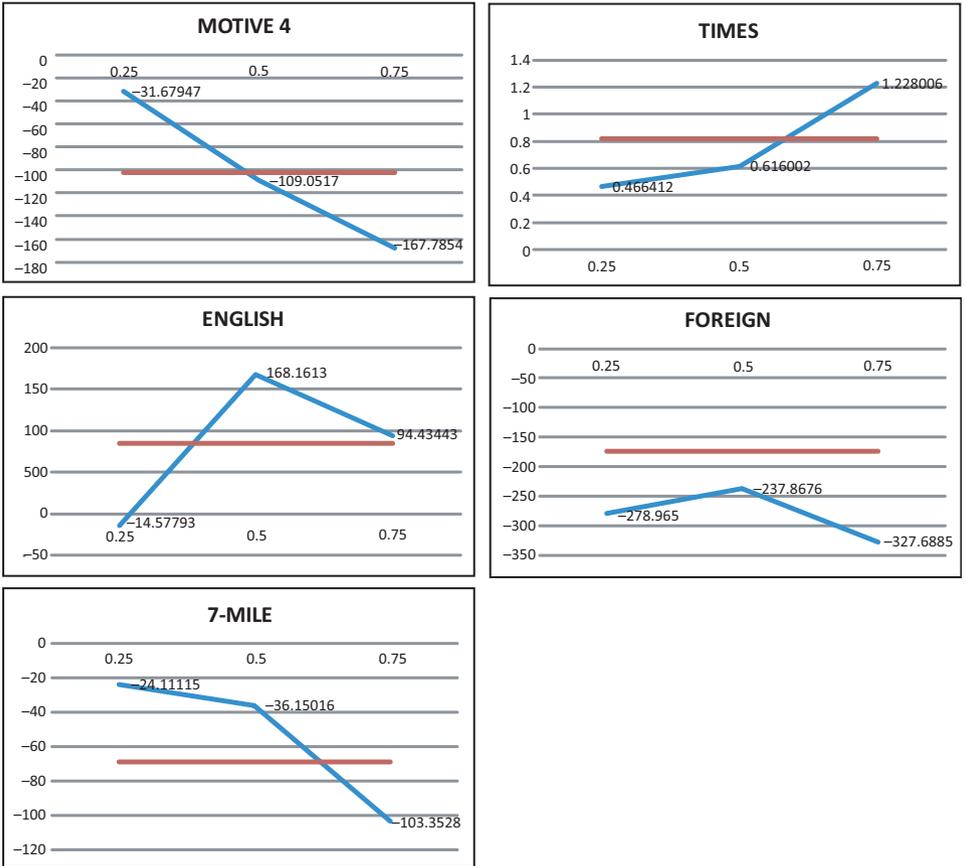


Figure A1. Coefficient plots.