Region: Cornwall and Devon
Project ID: project 1
Impact of new road near Exeter

IFS Property Value Calculator

1 Introduction

2 Type of project

The project is a new **road** in the **Cornwall and Devon** region. Figure 1 displays a map of the new road. The road is approximately 98.8 miles long and has 6 junctions. It begins near Exeter and finishes near Penzance.

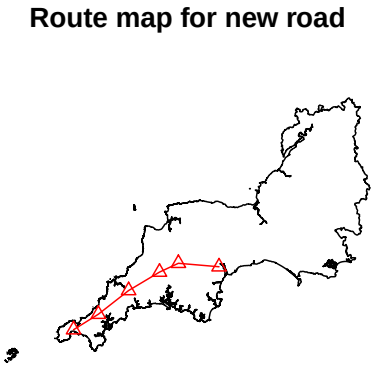

Figure 1: Route map of road

It is assumed that the average speed on the new road is 60 miles per hour (mph). To predict, new travel times for the region, this report assumes:

- House prices are determined by 1) property size and structure and 2) location. Details of the data used to estimate the model are presented in Section 5. Model details are presented in

Section 6.

- Location values are primarily determined by travel time to various destinations, land use in the surrounding area, distance to the coast, and various local amenities and disamenties including greenbelt status, and road noise.
- Travel times to 4 cities are the dominant fators for property values in this region. These cities are: (**Barnstaple, Exeter, Falmouth, Plymouth**).
- New travel times after the investment equal the minimum of the baseline travel time and the new travel time using the new road.
- New travel time using the new road consists of:
  1. travel time from each house to the nearest junction/station on the new road.
  2. travel time along the new road.
  3. travel time from the new road to each destination.
- All travel times are estimated using Google Maps.
- The model does not account for changes in congestion or any other changes in travel time induced by the new road.
- The model provides short-run predictions only. In the long run, commuting patterns, job locations and the importance of destinations will likely change. The model does not account for these long run changes.
- The model provides the best approximation to the short run impact of the new road.

3 Impact of the new road

For each city, these tables show the distribution of travel times from each property in the region. The tables also show the distribution of travel times from each property to the nearest rail station (RAIL).

Table 1: Travel times (minutes): pre investment

Statistic	*BSP*	*EXE*	*FAL*	*PLY*	*RAIL*
Mean	90.6	58.4	99.8	59.2	24.9
Min	22.1	20.6	27.5	18.1	8.5
Pctl(25)	67.1	32.1	81.2	40.7	19.1
Median	99.1	57.9	111.4	57.0	22.4
Pctl(75)	104.5	76.4	127.1	76.9	29.5
Max	184.9	151.9	175.5	127.9	70.4
St. Dev.	30.0	28.9	35.3	27.6	9.0

Table 2: Travel times (minutes): post investment

Statistic	BSP	EXE	FAL	PLY	$RAIL$
Mean	90.6	58.3	99.4	58.0	24.9
Min	22.1	20.6	27.5	18.1	8.5
Pctl(25)	67.3	32.0	81.1	40.6	19.1
Median	99.1	57.8	111.4	56.9	22.4
Pctl(75)	104.5	76.1	127.1	76.0	29.5
Max	176.9	149.3	160.4	121.9	70.4
St. Dev.	29.8	28.8	34.7	25.9	9.0

Table 3: Change in travel time (minutes): (new minus old)

Statistic	BSP	EXE	FAL	PLY	$RAIL$
Mean	−0.03	−0.005	−0.4	−1.0	0.0
Min	−9.4	−4.2	−20.2	−17.4	0
Pctl(25)	0.0	0.0	0.0	0.0	0
Median	0.0	0.0	0.0	0.0	0
Pctl(75)	0.0	0.0	0.0	0.0	0
Max	0.0	0.0	0.0	0.0	0
St. Dev.	0.4	0.1	2.0	3.4	0.0

4 Impact on prices

Table 4: Property prices (units = year 2017)

Statistic	*oldprice*	*newprice*	*deltaprice*
Mean	211,453.9	221,804.3	10,287.9
Min	70,417.4	70,210.1	−141,173.1
Pctl(25)	152,595.0	156,787.4	−271.3
Median	189,818.7	196,731.4	1,958.5
Pctl(75)	247,224.0	259,476.9	4,766.5
Max	1,911,362.0	5,770,412.0	3,859,050.0
St. Dev.	87,223.1	114,685.6	51,921.9

This table shows the distribution of property prices across all properties in the region

5 Data

6 Model

Section 6.1 shows how log prices depend on building characterstics and time.

Section 6.2 shows how log prices depend on travel times to important cities and destinations in the region as well as on other local amenities and disamenities.

6.1 Model 1

Table 5: Dependence of log property values on structure and time

	Dependent variable:
	logprice
year2009	-0.066^{***} (0.004)
year2010	-0.003 (0.004)
year2011	-0.022^{***} (0.004)
year2012	-0.016^{***} (0.004)
year2013	-0.011^{**} (0.004)
year2014	0.029^{***} (0.004)
year2015	0.068^{***} (0.004)
year2016	0.103^{***} (0.004)
year2017	0.129^{***} (0.005)
propertytypeF	-0.269^{***} (0.007)
propertytypeO	-0.026^{*} (0.014)
propertytypeS	-0.212^{***} (0.002)
propertytypeT	-0.314^{***} (0.002)
newbuildY	0.091^{***} (0.003)
tenureL	-0.146^{***} (0.006)
bSize1	0.281^{***} (0.011)
bSize2	0.459^{***} (0.009)
bSize3	0.757^{***} (0.010)
bSize4	1.281^{***} (0.011)
bSize5	1.387^{***} (0.015)
bLat1	2.460^{***} (0.115)
Observations	100,000
R^2	0.682
Adjusted R^2	0.681
Residual Std. Error	0.256 (df = 99859)
F Statistic	$1{,}528.639^{***}$ (df = 140; 99859)
Note:	*p<0.1; **p<0.05; ***p<0.01

6.2 Model 2

Table 6: Dependence of log property values on locational amenities

	Dependent variable:
	location_value
builtuparea_pct	-0.0004^{***} (0.0001)
busyland_pct	-0.0005^{***} (0.0002)
restrictedland_pct	
localplanrate	-11.657^{***} (0.873)
lu_domestic_shr	-0.125^{*} (0.069)
lu_gardens_shr	0.317^{***} (0.041)
lu_nondom_shr	0.805^{***} (0.101)
lu_road_shr	-0.314^{***} (0.080)
lu_rail_shr	-0.542^{***} (0.102)
lu_greenspace_shr	0.124^{***} (0.036)
lu_water_shr	0.148^{***} (0.039)
popdensityOA	-0.0001^{***} (0.00002)
imddecile2	-0.002 (0.004)
imddecile3	0.006 (0.004)
imddecile4	0.005 (0.004)
imddecile5	0.008^{**} (0.004)
imddecile6	0.014^{***} (0.004)
imddecile7	0.011^{***} (0.004)
imddecile8	0.018^{***} (0.004)
imddecile9	0.031^{***} (0.004)
imddecile10	0.040^{***} (0.005)
prob_4bandHigh	0.042 (0.056)
prob_4bandLow	0.046 (0.056)
prob_4bandMedium	0.061 (0.056)
prob_4bandNone	0.051 (0.056)
prob_4bandVery Low	0.089 (0.057)
noiseclass>=75.0	0.027 (0.056)
noiseclass55.0-59.9	-0.012^{***} (0.003)
noiseclass60.0-64.9	-0.005 (0.005)
noiseclass65.0-69.9	-0.006 (0.007)
noiseclass70.0-74.9	-0.015 (0.015)
greenbelt	
log(distance_coast)	-0.010^{***} (0.001)
log(drive_station)	0.026^{***} (0.008)
Constant	1.501^{***} (0.122)
Observations	9,751
R^2	0.828
Adjusted R^2	0.826
Residual Std. Error	0.056 (df = 9662)
F Statistic	526.885^{***} (df = 88; 9662)
Note:	*p<0.1; **p<0.05; ***p<0.01

Figure 2: Driving time

7 Figures

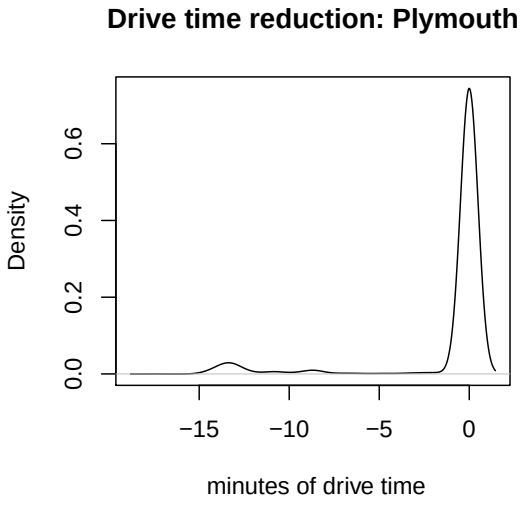

Figure 3: Driving time

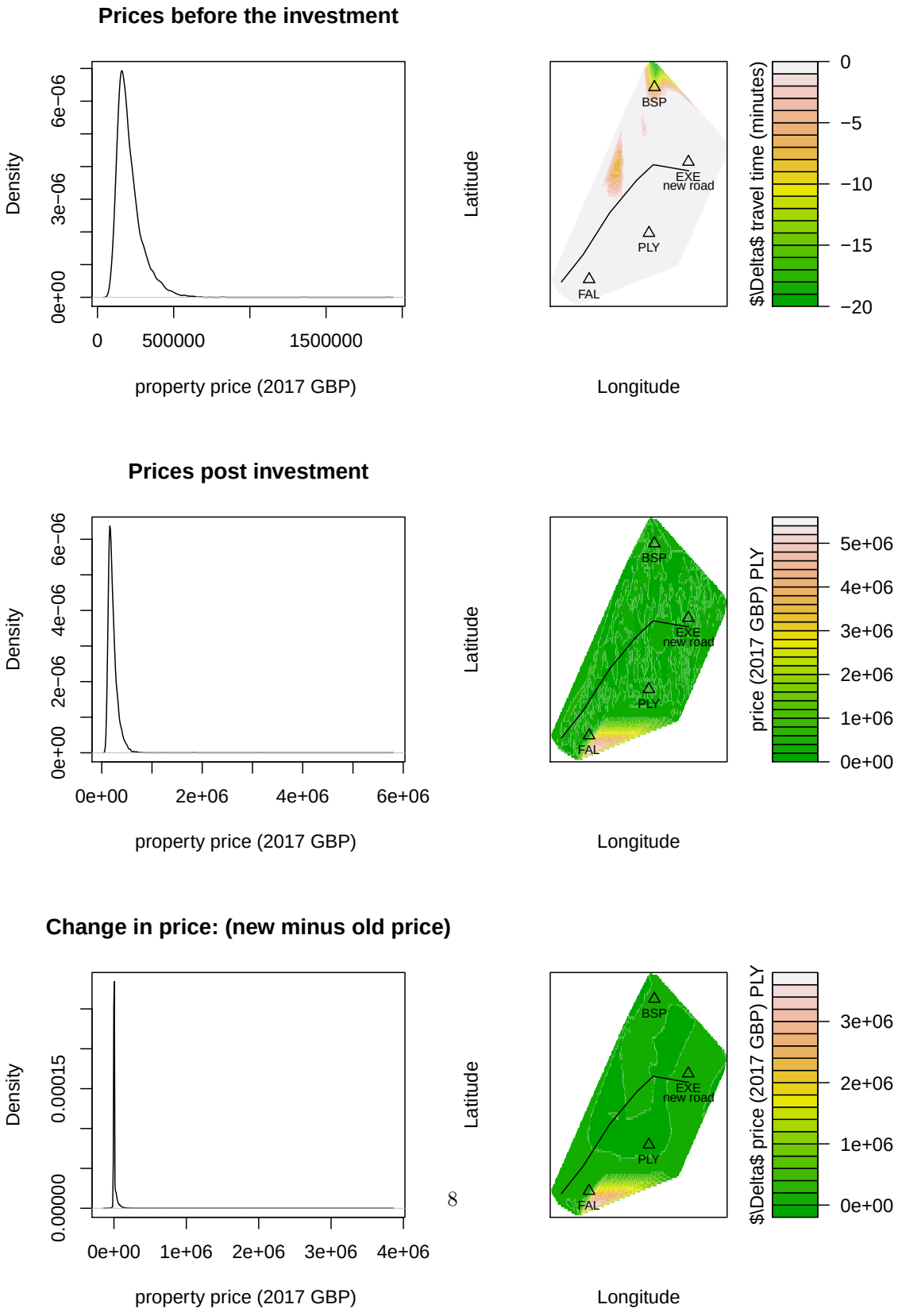

Figure 4: Impact of project on prices