Railway Stream Analysis Report

Introduction

The report will be divided into two parts, the first part will conduct questionnaire analysis on respondents' willingness and mode of travel, including Pearson correlation analysis and cross-tabulation combined with chi-square test; The second part is a normality test for mileage counted by different railway operators. It is intended to inform the reform of British Railways.

Part 1

1.Research methods

In statistics, the Pearson correlation coefficient (PCC) — also known as Pearson's, the Pearson product-moment correlation coefficient (PPMCC), the bivariate correlation, or colloquially simply as the correlation coefficient— is a measure of linear correlation between two sets of data. Pearson correlation analysis requires that the variable type be a continuous numeric variable, and in questionnaires, the data on the Richter scale is generally regarded as a continuous numerical variable. Therefore, Pearson correlation analysis is the most commonly used statistical method for scale analysis.

However, for nominal multiple-choice questions, the data are unordered categorical variables and count data. So, when I study the correlation between two unordered variables, I can no longer use Pearson correlation analysis, and I have to use a crosstab chi-square test instead. The method of chi-square analysis is to first assume that the two variables are independent and unrelated from each other. This is statistically called the null hypothesis (H_0); For the data of the two variables obtained in the survey, their distribution (frequency and percentage) is expressed in the form of a table, where the frequency is called the observation frequency, and this table is called the contingency table; If the null hypothesis is true, under this premise,

you can calculate what frequency should be in each cell in the contingency table above, which is called the expected frequency; Compare the difference between the observation frequency and the expected frequency, if the difference between the two is larger, it indicates that the actual situation is far from the null hypothesis; The smaller the difference, the closer the actual situation is to the null hypothesis.

2.Data collection

The questionnaire was collected in the form of face-to-face interview on October 29, 2022 in the square south of the Great Hall. Group members work in pairs, intercept people as they pass through the data collection area and ask if they would be willing to take part. If people don't wish to be interviewed respect their decision. Data Entry form will be provided by TDCA team. Each pair of data recorders should attempt to interview at least 10 subjects within the 30-minute period.

The report's data is based on 263 questionnaires on travel modes collected in TDCA fieldwork, including nominal and scale data. Due to the lack of values in some questionnaires, the data were excluded for different analyses. In the first part of the analysis, 256 pieces of data were retained, and in the second part of the analysis, 167 people with train travel experience were counted.

3. Analysis process and Results

Firstly, Pearson correlation analysis was carried out on 256 Richter scale data, and whether there was a correlation between the different perception magnitudes of passengers and the magnitude of the factors considered for riding the train. The results are as follows.

Table 1 Travelling by train is?

	Comfortable	Reliable	Affordable	Time-saving	Accessible	Environmentally friendly	Safe at night
Comfortable	1	0.773	0.452	0.790	0.798	0.756	0.714
Reliable		1	0.636	0.771	0.762	0.714	0.712
Affordable			1	0.523	0.581	0.478	0.491
Time-saving				1	0.840	0.711	0.700
Accessible					1	0.732	0.674

Environmentally friendly	1	0.736
Safe at night		1

Table 2 When choosing whether to travel by train, I consider the following factors.

	Cost	Time	Frequency of services	Reliability of services	Potential level of occupancy	Free Wifi	Plug sockets	Connectivity with other modes	Potential level of occupancy
Cost	1	0.864	0.761	0.792	0.531	0.491	0.639	0.424	0.601
Time		1	0.811	0.846	0.544	0.468	0.629	0.477	0.633
Frequency of services			1	0.837	0.575	0.476	0.597	0.483	0.689
Reliability of services				1	0.578	0.494	0.615	0.524	0.684
Potential level of occupancy					1	0.698	0.649	0.403	0.725
Free Wifi						1	0.721	0.410	0.609
Plug sockets							1	0.464	0.626
Connectivity with other modes								1	0.481
Potential level of occupancy									1

For Table 1, the significance between all variables is all 0.00<0.05, and the correlation coefficient is greater than 0, which means that there is a significant positive correlation between them. Among them, there is a positive correlation between Comfortable and Accessible with a correlation coefficient of 0.792. To be specific, people who think that taking a train is accessible will also feel Comfortable to a large extent

Looking at Table 2, the analysis results also show that the significance between all variables is 0.00<0.05, and the correlation coefficient is greater than 0, which means that there is a significant positive correlation between them. The largest correlation coefficient is time and cost, which is 0.864, which means that when choosing whether to travel by train, people consider time and cost to show a significant positive correlation.

The above analysis makes use of Pearson correlation analysis, because the scale question can be regarded as a continuous numerical variable, that is, the measurement data, so Pearson correlation analysis can be used. However, for nominal multiple-choice questions, the data are unordered categorical variables and count data. So, when I study the correlation between two unordered variables, I can no longer use Pearson correlation analysis, and I have to use a crosstab chi-square test instead.

Next, the report began to use SPSS to explore gender, age, occupation, train ticket purchase confidence, ticket purchase type, and ticket normally purchase way to cross-table chi-square test to explore the correlation between them.

The nominal scale data is entered into the SPSS, and all nominal variables correspond to the numbers as follows:

Table 3

	1	2	3	4	5	6	7
Gender	Female	Male	Non-binary/ third gender	Prefer not to say			
Age	18-30	31-40	41-50	51 or over	Prefer not to say		
Occupation	Student	University employee	Employed (not university)	Retired	Other:		
Confidence	Not confident at all	Not very confident	I am not sure	Fairly confident	Very confident		
Type of tickets	Single	Return	Weekly ticket	Monthly ticket	Annual ticket	Flexi season ticket	Other
Normally purchase way	Mobile app	Inside train	Online	Ticket office	Ticket machine	Other	

Crosstabs are established sequentially between the two pairs of data and a chi-square test is performed.

The analysis results showed that there was no significant correlation between gender, the degree of confidence in purchasing tickets, and the progressive significance of purchasing methods were greater than 0.05, but there was a significant correlation with the progressive significance of 0.006<0.05 of the type of ticket purchased. Conversely, the age and occupation of the respondents were significantly correlated with the confidence level and purchasing method of ticket purchase, and the progressive significance was 0.040, 0.000, 0.017, 0.000, respectively, all less than 0.05, but there was no correlation with the type of ticket purchase. The crosstab results are shown in the following tables.

Table 4

	Single	Return	Weekly ticket	Monthly ticket	Annual ticket	Flexi season ticket	Other:
Female	22.4%	63.3%	7.1%	3.1%	2.0%	0.0%	2.0%
male	34.9%	60.3%	0.0%	1.6%	0.0%	1.6%	1.6%
Non-binary/ third gender	0.0%	40.0%	60.0%	0.0%	0.0%	0.0%	0.0%
Prefer not to say	0.0%	100.0%	0.0%	0.0%	0.0%	0.0%	0.0%

Table 5

	Not confident at all	Not very confident	I am not sure	Fairly confident	Very confident
18-30	2.6%	10.5%	21.1%	42.1%	23.7%
31-40	20.0%	0.0%	0.0%	80.0%	0.0%
41-50	0.0%	33.3%	0.0%	33.3%	33.3%
51 or over	28.6%	0.0%	14.3%	42.9%	14.3%

Table 6

	Mobile app	Inside train	Online	Ticket office	Ticket machine	Other
18-30	84.2%	0.7%	7.2%	3.3%	3.9%	0.7%
31-40	40.0%	0.0%	40.0%	0.0%	20.0%	0.0%
41-50	100.0%	0.0%	0.0%	0.0%	0.0%	0.0%

51 or over	0.0%	0.0%	28.6%	42.9%	14.3%	0.0%

Table 7

	Not confident at all	Not very confident	I am not sure	Fairly confident	Very confident
Student	2.6%	10.3%	20.6%	42.6%	23.9%
University employee	33.3%	33.3%	0.0%	33.3%	0.0%
Employed (not university)	16.7%	0.0%	0.0%	66.7%	16.7%
Retired	0.0%	0.0%	100.0%	0.0%	0.0%
Other	50.0%	0.0%	0.0%	50.0%	0.0%

Table 8

	Mobile app	Inside train	Online	Ticket office	Ticket machine	Other
Student	83.2%	0.6%	7.1%	4.5%	3.9%	0.6%
University employee	66.7%	0.0%	33.3%	0.0%	0.0%	0.0%
Employed (not university)	33.3%	0.0%	33.3%	0.0%	16.7%	0.0%
Retired	0.0%	0.0%	0.0%	100.0%	0.0%	0.0%
Other	79.6%	0.6%	9.0%	4.8%	4.8%	0.6%

According to the results of Table 4, 63.3% of women and 60.3% of men and 100% of those who do not prefer to say their gender choose return tickets, but for non-binary/third gender people, they choose to buy monthly passes.

Compared with Table 5 and 6, when commuting by train, the 31-40 age group is significantly fairly confident in their willingness to usually purchase the best value ticket than other age groups. Moreover, the proportion of them choosing to buy tickets online is much higher than others. However, People over the age of 51 are more likely to have no confident than others. But they are the largest age group to buy tickets from the Ticket office.

Move to Table 7 and 8, Retirees are unsure about usually purchasing the best value ticket, far higher than the second-place student group (20.6%). However, it is the students who are most confident. For ticket purchase methods, the proportion of students using mobile ticket purchase was 83.2%, and the percentage of retirees who go to the ticket office to buy tickets is 100%, much higher than the rest of the group.

Part 2

1.Research methods

In statistics, a normal distribution or Gaussian distribution is a type of continuous probability distribution for a real-valued random variable. The general form of its probability density function is

$$f(x) = \frac{1}{\sigma\sqrt{2\pi}} e^{-\frac{1}{2}\left(\frac{x-\mu}{\sigma}\right)^2}$$

The parameter μ is the mean or expectation of the distribution (and also its median and mode), while the parameter σ is its standard deviation. The variance of the distribution is σ^2. A random variable with a Gaussian distribution is said to be normally distributed, and is called a normal deviate.

The Kolmogorov-Smirnov test is a useful nonparametric hypothesis test that tests whether a set of samples comes from a one-sample K-S test.

Suppose there are observations $x_1, x_2, \ldots, x_n$ we think these values come from some distribution P. K-S test is used for testing: H_0: The sample is from P. H_1: The sample does not come from P.

The cumulative distribution function of random variable X is

$$F(x) = P(X \leq x)$$

For observations $x_1, x_2, \ldots, x_n$, their empirical distribution function is

$$F_{obs}(x) = \frac{nums\ of\ observations\ below\ x}{observations}$$

If you put all the observations in order, you get, $y_1, y_2, \ldots, y_n$ then

$$F_{obs}(y_i) = \frac{i}{n}$$

Compare the resulting empirical distribution function with the cumulative distribution function (denoted F_{exp}) in null hypothesis

$$D_n = max\left|F_{exp}(x) - F_{obs}\right|$$

So, the Kolmogorov-Smirnov statistic is $D_n = max\left|F_{exp}(x) - F_{obs}\right|$.

2.Data Collection and Describe

The datasheet worksheet contains annual and quarterly passenger trips (in millions) for London and South Eastern, long-haul and regional concessionaires, as well as trips for open operators. It contains two vertically displayed tables with a blank row between the tables. The first table shows annual data and the second table shows quarterly data. Collected and collated work was done by Computer Analysis of Passenger Revenue Information (CAPRI) ticketing and revenue database, Latest Earnings Networked Nationally Over Night (LENNON) ticketing and revenue database, Train Operating Companies (TOCs).

Normally, quarterly data has a sample size of 28 per column and annual data of 112. It is worth noting that in the data columns of Open access operators, there are missing values for both annual and quarterly data, with only 24 and 96 for quarterly and annual data, respectively.

3. Analysis Process and Results

'Data for Table 1221b: Passenger journeys by sector, quarterly data' are selected for the following analysis, and data collation is performed before normality testing. It's worth noting that Open access operators have 16 missing values because There were no open access passenger operators before Apr 1998. Therefore, since the data is a continuous variable, we use the simplest missing value treatment method, that is, it is eliminated, and the remaining sample number is 96. The remaining four operators all had a sample size of 112.

After removing the missing values, import the data into the SPSS software for the Kolmogorov-Smirnov Test (K-S test), and the result is shown in the following figure:

Table 9

	Franchised long distance operators (million)	Franchised London and South East operators (million)	Franchised regional operators (million)	Open access operators (million)
Amount	112	112	112	96
Average	24.13	204.58	20.47	1.50
Standard Deviation	8.13	63.95	20.47	0.52
Z	0.081	0.121	0.070	0.112
Significance	0.067	0.000	0.200	0.005

According to Table 8, it can be concluded that the departments that conform to the normal distribution are Franchised long distance operators and Franchised regional operators, both of

which have significance of 0.067 and 0.200 respectively, and are greater than 0.05. The significance of the data for the remaining operators was less than 0.05, which did not conform to the normal distribution.

Finally, plot the departments that conform to the normal distribution with excel as below screenshot shown:

Figure 1

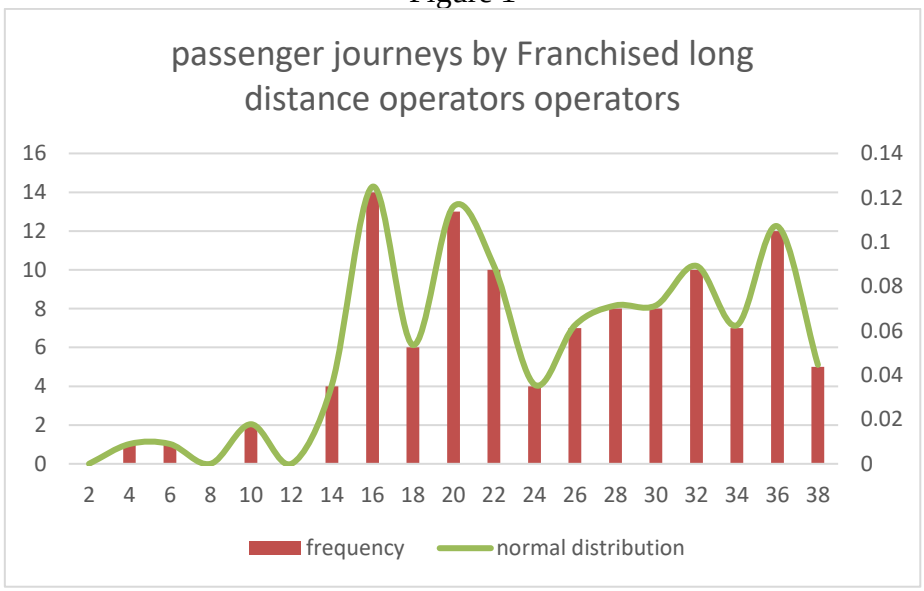
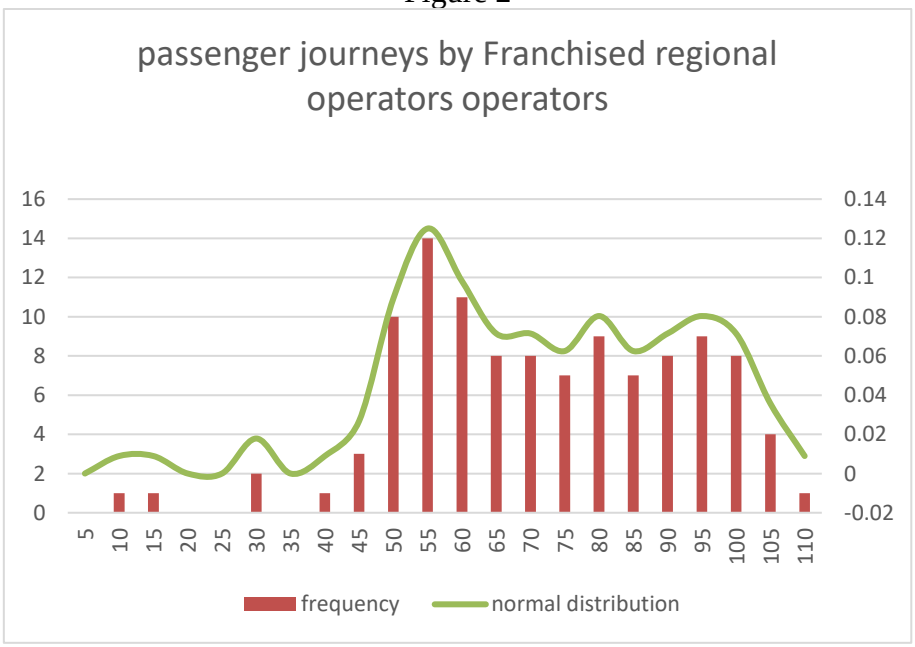


Figure 2



What has mentioned above is that 2 operators' data that do not conform to the normal distribution, and the reason for this can be attributed to too many extreme values.

The maximum value of Franchised London and South East operators was 314.5 in October-November 2019. The minimum value was only 27 million in April-June 2020. The reason is that an extra week of Transport for London (TfL) contactless data (around 2.2 million journeys) were included in the quarter Oct to Dec 2019 compared with the same quarter in the previous year (Oct to Dec 2018). This difference affects the London and South East sector.

The maximum value for Franchised regional operators was only 2.3, which occurred in April and June 2018 and 2019. The minimum value was 0 and occurred between April and June 1998. Arguably, the number of trips made by travellers who choose Franchised regional operators is really small.

As British Rail was privatized between 1992 and 1997.The agencies responsible for delivering the policy were numerous, and with BR being split into over 100 self-accounting business units, the vendors needed to attract many private-sector buyers in what was a highly charged political arena (Grantham A., 2001). As a result, when collecting railway related data, there are huge obstacles and data sources.

Lennon uses the railway ticket information of most countries purchased by the UK to distribute the ticket sales revenue among TOCs. Prior to 1 April 2010, non-LENNON data were provided annually to ORR at the end of the financial year and were apportioned out to each financial quarter. The apportionment of the additional kilometres and journeys data to each quarter was based on the split of LENNON data (ORR, 2022). However, the Eurobarometer survey in 2018 found that since the survey in 2013, the UK has dropped from the second place to the sixth place in terms of overall satisfaction with railways. On the one hand, it shows that the privatized British railway is more efficient than the nationalized railway system in most European countries. On the other hand, it also shows that there is still room for improvement.

My suggestions are as follows:

The Rail Transport Group should be reformed to fully integrate the different railway organizations and a new independent body focused on consumers should be established. The agency could be responsible for implementing policies and monitoring standards, with a medium- to long-term perspective. If necessary, the agency punishes the transportation service provider. The roles of existing governing bodies and industry bodies should be reviewed and some of them integrated into the newly created body. It is worth noting that the reforms mentioned here do not equate to renationalization.

Reference

Grantham, A. 2001.How networks explain unintended policy implementation outcomes: the case of UK rail privatization. *Public Administration*, *79*(4), 851-870.

Appendix

gender	Age	occupation	how confident	type	normally buy
3	1	1	4	3	1
1	1	1	4	3	1
3	1	1	5	3	1
1	1	1	5	3	1
1	1	1	4	3	1
1	1	1	3	1	1
1	1	1	4	3	1
1	1	1	3	3	5
1	1	1	4	3	1
1	1	1	4	1	1
3	1	3	5	3	1
1	1	1	4	1	1
1	1	1	3	4	3
1	1	1	3	3	3
2	1	1	3	1	1
2	2	2	4	2	1
1	1	1	4	2	1
1	1	1	3	1	1
1	1	1	4	5	1
2	1	1	3	2	5
2	1	1	4	2	1
2	1	1	2	2	1
2	1	1	4	2	1
2	1	1	3	1	1
1	1	1	4	2	1
1	1	1	5	2	1
1	1	1	3	2	1
2	1	1	3	1	4
1	1	1	2	2	1
1	1	1	5	2	1
1	1	1	5	2	1
2	1	1	4	2	1
1	1	1	4	5	1
2	4	2	1	2	3
2	1	1	3	2	1
1	1	1	2	2	1
1	1	1	3	2	1
1	1	1	4	2	1
1	1	1	4	2	1
2	2	3	4	2	3
2	1	1	5	1	1
2	1	1	2	1	4
1	1	1	3	4	1
1	1	1	5	2	1
1	1	1	5	2	1

1	1	1	5	2	1
2	1	1	4	2	1
1	1	1	2	2	1
1	1	1	3	2	1
1	1	1	4	2	1
1	1	1	4	2	1
2	2	3	4	2	3
2	1	1	5	1	1
2	1	1	2	1	5
1	1	1	3	4	1
1	1	1	5	2	1
1	1	1	5	2	1
1	1	1	5	2	1
2	1	1	4	2	1
2	1	1	4	2	1
1	1	1	4	2	2
1	1	1	5	2	1
1	1	1	4	2	1
1	1	1	5	1	1
1	1	1	4	2	1
2	1	1	5	1	4
2	1	1	4	2	1
2	1	1	4	1	1
1	1	1	2	1	1
2	1	1	3	1	1
2	1	1	5	6	1
1	1	1	4	2	1
1	4	5	1	2	5
1	1	1	3	1	1
1	1	1	5	2	1
1	1	1	4	1	1
1	1	1	3	2	1
1	1	1	4	2	3
1	1	1	4	2	1
2	1	1	5	2	1
1	3	1	5	1	1
1	1	1	4	2	1
1	1	1	5	1	1
1	1	1	4	2	1
2	1	1	5	2	1
2	1	1	4	1	1
2	1	1	4	2	5
1	1	1	5	1	1
2	4	4	3	2	4
2	1	1	3	2	1
1	1	1	2	1	1
2	1	1	4	2	1
1	1	1	4	2	1

2	1	1	3	7	5
1	1	1	4	1	1
2	1	1	3	1	1
1	1	1	5	2	1
2	1	1	4	2	1
1	1	3	4	2	1
2	1	1	2	2	1
1	1	1	3	1	4
1	1	1	2	2	1
2	1	1	5	2	3
1	1	1	3	7	1
2	2	1	4	2	1
2	1	1	4	2	1
2	1	1	2	1	1
1	1	1	5	2	3
2	1	1	4	2	1
1	1	1	3	1	1
2	1	1	4	2	1
2	1	1	2	1	5
3	4	5	4	2	3
1	1	1	4	2	1
1	1	1	4	2	1
1	1	1	4	2	1
1	1	1	5	2	3
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2	1	1	1	2	1
2	1	1	5	2	3
2	1	1	5	2	1
2	1	1	5	2	1
2	1	1	4	1	1
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1	1	1	3	1	1
2	1	1	2	1	3
3	1	1	5	2	1
1	1	1	2	2	3
1	4	1	4	2	4
2	1	1	4	2	1
1	4	3	4	2	33
1	1	1	4	2	1
1	1	1	4	2	1
1	1	1	1	2	1
1	1	1	1	2	1
2	1	1	4	2	1
1	1	1	5	2	1
1	1	1	3	1	1
1	1	1	5	2	1
1	1	1	4	2	1

2	1	1	5	1	1
2	1	1	5	2	1
2	1	1	4	4	1
2	1	1	4	2	1
2	1	1	4	1	1
2	1	1	3	1	1
1	1	1	1	7	6
1	3	2	2	1	1
2	4	1	5	2	4
2	1	1	5	1	1
1	1	1	4	2	1
1	1	1	3	2	3
1	1	1	4	2	1
4	1	1	2	2	1
2	1	1	4	2	4
1	1	1	3	2	1
2	3	1	4	1	1
2	1	1	4	2	1
1	1	1	2	1	3
1	1	1	3	1	1
2	1	1	4	1	1
1	1	1	3	2	1
1	1	1	4	2	1
1	1	1	4	2	1
1	1	1	4	2	1
1	1	1	4	2	1

Table 1221b: Passenger journeys by sector, quarterly data

Time period	Franchised long distance operators (million)	Franchised London and South East operators (million)	Franchised regional operators (million)	Open access operators (million) [note 2]	Total passenger journeys (million) [note 3]
Apr to Jun 1994 [note 4]	14.3	125.0	44.8	[z]	184.1
Jul to Sep 1994	12.0	111.3	37.4	[z]	160.7
Oct to Dec 1994	14.2	136.3	46.8	[z]	197.4
Jan to Mar 1995	13.7	134.4	44.7	[z]	192.9
Apr to Jun 1995	13.6	126.7	45.6	[z]	185.9
Jul to Sep 1995	13.4	123.5	45.0	[z]	181.9
Oct to Dec 1995	14.4	138.3	48.4	[z]	201.1
Jan to Mar 1996	14.5	132.6	45.2	[z]	192.3

Apr to Jun 1996	14.1	131.7	46.5	[z]	192.3
Jul to Sep 1996	14.3	131.7	48.1	[z]	194.2
Oct to Dec 1996	15.4	145.4	51.6	[z]	212.4
Jan to Mar 1997	14.4	138.8	48.1	[z]	201.3
Apr to Jun 1997	14.7	137.5	47.9	[z]	200.1
Jul to Sep 1997	16.0	139.5	50.4	[z]	205.9
Oct to Dec 1997	17.0	153.5	53.4	[z]	223.9
Jan to Mar 1998	15.9	150.5	49.4	[z]	215.8
Apr to Jun 1998	15.8	143.8	51.0	0.1	210.7
Jul to Sep 1998	17.1	147.1	50.7	0.9	215.8
Oct to Dec 1998	17.8	165.0	54.6	0.9	238.3
Jan to Mar 1999	16.8	160.4	51.9	1.0	230.0
Apr to Jun 1999 [b]	17.2	151.8	52.6	1.1	222.8
Jul to Sep 1999	18.3	155.7	54.8	1.1	229.9
Oct to Dec 1999	18.4	166.2	57.4	1.1	243.0
Jan to Mar 2000	18.2	165.1	55.3	1.1	239.6
Apr to Jun 2000	18.6	160.9	55.3	1.3	236.2
Jul to Sep 2000	19.9	167.1	59.9	1.3	248.2
Oct to Dec 2000	15.3	169.2	55.3	1.3	241.1
Jan to Mar 2001	15.8	166.9	52.2	1.2	236.2
Apr to Jun 2001	18.1	164.3	53.8	1.2	237.5
Jul to Sep 2001	18.7	163.9	57.5	1.2	241.3
Oct to Dec 2001	18.9	173.2	59.4	1.2	252.7
Jan to Mar 2002	18.3	161.9	51.5	1.2	232.8
Apr to Jun 2002	18.7	166.7	53.2	1.3	240.0

Jul to Sep 2002	19.0	166.1	55.9	1.2	242.2
Oct to Dec 2002	20.0	174.4	56.4	1.3	252.2
Jan to Mar 2003	19.5	171.8	53.7	1.2	246.2
Apr to Jun 2003 [note 5]	19.8	167.0	56.5	1.2	244.5
Jul to Sep 2003	20.4	169.7	60.0	1.3	251.4
Oct to Dec 2003	20.5	176.2	62.8	1.3	260.8
Jan to Mar 2004	20.7	177.2	60.9	1.3	260.1
Apr to Jun 2004	20.1	169.6	62.8	1.3	253.8
Jul to Sep 2004	21.0	174.2	61.5	1.3	257.9
Oct to Dec 2004	21.8	183.7	65.4	1.2	272.0
Jan to Mar 2005	20.9	177.0	61.7	1.3	260.9
Apr to Jun 2005	22.0	182.7	64.1	1.4	270.2
Jul to Sep 2005	21.5	171.4	66.6	1.2	260.7
Oct to Dec 2005	23.2	188.3	69.9	1.4	282.8
Jan to Mar 2006	22.8	177.2	66.7	1.3	268.0
Apr to Jun 2006	23.7	185.9	65.3	1.4	276.3
Jul to Sep 2006	24.6	183.5	71.6	1.3	280.9
Oct to Dec 2006	25.2	202.5	71.9	1.4	301.0
Jan to Mar 2007	25.5	197.7	67.7	1.2	292.1
Apr to Jun 2007	25.7	198.4	68.1	1.3	293.6
Jul to Sep 2007	26.2	204.5	70.5	1.3	302.5
Oct to Dec 2007	25.1	215.8	75.5	1.3	317.7
Jan to Mar 2008	26.8	209.6	71.8	1.3	309.5
Apr to Jun 2008	27.7	212.7	76.5	1.3	318.2
Jul to Sep 2008	27.5	212.7	75.5	1.2	316.9

Oct to Dec 2008	27.5	218.1	77.4	1.5	324.5
Jan to Mar 2009	26.7	210.8	73.3	1.4	312.2
Apr to Jun 2009	26.8	202.8	74.0	1.5	305.1
Jul to Sep 2009	27.4	201.9	73.8	1.5	304.7
Oct to Dec 2009	28.9	210.7	79.7	1.7	320.9
Jan to Mar 2010	28.6	226.8	76.4	1.6	333.4
Apr to Jun 2010	28.4	213.3	77.8	1.7	321.3
Jul to Sep 2010	29.1	224.5	77.4	1.8	332.8
Oct to Dec 2010	29.8	231.1	80.7	2.0	343.5
Jan to Mar 2011	29.7	241.8	79.9	1.7	353.1
Apr to Jun 2011 [b]	29.6	232.1	81.0	1.9	344.6
Jul to Sep 2011	30.2	242.5	81.8	1.8	356.3
Oct to Dec 2011	31.2	249.0	87.9	1.8	370.0
Jan to Mar 2012	31.0	267.4	85.3	1.7	385.4
Apr to Jun 2012	30.4	244.4	81.1	1.8	357.8
Jul to Sep 2012	31.0	259.7	82.6	1.8	375.0
Oct to Dec 2012	31.6	261.5	89.8	1.9	384.7
Jan to Mar 2013	30.1	264.4	83.7	1.9	380.2
Apr to Jun 2013	31.2	266.5	84.9	2.0	384.5
Jul to Sep 2013	31.4	271.3	85.1	1.9	389.7
Oct to Dec 2013	32.4	275.6	92.5	1.9	402.5
Jan to Mar 2014	30.8	285.9	88.1	1.9	406.7
Apr to Jun 2014	32.0	271.1	87.4	2.0	392.5
Jul to Sep 2014	32.9	281.7	90.3	2.0	406.8
Oct to Dec 2014	34.3	296.9	96.0	2.0	429.2

Jan to Mar 2015	32.6	294.3	93.0	1.9	421.8
Apr to Jun 2015	32.9	288.6	89.9	2.1	413.4
Jul to Sep 2015	33.8	294.6	91.0	2.1	421.5
Oct to Dec 2015	35.1	304.9	99.3	2.1	441.3
Jan to Mar 2016	33.7	306.7	95.0	1.9	437.4
Apr to Jun 2016	34.4	296.7	93.0	2.1	426.3
Jul to Sep 2016	35.0	293.4	93.9	2.1	424.4
Oct to Dec 2016	36.0	298.9	104.2	2.1	441.3
Jan to Mar 2017	35.1	301.5	96.9	2.1	435.5
Apr to Jun 2017	34.7	284.0	93.9	2.3	414.9
Jul to Sep 2017	35.6	290.9	96.4	2.2	425.1
Oct to Dec 2017	36.5	294.6	103.9	2.2	437.2
Jan to Mar 2018	34.7	295.9	94.1	2.1	426.8
Apr to Jun 2018	35.6	293.0	96.4	2.3	427.3
Jul to Sep 2018	35.4	299.7	95.9	2.2	433.1
Oct to Dec 2018	36.9	307.4	102.8	2.1	449.3
Jan to Mar 2019	35.6	309.0	96.6	2.1	443.2
Apr to Jun 2019 [note 6]	36.2	301.1	97.9	2.3	437.5
Jul to Sep 2019 [note 6]	36.4	306.6	102.5	2.2	447.7
Oct to Dec 2019 [note 7]	37.2	314.5	107.4	2.1	461.2
Jan to Mar 2020	29.4	273.7	87.6	1.6	392.3
Apr to Jun 2020 [b]	2.4	27.0	5.9	0.0	35.4
Jul to Sep 2020	9.9	94.3	29.0	0.2	133.5
Oct to Dec 2020	8.0	105.9	25.3	0.2	139.4
Jan to Mar 2021	4.5	60.5	14.6	0.1	79.7

Apr to Jun 2021 [b]	14.2	127.1	40.3	0.4	182.0
Jul to Sep 2021	22.9	165.6	58.6	0.8	247.9
Oct to Dec 2021	25.4	190.2	68.1	1.3	285.0
Jan to Mar 2022	24.9	185.1	63.6	1.5	275.1