A preliminary analysis of odometer (mileage) data derived from light vehicle MoT tests implemented in the Greater London area (2007 – 2012)

December 2013

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Preface

The preliminary analysis presented in this research note has been carried out primarily to gain a better understanding of time and mileage related trends in rates of exhaust emissions of various pollutants from light vehicles in London. Exhaust emissions data were collected using roadside remote sensing techniques at various survey locations in London in 2008 and 2012. However, the insights gained into fleet average odometer (mileage) values by vehicle class and age may be of value in related areas of transport and environmental policy. The focus of this research note is on the derivation of fleet average mileage data from odometer readings recorded at annual MoT tests in the Greater London area.

Introduction

Mileage information for the observed fleet has been estimated from data published by the Vehicle & Operator Services Agency (VOSA) (DfT, 2013). Light vehicles in the UK are generally required to be presented for an assessment of roadworthiness (known as an MoT test) on an annual basis once the vehicle has reached the age of three years. MoT tests are carried out at government authorised testing stations, and vehicle odometer readings are recorded as part of each test. There are currently approximately 20,000 authorised MoT testing stations within the UK licensed to test and certify passenger cars. Over 30 million MoT tests are carried out in the UK each year. These published data (available in complete form for tests carried out since April 2006) are described in general in Grove (2013), and some applicable mathematical and computational techniques for deriving annual mileage rates from these data are described in Wilson et al (2013a, b, & c).

It is hypothesised that patterns of vehicle ownership, usage and mileage may vary depending on geographic location. For example, vehicle ownership, usage and mileage in an urban conurbation may differ from a rural location. In addition, the existence of the Low Emission Zone (LEZ) and the Congestion Charging zone in London will have an influence on vehicle ownership and usage. For example, since January 2012, commercial vehicles between 1.205 tonnes unladen and 3.5 tonnes Gross Vehicle Weight have been required to meet the Euro 3 emissions standard for particulate matter within the LEZ (generally deterring the use in London of N1 class vans registered before 2002). The existence of the London congestion charging zone, whilst covering a smaller geographic area than the LEZ, will also have a local influence on vehicle choice and usage.

Therefore, since the vehicle exhaust emissions surveys were carried out at geographic locations within London, the analysis of vehicle mileage information derived from MoT tests was constrained to data associated with MoT testing stations physically located within the Greater London area, specifically central London postcode areas E, EC, N, NW, SE, SW, W, WC, and outer London postcode areas AL, BR, CR, DA, EN, HA, IG, KT, RM, SM, TW, UB, and WD. These postcode areas are illustrated in Figure 1 below.

Figure 1: London postcode areas used to identify applicable MoT testing stations. Map data © Google 2013.

Data processing

The published MoT test result records contain the following data fields:

Test ID	Unique Identifier for a test
Vehicle ID	Unique Identifier for a vehicle
Test Date	Date of Test (DD-MM-YYYY)
Test Class ID	Class of Vehicle Tested
Test Type	Type of MOT Test
Test Result	Test Outcome
Test Mileage	Mileage recorded at point of test
Postcode Area	Test Location
Make	Vehicle Make
Model	Vehicle Model
Colour	Vehicle Colour
Fuel Type	Vehicle Fuel Type
Cylinder Capacity	Vehicle Cylinder Capacity
First use Date	Vehicle Date of First Use (DD-MM-YYYY)

A full metadata description can be found in VOSA (2013).

The raw data required processing and cleaning before it could be utilised to estimate mileage values for the light vehicle classes specified in the vehicle emissions analysis, i.e. vehicle categories M1 and N1 (VCA 2013).

- **Vehicle category M1:** Vehicles with at least four wheels designed and constructed for the carriage of passengers and comprising no more than eight seats in addition to the driver's seat.
- **Vehicle category N1:** Vehicles with at least four wheels designed and constructed for the carriage of goods and having a maximum mass not exceeding 3.5 tonnes.

Specifically, N1 class vehicles (commercial vehicles up to 3.5 tonnes) had to be extracted from Class 4 MoT test results (light vehicles up to 3 tonnes), and aggregated with Class 7 MoT test results (commercial vehicles between 3 and 3.5 tonnes) to create an N1 (commercial vehicles up to 3.5 tonnes) data set. In addition, vehicles which initially fail the MoT test, and then subsequently pass the test after repair, generally result in two (or more) test records; such double counting was removed during data processing. Records with missing values for variables such as 'First use date', engine capacity, and fuel type were excluded from the analysis, as were records with zero mileage recorded. Any vehicles clearly definable as London taxis based on make and model (e.g. LTI TX series, Metrocab etc.) were excluded from the analysis since these are analysed separately in the emissions data (and roadworthiness tests for black cabs in London are generally carried under the auspices of the Public Carriage Office); it was not possible to explicitly identify private hire vehicles within the data set. Similarly, vehicles recorded as MoT Class 4, but described as motorcycles or other non-M1 vehicle types under 'Vehicle make' or 'Vehicle model' were excluded. Mileage values for very old vehicles become increasingly unreliable due to vehicles going 'round the clock' (exceeding the recording capacity of the odometer), or odometers being replaced due to faults. For this reason, vehicles classified by the Department for Transport as 'historic' for taxation purposes (originally registered prior to 1973) were also excluded from the analysis.

Table 1: Summary of London MoT test results sample size

	Year of MoT test					
	2007	2008	2009	2010	2011	2012
Raw data	4,019,248	4,117,758	4,224,485	4,290,659	4,362,422	4,340,549
Post processed	2,995,796	3,065,965	3,150,746	3,220,233	3,278,226	3,283,151
Of which:						
Petrol cars (M1)						
< 1.4 litres	870,926	868,379	866,299	857,598	862,089	872,514
1.4-2.0 litres	1,221,447	1,221,781	1,223,806	1,219,610	1,205,988	1,173,037
> 2.0 litres	322,585	327,607	336,887	338,353	326,959	311,240
Diesel cars (M1)						
< 2.0 litres	275,372	307,163	345,491	386,199	436,589	474,470
>2.0 litres	110,211	127,862	151,422	177,398	197,465	214,978
Diesel vans (N1)	195,255	213,173	226,841	241,075	249,136	236,912

The data cleaning and processing resulted in 'useable' data sample sizes as presented in Table 1. New variables were then added to the data sets including COPERT / EEA engine capacity categories for M1 diesel and petrol passenger cars, and a vehicle age variable. Vehicle age (at the time of the MoT test) was calculated by subtracting the date of first use (DD-MM-YYYY) from the MoT test date (DD-MM-YYYY) for each record, and stored in real number format to two decimal places (i.e. to a time resolution of circa four days). Decimal date was estimated using:

Decimal date = YYYY + ((MM – 1) /12) + (DD / 365)

For example, if the MoT test date was recorded as August 25th 2011, and the date of first use was recorded as June 4th 1996, then:

a) MoT test date = 2011 + ((8 – 1) /12) + (25 / 365) = 2011.65
b) Date of first use = 1996 + ((6 – 1) /12) + (4 / 365) = 1996.43
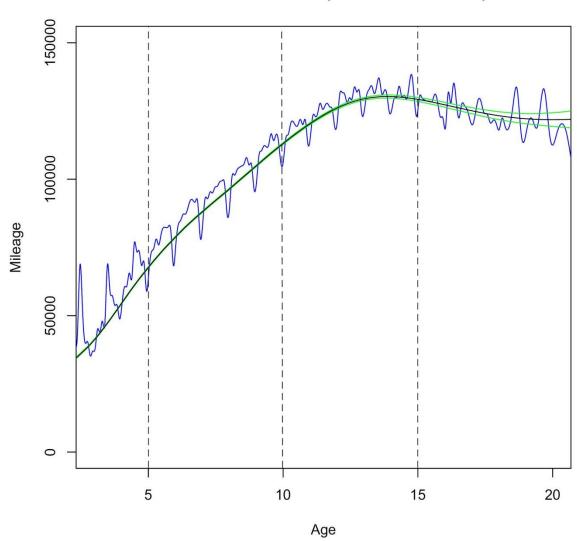c) Estimated vehicle age at MoT = 2011.65 – 1996.43 = 15.22 years

Results

The relationship between calculated vehicle age at the time of the MoT tests and recorded vehicle mileage in each subset of the data is estimated in this case by fitting a cubic smoothing spline using the 'R' function, smooth.spline (R Core Team, 2013). Figure 2 below presents an example of the relationship between vehicle age and mileage for diesel passenger cars (M1) with engine capacity greater than 2.0 litres, from MoT tests carried out in calendar year 2007. The lower limit on the 'x' axis of the graph has been set at 3 years, since cars are generally not required to be presented for MoT test until they are 3 years old (although there are a small number of exceptions in the data).

It should be noted that beyond a certain vehicle age, the rate of removal of vehicles from the fleet due to scrapping etc. may tend to reduce the fleet average odometer value, particularly since higher mileage vehicles would tend to be scrapped before lower mileage vehicles. This explains the flattening and downturn in the fleet average odometer values observed in the data, typically beyond 10 to 15 years. Of course, when considering any individual vehicle, the odometer value can only increase (except for certain exceptions, such as 'going round the clock' on older vehicles, or illegal 'clocking').

It is notable in Figure 2 that there is a clear and recurring annual 'saw tooth' pattern in the unsmoothed estimated spline. The trough of the saw tooth (where the annual mileage value is lowest) coincides with MoT tests carried out when vehicles are close to, or just less than, a full year old (or multiples thereof), i.e. ≈4.92 to 5 years old, ≈5.92 to 6 years old etc. This pattern can be considered as when the MoT tests are 'in phase' with the original date of first use, e.g. a vehicle with a first use date falling in June would tend to be submitted for an MoT test each subsequent June (or perhaps May) if it remained 'in phase'. UK MoT regulations permit a light vehicle to be submitted for test up to four weeks before the due date, whilst still retaining the original annual test date (equal to the date of first registration). In contrast, vehicles which are submitted for MoT test 'out of phase' i.e. with

calculated ages of between say 4.1 to 4.8 years old, 5.1 to 5.8 years old etc., appear to be associated with higher mileages (the peak of the saw tooth).

M1 Diesel <2.0 litres (2012 MoT test data)

Figure 2: Vehicle odometer data from MoT tests carried out in 2012; Diesel passenger cars with engine capacity less than 2.0 litres. *'R' Smooth.spline parameters:*
a) *Blue line: spar= 0.0525, lambda= 5.8604e-08, Equiv. Degrees of Freedom: 191.7;*
b) *Black line: spar= 0.9255, lambda= 0.1186, Equiv. Degrees of Freedom: 10.0:*
c) *Green lines: Bootstrapped 95% confidence interval around the black line spline estimate based on 1000 bootstrap re-samplings.*

Figure 3 (a, b) illustrates the frequency distribution of MoT tests carried out in 2012, plotting month of first use against month of MoT test (diesel cars <2.0L engine capacity). Figure 3(a) presents data for cars registered in 2009 (i.e. cars being presented for their first MoT test at 3 years old). Figure 3(b) presents data for cars registered in 2003 (i.e. cars which are nine

years old). As is perhaps to be expected, at first MoT test at three years old, vehicles which are 'in phase' i.e. observed on the diagonal of the graph (Jan,Jan; Feb,Feb, Mar,Mar...., Dec,Dec) tend to dominate the distribution. The two peaks on the diagonal in March and September associated with the release of the new vehicle registration prefixes are particularly dominant, with smaller peaks as expected in February and August MoT tests for vehicles first used in March and September. Combinations of month of first use and month of MoT test 'off the diagonal' tend to be sparsely populated. However, it can be seen in the data for cars first registered in 2003 (nine years old) that whilst the March and September peaks can still be observed, the frequency distribution is far more dispersed, with a higher proportion of MoT tests now 'out of phase'. The influence of this phenomena on vehicle mileage is probably due to factors such as mode of ownership (individual, business), socio-demographic characteristics of private owners, the extent to which vehicles are submitted for MoT tests at trade-in (e.g. prior to resale), whether MoT tests are coordinated with / constrained to vehicle service intervals etc. These issues require further research which is outside the scope of this research note. A final insight is provided by Figure 4 (a, b) which presents similar data, but in this case for diesel vans (N1). It can be hypothesised that the criteria relating to acquisition, ownership, and disposal of commercial vans will differ from passenger cars. The frequency distribution for three year old diesel vans is very similar to diesel cars. However, at nine years old, the distribution of observations away from the diagonal (prevalence of 'out of phase' MoT tests) becomes perhaps even more marked.

Figure 3(a): Frequency distribution of MoT tests (2012 test data): Month of first use versus month of MoT test. Diesel cars <2.0L first registered in 2009.

Figure 3(b): Frequency distribution of MoT tests (2012 test data): Month of first use versus month of MoT test. Diesel cars <2.0L first registered in 2003.

Figure 4(a): Frequency distribution of MoT tests (2012 test data): Month of first use versus month of MoT test. Diesel vans (N1) first registered in 2009.

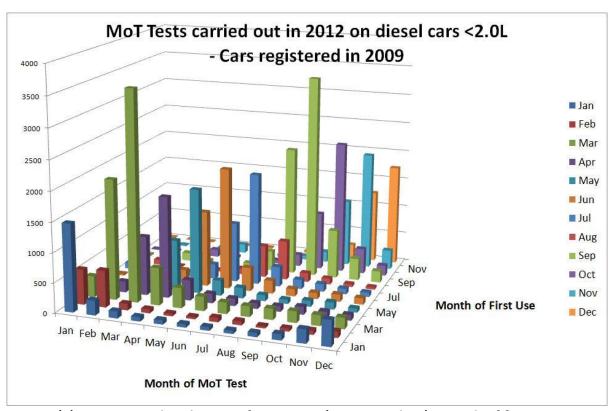**Figure 4(b): Frequency distribution of MoT tests (2012 test data): Month of first use versus month of MoT test. Diesel vans (N1) first registered in 2003.**
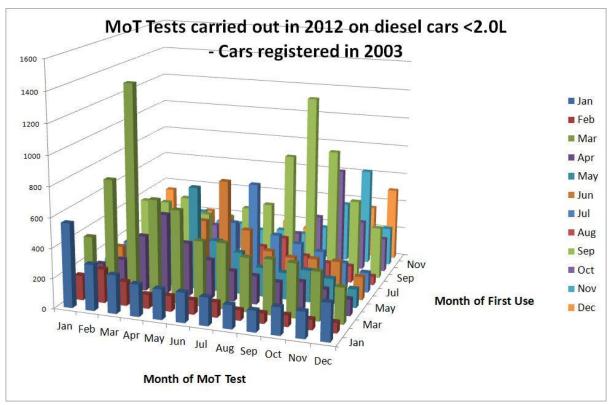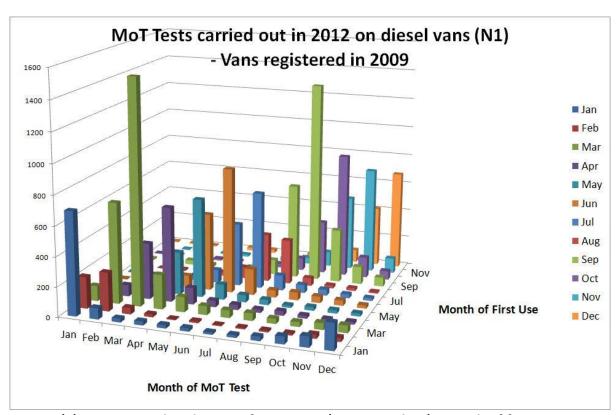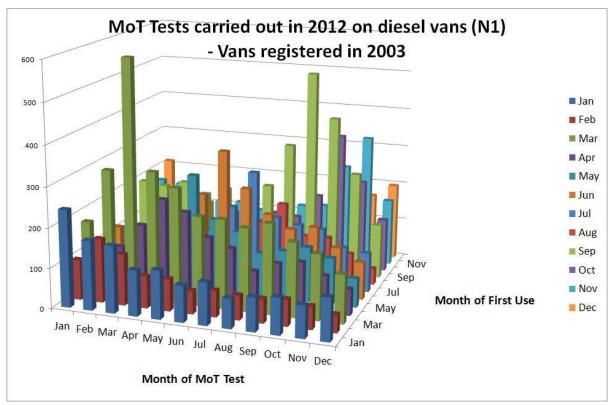
Smoothing splines were fitted through each of the thirty six subsets of processed data identified in Table 1, by year of MoT test, vehicle type, fuel type, and engine capacity. Figure 5 (a to f) presents these curves by year of MoT test from 2012 to 2007 inclusive. Given that mileage data is generally not available for vehicles less than three years old, the range on the 'x' axis from zero to three has been estimated by interpolation through the origin (0,0). The first general observation to make is that the results 'year on year' are relatively stable, particularly in terms of the relative odometer (mileage) results by vehicle class and fuel type. Petrol cars travel lower mileages per year, and lower mileages overall than diesel fuelled light vehicles (cars and vans), with the exception of the largest capacity petrol engine cars which cover high mileages overall but at a lower incremental rate per annum. It can be seen that smaller capacity petrol cars (<1.4 litres) have the lowest annual mileage rate, and the lowest overall fleet mileage, followed by petrol cars (1.4 to 2.0 litres), and finally the largest capacity petrol cars (>2.0 litres). Diesel light vehicles (both cars and vans) are observed to travel higher mileages per annum, and to generally travel higher mileages overall (although there are some notable time trends which influence these relationships).

When reviewing these data on an annual basis, a number of trends can be seen. Firstly, the maximum fleet mileage for diesel cars with engine capacity less than 2.0 litres steadily increases from circa 110,000 miles (at twelve years old) for MoT tests carried out in 2007, to circa 130,000 miles (at fourteen years old) for MoT tests carried out in 2012. Up to year 2011, it can be seen to be converging with the results for diesel cars with engine capacity greater than 2.0 litres, although the larger engine diesel cars are always seen to cover higher mileages overall. Secondly, a similar (although less marked) increase in maximum fleet mileage for diesel vans (N1) is observed in the data from 2007 to 2011, the notable change in the case of vans being that peak fleet mileage occurs at age eleven years for MoT tests carried out in 2007, and at age fourteen years for MoT tests carried out in 2011. An interesting step change occurs in the diesel van (N1) data in the 2012 MoT test data; mileage suddenly drops off after vehicles reach eleven years old. It is hypothesised that this is the influence of the introduction of the Euro 3 emission standard for particulate matter in the London Low Emission Zone, generally applicable to N1 class vans between 1.2 and 3.5 tonnes from January 2012. The effect of the Euro 3 standard on N1 vans is to essentially remove many vehicles first registered before 2002 from the fleet operating within the LEZ (with some exceptions for early adopters of Euro 3 emissions control technology). Thirdly, it can be seen that the maximum mileage for petrol engine cars (of all engine capacities) is occurring at a progressively older age. At 2007 (<1.4 litres, 14 years; 1.4 to 2.0 litres, 15 years; >2.0 litres, 16 years); at 2012 (<1.4 litres, 18 years; 1.4 to 2.0 litres, 19.5 years; >2.0 litres, 18.5 years). The older petrol engine cars still remaining on the road are covering higher mileages than they did in the past.

However, it should be noted that this preliminary analysis does not take into account the number of vehicles of varying age being driven on the road, only the relationship between age and recorded mileage. To move towards an inventory of the exhaust emissions from each group of vehicles, the frequency distribution of vehicles by age and mileage group would need to be incorporated in the analysis.

Figure 5(a). Fitted smooth spline curves (odometer reading vs vehicle age) by vehicle type, fuel type, and engine capacity. MoT tests carried out in Greater London in 2012.

Figure 5(b). Fitted smooth spline curves (odometer reading vs vehicle age) by vehicle type, fuel type, and engine capacity. MoT tests carried out in Greater London in 2011.

Figure 5(c). Fitted smooth spline curves (odometer reading vs vehicle age) by vehicle type, fuel type, and engine capacity. MoT tests carried out in Greater London in 2010.

Figure 5(d). Fitted smooth spline curves (odometer reading vs vehicle age) by vehicle type, fuel type, and engine capacity. MoT tests carried out in Greater London in 2009.

Figure 5(e). Fitted smooth spline curves (odometer reading vs vehicle age) by vehicle type, fuel type, and engine capacity. MoT tests carried out in Greater London in 2008.
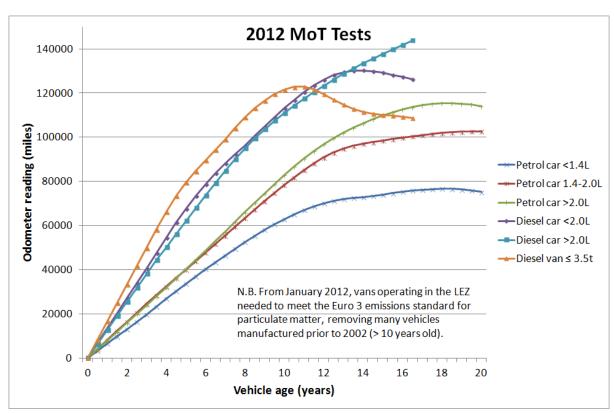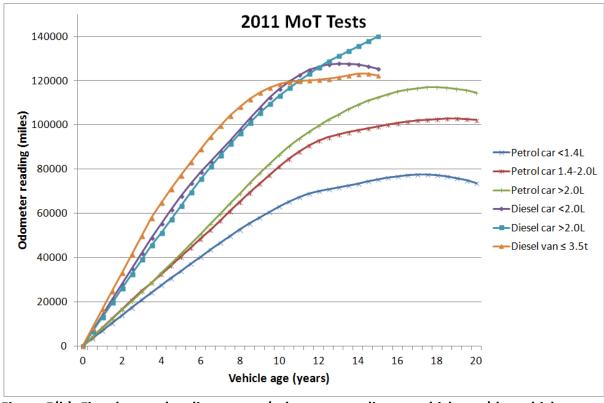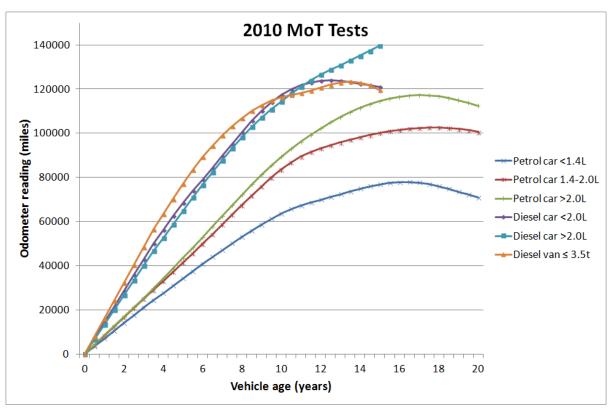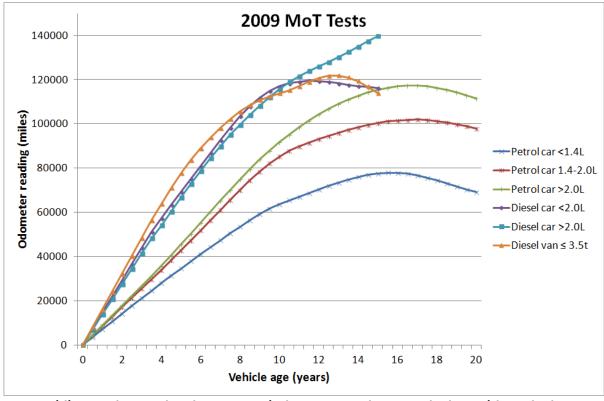

Figure 5(f). Fitted smooth spline curves (odometer reading vs vehicle age) by vehicle type, fuel type, and engine capacity. MoT tests carried out in Greater London in 2007.

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Disclaimer

The analysis described in this research note is furnished "as is". Whilst reasonable efforts have been made to ensure accuracy, no warranty is provided whatsoever. The author will not be held responsible for any loss, damage or inconvenience caused as a result of any inaccuracy or error.

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Appendix A

Smooth spline estimates of odometer values by vehicle age for MoT tests carried out in Greater London annually for the period 2012 to 2007 - Consistent with Figures 5(a-f).

Smooth spline estimates of odometer values by vehicle age for MoT tests carried out in Greater London in 2012 - Consistent with Figure 5(a).

Vehicle Age	Petrol car <1.4L	Petrol car 1.4-2.0L	Petrol car >2.0L	Diesel car <2.0L	Diesel car >2.0L	Diesel van ≤ 3.5t
0.0	0	0	0	0	0	0
0.5	3278	4106	3987	6778	6354	8317
1.0	6555	8212	7974	13556	12707	16635
1.5	9833	12318	11962	20334	19061	24952
2.0	13110	16424	15949	27113	25415	33270
2.5	16388	20530	19936	33891	31769	41587
3.0	19665	24636	23923	40669	38122	49905
3.5	23303	28522	27935	47447	44476	58222
4.0	26882	32423	31997	54377	50119	66190
4.5	30362	36297	36102	61337	56147	73293
5.0	33735	40134	40250	67632	62085	79445
5.5	37031	43980	44455	73487	67881	84678
6.0	40251	47817	48708	78712	73517	89452
6.5	43427	51667	53011	83617	79221	94155
7.0	46527	55523	57344	87987	84791	99068
7.5	49576	59447	61704	92224	90096	104136
8.0	52525	63369	66035	96307	94913	108905
8.5	55395	67286	70340	100594	99393	113093
9.0	58077	71102	74588	104825	103528	116612
9.5	60575	74834	78787	109074	107395	119505
10.0	62837	78402	82850	113058	110966	121603
10.5	64976	81852	86739	116873	114306	122777
11.0	66925	85084	90363	120336	117404	122795
11.5	68706	88114	93738	123452	120355	121679
12.0	70166	90794	96815	126057	123202	119650
12.5	71289	93071	99586	128080	125978	117177
13.0	72022	94818	102040	129428	128611	114765
13.5	72512	96110	104246	130135	131069	112820
14.0	72913	97044	106247	130252	133343	111462
14.5	73410	97813	108087	129921	135495	110628
15.0	74004	98500	109754	129234	137597	110116
15.5	74655	99181	111247	128302	139700	109725
16.0	75275	99838	112540	127239	141783	109324
16.5	75823	100471	113620	126143	143807	108828
17.0	76250	101040	114465			
17.5	76541	101535	115056			
18.0	76666	101943	115381			
18.5	76609	102266	115436			
19.0	76346	102486	115238			
19.5	75884	102591	114793			
20.0	75230	102558	114110			

Smooth spline estimates of odometer values by vehicle age for MoT tests carried out in Greater London in 2011 - Consistent with Figure 5(b).

Vehicle Age	Petrol car <1.4L	Petrol car 1.4-2.0L	Petrol car >2.0L	Diesel car <2.0L	Diesel car >2.0L	Diesel van ≤ 3.5t
0.0	0	0	0	0	0	0
0.5	3468	4153	4070	6988	6496	8286
1.0	6937	8305	8140	13976	12992	16573
1.5	10405	12458	12210	20964	19488	24859
2.0	13873	16611	16279	27952	25983	33145
2.5	17342	20763	20349	34940	32479	41431
3.0	20810	24916	24419	41928	38975	49718
3.5	24120	28690	28636	48916	45471	58004
4.0	27427	32546	32919	55274	51172	64696
4.5	30721	36482	37277	61784	57215	71044
5.0	33978	40454	41687	67842	63323	77163
5.5	37212	44453	46141	73506	69473	83094
6.0	40396	48482	50633	78527	75397	88924
6.5	43558	52608	55183	83339	81007	94506
7.0	46665	56779	59766	87996	86229	99603
7.5	49732	60999	64381	92936	91272	104141
8.0	52656	65182	68979	97864	96107	108157
8.5	55457	69348	73566	102871	100797	111639
9.0	58084	73404	78058	107639	105234	114479
9.5	60634	77374	82402	112203	109375	116734
10.0	63027	81131	86473	116196	113117	118377
10.5	65290	84686	90257	119650	116572	119451
11.0	67242	87877	93686	122471	119843	119972
11.5	68860	90636	96806	124729	122995	120165
12.0	70052	92794	99633	126338	125929	120383
12.5	70952	94430	102244	127328	128603	120868
13.0	71707	95651	104660	127738	131035	121604
13.5	72534	96672	106909	127689	133307	122453
14.0	73450	97578	108955	127228	135512	123054
14.5	74423	98455	110798	126465	137720	123102
15.0	75341	99290	112423	125487	139934	122413
15.5	76153	100092	113831			
16.0	76794	100819	115002			
16.5	77254	101456	115921			
17.0	77499	101984	116575			
17.5	77509	102404	116953			
18.0	77246	102692	117043			
18.5	76717	102838	116837			
19.0	75945	102818	116336			
19.5	74957	102612	115554			
20.0	73778	102197	114512			

Smooth spline estimates of odometer values by vehicle age for MoT tests carried out in Greater London in 2010 - Consistent with Figure 5(c).

Vehicle Age	Petrol car <1.4L	Petrol car 1.4-2.0L	Petrol car >2.0L	Diesel car <2.0L	Diesel car >2.0L	Diesel van ≤ 3.5t
0.0	0	0	0	0	0	0
0.5	3501	4181	4221	7149	6686	8061
1.0	7001	8362	8441	14298	13371	16121
1.5	10502	12543	12662	21447	20057	24182
2.0	14003	16724	16883	28597	26742	32242
2.5	17503	20905	21103	35746	33428	40303
3.0	21004	25086	25324	42895	40113	48363
3.5	24306	29071	29758	50044	46799	56424
4.0	27614	33123	34265	56261	52468	63366
4.5	30930	37222	38841	62614	58665	70230
5.0	34221	41373	43474	68435	64883	76957
5.5	37499	45622	48178	73877	70889	83335
6.0	40734	49926	52923	79002	76595	89156
6.5	43946	54304	57704	84352	82234	94306
7.0	47052	58687	62490	89663	87727	98905
7.5	50078	63103	67315	95131	93103	103068
8.0	52967	67468	72093	100398	98169	106762
8.5	55822	71810	76767	105531	102829	110028
9.0	58560	75971	81204	110106	106987	112727
9.5	61200	79961	85398	114121	110800	114833
10.0	63566	83598	89268	117385	114390	116310
10.5	65630	86828	92856	119963	117847	117355
11.0	67269	89453	96158	121801	121050	118247
11.5	68620	91550	99249	123008	123929	119327
12.0	69813	93196	102134	123666	126454	120624
12.5	71063	94607	104821	123889	128691	121954
13.0	72356	95856	107264	123688	130785	122952
13.5	73663	97045	109478	123174	132873	123368
14.0	74873	98156	111438	122463	135027	122985
14.5	75963	99207	113134	121675	137263	121722
15.0	76846	100142	114543	120871	139522	119616
15.5	77491	100944	115662			
16.0	77845	101590	116484			
16.5	77888	102088	116998			
17.0	77571	102418	117193			
17.5	76913	102586	117072			
18.0	75963	102578	116638			
18.5	74803	102384	115914			
19.0	73497	101978	114931			
19.5	72135	101361	113744			
20.0	70785	100534	112412			

Smooth spline estimates of odometer values by vehicle age for MoT tests carried out in Greater London in 2009 - Consistent with Figure 5(d).

Vehicle Age	Petrol car <1.4L	Petrol car 1.4-2.0L	Petrol car >2.0L	Diesel car <2.0L	Diesel car >2.0L	Diesel van ≤ 3.5t
0.0	0	0	0	0	0	0
0.5	3533	4265	4448	7310	6880	8040
1.0	7067	8530	8897	14620	13760	16080
1.5	10600	12795	13345	21930	20640	24120
2.0	14133	17059	17793	29239	27519	32159
2.5	17667	21324	22242	36549	34399	40199
3.0	21200	25589	26690	43859	41279	48239
3.5	24551	29702	31226	51169	48159	56279
4.0	27896	33925	35862	57232	54035	63768
4.5	31239	38275	40603	63335	60324	70985
5.0	34558	42712	45424	69127	66581	77678
5.5	37866	47239	50323	75017	72728	83636
6.0	41086	51790	55261	80798	78621	88955
6.5	44252	56395	60249	86750	84384	93758
7.0	47338	60977	65221	92521	89846	98125
7.5	50435	65573	70146	98222	94952	102125
8.0	53455	70039	74907	103383	99598	105628
8.5	56417	74397	79498	108000	103952	108528
9.0	59139	78445	83817	111797	108086	110745
9.5	61588	82121	87864	114808	112043	112391
10.0	63631	85197	91602	116929	115669	113743
10.5	65390	87739	95104	118329	118860	115222
11.0	66969	89788	98356	119124	121565	117036
11.5	68597	91562	101385	119468	123862	119007
12.0	70249	93120	104141	119362	125919	120688
12.5	71897	94587	106656	118939	127966	121695
13.0	73419	95948	108912	118334	130138	121802
13.5	74809	97246	110925	117720	132444	120993
14.0	75995	98421	112677	117175	134842	119313
14.5	76950	99468	114169	116737	137293	116869
15.0	77608	100351	115390	116356	139661	113881
15.5	77937	101063	116335			
16.0	77868	101565	116985			
16.5	77418	101850	117324			
17.0	76629	101898	117330			
17.5	75582	101713	116992			
18.0	74352	101296	116324			
18.5	73028	100678	115388			
19.0	71676	99875	114249			
19.5	70351	98911	112960			
20.0	69072	97795	111546			

Smooth spline estimates of odometer values by vehicle age for MoT tests carried out in Greater London in 2008 - Consistent with Figure 5(e).

Vehicle Age	Petrol car <1.4L	Petrol car 1.4-2.0L	Petrol car >2.0L	Diesel car <2.0L	Diesel car >2.0L	Diesel van ≤ 3.5t
0.0	0	0	0	0	0	0
0.5	3576	4337	4679	7383	7088	8225
1.0	7152	8673	9357	14766	14175	16449
1.5	10728	13010	14036	22149	21263	24674
2.0	14303	17347	18714	29532	28351	32899
2.5	17879	21683	23393	36915	35439	41124
3.0	21455	26020	28071	44298	42526	49348
3.5	24796	30539	32725	51681	49614	57573
4.0	28138	35130	37536	57633	55592	64884
4.5	31481	39782	42490	64265	62097	71553
5.0	34771	44462	47540	70896	68589	77728
5.5	38040	49201	52690	77576	74906	83440
6.0	41277	53957	57870	83969	80802	88653
6.5	44576	58782	63045	90307	86300	93444
7.0	47860	63546	68091	96057	91330	97810
7.5	51147	68269	73004	101264	96121	101643
8.0	54247	72723	77676	105640	100717	104807
8.5	57121	76840	82084	109256	105114	107285
9.0	59611	80379	86163	111935	109082	109323
9.5	61811	83418	90003	113800	112519	111361
10.0	63767	85945	93604	114954	115379	113612
10.5	65683	88154	96999	115579	117811	115936
11.0	67550	90077	100124	115683	120027	117831
11.5	69405	91867	103008	115475	122290	118921
12.0	71150	93512	105640	115070	124689	119072
12.5	72798	95079	108054	114576	127173	118356
13.0	74256	96509	110236	114058	129692	116777
13.5	75504	97816	112171	113638	132232	114340
14.0	76446	98955	113829	113301	134702	111279
14.5	77034	99919	115212	112979	137043	108053
15.0	77153	100642	116304	112632	139181	105089
15.5	76806	101103	117087			
16.0	76048	101269	117517			
16.5	75011	101158	117573			
17.0	73811	100785	117252			
17.5	72572	100203	116604			
18.0	71358	99446	115691			
18.5	70201	98551	114563			
19.0	69099	97530	113257			
19.5	68062	96392	111788			
20.0	67073	95134	110154			

Smooth spline estimates of odometer values by vehicle age for MoT tests carried out in Greater London in 2007 - Consistent with Figure 5(f).

Vehicle Age	Petrol car <1.4L	Petrol car 1.4-2.0L	Petrol car >2.0L	Diesel car <2.0L	Diesel car >2.0L	Diesel van ≤ 3.5t
0.0	0	0	0	0	0	0
0.5	3603	4522	4905	7493	7359	8499
1.0	7207	9044	9810	14985	14719	16998
1.5	10810	13566	14715	22478	22078	25498
2.0	14413	18088	19619	29971	29438	33997
2.5	18017	22610	24524	37464	36797	42496
3.0	21620	27132	29429	44956	44157	50995
3.5	25023	31893	34401	52449	51516	57681
4.0	28418	36714	39524	59234	57740	64403
4.5	31812	41603	44781	66512	64369	70852
5.0	35199	46526	50098	73658	70877	76909
5.5	38654	51536	55427	80729	77121	82528
6.0	42104	56529	60649	87137	82859	87787
6.5	45568	61535	65776	93000	88285	92597
7.0	48873	66324	70706	97951	93472	96887
7.5	51997	70824	75446	102017	98449	100578
8.0	54811	74786	79921	104939	102953	103818
8.5	57426	78298	84187	106919	106851	106989
9.0	59852	81320	88199	108175	110055	110257
9.5	62245	84027	91993	109052	112645	113378
10.0	64561	86406	95507	109561	114814	115790
10.5	66827	88612	98797	109876	116888	117220
11.0	68916	90631	101840	110098	119079	117545
11.5	70872	92558	104649	110277	121463	116918
12.0	72623	94322	107198	110313	123983	115299
12.5	74174	95941	109494	110269	126557	112638
13.0	75403	97345	111520	110082	129048	109219
13.5	76236	98522	113290	109680	131454	105745
14.0	76537	99387	114785	109030	133740	102814
14.5	76323	99930	115987	108313	135818	100624
15.0	75676	100138	116846	107798	137564	99168
15.5	74774	100062	117331			
16.0	73731	99742	117426			
16.5	72676	99258	117173			
17.0	71649	98648	116640			
17.5	70679	97949	115880			
18.0	69762	97144	114916			
18.5	68899	96224	113747			
19.0	68065	95163	112337			
19.5	67249	93952	110667			
20.0	66446	92588	108741			