



Index of the comparative operating costs of Registered Social Landlords in Scotland

Analysis incorporating 2004/05 data

August 2006



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1 Summary and conclusions

1.1 Summary

Introduction

In August 2005 Communities Scotland published a report entitled “*Index of the comparative operating costs of Registered Social Landlords in Scotland*”. The purpose of that work was to provide a method of comparing the operating and maintenance costs of Scottish Registered Social Landlords (RSLs). Communities Scotland has commissioned Indepen to update the Operating Cost Index (OCI) using 2004/05 data and this report summarises our findings.

The OCI uses statistical methods to establish the relationship between the operating costs of RSLs and various cost drivers that might influence them. We use this relationship to predict costs for each RSL given their specific circumstances and then calculate the difference between actual and predicted costs for each RSL. This nature of this approach, which is comparative, means that some RSLs will have positive differences and others negative. A positive difference means that the costs of the RSL are higher than predicted by the cost function, and vice versa.

Changes since the previous analysis

Communities Scotland’s objective is to develop a comparative OCI that it and the RSLs can use in their monitoring and planning and which will inform the regulatory dialogue between them. This means that there is a premium on the OCI having the broadest coverage of Scottish RSLs within a single index and one that includes data for more than one year so that it can reveal trends over time.

The main changes since the August 2005 report are the use of additional data for 2004/05 and the inclusion of the three large local authority whole stock transfers that occurred in 2003/04. We have revisited the specification we used last time and conducted statistical tests and sensitivity analysis to evaluate the validity of the assumptions underlying the analysis. The report explains that the tests suggest that it is valid to pool the data for general needs RSLs, Large Scale Voluntary Transfers (LSVTs) and Local Authority Whole Stock Transfers (LAWSTs) and that we can combine the data from 2003/04 and 2004/05 to estimate the cost relationship.

In view of the changes highlighted above, the 2003/04 results reported in this study will differ from those in the August 2005 publication.

Results

The results are subject to the following.

- There is no presumption that the residuals are entirely due to differences in efficiency.
- The estimated cost relationship is a description of the sector as a whole and the effect of the cost drivers will vary from one RSL to another.

We have used data for 153 RSLs for the years 2003/04 and 2004/05 and employed the Ordinary Least Squares method of estimation.

The preferred equation includes

- status of the RSL – LSVT and local authority whole stock transfer
- the number of social housing units
- variables representing



- type of unit (bed spaces, non self contained units, shared units, non social housing units)
 - physical characteristics (high rises, tenement, four-in-a-block, other flats)
 - age of the units (1919-1944, 1945-1964, 1965-1982, after 1982)
 - size of unit (two bedroom units, three bedroom units, four bedroom units and five or more bedroom units)
- time in years since registration of the RSL.

The interpretation of the preferred equation is covered in section 5.2.

1.2 Conclusions

The analysis we have conducted suggests that it is valid to pool the data for general needs RSLs, LSVTs and local authority whole stock transfers and that we can combine the data from 2003/04 and 2004/05 to estimate the cost relationship.

This report reflects useful progress in developing the approach to comparing Scottish RSLs' operating costs. Further development will be necessary in future in response to changes in the data and the composition of the sector.

The results of the analysis suggest that the OCI should continue to form a useful part of the regulatory dialogue between Communities Scotland and the RSLs.



2 Introduction

Communities Scotland has commissioned Indepen to update the Operating Cost Index (OCI) using 2004/05 data and this report summarises our findings.

In August 2005 Communities Scotland published a report entitled “*Index of the comparative operating costs of Registered Social Landlords in Scotland*”. The purpose of that work was to provide a method of comparing the operating and maintenance costs of Scottish Registered Social Landlords (RSLs). As discussed in the August 2005 report, the analysis related to operating costs: capital costs and output quality were outside the scope and this is also the case for this report.

The OCI uses statistical methods to establish the relationship between the operating costs of RSLs and various cost drivers that might influence them. We have used the term cost function to describe this relationship. We use the cost function to predict costs for each RSL given its specific circumstances and then calculate the difference between actual and predicted costs for each RSL. These differences are known as the residuals. This nature of this approach, which is comparative, means that some RSLs will have positive residuals and others negative. A positive residual means that the costs of the RSL are higher than predicted by the cost function and vice versa.

It is important to note that there is no presumption that the residuals are entirely due to differences in efficiency. The residuals will reflect efficiency differences but they may also include the effects of the following as well

- differences in the quality of the outputs of the RSLs
- any cost drivers not included in the specification
- errors in the specification of the cost relationship, if any
- errors in the data, if any
- timing differences in maintenance and repair costs
- accounting and reporting differences.



3 Overview of our approach to estimating the OCI

In this section we describe

- the cost drivers and their use in the analysis
- important issues affecting the application of the approach
- the interpretation of the results.

Appendix A provides a glossary of the econometric terms used in this report.

3.1 Cost drivers

The data on potential cost drivers are from the Annual Performance and Statistical Return (APSR). Our basic assumption is that the scale of the services provided by each RSL is related to the number of units that it owns and manages. The analysis tests whether the costs incurred in providing these services differ according to a range of characteristics, including the following.

- the type of organisation that an RSL is, i.e. general needs, LSVT, whole stock transfer
- the types of accommodation that an RSL manages, e.g. self contained units, bed spaces, and non self contained units
- the extent to which the houses have been adapted to accommodate different types of tenants, e.g. general needs, sheltered, very sheltered, medium dependency, wheelchair users, ambulant disabled and other special adaptations
- the age of the property and other physical characteristics of the accommodation, e.g. houses, high rise flats, tenements, four-in-a-block, other flats or maisonettes.
- the locations of the properties. The properties are disaggregated according to the local authority areas where they are located.

If a cost driver contributes to the explanation of observed differences between RSLs' operating costs then it is said to be statistically significant. If it does not, then on average the factor has little or no effect on costs although it might have a substantial effect on individual RSLs.

3.2 Application of the econometric approach

Communities Scotland's objective is to develop a comparative OCI that it and the RSLs can use in their monitoring and planning and which will inform the regulatory dialogue between them. This means that there is a premium on the OCI having the broadest coverage of Scottish RSLs within a single index and one that includes data for more than one year so that it can reveal trends over time.

Under certain conditions reliability of estimated effects of cost drivers is increasing as the number of observations increases. However this may result in the inclusion of RSLs that are very different from each other such that the assumption of a common cost relationship may not hold. The *pooling* of different RSLs to estimate a single equation is an underlying assumption that is testable. Similarly, pooling the data from different years assumes that there are no large changes in the cost structure from year to year; an assumption that is also testable.

Evidently, RSLs differ in terms of the services they provide, the sort of tenants they serve, and in other ways. By pooling the RSLs we are in effect assuming that a single cost function describes how all RSLs' costs are incurred. In the context of the Scottish RSLs, we cannot test this relationship directly,



as some of the RSL categories contain too few comparators to support valid statistical inference.¹ Instead we have carried out a sensitivity analysis to explore and understand the cost drivers for the different categories.

Similarly, pooling data from more than one year assumes that the way in which RSLs incur social housing costs does not change materially from one year to the next. This is testable with the available data and the tests indicate that the use of the two years together is valid.

Given the several dimensions, the number of possible relationships that we might test is very large.² It is not good econometric practice to test all possible combinations as such a process inherently reduces the confidence that can be placed on any results. Instead, econometricians rely on prior hypotheses of how the sector works to inform their choices and this is what we have done. In the main our prior assumptions have been built upon the work reported in August 2005. We have held discussions with Communities Scotland about areas not covered then and changes in circumstances since that time. This formed the starting point for our analysis. We have not performed blanket sensitivity tests but have been selective in exploring the possibilities in a structured way. This means that we have undertaken a manageable programme of analysis and the number of estimates has not been so numerous as to threaten the inferences we can draw.

3.3 Interpretation of the results

There are three components of the results of a regression using ordinary least squares (OLS)³

- the coefficients of the cost drivers
- the predicted costs
- the residuals.

Using the estimated coefficients, we calculate the predicted values and the residuals for each RSL. The interpretation of the residuals is not always obvious. Different specifications of the cost function will give different predicted values and residuals. The specification of the cost function has two parts: the cost drivers; and the functional form of the relationship.

In choosing the specification we have regard to

- sector knowledge
- the results of standard statistical tests which tell us what confidence we can have in the results
- the results of a tailored sensitivity analysis to evaluate the extent to which the results change between different time periods, across different groups of the RSL population and with respect to different specifications of the cost function.

These techniques are used by economic regulators (including Office of Water Services (Ofwat), The Office of Gas and Electricity Markets (Ofgem) and the Water Industry Commission for Scotland) as the basis of judgements about the efficiency of the regulated businesses. As noted in the introduction to this report, however, there should be no presumption that the residuals are entirely due to differences in efficiency.

¹ Statisticians are wary of drawing inferences from small samples and the number of observations required to support statistical inference increases as the number of cost drivers included in the equation increases.

² There are 420 possible combinations of cost drivers (4 RSL types x 3 accommodation types x 7 tenant types x 5 stock types, not including the location factors (32 local authorities)).

³ An explanation of OLS can be found in Appendix II, "Index of the comparative operating costs of Registered Social Landlords in Scotland", August 2005



4 Technical issues in the analysis

In this section we consider

- the estimation method
- specification of the cost function
- issues that might affect the approach and methodology we adopt.

We also describe the tailored sensitivity analysis we have undertaken.

4.1 Estimation method

OLS is an appropriate method to use if the average provides a good summary of costs and cost drivers across the sector. Table 4.1 summarises the distribution of RSLs' housing units in 2004/05. Some types, particularly stock transfers and the care and support providers have quite skewed distributions.

Figure 4.1 shows the frequency distributions of total social housing units including and excluding the 2003/04 local authority whole stock transfers (LAWSTs). As recognised in the Communities Scotland publication, "Scottish Registered Social Landlord Statistics 2004-05",⁴ the presence of the LAWSTs presents problems for comparative analysis and "*distorts the sector's performance and masks trends within non-stock transfer RSLs*". As a result, Communities Scotland has opted to use the median as the appropriate summary statistic for the sector since it is less affected by extreme values.

The LAWSTs will affect the econometric results too. With skewed data OLS will yield results that may be biased and difficult to interpret. As in our previous report, we have used logarithmic transformations on the stock figures and operating costs to give a more symmetrically shaped distribution⁵. This means that the specification satisfies the assumption made by the OLS approach, making the interpretation of the results more straightforward.

The estimation technique known as quantile regression, an extension of OLS, is designed to deal with some instances of skewed distributions. Rather than estimating the line that fits the average of the observations, as in OLS, quantile⁶ regression fits the line to a specified quantile such as the median. This approach is less affected than OLS by extreme values.

Whereas Table 4.1 shows that the average number of units is significantly affected by the inclusion of the three LAWSTs, Table 4.2 shows that the averages and medians of the potential cost drivers do not change substantially when the LAWSTs are included. While this might indicate the use of median regression, we have not adopted this methodology at this stage. The approach is complex and its application is not easy to interpret within the context of panel data.

⁴ http://www.communitiesscotland.gov.uk/stellent/groups/public/documents/webpages/cs_012191.pdf

⁵ For a detailed description of the logarithmic transformation, please refer to Appendix II of the August 2005 report.

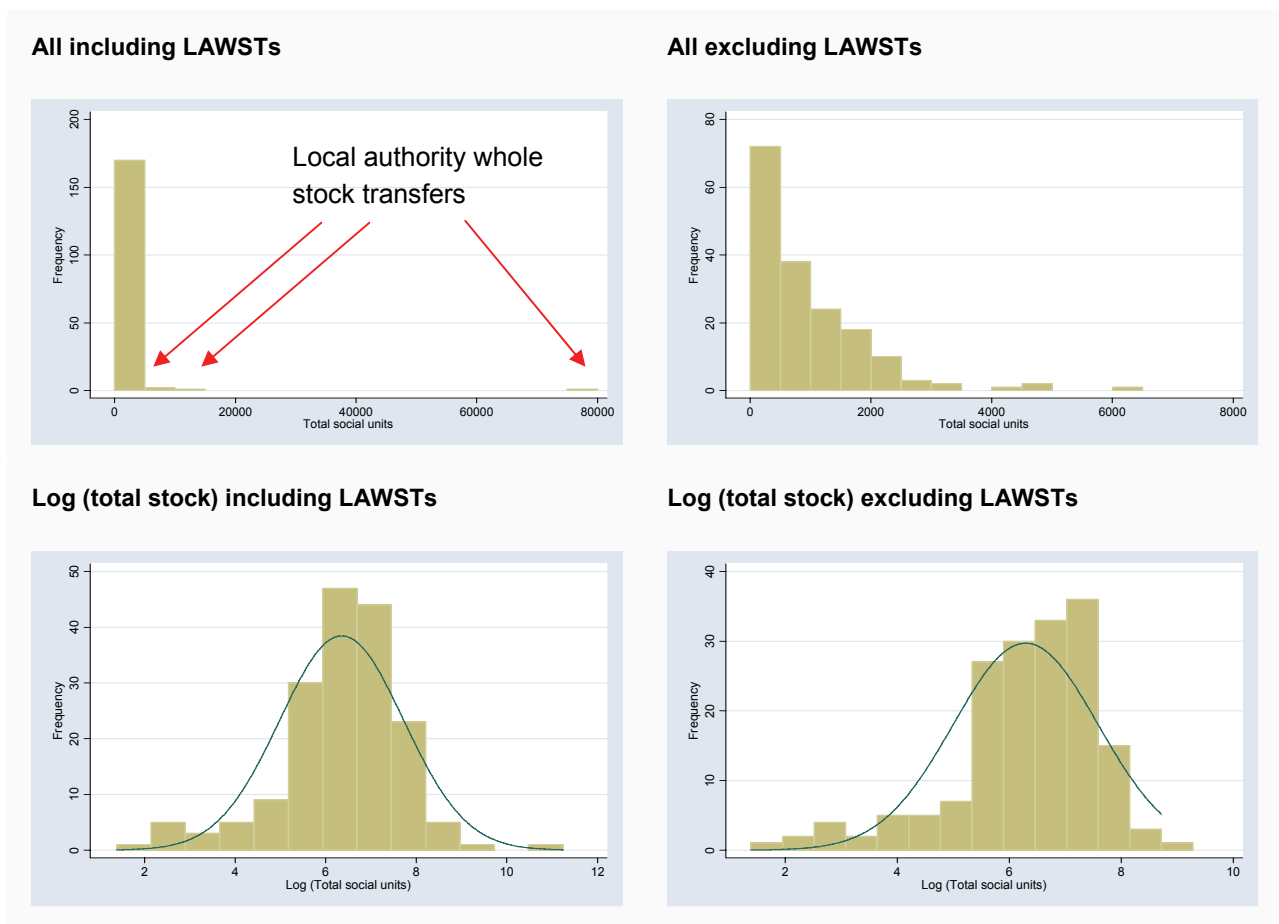
⁶ This is another word for percentile, for example the median is the 50th percentile.



Table 4.1 – Total social housing units in 2004/05

	Number of RSLs	Social housing units			
		Minimum	Maximum	Average	Median
All	173	8	76,394	1,488	682
2003/04 local authority whole stock transfers (LAWSTs)	3	6,330	76,394	31,283	11,125
LSVTs	26	267	3,366	1,266	1,008
Care and support providers	20	15	4,564	1,086	467
General needs RSLs (i.e. All other RSLs)	124	8	6,127	879	540

Figure 4.1 – Frequency distribution of social housing units in 2004/05



**Table 4.2 –Summary statistics of potential cost drivers including LAWSTs in 2004/05**

	Including LAWSTs		Excluding LAWSTs	
	Average	Median	Average	Median
Log (Total social units)	6.353	6.525	6.293	6.500
% self contained social housing units	0.957	1.000	0.957	0.997
% bed spaces used for social housing	0.036	0	0.036	0.002
% non self contained social housing units`	0.007	0	0.007	0
% self contained units with 1 bedroom	0.022	0	0.022	0
% self contained units with 2 bedrooms	0.326	0.298	0.327	0.298
% self contained units with 3 bedrooms	0.394	0.398	0.392	0.398
% self contained units with 4 bedrooms	0.210	0.194	0.210	0.195
% self contained units with 5 or more bedrooms	0.042	0.028	0.043	0.028
% social housing units that are houses	0.350	0.306	0.349	0.306
% social housing units in high rises	0.023	0	0.022	0
% social housing units in 4 in a block	0.384	0.318	0.386	0.321
% social housing units in tenements	0.067	0.027	0.066	0.026
% social housing units in other flats or maisonettes	0.170	0.044	0.171	0.044
% social housing units built between 1919 and 1944	0.049	0	0.046	0
% social housing units built between 1945 and 1964	0.173	0.015	0.169	0.014
% social housing units built between 1965 and 1982	0.138	0.003	0.134	0
% social housing units built after 1982	0.473	0.446	0.480	0.480
% social housing units built before 1919	0.162	0	0.165	0
Index of stock concentration	0.874	1.000	0.871	1.000
Number of local authorities where units are located	2.529	1.000	2.556	1.000



4.2 Specification of the cost function

4.2.1 Selecting the operating cost variable

As in the August 2005 study, we have adopted the following cost definition.

Total operating costs	
Less	Income from factoring
	Income from other management services
	Miscellaneous income from other sources
Less	Housing depreciation
	Impairment & revaluation adjustment
Equals	Net operating costs

Net operating costs for the four classes of RSL are summarised in Table 4.3.

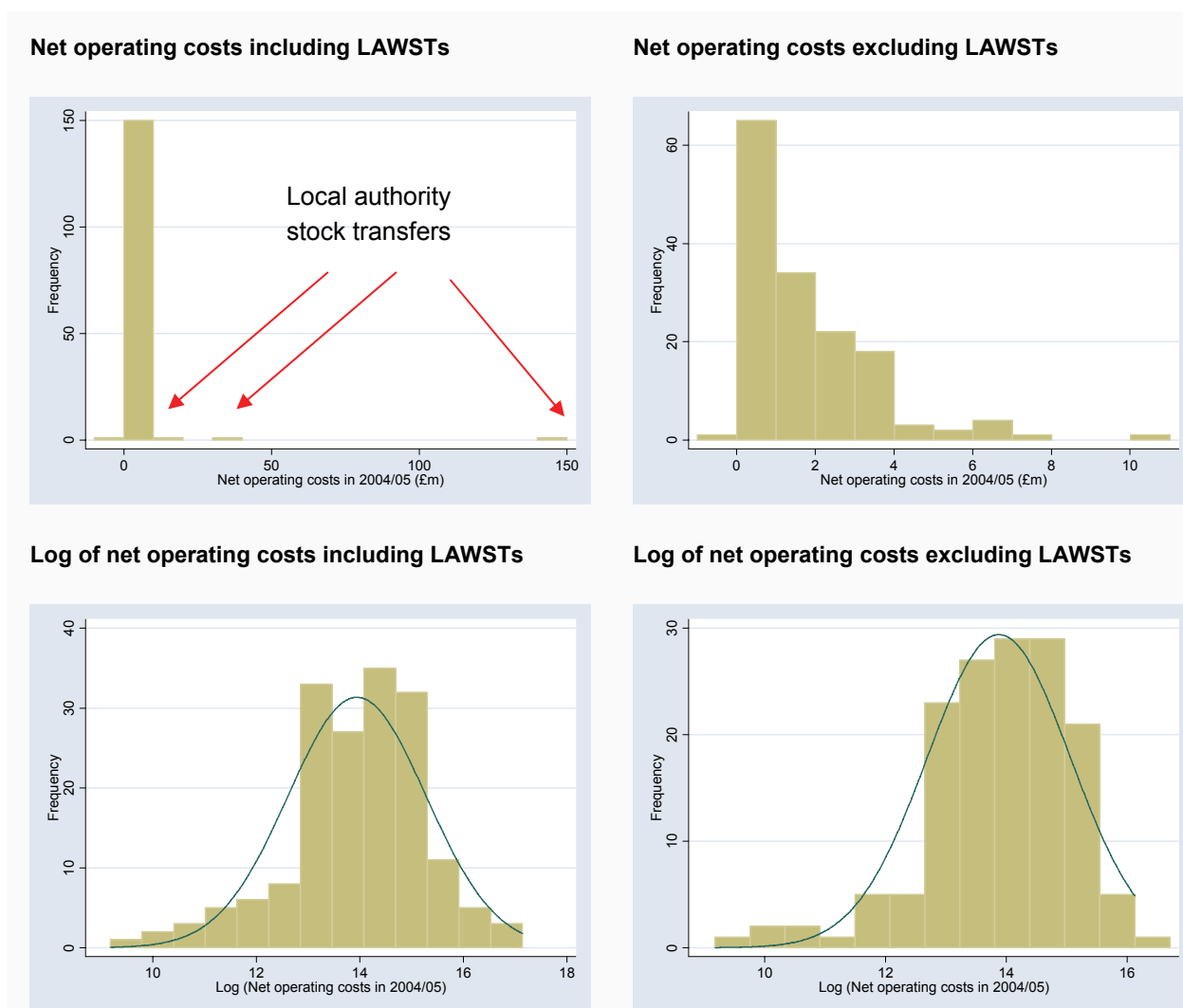
Table 4.3 – Net operating costs of RSLs in 2004/05 (£m)

	No of RSLs	Net operating costs (£m)			
		Minimum	Maximum	Average	Median
All	173	0.01	144.44	3.405	1.448
LAWSTs	3	9.85	144.44	62.59	33.49
LSVTs	26	0.63	6.60	2.48	2.24
Care and support RSLs	20	0.06	27.92	6.62	3.96
General needs RSLs (i.e. All other RSLs)	124	0.01	10.07	1.65	1.02

The pattern of the distribution of net operating costs is shown in Figure 4.2.



Figure 4.2 – Distribution of RSL net operating costs in 2004/05



Unit net operating cost statistics for the sector are shown in Table 4.4. The average and median unit net operating cost figures for the sector are similar across the different types of RSL.

Table 4.4 – Unit net operating costs of RSLs in 2004/05

	Number of RSLs	Unit operating costs			
		Minimum	Maximum	Average	Median
All	173	935	52,780	2,927	1,863
LAWSTs	3	1,556	3,010	2,152	1,891
LSVTs	26	1,147	2,948	2,018	1,982
Care and support providers	20	2,077	52,780	11,066	4,516
General needs RSLs (i.e. All other RSLs)	124	935	4,196	1,823	1,802



4.3 Issues affecting the approach

There are three issues that might affect the approach we adopt. They are

- whether we can pool the data for all RSLs or whether the types have to be taken separately
- whether the cost function is sufficiently stable over time for us to use data from more than one year
- the extent of changes in the composition of the sector, including the specific issue of the 2003/04 local authority whole stock transfers (LAWSTs).

To select the most appropriate cost function we have carried out a number of statistical tests and sensitivity analyses.

4.3.1 Pooling data on RSLs of different types

There are different types of RSL and if they were to display different cost behaviour, it would be inappropriate to consider them all together.

We have looked at whether it is valid to combine the different types to obtain a generalised cost equation. There are differences between the types in terms of the nature and mix of services as well as the scale on which they are provided.

To make comparisons between groups econometricians sometimes use binary variables. A binary variable is one that has value of one if the RSL is of a particular type that and zero otherwise. If the binary variable is statistically significant, this suggests that the two types of RSLs are different. Even so, the presence of the binary variable allows us to make valid comparisons. Such variables can be helpful but they do not add to our fundamental understanding. If such variables are significant, this suggests that we need to understand more about how the sector generates costs.

Of the four classes of RSL, only the general needs class contains a sufficient number of RSLs for us to be able to estimate a cost equation for the class. We have used two additional sorts of variable to explore the consequences of pooling across the different RSL types⁷:

- binary variables for each of the types. These variables take a value unity if the RSL is of a particular type and zero otherwise.
- interaction variables, obtained by multiplying each of the binary variables by each of the potential cost drivers.

By estimating an equation that includes the binary variables and the interaction variables as well as the other cost drivers, we can explore any differences in the way costs behave between the different classes of RSL.

4.3.2 Pooling data from more than one year

When we use data from a single year, we are in effect assuming that all cost drivers affect all RSLs similarly. There may, however, be one-off factors that affect some RSLs in any year and these would pose problems for the analysis. If data on the one-off factor are available for all RSLs, then we would be able to include it as a variable in a single year analysis. If not, we can pool data for more than one year and make inferences provided that the cost function remains stable. The advantage of this approach is the increase in the precision of the estimated coefficients.⁸

⁷ Further details in Appendix B.

⁸ Further details available in Appendix B.



Panel data analysis is the term that refers to pooling observations over time. It allows us to judge whether the necessary conditions are true. If an RSL has a high residual in both years this might indicate an RSL-specific factor that should be included in the cost function. A high residual in one year might reflect a once-off effect. By considering the reasons for changes in the residuals, we can understand the quality of the estimated function and the confidence we can have in its explanatory power.

Using two years' data, we can test whether the results from a combined analysis differ significantly from those when each year is estimated separately.⁹

There are two types of panel, balanced and unbalanced. In a balanced panel the sample of RSLs remains the same over the years. In an unbalanced panel it does not and this requires additional attention.

Balanced and unbalanced panels

The changing composition of the sector over time means that the data might be affected by mergers and the appearance and disappearance of RSLs. The local authority whole stock transfers that took place in 2003/04 are an instance of this. The relatively large size of the 2004/05 LAWSTs might have disproportionate effects on the estimates and results for all RSLs.¹⁰

In 2003/04 stock transfers took place to create Scottish Borders Housing Association, Dumfries and Galloway Housing Partnership and Glasgow Housing Association. In our previous work using data for 2002/03 and 2003/04 we excluded them. Communities Scotland wished to understand how to include these large RSLs in the analysis now that there are two years' of data including these RSLs.

There were 177 RSLs in the sector in 2004/05, with over 256,000 housing units in total¹¹. We can use a balanced panel for 2003/04 and 2004/05 as there were no mergers or acquisitions over this period. 173 RSLs have data for the two years. The use of three years' data is feasible, but it would require either an unbalanced panel approach or the exclusion of the three LAWSTs, neither of which is ideal.

4.3.3 Selecting the cost drivers and the form of the function

The number of potential cost drivers means that we need a systematic approach to selecting the functions to be tested. If the number of observations is sufficiently large, it is possible to adopt the conventional approach of testing down. This starts with an equation that includes all the cost drivers. At the second stage, an insignificant variable is dropped and the equation re-estimated. This iterative elimination process continues until we arrive at an equation in which all the drivers included are significant. A disadvantage of this approach is that it does not provide guidance as to which cost drivers should be eliminated first and the sequence of the exclusions can affect the results. Furthermore, if there is a large number of potential cost drivers relative to the total number of observations it will not be feasible to include all cost drivers at once. Input is needed in the form of the prior knowledge regarding the most appropriate cost drivers to include and their anticipated relationships to operating costs. It is important that there is a coherent rationale as to why a driver would be important.

We have tested a selection of alternative specifications:

⁹ In order to make comparisons between costs across different time periods, we have adjusted the data for inflation using the Consumer Price Index.

¹⁰ The Glasgow transfer involved more than 80,000 homes. GHA has proposed greater community involvement and has identified a number of RSLs to manage homes on its behalf. In the long term it hopes to promote further transfers to smaller, local entities.

¹¹ Tables 1 and 2, "Scottish Registered Social Landlord Statistics 2004-05", Communities Scotland, http://www.communitiesscotland.gov.uk/stellent/groups/public/documents/webpages/cs_012191.pdf



- Linear and quadratic forms of the equations.
- Net operating costs and net operating cost per social housing unit as the dependent variable
- Inclusion of binary and interaction variables
- Combinations of variables relating to
 - The types of accommodation that an RSL manages, e.g. self contained units, bed spaces and non self contained units
 - The extent to which the stocks have been adapted to accommodate different types of tenants.
 - The age of the property and other physical characteristics of the accommodation, e.g. houses, high rise flats, tenement, four in a block and other flat or maisonette.
 - The locations of these properties. The properties are disaggregated according to the local authority areas where they are located.



5 Results

5.1 The cost equation

Discussion with Communities Scotland led us to consider how to capture the extent of care and support services provided by RSLs as such provision is likely to increase an RSL's costs. We considered netting off the costs of providing the specialist services (or as a proxy for this, the grants they receive for these services), but this led to a number of them having negative or very low net operating costs for the purposes of this analysis. As a result, Communities Scotland decided that we should exclude care and support RSLs from the analysis. The RSLs excluded are those classed as "Older clients", "Supported accommodation" and "Other specialist RSLs".

This means we have used data for 153 RSLs for the years 2003/04 and 2004/05. The summary statistics for this data set are shown in Table 5.1

Table 5.1 – Summary statistics of 153 included RSLs in 2004/05

	Minimum	Maximum	Average	Median
Social housing units	8	76,394	1,540	686
Net operating costs (£m)	0.01	144.44	2.98	1.25
Unit net operating costs (£/unit)	935	4,196	1,863	1,817

The preferred cost function is a total cost specification, with two binary variables for the different RSL types. It is as follows.

$$\begin{aligned} \text{Ln(Net operating costs)} = & \text{Constant} + b1*\text{LSVT} + b2*\text{LAWST} + b3*\text{Ln (Total social housing} \\ & \text{units)} + b4*\% \text{ bed spaces} + b5*\% \text{ non self contained units} + b6*\text{Ln (Shared units)} + b7*\text{Ln} \\ & \text{(Non social housing units)} + b8*\% \text{ high rises} + b9*\% \text{ tenement} + b10*\% \text{ 4 in a block} + b11*\% \\ & \text{other flats} + b12*\% \text{ built in 1919-1944} + b13*\% \text{ built 1945-1964} + b14*\% \text{ built 1965-1982} + \\ & b15*\% \text{ built after 1982} + b16*\% \text{ 2 bedroom units} + b17*\% \text{ 3 bedroom units} + b18*\% \text{ 4} \\ & \text{bedroom units} + b19*\% \text{ 5 or more bedroom units} + b20*\text{Year since registration} + b21*(\text{Year} \\ & \text{since registration}) * (\text{Year since registration}) \end{aligned}$$

The constant term and the coefficients b1 to b21 are estimated using OLS and a two year panel of data. The results of the tests described in Section 3.3 suggest that we can

- pool the data for general needs RSLs, LSVTs and LAWSTs - we need to include binary variables for the LSVT and LAWSTs, but there is no need for interaction variables.
- combine the data from 2003/04 and 2004/05 together in the estimation of cost relationship.

5.2 Interpretation of cost drivers

The cost drivers included and their coefficients, standard errors and p values are shown in Table 5.2.

The coefficients can be interpreted as the average percentage impact on net operating costs with a percentage rise in the value of the cost driver. So a 1% increase in the number of total social housing units increases net operating costs by 0.874%. Similarly, a 1% increase in the proportion of units that are high rise increases net operating costs by 0.646%.



Table 5.2 – Estimated cost relationship

Variable	Coefficient	Standard error	p value
Ln (Total social housing units)	0.874	0.03	0.00
% bed spaces	-1.341	1.19	0.26
% non self contained units	2.399	4.19	0.57
Ln (Shared units)	0.038	0.02	0.02
Log (Non social housing units)	0.021	0.02	0.21
% high rises	0.646	0.23	0.01
% tenement	0.102	0.12	0.39
<i>% block</i>	<i>-0.356</i>	<i>0.27</i>	<i>0.19</i>
% other flats	-0.094	0.16	0.55
<i>% built between 1919 and 1944</i>	<i>0.247</i>	<i>0.18</i>	<i>0.16</i>
% built between 1945 and 1964	0.162	0.15	0.30
<i>% built between 1965 and 1982</i>	<i>0.225</i>	<i>0.16</i>	<i>0.16</i>
% built after 1982	0.006	0.13	0.97
% 2 bedroom units	-0.275	0.71	0.70
<i>% 3 bedroom units</i>	<i>-1.043</i>	<i>0.65</i>	<i>0.11</i>
% 4 bedroom units	0.082	0.65	0.90
% 5 bedroom units	0.126	0.82	0.88
LVST binary variable	0.309	0.09	0.00
New stock transfer binary variable	0.642	0.22	0.00
Year since registration	-0.002	0.01	0.88
<i>Year squared</i>	<i>0.001</i>	<i>0.00</i>	<i>0.12</i>
Constant	8.316	0.68	0.00

Note: Cost drivers significant at the 10% level are highlighted in **bold**, and at the 20% level in *Italics*.

The types of cost driver included in this specification are discussed below.

5.2.1 Constant

The constant term is essentially a fixed operating cost that RSLs incur regardless of the number of units they own and manage.

5.2.2 Binary variables

A positive coefficient on the LSVT and LAWST binary variables indicates that the fixed costs for these types of RSLs are higher than those of general needs. On average, the net operating costs of LSVTs and LAWSTs are 0.309% and 0.642% higher than those of general needs respectively.



5.2.3 Stock variables

The logarithmic transformation of the variables is necessary for cost drivers that have a large variance, such as the number of social housing or shared units. Variables that reflect percentages are bounded between 0 and 1 and we do not need this transformation.

The number of social housing units, defined as the sum of the number of self contained units, number of bed spaces and number of non self contained units, has a significant positive impact on the net operating costs of RSLs. For every 1% increase in the number of social housing units owned and managed by RSLs, the net operating costs increase by 0.874%. A 1% increase in the number of shared units increases costs by an additional 0.038%. The coefficient on non social housing units is positive but insignificant.

To estimate the effect on costs of the different types of social housing unit (bed spaces, self contained and non self contained) we include the proportions of these types. The coefficients show that bed spaces are less costly than self contained units, but the difference is not significant. On average non self contained units appear to be more costly than self contained units, but this does not affect the majority of RSLs.

One of the types, self contained units, is taken as the point of reference and is not included in the equation; otherwise the proportions would add to 1. A similar consideration applies to other sets of variables, see Section 4.2.4.

5.2.4 Variables describing characteristics of stocks

We have identified three characteristics that affect costs.

- Type of building in which the unit is located, i.e. house, high rise block, tenement, four-in-a-block or other flats and maisonettes.
- Age of the social housing unit, described by the year in which the unit was built, i.e. before 1919, between 1919 and 1944, between 1945 and 1965, between 1965 and 1982 and after 1982.
- Size of the social housing unit, described by the number of bedrooms it has, i.e. one bedroom, two bedrooms, three bedrooms, four bedrooms and five or more bedrooms.

For each characteristic, one of the variables is taken as the point of reference and is not included in the equation otherwise the proportions would add to 1.¹² Although not every individual variable in describing a particular characteristic is statistically significant, taken together they are significant. For example, the coefficient on the percentage of units built after 1982 is statistically insignificant but the probability that the coefficients on all four age variables are zero is low. This means that the variables are jointly significant.

Compared with houses, RSLs with stocks in high rise blocks have higher operating costs and RSLs with units in blocks of four have lower operating costs. Compared with units built before 1919, the newer buildings are more expensive for some of the RSLs. Smaller units are less costly than larger ones as shown by the signs on the coefficients of the two and three bedroom units compared with the four and five bedroom units.

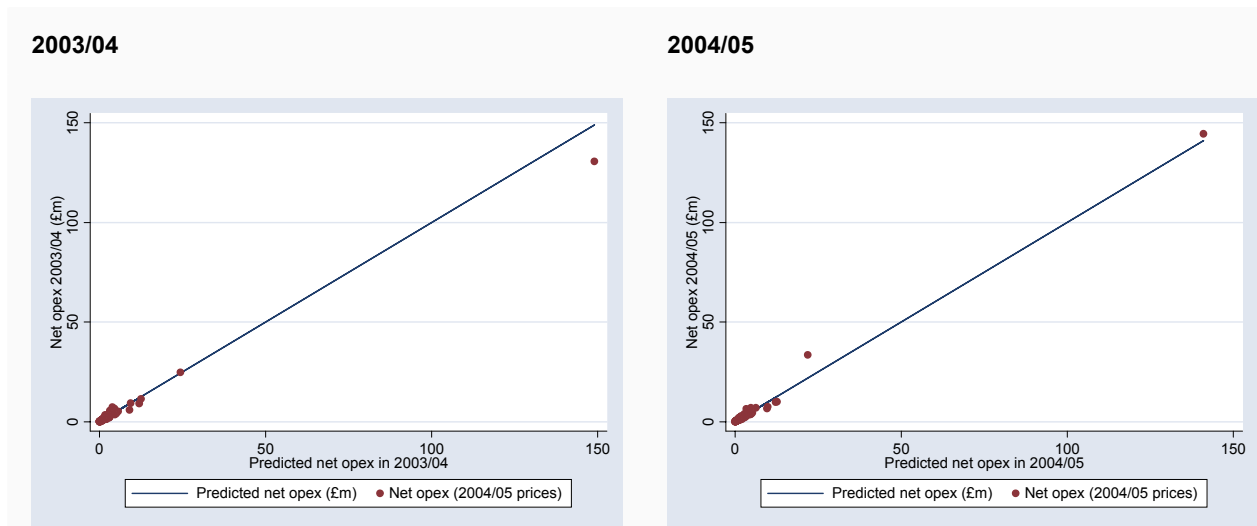
¹² For example, the proportion of houses is taken as the point of reference and is not included in the equation.



5.3 Predicted costs and residuals

The residuals for the two years are shown in Figure 5.1. The red dots represent actual costs. Those above the 45 degree line represent RSLs that have actual costs higher than predicted, and vice versa. For presentational purposes, the diagrams show each year separately although data from both years were used to estimate the cost function. Further graphs for different types of RSLs are included in Appendix C.

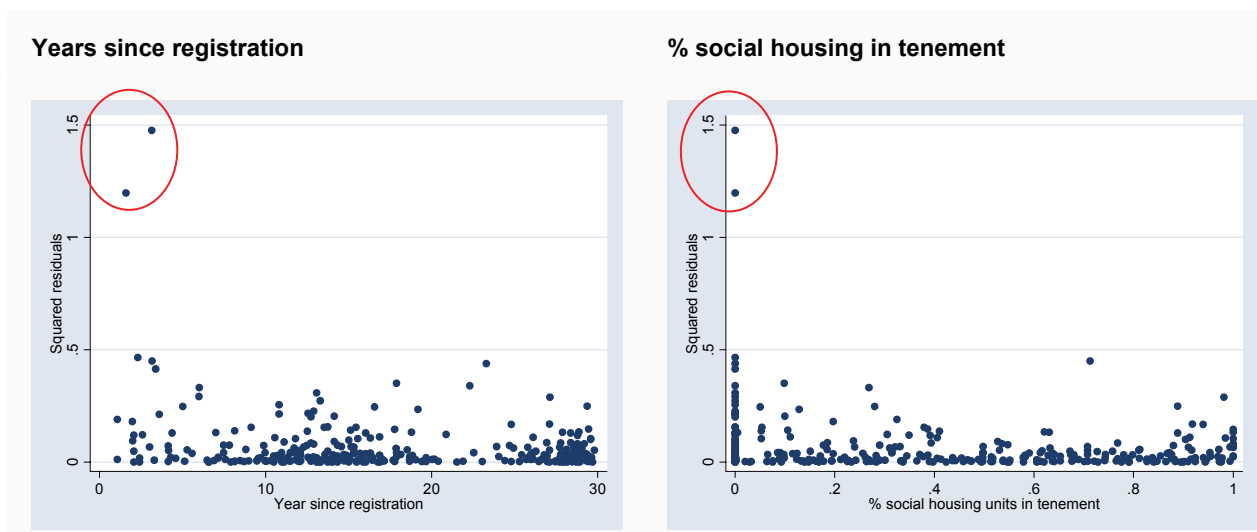
Figure 5.1 – Actual versus predicted costs - preferred equation



The residuals represent unexplained differences after accounting for relevant cost drivers, and they should display no systematic pattern when plotted against any of the cost drivers. We have tested this explicitly and found no significant correlation between the residuals and the various cost drivers. Plots of the correlation plot between the residuals and two of the cost drivers are shown in Figure 5.2. These illustrate an absence of correlation. The two possible outliers are associated with two different RSLs and we have no reason to believe that systematic factors have been excluded from the relationship.



Figure 5.2 – Correlation between squared residuals and selected cost drivers



5.4 Tests on preferred specification

If we have included all the relevant cost drivers and the functional form is correct, the residuals from the relationship should show no systematic pattern and there should be no correlation between the residuals and any of the cost drivers.

Section 3.3 set out the issues that affect the determination of the cost relationship. In this section we describe the tests of alternative specifications that lead to the final specification.

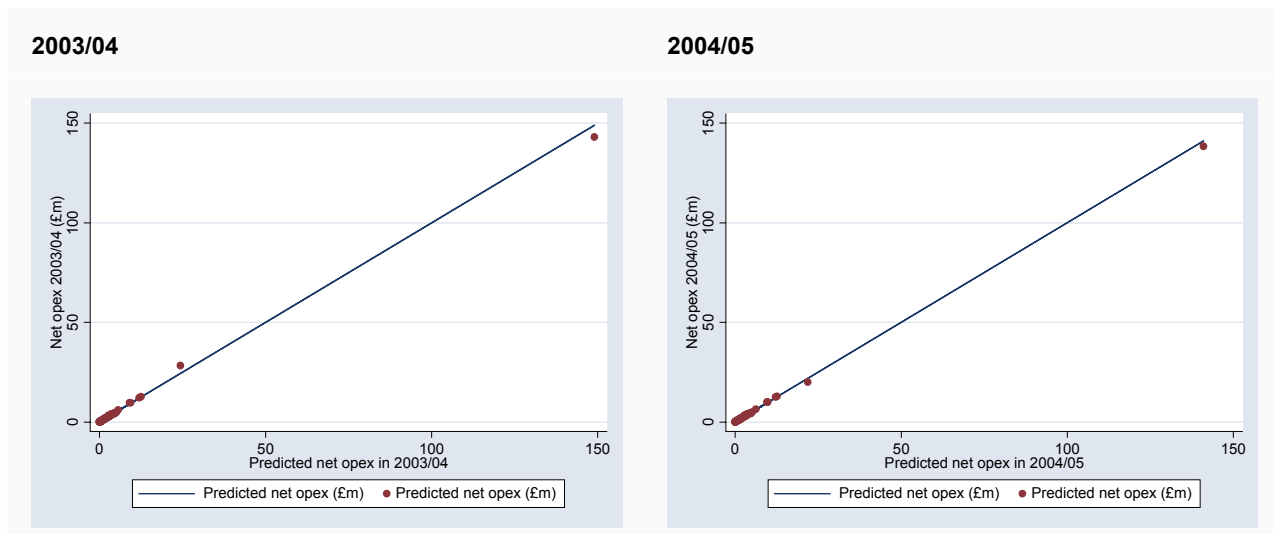
5.4.1 Panel data structure

As stated earlier, it is necessary to test whether the data supports the hypothesis that the cost relationship has not changed significantly from 2003/04 to 2004/05 and that we can pool the data in our analysis.

Figure 5.3 compares the residuals from the preferred equation and equations for the two years taken separately and shows that there is very little difference in the estimates. The test statistics support the use of the panel data approach.



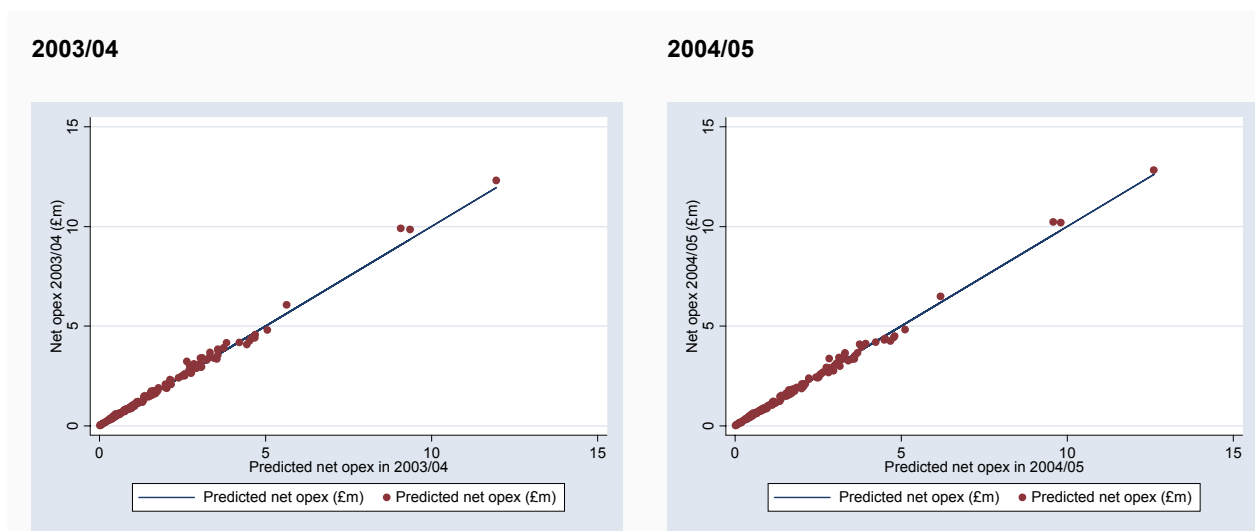
Figure 5.3 – Comparison of predicted costs: Final equation versus equations for two years separately



5.4.2 Local Authority Whole Stock Transfers

We have tested whether the estimated coefficients and therefore the predicted costs and residuals for the RSLs in general are significantly changed by the inclusion of the three LAWSTs. There is little change in the predicted costs, confirming the observation relative to Table 4.2 where there was a high correlation between the statistics with and without the LAWSTs.

Figure 5.4 – Comparison between predicted costs: Final equation versus equation that excludes LAWSTs



5.4.3 Other potential cost drivers

Not all of the items on the list of potential cost drivers in Table 4.2 have been included in the preferred equation. The following were not significant and have not been included in the final equation

- Index of stock concentration
- Number of local authorities where units are located



- Proportion of units that are sheltered or specially adapted
- Tenancies managed
- Houses factored
- Voids

The August 2005 report identified areas where further work might improve the results as part of Communities Scotland's approach to proportionate regulation. For the time being, we cannot analyse the effects of the following possible cost drivers because data relating to these factors are not available to Indepen.

- Regional wage differences within Scotland
- The dispersion of RSLs' stocks measured by distance rather than local authority area
- Operating conditions including the extent of social deprivation, the level of demand for social housing, ethnic diversity and rural/urban mix which might shape the way an RSL carries out its day-to-day operations and affect its costs relative to those of other RSLs
- The timing of investment, which is lumpy by nature and the quality of the housing stock
- The quality of the services provided to tenants

5.4.4 Interaction variables

The assumption made in the estimated cost relationship is that the cost drivers impact RSLs' net operating costs in the same way regardless of their type. To test this, we added interaction variables and tested whether they were jointly significant or not in the pooled model. For both the LSVTs and the LAWSTs, they were not and the data support our method of pooling over the different RSL types.

5.4.5 Median regression

We have estimated the preferred specification using median regression. It is not possible entirely to reconcile the differences but there are some interesting observations¹³.

For the majority of the cost drivers, the sign and significance of the cost drivers are similar in the two approaches. Exceptions are the binary variables for LSVTs and LAWSTs, which are insignificant with median regression. With a small number of RSLs of these types, the median will be zero and the variable will not explain any of the variation in net operating costs.

Variables such as the proportion of social housing units that are in high rises, the proportion of units that are built before 1919 and those built between 1919 and 1944 are insignificant in the median regression.

The comparison between the residuals is shown in Figure 5.5.

Looking at the distribution of unit operating costs in 2003/04, the wide range results in a bigger gap between the mean and the median, leading to a greater difference between the OLS and median regression results. In 2004/05 the range of unit costs is less and so there is less difference between the results.

¹³ The median regression results shown are based on two separate equations, one for 2003/04 and one for 2004/05, whereas the final estimated cost relationship takes into account the panel nature of the data.



Figure 5.5 – Comparison between predicted costs: Final equation versus Median regression

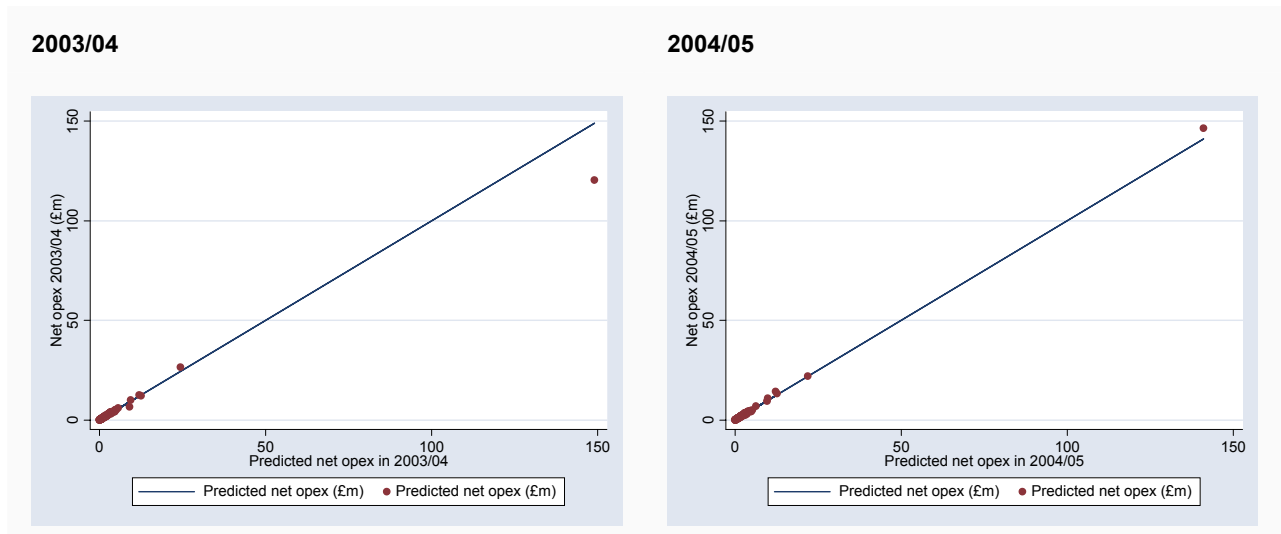
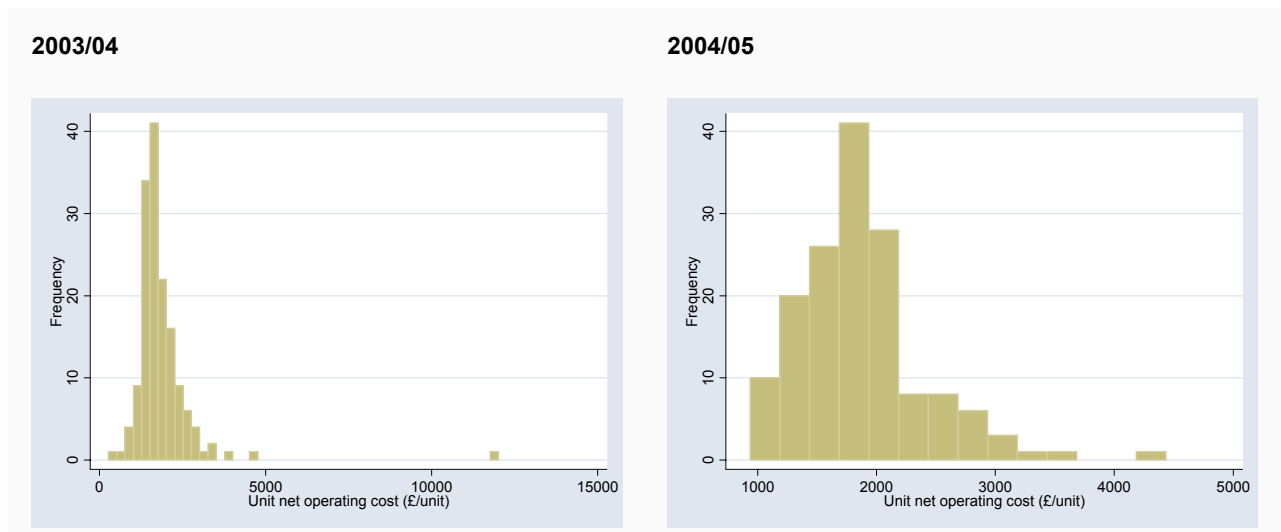


Figure 5.6 – Frequency distribution of unit costs for 153 RSLs included in analysis





Appendix A: Glossary

The glossary explains the econometric terms used in the report. It does not repeat those definitions that are included in the text, for example of the various statistical tests.

Coefficient	Parameter expressing the extent to which the <i>dependent variable</i> changes with respect to changes in an independent variable.
Average	The simplest measure of the central tendency of a set or list of data, and refers to a measure of the "middle" of the data set. The most common method, and the one generally referred to simply as the average, is the arithmetic <i>mean</i> , which is the sum of all the members of the list divided by the number of items in the list.
ARCS	Communities Scotland's Accounts Review Calculation System (ARCS), which holds data from the published accounts of RSLs.
Binary variable	Also known as a dummy variable. This takes the values 0 or 1 to indicate the absence or presence of some categorical effect that may be expected to shift the outcome. If a constant term is included in the regression, it is important to exclude one of the dummy variables from the regression, making this the base category against which the others are assessed. If all the dummy variables are included, their sum is equal to the constant term, resulting in perfect <i>multicollinearity</i> .
Coefficient of determination	Usually referred to as R^2 (R squared), and is the proportion of a sample variance of a response variable that is "explained" by the <i>explanatory variables</i> when a <i>linear regression</i> is done. It is a measure of how well the statistical relationship "explains" the variation in the <i>dependent variable</i> .
Conditional mean	The expected value of a random variable, adjusted to take into account values of other variables that are thought to affect it.
Cost drivers	A factor related to an activity that changes the volume or characteristics of that activity, and in doing so changes its costs. Activities can have multiple cost drivers.
Cost function or equation	The relationship, expressed as an equation, between a cost and a one or more variables or cost drivers. In choosing a cost function both economic plausibility and goodness fit are relevant.
Cross section data	A type of one-dimensional data set. Cross section data refers to data collected by observing many subjects (such as individuals, firms or countries/regions) at the same point of time, or without regard to differences in time. Analysis of cross sectional data usually consists of comparing the differences among the subjects.
Dependent variable	In regression, the variable whose values are to be explained by changes in the other variable (the independent or explanatory variables). Usually one regresses the dependent variable on the independent variable.
Distribution	The pattern of variation of a variable is called its distribution, which can be described both mathematically and graphically. In essence, the distribution records all possible numerical values of a variable and how often each value occurs (its frequency). The most well known example of a distribution is the bell-shaped curve.
Elasticity	Percentage change in the dependent variable due to a percentage change in the explanatory variable.



Error	The difference between the actual costs of an RSL and the cost predicted by the econometric relationship. Synonymous with <i>residual</i> .
Expected value	The sum of all possible values for a random variable, each value multiplied by its probability of occurrence. For a symmetrically distributed random variable the <i>mean</i> is the same as the expected value and is the same as the <i>median</i> .
Explanatory variable	In regression, an explanatory variable (also known as a regressor or independent variable) is a variable which appears on the right hand side of the equation. Its function is to explain the evolution of the <i>dependent variable</i> .
Fitted values	The value of the <i>dependent variable</i> that is predicted by the regression analysis. It is the conditional <i>mean</i> or <i>expected value</i> of the <i>dependent variable</i> conditional on the values of the <i>explanatory variables</i> .
F test	The F test employs the statistic (F) to test various statistical hypotheses about the <i>mean</i> (or means) of the distributions from which a sample or a set of samples have been drawn. The t-test is a special form of the F test.
Fixed costs	Elements of cost that do not vary with the number of units the RSL has. In an econometric cost equation, the <i>intercept</i> is interpreted as the fixed cost.
Heteroskedastic and Homoskedastic	In statistics, a sequence or a vector of random variables is homoskedastic if all random variables in the sequence or vector have the same finite variance. This is also known as homogeneity of variance. The complement is called heteroskedasticity. The assumption of homoskedasticity simplifies mathematical and computational treatment and may lead to good estimation results (e.g. in data mining) even if the assumption is not true.
Intercept	The point at which the econometric relationship crosses the vertical axis when plotted in two dimensions. In a <i>cost function</i> , the intercept is interpreted as the fixed cost.
Kurtosis	Kurtosis is an attribute of a distribution, describing its 'peakedness'. Data sets with high kurtosis tend to have a distinct peak near the mean, decline rather rapidly, and have heavy tails. Data sets with low kurtosis tend to have a flat top near the mean rather than a sharp peak. A uniform distribution is the extreme case.
Linear regression	A regression analysis where the relation between the <i>dependent variable</i> and the <i>explanatory variables</i> is a linear function of the <i>coefficients</i> .
Logarithmic transformation	The transformation is the logarithm of an original number. The logarithm is the power to which a base, such as 10, must be raised to produce a given number. If $n^x = a$, the logarithm of a, with n as the base, is x; symbolically, $\log_n(a) = x$. For example, $10^3 = 1,000$; therefore, $\log_{10}(1,000) = 3$. The natural logarithm is a special case, which is the logarithm to the base e, where e is equal to 2.718281828459... (continuing infinitely).
Mean	Technical term for the <i>arithmetic average</i> . For a set of observations it is calculated by adding up the observations and dividing by their number.
Median	In statistics, the middle value of a set of numbers or data points; half the figures will fall below the median and half above.



Multicollinearity	<p>Multicollinearity refers to linear inter-correlation among variables. If nominally "different" measures actually quantify the same phenomenon to a significant degree, i.e., different variables with numerical representations but correlate highly with each other, then one of them is redundant.</p> <p>A principal danger of such data redundancy is that of overfitting in regression analysis models. The best regression models are those in which the predictor variables each correlate highly with the dependent (outcome) variable but correlate at most only minimally with each other. Such a model is often called "low noise" and will be statistically robust (that is, it will predict reliably across numerous samples of variable sets drawn from the same statistical population).</p>
Ordinary least squares (OLS)	A method of estimating a relationship between a dependent variable and one or more explanatory variables which minimises the sum of the squares of the residuals
p value	The probability that the estimated value is statistically equivalent to zero. Typically one would accept a p value of up to 20 per cent as being evidence that the estimated value is significant in explaining the dependent variable.
Panel data	<p>Panel data is a two-dimensional data, for example, data on a population over time.</p> <p>A balanced panel exists where there are data for all members of the population for each year. If this is not the case, there is an unbalanced panel.</p>
Panel data analysis	Method of statistical analysis combining <i>cross section data</i> and <i>time series data</i>
Post-estimation tests	Statistical tests carried out on the residuals to make sure the OLS assumptions are valid.
Predicted costs	Same as <i>fitted costs</i> .
Quantile	A quantile is the value that corresponds to a specified proportion of an (ordered) sample of a population. For instance a very commonly used quantile is the <i>median</i> , which is equal to a proportion of 0.5 of the ordered data.
Quantile regression	Quantile Regression seeks to complement classical linear regression analysis. In <i>Ordinary Least Squares</i> (OLS) the primary goal is to determine the conditional mean of random variable Y, given some explanatory variables, reaching the expected value. Quantile Regression goes beyond this and enables one to pose such a question at any quantile of the conditional distribution function.
Regression analysis	A statistical technique used to find relationships between variables for the purpose of explaining the observed variation in these variables and predicting future values.
Residual	The residual is a positive or negative numeric difference between two numbers. The residual of a cost function is the difference between the actual costs and the cost predicted by the econometric relationship.
Skewness	Skewness is an attribute of a <i>distribution</i> describing its symmetry. A distribution that is symmetric around its mean has skewness of zero, and is 'not skewed'. The skewness of a normal distribution is zero and any symmetric data should have skewness near zero. Negative values for the skewness indicate data that are skewed left (i.e. the left tail is heavier than the right tail) and positive values for the skewness indicate data that are skewed right. Some measurements with a lower bound (e.g. of zero) are skewed to the right.
Standard deviation	Measure of the dispersion of observations around their <i>mean</i> , the higher the standard deviation the more disperse the observations.



Standard error	A common measure of the uncertainty associated with a numerical estimate. In a regression analysis, standard errors are often reported with the <i>coefficient</i> estimates. A large standard error suggests a wide range of possible values and therefore high level of uncertainty associated with the estimate.
Statistical inference	The process of making conclusions about a population using data collected from a sample.
Time series data	A time series is a sequence of data points, measured typically at successive times, spaced apart at uniform time intervals. Time series analysis comprises methods that attempt to understand such time series, often either to understand the underlying theory of the data points (where did they come from? what generated them?), or to make forecasts (predictions).
Unconditional mean	Same as <i>average</i> , and is sum of all the members of the list divided by the number of items in the list.
Univariate regression	A regression analysis where the dependent variable is determined by only one explanatory variable.
Variables	A series of comparable observations or characteristics of a phenomenon taken as a single set of data; a listing of specific characteristics of a population or a number of observations taken over a specific period of time which may reasonably be expected to vary from observation to observation. In a cost function, the behaviour of the costs is related to or explained by the explanatory variables (or cost drivers).



Appendix B: Pooling of data

B.1 Pooling RSLs of different types

Given the four identified categories of RSLs, only the general needs group has sufficient number of observations to estimate an equation type-only data as described in Section 2.2. As a result, we used two additional groups of variables to test the assumption of pooling across the different RSL types:

- binary variables for each of the types. These variables take a value 1 if the RSL is of a particular type and 0 otherwise
- interaction variables, obtained by multiplying each of the binary variables by each of the potential cost drivers.

In an OLS regression with net operating costs as the dependent variable, a binary variable adds a second constant term for a particular type of RSL. For example, if the following equation was estimated:

$$\text{Net operating costs} = a + d_1 \cdot \text{LST} + d_2 \cdot \text{VT} + d_3 \cdot \text{CS} + b \cdot \text{Total stock}$$

where

- a = constant term
- b = slope coefficient
- LST = Local authority whole stock transfer binary variable, 1 for new stock transfers and 0 otherwise
- VT = LSVT binary variable, 1 for LSVTs and 0 otherwise
- CS = Care and support binary variable, 1 for care and support RSLs and 0 otherwise.
- d_1 = coefficient on LST
- d_2 = coefficient on VT
- d_3 = coefficient on CS

We can think of the above as four separate equations, one for each type of RSL:

- Net operating costs = $a + b \cdot \text{Total stock}$ General needs RSLs
- Net operating costs = $a + d_1 + b \cdot \text{Total stock}$ New stock transfers
- Net operating costs = $a + d_2 + b \cdot \text{Total stock}$ LSVTs
- Net operating costs = $a + d_3 + b \cdot \text{Total stock}$ Care and support RSLs

Similarly, the interaction variables adjust the slope coefficient b for each type of RSL:

$$\text{Net operating costs} = a + b \cdot \text{Total stock} + d_1 \cdot \text{Total stock} + d_2 \cdot \text{Total stock} + d_3 \cdot \text{Total stock}$$

This can be re-written as four equations:

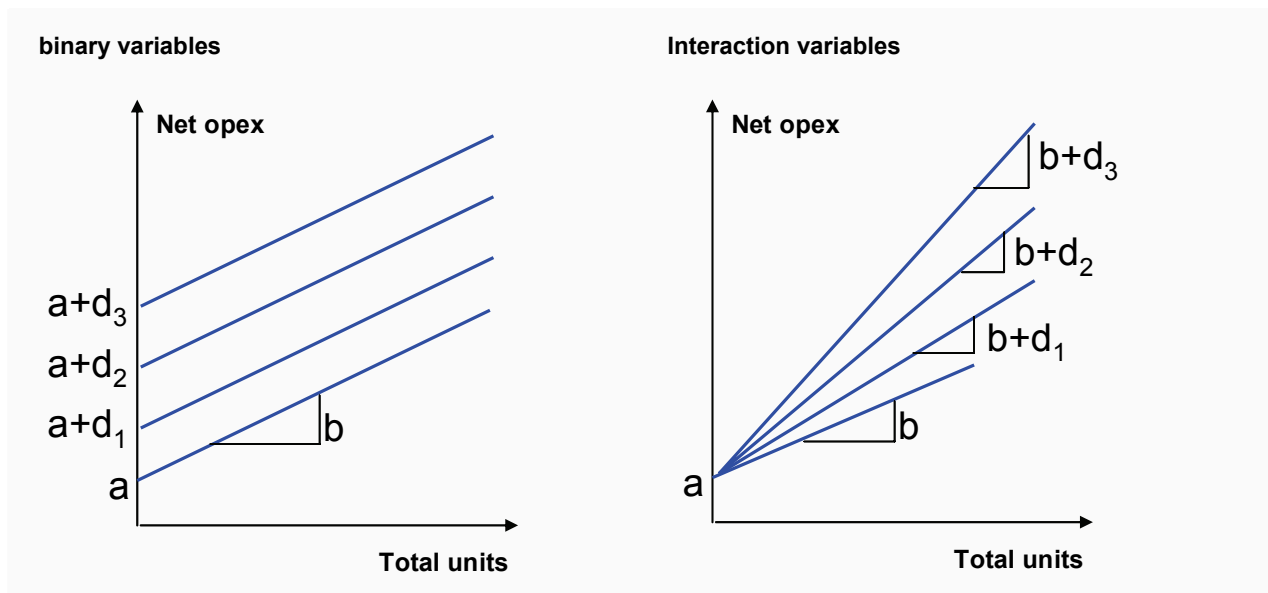
- Net operating costs = $a + b \cdot \text{Total stock}$ General needs RSLs
- Net operating costs = $a + (d_1 + b) \cdot \text{Total stock}$ New stock transfers
- Net operating costs = $a + (d_2 + b) \cdot \text{Total stock}$ LSVTs



- Net operating costs = $a + (d_3 + b) \times \text{Total stock}$ Care and support RSLs

Graphically, these can be illustrated as follows:

Illustration of binary and interaction variables



By estimating the equation with both the binary variables and the interaction variables we can test whether they are significant or not. If they are, it suggests differences in the way costs behave between the types of RSL. Using the example above, the binary variables can be interpreted as fixed costs, i.e. the costs that RSLs incur regardless of the number of units owned. Therefore, a significant binary variable as defined above indicates that different types of RSLs have different fixed costs. In a similar vein, the interaction variables are the operating costs incurred by RSLs for every unit of stock. Significant interaction variables therefore suggest that different RSL types have different unit costs.

B.2 Pooling over time

Given two years' worth of data, we can test whether a particular cost specification is the same for both years by estimating the following models:

- Model A uses data from both 2003/04 and 2004/05.
- Model B uses only the data from 2003/04
- Model C uses only the data from 2004/05

We begin with the hypothesis that the specification we have is valid for both 2003/04 and 2004/05, and estimate Model A. If this hypothesis is not true, then at a minimum, the coefficients will differ between the two years. This *unrestricted* model represents the estimation of Models B and C separately using the same specification. To assess whether the *restricted* Model A can predict the costs as well as the unrestricted model we take the sum of squared residuals¹⁴ from Model A and compare it with the total sum of squared residuals from Models B and C using a standard F test.

¹⁴ Since the sum of residuals is zero by construction. The OLS approach minimises the sum of squared residuals.



Note that the rejection of the hypothesis does not reveal the underlying reason for the differences; it merely suggests that the specification using pooled data generates a deterioration in the fit compared to one that uses two separate equations. We explore these reasons using the interaction variables described earlier.

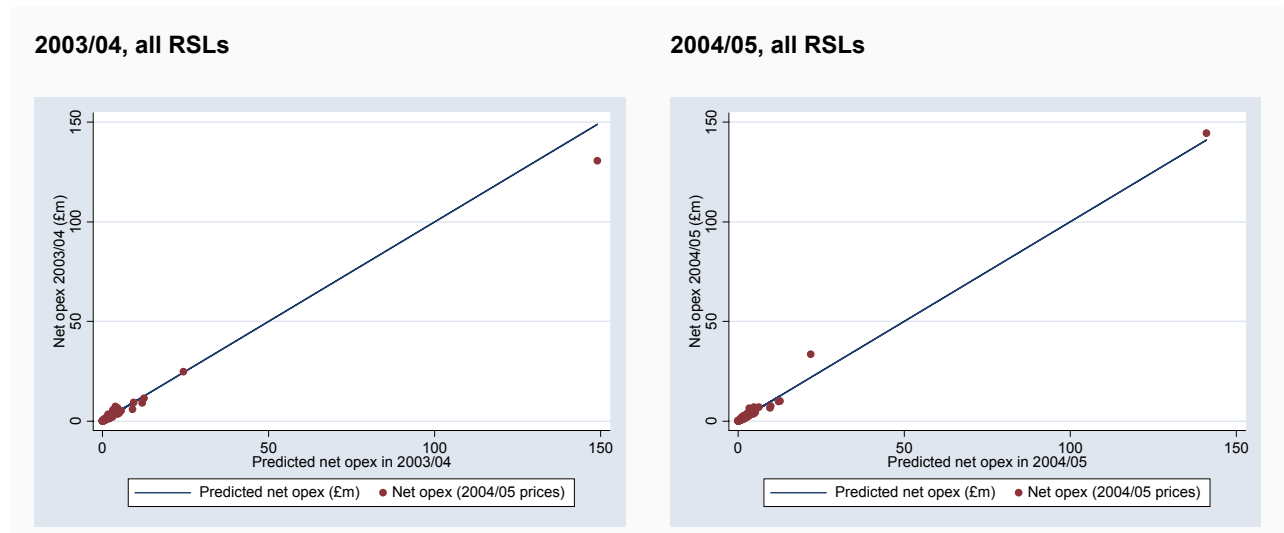
As was the case in the August 2005 report, the sum of squared residuals does not differ significantly. This means we are able to use the Model A formulation in estimating the cost relationship.



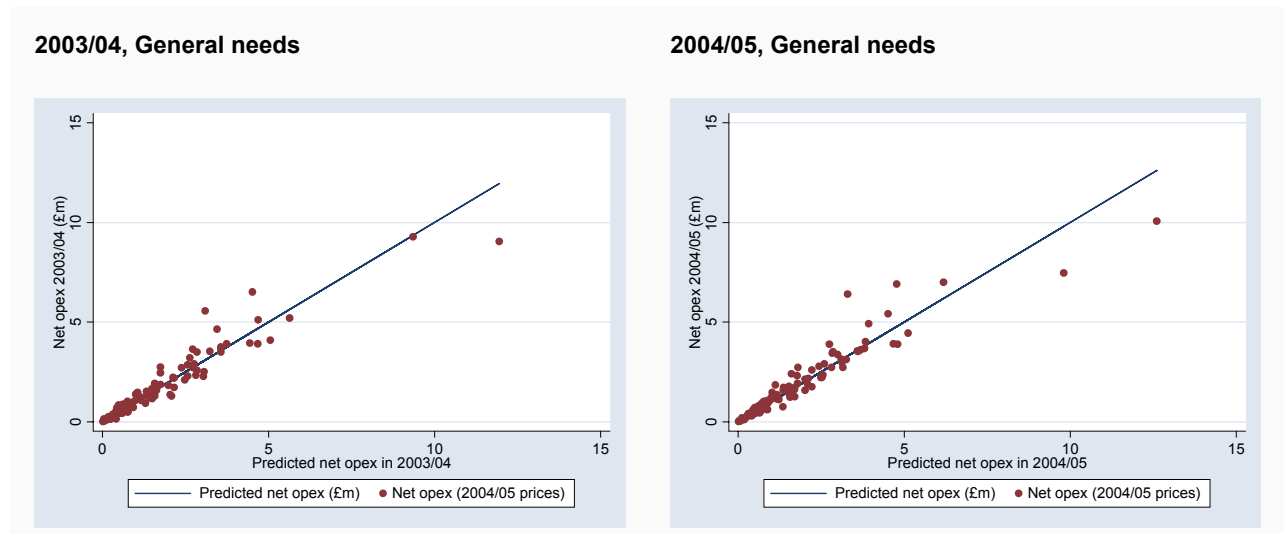
Appendix C: Results

C.1 Graphs showing actual versus predicted costs

C.1.1 All RSLs

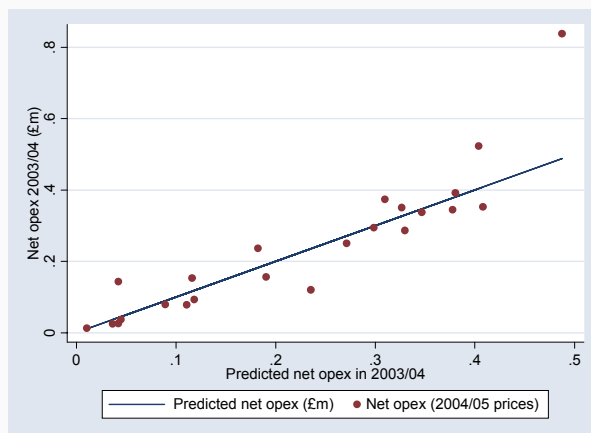


C.1.2 General needs RSLs

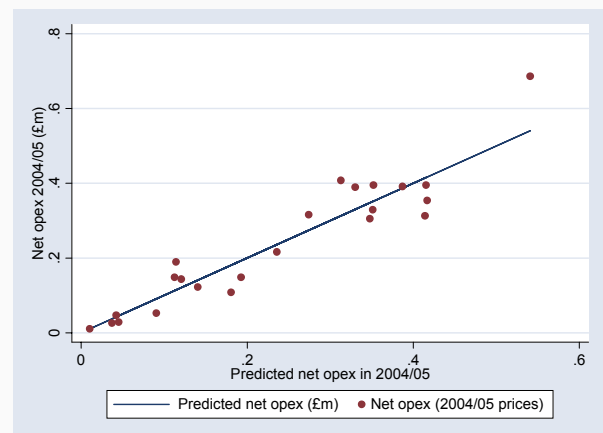




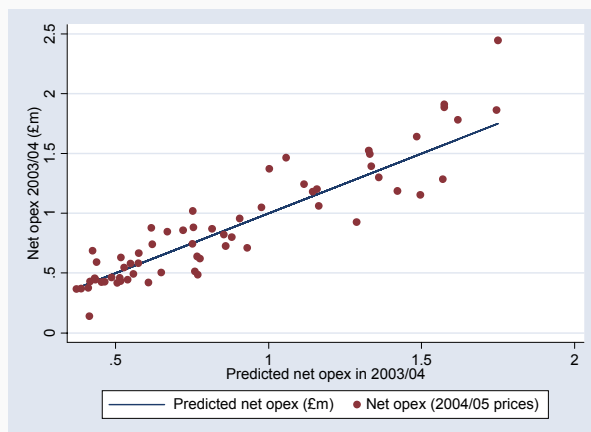
2003/04, General needs <250 units



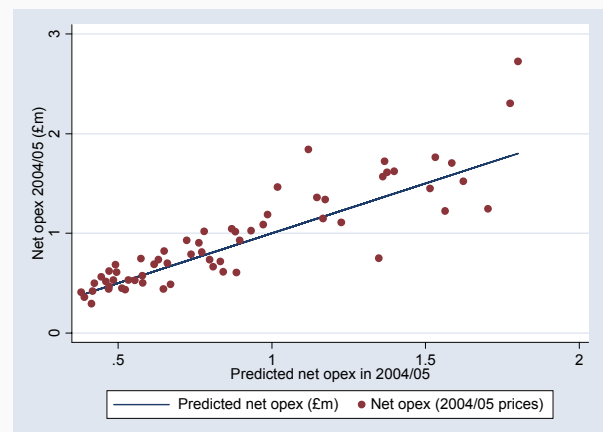
2004/05, General needs <250 units



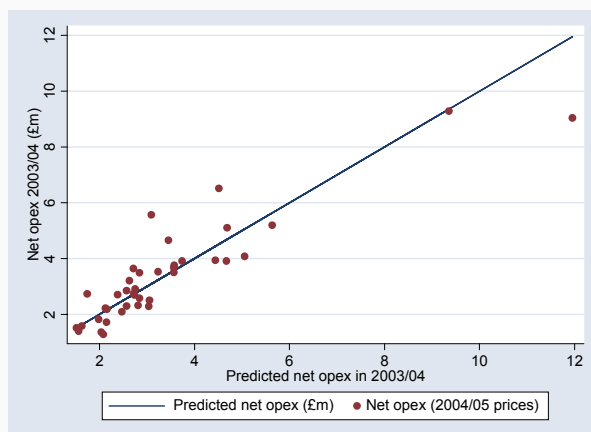
2003/04, General needs 250 – 1000 units



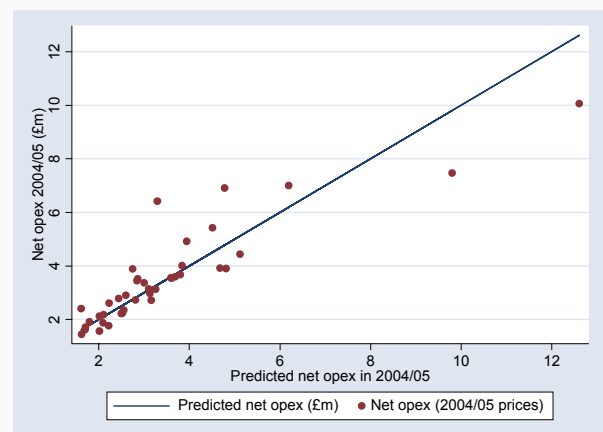
2004/05, General needs 250 – 1000 units



2003/04, General needs >1000 units



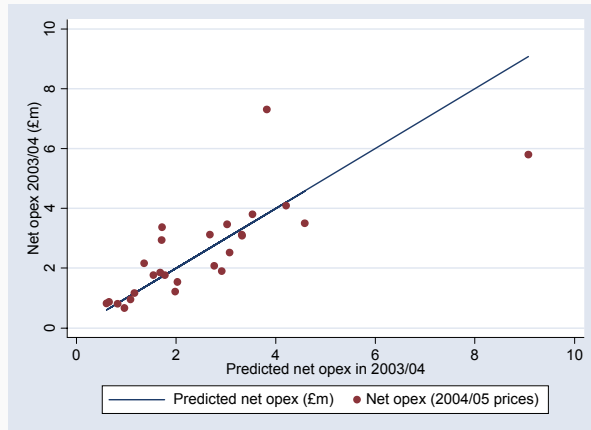
2004/05, General needs >1000 units



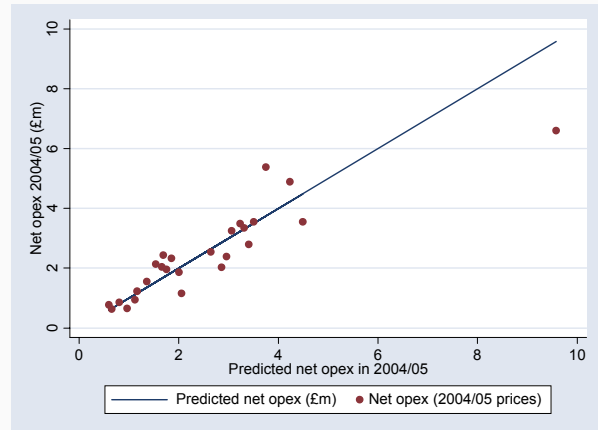


C.1.3 LSVTs

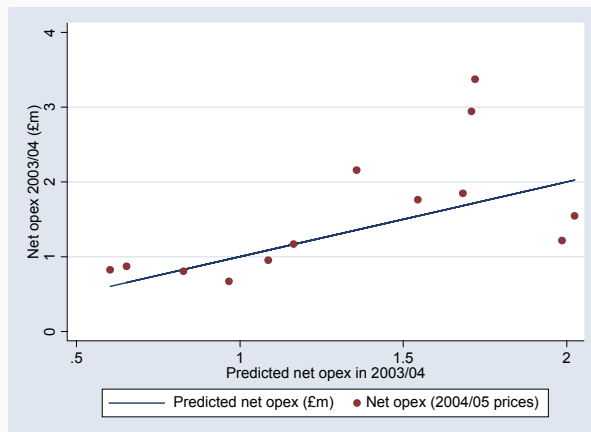
2003/04, LSVTs



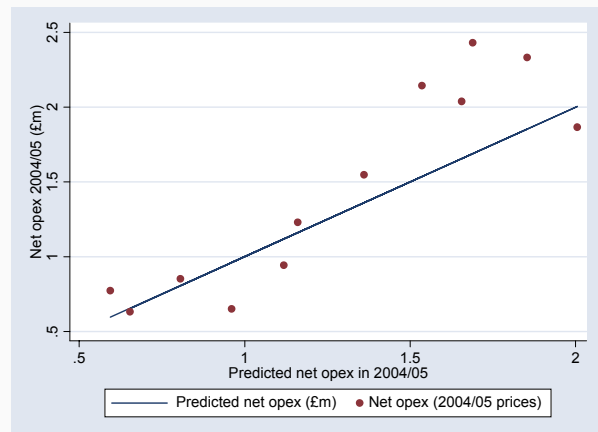
2004/05, LSVTs



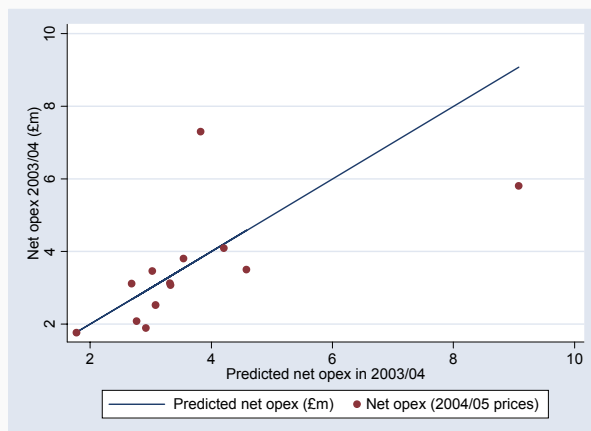
2003/04, LSVTs <1000 units



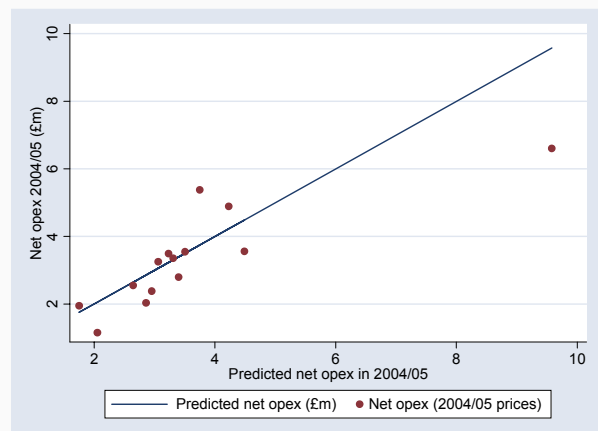
2004/05, LSVTs <1000 units



2003/04, LSVTs >1000 units

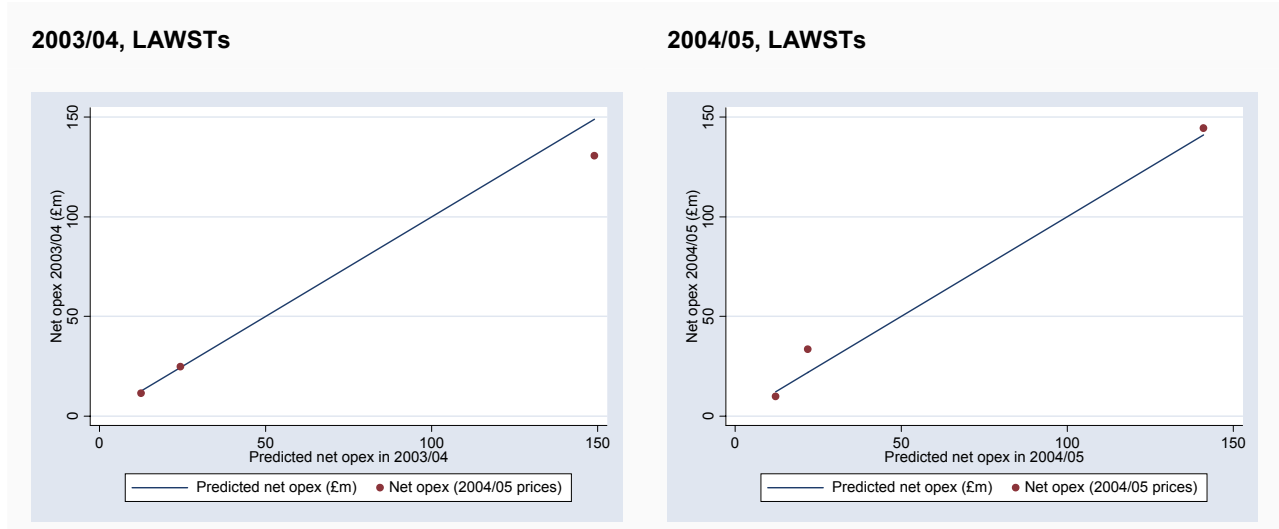


2004/05, LSVTs >1000 units





C.1.4 Local authority whole stock transfers





C.2 Table of results

The table summarises the results based on the preferred cost function.

The predicted net operating costs and residuals are rounded to the nearest £10,000, and predicted unit net operating costs and unit residuals are rounded to the nearest £10. The 2003/04 results differ from those published in the August 2005 report because the estimated cost relationship presented in this report takes into account the LAWSTs that occurred in 2003/04.

ID	RSL	2003/04 (Revised)					2004/05					
		Actual opex (£000)	Opex in 2004/05 prices (£000)	Predicted net opex (£000)	Predicted net opex (£/social housing unit)	Unit residual (£/social housing unit)	Actual opex (£000)	Predicted net opex (£000)	Predicted net opex (£/social housing unit)	Residual (£000)	Unit residual (£/social housing unit)	
64	Albyn	4,584	4,651	3,450	2,040	1,200	710	3,536	3,610	2,050	-70	-40
65	Angus	2,537	2,574	2,840	1,930	-270	-180	3,368	3,000	2,000	370	240
70	Barrhead	1,186	1,203	1,160	1,650	40	60	1,337	1,170	1,680	160	230
73	Blythswood	348	353	410	2,630	-60	-360	313	410	2,710	-100	-660
76	Broomhouse	92	93	120	1,220	-30	-260	143	120	1,240	20	240
77	Lorne Area	809	821	850	1,900	-30	-70	930	900	1,910	30	70
80	Calvary	788	800	880	2,150	-80	-200	1,016	880	2,170	130	330
81	Castle Rock	5,123	5,198	5,640	1,740	-440	-140	7,001	6,190	1,820	810	240
83	Castlehill	3,159	3,205	2,630	2,060	580	450	3,450	2,840	2,110	610	460
84	Cassiltoun	868	881	750	1,720	130	290	811	770	1,750	40	90
85	Cathcart & District	497	504	650	2,310	-150	-520	488	670	2,390	-180	-650
86	Clydebank	1,268	1,286	2,080	1,930	-790	-740	1,874	2,090	1,980	-220	-210
87	Govan	2,145	2,176	2,160	2,100	20	20	2,226	2,520	2,080	-290	-240
88	Charing Cross	1,164	1,181	1,140	1,970	40	60	1,148	1,170	2,030	-20	-30
90	Homes in Scotland	3,439	3,490	2,840	1,840	650	420	3,550	3,590	2,050	-40	-20



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91	Cloch	1,756	1,782	1,620	1,650	160	170	1,910	1,790	1,670	120	110
93	Clydesdale	1,035	1,051	980	1,550	70	120	1,187	990	1,490	200	300
95	Craigdale	412	418	510	1,550	-90	-270	447	510	1,570	-70	-200
98	Dalmuir Park	1,475	1,497	1,330	1,950	160	240	1,723	1,370	2,000	360	520
99	Ferguslie Park	1,445	1,466	1,060	1,410	410	540	1,843	1,120	1,430	720	930
103	East Lothian	1,885	1,912	1,570	1,680	340	360	1,706	1,590	1,690	120	130
104	Wishaw & District	1,171	1,189	1,420	1,860	-230	-300	1,450	1,510	1,900	-60	-80
106	Castle Rock Edinvar	2,243	2,276	3,040	1,890	-760	-470	2,969	3,130	1,970	-160	-100
107	Eildon	3,444	3,495	3,570	2,090	-70	-40	3,680	3,800	2,170	-120	-70
108	Elderpark	1,692	1,716	2,150	1,960	-430	-400	1,760	2,220	2,020	-460	-420
110	Forth	573	582	570	1,340	10	20	689	620	1,300	70	150
111	Dunedin	3,589	3,642	2,720	1,840	930	630	3,893	2,750	1,850	1,140	770
112	Four Walls Co-op	25	25	40	3,290	-10	-1,030	26	40	3,360	-10	-1,010
114	Arklet	825	838	490	2,770	350	1,990	687	540	2,750	150	740
116	Dunedin Canmore	3,881	3,938	4,440	2,340	-500	-260	3,909	4,680	2,390	-770	-390
117	Govanhill	2,656	2,695	2,740	1,650	-40	-20	3,134	3,100	1,860	30	20
120	Grampian	3,849	3,906	3,740	1,870	170	80	4,922	3,940	1,900	980	470
125	Hillcrest	9,150	9,285	9,360	1,930	-70	-10	7,466	9,810	1,970	-2,340	-470
126	Glasgow West	1,373	1,393	1,340	1,780	60	80	1,567	1,360	1,820	210	280
127	Hjaltland	631	640	770	2,630	-130	-430	718	830	2,650	-110	-370
128	Horizon	1,046	1,062	1,160	1,710	-100	-150	1,110	1,230	1,890	-120	-180



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129	Fairfield	486	493	560	1,790	-60	-210	574	580	1,830	-10	-20
130	Hunters	386	391	380	1,890	10	50	391	390	1,930	0	20
137	Oak Tree	1,791	1,817	1,980	1,420	-170	-120	2,124	2,010	1,450	110	80
142	Kingdom	5,479	5,559	3,090	1,420	2,470	1,130	6,408	3,290	1,470	3,110	1,390
145	Langstane	3,628	3,682	3,560	1,690	120	60	4,009	3,840	1,740	170	80
148	Link Group	8,905	9,036	11,960	2,010	-2,920	-490	10,067	12,610	2,060	-2,540	-410
149	Linthouse	2,662	2,701	2,380	2,040	320	270	2,782	2,440	2,120	340	300
150	Lister	515	523	400	2,190	120	650	354	420	2,270	-60	-340
151	Lochaber	507	515	760	1,700	-250	-550	735	800	1,710	-60	-140
153	Loreburn	2,703	2,742	2,720	1,730	20	10	3,516	2,860	1,720	660	400
159	Maryhill	1,860	1,887	1,570	1,990	310	390	1,523	1,620	2,020	-100	-120
161	Milnbank	1,267	1,286	1,570	2,180	-280	-390	1,246	1,700	2,240	-460	-600
162	New Lanark	76	77	110	2,460	-30	-740	189	110	2,540	70	1,660
163	West	716	727	860	1,980	-130	-310	607	890	2,040	-280	-640
164	Orkney	835	847	670	1,680	180	450	790	740	1,690	50	120
166	Paisley South	1,556	1,578	1,630	1,530	-50	-50	1,613	1,690	1,520	-80	-70
167	Parkhead	2,255	2,289	2,570	1,870	-280	-200	2,212	2,490	1,950	-280	-220
168	Partick	3,700	3,754	3,570	2,120	180	110	3,600	3,690	2,160	-90	-50
170	Port of Leith	2,465	2,501	3,060	2,110	-560	-380	2,714	3,160	2,160	-440	-300
171	Hawthorn	457	463	490	1,540	-20	-70	610	500	1,570	110	360
172	Queens Cross	6,416	6,511	4,510	2,200	2,000	970	6,913	4,780	2,270	2,130	1,010



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173	Reidvale	1,836	1,862	1,750	1,830	120	120	2,305	1,780	1,880	530	560
174	Rosehill	913	926	1,290	1,800	-360	-510	748	1,350	1,690	-600	-750
176	Rutherglen & Cambuslang	1,138	1,155	1,500	2,020	-340	-460	1,223	1,560	2,000	-340	-440
183	Shettleston	2,867	2,909	2,750	1,830	160	100	2,723	2,810	1,890	-90	-60
185	Drumchapel	730	741	620	1,340	120	260	736	630	1,360	100	230
186	Southside	1,502	1,524	1,330	2,510	200	370	1,612	1,380	2,620	240	450
187	North Glasgow	3,854	3,911	4,670	2,100	-760	-340	3,897	4,810	2,150	-910	-410
193	Thernew	5,032	5,106	4,690	1,730	420	150	5,423	4,510	1,730	910	350
195	Cunninghame	2,809	2,850	2,570	1,430	280	160	2,898	2,590	1,450	300	170
197	Tollcross	1,620	1,643	1,480	2,200	160	240	1,763	1,530	2,260	230	340
201	West of Scotland	4,022	4,081	5,060	1,960	-980	-380	4,441	5,120	1,990	-680	-260
202	Lanarkshire	1,226	1,244	1,120	1,500	130	170	1,360	1,150	1,540	210	290
203	West Whitlawburn	1,354	1,374	1,000	1,840	370	680	1,465	1,020	1,870	450	820
204	Prospect Community	1,282	1,301	1,360	1,570	-60	-70	1,622	1,400	1,580	220	250
205	Whiteinch & Scotstoun	2,411	2,446	1,750	1,880	700	750	2,726	1,800	1,910	920	980
207	Williamsburgh	1,338	1,358	2,040	1,510	-680	-500	1,564	2,010	1,520	-450	-340
208	Yoker	701	712	930	1,770	-220	-420	1,086	970	1,820	110	210
209	Yorkhill	620	629	520	1,580	110	350	685	490	1,530	190	600
211	New Gorbals	2,065	2,095	2,480	1,760	-380	-270	2,350	2,550	1,810	-200	-140
212	Trafalgar	426	432	520	1,710	-80	-280	432	520	1,740	-90	-300
213	Ochil View	1,376	1,396	1,560	1,410	-170	-150	1,448	1,610	1,400	-170	-140



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214	Gardeen	369	374	410	1,600	-40	-140	417	420	1,630	0	0
216	Blairtummock	454	460	510	1,430	-50	-150	745	570	1,490	170	440
219	Ardenglen	1,004	1,019	750	1,360	270	480	1,017	780	1,370	240	420
220	Cube	5,720	5,804	9,080	2,750	-3,270	-990	6,602	9,580	2,850	-2,980	-890
223	Blochairn	333	338	350	1,580	-10	-40	395	350	1,600	40	200
224	Perthshire	1,487	1,509	1,520	1,380	-10	-10	1,705	1,700	1,380	0	0
225	West Granton	361	367	370	1,480	-10	-20	408	380	1,510	30	110
226	Garrion Peoples	368	374	310	1,410	60	290	408	310	1,430	100	430
230	Cernach	422	428	460	1,500	-40	-120	620	470	1,520	150	480
231	Pineview	733	744	750	1,420	-10	-10	903	760	1,450	140	270
232	Rural Stirling	425	431	420	1,320	10	50	465	470	1,320	-10	-20
233	Copperworks	449	456	430	1,480	20	80	500	420	1,460	80	260
234	Kingsridge Cleddans	290	294	300	1,480	0	-20	330	350	1,480	-20	-90
235	Bellsmyre	939	953	1,090	1,810	-130	-220	941	1,120	1,910	-180	-300
236	Ore Valley	857	869	650	1,670	220	550	630	650	1,690	-20	-60
237	Faifley	676	686	430	1,340	260	820	518	460	1,320	60	170
238	Easthall Park	416	422	610	1,420	-190	-430	439	650	1,400	-210	-450
241	Glen Oaks	2,049	2,079	2,770	2,000	-690	-500	2,387	2,960	2,150	-570	-420
242	Provanhall	364	369	390	1,330	-20	-60	358	390	1,350	-30	-110
245	Tenants First	2,696	2,735	1,740	1,450	1,000	830	2,397	1,610	1,420	790	690
246	Kincardine	233	236	180	2,090	50	620	108	180	2,150	-70	-870



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251	Kendoon	283	287	330	1,480	-40	-190	305	350	1,460	-40	-180
258	South Uist	78	79	90	1,620	-10	-180	52	90	1,640	-40	-700
259	Cordale	539	547	530	1,500	20	60	529	530	1,510	0	-10
260	Dunbritton	943	957	910	1,740	50	100	1,026	930	1,750	90	180
261	Muirhouse	438	444	540	1,210	-90	-210	500	580	1,260	-80	-170
263	North	36	37	40	1,590	-10	-290	28	50	1,610	-20	-600
264	Beechwood	153	156	190	1,640	-30	-300	148	190	1,660	-50	-390
267	Glen	583	591	440	1,280	150	450	561	440	1,290	120	340
268	Lochfield Park	439	446	430	1,430	10	40	439	470	1,320	-30	-90
269	North View	856	868	820	1,330	50	90	1,044	870	1,330	170	270
270	Cadder	1,150	1,167	1,170	1,670	0	0	1,230	1,160	1,690	70	100
271	Forgewood	345	350	330	1,490	20	110	389	330	1,510	60	270
272	Barra & Vatersay	25	25	40	1,820	-20	-720	47	40	1,840	0	200
273	Pentland	479	486	770	2,160	-280	-800	612	840	2,130	-230	-580
274	Molendinar Park	846	859	720	1,500	140	290	930	720	1,520	210	430
275	Abronhill	340	345	380	1,710	-30	-150	395	420	1,880	-20	-90
276	Berneray	12	12	10	1,290	0	240	10	10	1,300	0	-90
277	Ruchazie	247	251	270	1,560	-20	-120	316	270	1,580	40	240
279	East Kilbride & District	570	579	550	1,380	30	80	525	550	1,390	-30	-70
280	Irvine	2,487	2,523	3,080	1,680	-550	-300	2,791	3,400	1,670	-610	-300
281	Wellhouse	417	424	450	1,210	-30	-80	528	480	1,210	40	110



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282	Muirmeag	151	153	120	1,350	40	430	123	140	1,280	-20	-160
284	Manor Estates	1,737	1,762	1,540	1,670	220	240	2,143	1,540	1,680	610	670
285	Almond	3,478	3,529	3,230	1,440	300	130	3,121	3,260	1,380	-140	-60
286	Melville	3,751	3,806	3,540	2,140	270	160	3,545	3,510	2,150	40	20
289	Berwickshire	3,079	3,125	3,320	1,870	-190	-110	3,496	3,230	1,870	260	150
291	Clyde Valley	4,035	4,094	4,210	1,760	-120	-50	4,888	4,230	1,730	660	270
293	Larkfield	659	668	970	2,210	-300	-680	651	960	2,230	-310	-720
295	Fife Special	3,451	3,502	4,580	1,900	-1,080	-450	3,557	4,490	1,900	-930	-390
296	Shire	1,523	1,545	2,020	2,190	-480	-520	1,865	2,000	2,200	-140	-150
297	Abertay	3,416	3,466	3,030	1,760	440	250	3,249	3,060	1,770	190	110
298	Paragon	3,071	3,116	2,680	1,840	430	300	2,548	2,650	1,860	-100	-70
299	Linstone	3,038	3,082	3,330	1,990	-250	-150	3,353	3,310	2,020	40	30
300	Knowes	1,746	1,772	1,770	1,750	0	0	1,953	1,750	1,750	200	200
301	Bridgewater	1,819	1,845	1,680	2,320	160	220	2,039	1,660	2,340	380	540
302	Sanctuary (Scotland)	2,285	2,319	2,810	1,340	-490	-240	2,171	2,110	1,340	60	40
304	Ayrshire	1,196	1,213	1,990	2,080	-770	-810	1,160	2,050	2,030	-890	-890
305	Atrium	2,901	2,943	1,710	2,040	1,240	1,470	2,432	1,690	2,050	740	900
306	Ayrshire North Community	2,127	2,158	1,360	1,890	800	1,120	1,548	1,360	1,910	190	260
307	Antonine	791	803	830	2,290	-20	-70	851	810	2,300	50	130
309	Cumbernauld	7,202	7,308	3,830	2,030	3,480	1,850	5,381	3,750	2,030	1,630	880
310	Thistle	3,325	3,374	1,720	1,760	1,650	1,700	2,334	1,850	1,940	480	500



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312	Aberdeenshire	657	667	580	1,150	90	180	823	650	1,110	170	290
313	Scottish Borders	11,169	11,333	12,540	1,930	-1,210	-190	9,850	12,200	1,930	-2,350	-370
314	Port Glasgow	812	824	600	2,210	220	810	772	590	2,230	180	670
315	Dumfries & Galloway	24,379	24,737	24,300	2,130	430	40	33,486	21,830	1,960	11,660	1,050
317	Glasgow	128,823	130,716	149,040	1,900	-18,330	-230	144,442	141,110	1,850	3,330	40
318	West Lothian	118	120	240	1,020	-120	-500	216	240	1,030	-20	-90
319	Capital City	141	143	40	3,510	100	8,370	148	110	1,910	40	590
321	Fyne	2,187	2,219	2,130	1,610	90	70	2,601	2,220	1,640	380	280
323	Spire View	614	623	780	1,520	-150	-300	665	810	1,520	-140	-270
324	BT Loch Aillse	866	878	620	1,740	260	740	699	660	1,740	40	100
325	Moray	137	139	410	1,560	-270	-1,030	294	410	1,560	-120	-450
327	Waverley	1,868	1,895	2,920	1,810	-1,020	-630	2,033	2,860	1,820	-830	-530