THE IMPACT OF TENANTS ON PUBLIC HOUSING STOCK MAINTENANCE EXPENDITURE IN THE UK

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This paper describes a statistical model of how the occupants of housing units impact on the maintenance expenditure of housing stock in a local authority environment. The study examines the procedures for the reporting of defects by both the tenants and the surveyors in the management of the sampled stock. The study is based upon a combination of questionnaire survey and maintenance records database of the chosen local authority. The study finds, inter alia, that the presence of disability in a dwelling is the most influential tenant's attribute affecting maintenance expenditure.

Keywords: occupants, maintenance expenditure, defects

INTRODUCTION

Housing maintenance and defect is influenced by a multitude of factors. These factors need to be isolated if reliable corrective actions are to be formulated to curb degradation process in the built form.

This study identifies the influence of tenants on housing maintenance expenditure in the public sector i.e. the local authority environment.

Wyatt (1980) suggestes that maintenance requirements are influenced by the actions and expectations of tenants in the public sector. He claims this to be particularly true on unpopular estates where vandalism is rampant and where occupancy turnover is high and councils are required to redecorate. Honstede (1990) has also iobserved that the way and manner in which occupants make their dwelling to suit individual tastes do significantly influence the condition of housing stock.

Whereas Honstede's (1990) findings emanated from purely a sociological appreciation of the problem of housing quality, Gambardella and Moroni's (1990) study demonstrates a more technical appreciation of the same problem. Among the three sets of factors identified by them is the system of usage and environmental conditions which cause a series of stress actions on the building. In the light of these concurrent findings, it is no surprise that Spedding et al (1995) adopted 'user effect' as one of the four groups of factors upon which they based the development of their W.P.E. Systems Ltd. priority category matrix for prioritising maintenance.

BACKGROUND

The importance and benefit of maintaining a relevant data base of housing tenants' attributes in the housing maintenance and management sector is somewhat misplaced because the records as they currently exist are superfluous and border on trifles and irrelevance. Very limited work has been done on the impact of tenant's characteristics

Olubodun, F and Mole, T (1997) The impact of tenants on public housing stock maintenance expenditure in the UK. *In:* Stephenson, P (Ed.), *13th Annual ARCOM Conference*, 15-17 September 1997, King's College, Cambridge. Association of Researchers in Construction Management, Vol. 2, 643-53.

on maintenance requirements profile (Olubodun and Mole, 1996; Olubodun, 1996). Whilst most attention has been focused upon the internal dynamics of the building as an engineering product. Arguably, it is partly in recognition of the need for a shift of emphasis that the Government set forth in the Tenant's Charter' as follows:

"Those who prefer to remain as tenants, or who cannot afford ownership should be respected as the valued customers of the local authorities. They have to sustain its costs. They have the right ... expect high standards and to prompt action when performance is poor" (AMA,1991).

Most surprisingly, this initiative on the part of government has not met with corresponding research efforts into how maintenance need is explained by tenants' variability.

METHODOLOGY

This paper is based on a study conducted between 1993 and 1996 (Olubodun, 1996). It sought to evaluate the factors at play in local authority housing maintenance requirements.

The data for this aspect of the study was obtained in two parts. The first part of the data was achieved by collecting data on repair costs for the sample dwellings from the authority's Direct Labour Organisation (DLO) system. The second part was based upon postal questionnaire which were distributed among tenants of the sample dwellings. In total, 252 completed questionnaire on each of which computer DLO records were obtainable provided quantitative data analysis. The 252 questionnaires used for this part of the study represented a response rate of about 40%.

This paper, having identified some important attributes of the tenants, attempted to evaluate the impact of these attributes on historic repair expenditure on housing stock of the local authority studied.

TENANT'S PARTICIPATION IN HOUSING MAINTENANCE MANAGEMENT

Reporting of Defects

Reporting of defects is essentially about giving an eye-witness account and at the same time making limited judgement on what is observed depending on who the reporter is, thus making the whole exercise of reporting a seriously subjective exercise. According to Croome (1980) a building defect is intractably subjective unless it was brought to the notice of those who are trained to both diagnose and offer prognosis for such defects. This, as Porteous (1985) observed, is still fraught with complexities. As Croome (1980) contended, every too often, components are judged to have failed if sufficient complaints are received about their conditions, and these complaints are not reliable indicators of the severity of failure. Especially in building, unless there is a serious and obvious structural failure, there is usually no focal point for complaints.

Porteous (1985) has noted that one of the factors which may decide whether a building defect is reported to some person competent to record and make judgement upon it is the ownership of the building. Local authorities who hold buildings as socio-investment units have a higher expectation of defect-free stock than owner-occupiers. Whilst the owner-occupier makes decision on defect strictly on commercial

judgement, the local authority is looking for sound, trouble free investment for political reasons as dictated by the political interest of the central government.

Day-to-day survey
Contrary to the formalised pre-planned and systematic approach to overall stock assessment in condition survey, day-to-day reactive survey can be ad hoc or even haphazard to a greater or lesser extent. This is occasioned sometimes, by the whimsical and untrained impulse of dwellers (Croome, 1980) to what is considered to be an incursion of defect or a symptom of it. The practical implication of this is that it is extremely difficult for the surveyor to always carry out his investigation in a totally unbiased manner however theoretically professional that activity might be said to be. This situation is further complicated by the increasingly conscious 'consumer-oriented' society that we live in. The negative effect of which is for the surveyor to be positively biased in favour of pleasing the consumer (in this case the tenant or dweller) in his diagnosis and prognosis of reported defects. Nonetheless, reactive survey, more often than not helps to 'nip the problem on the board' and can be rightly described as 'a stitch in time that saves nine'.

PROCEDURES FOR REPAIR ACTION

Defects reporting by tenants
A tenant is responsible for the behaviour of every person, including children living in or visiting his home. Every tenant is obligated by the tenancy agreement to inform the council about any defects or damage immediately.

When a repair is reported by a tenant, the receiving housing officer will immediately order the repair as required following departmental laid down procedures once the officer satisfies himself that the job has not already been ordered. Once ordered, a computer generated confirmation slip is given or sent to the tenant confirming his report. This receipt will show that the tenant had in fact met up with the requirement to report repairs needs if there is a problem in the future.

Where damage is caused deliberately or by neglect, the tenant is expected to carry out or pay for such repairs. Furthermore, the tenant is expected to do small repairs such as unblocking sinks, replacing taps or internal door handles. It is however often too difficult to prove where repair needs has been caused deliberately or by neglect. In the end, the responsibility to do repairs falls upon the council.

Housing officer's inspection
Repairs which are not prioritised as emergency would normally require housing officer's inspection. Such repairs are required to be inspected within five working days of report being made by tenant. Where the housing officer could not obtain access to the dwelling a 'no access' card is left giving details of job and requesting the tenant to reply within seven days and making arrangement for a mutually convenient time for a repeat visit by the housing officer. This visit is simply to ensure that the repair has been correctly ordered.

Once it has been decided that the repair is valid, the housing officer exercises his discretion as to whether or not the defect requires the expertise of a building surveyor for accurate diagnosis.

Repairs are divided into two groups, namely; those that require a pre-inspection to determine the work specification by building surveyors, and those which are routine repairs and can be ordered reasonably accurately without pre-inspection.

Where required, survey order request is raised by the housing officer for the surveyors' group for the housing area, if not, the job is processed through the computer system for the action of the DLO department. At this stage, a confirmation letter is sent to the tenant informing him/her that repair works will be carried out. The deadline by which the repair will be completed will either be 4 weeks from the day the repair order is sent to the DLO or 12 weeks from the day the survey request is sent to the surveyors as appropriate.

THE ANALYSIS

Tenant Attributes

There are a number of variables that measure the characteristics of occupier of a residential property including the number of children in dwelling (CHILDCT), attitude to repair problems (REPIRATT), Right-To-Buy speculation (RTBCOMP), gender (GENDER), restraints on physical mobility (DISABLE), move plan, i.e. residential stability (MOVEPLAN), length lived in last home (LENTLAST) and length live in current home (LENTLIVE), employment status (TEMPLOY1) age (TENAGE) and number of void relets carried out on property in the last five years (RELET1). Together, they give an insight into the behaviour and influence of the tenants as they impact upon the dwelling and hence on maintenance need.

A regression analysis was conducted with the 11 attributes along with nine other variables (see Appendix A) on the dependent variables and the historic repair expenditure as the independent variable. It has been demonstrated elsewhere (Olubodun, 1996) that historic maintenance expenditure is only a segment of overall maintenance requirements. Other indices of maintenance requirements identified are property condition and tenant' satisfaction index.

RESULTS

Maintenance expenditure model

The results of repair cost regression are shown in the Apendix A-A1. A full regression model using all 20 independent variables has a multiple coefficient of determination (R^2) of 0.6021 and an F ratio of 5.4465 which is significant at a better than 99% level of significance. This value of (R^2) shows that the variables altogether explain 60 per cent of the variations in repair costs.

As a first step in developing a better model, the variables with t-values of less than 1.6 (i.e. 90% significance level) were removed from the equation. The reason for including variables at 90% significance level is that some of those variables may improve their significance to the predicted 95% level when some of the weak variables are eliminated. This resulted in the regression model shown in Apendix B-B1 which comprises of four variables all of which satisfied the 95% level of significance. The (R^2) dropped from 0.6021 to 0.4963, but the F ratio improved very substantially from 5.4465 to 25.4723, at better than 99% significance level. The improved F ratio indicates that the latter model (Apendix B1) is yet still more highly significant than the former (Appendix A1). Hence, Appendix B1 results are the final

model. The four variables in this final model include RELET1, DISABLE, LENTLIVE and TENAGE.

INFERENCE FROM THE REGRESSION MODELS

What this group of models seems to elicit is that all the 20 independent variables account for about 60 per cent of the variation in repair costs within the local authority housing organisation. As the original 20 variables were fine-tuned on statistical grounds, we were able to reduce them to just four variables which explain 50 per cent of the total variation in the dependent variable.

The final model (Appendix B1) includes four variables which all fall into the category of tenant attribute variables (RELET1, DISABLE, LENTLIVE and TENAGE). This exclusive inclusion of variables in only one of the four areas of tenant, property, environmental and property management attributes is surprising. It indicates that the tenant characteristics are the dominant factors affecting day-to-day repair expenditure; as a component of overall maintenance need of a residential property.

It is surprising because, on *a priori* grounds, it was expected that all the four areas should inter-play in determining expenditure to a lesser or greater extent. Initial speculation suggested that environmental factors should bear significantly upon MAINTCST (the dependent variable), which in this case has not been supported. This confirms an earlier parallel finding, which puts vandalism as one of least influential on overall maintenance need; second only to age of property. It is worthy of note that the Tolerance of the four variables are reasonably high, which enable us to reject any suggestion of multi-collinearity as a problem within the models. Upon this evidence, we could not explain away the features of the model on the grounds of inter-correlations with other variables in the property, environmental and property management domains.

The partial coefficients indicate that, in magnitude, DISABLE, is the strongest variable influencing repair expenditure, followed by TENAGE, RELET1 and LENTLIVE. The positive coefficient for the variable LENTLIVE is contrary to expectation. The speculation would have been that the longer a tenant stayed in the dwelling, the less would be his/her demands for repairs. However, this difference in impact can be explained in three ways. Firstly, the awareness of tenants increases with length of tenure, and as he becomes more aware of his rights, the higher the cost records associated with his dwelling, especially where the tenant is likely to claim entitlement to legal support. Secondly, the degree to which pressure is generated by the tenant on local housing management team increases with tenant's self confidence which, in turn, increases with length of tenure. Thirdly, whilst newer tenants become satisfied once pre-occupation needs are met by the housing management team, when those needs cease to be 'real needs' in the perception of the tenants, higher order needs are naturally created by the tenants. Many of such needs may only be artificial. Therefore, the longer the tenant is in occupation, the more demanding he is likely to be and hence may generate more artificial defects which may, some of the time, have to be attended to by the housing management group.

The negative coefficient for the variable RELET1 at (0.2834) indicates that repair expenditure decreases where a property has had relet work carried out within the period in question. This observation seems to contradict theoretical expectations since tenancy turnover means more work being carried out on dwelling in order to secure replacement tenants and hence increased maintenance expenditure. However, the

contradiction disappears where and if relet works constitute an encapsulation of all existing as well as impending defects into one 'big' repair action. Thus resulting in an 'economies of scale' which proves to be more cost efficient, as well as possessing some attribute of pro-active and preventative maintenance. Hence, what is observed is that repair cost is reduced in the medium or long term where there is tenancy turnover in so far as such a turnover is not so frequent as to make the event itself short termed. The problem with this trend however, lies in the time-value of such lump sum expenditure as well as the management of day-to-day repair as a 'revenue account' cost item.

The variable for DISABLE, which represents the physical well-being of tenants, has a positive influence. What shows to be a negative partial coefficient is in actual sense a positive coefficient since the scoring of the variable in the original data is in reverse order with; 1 - representing an existence of disabled person and a higher score representing an absence of person with disability. It is also note worthy that some items of maintenance in dwellings occupied by disabled persons are carried out under social services account rather than housing revenue account. Thus strengthening the negative correlation, but the impact is not strong enough as to off-set additional expenditure by housing department on disabled person's dwellings.

It is interesting that this variable has the strongest influence on repair expenditure. It is useful to mention that repair expenditure profile does not include for ad-hoc social services works carried out on properties for disabled persons, for, in the presence of this, it becomes obvious why there would be a strongly positive inter-relationship. On the contrary, it would appear that the strong influence is supported on account of the sensitivity with which disabled persons are treated by housing officers, and therefore any requests made by such persons. Therefore, a tenant's report for defects which may pass for trifle in the case of non-disabled tenant, tends to receive more sympathetic and urgent action when such a report comes from a disabled tenant. Secondly, one would expect that disabled tenants are likely to spend more hours at home, and therefore, likely to generate more work, especially condensation related problems. Furthermore, because they tend to spend more time at home, they are in better position to identify at much earlier stage, defects which other tenants will ignore or may not notice. Thirdly, where the disabled person is a parent, the chances of do-it-yourself (DIY) works being done on a dwelling become very remote, and hence, such defects fall to housing management for rectification.

The negative partial coefficient for the variable TENAGE is interesting. What it suggests is that the older the tenant is, the lower the repair costs. Anecdotal evidence as well as findings by Alner and Fellows (1990) in their study of school buildings suggests that age of property should be the strongly influencing factor in repair expenditure. In this research, these findings are unsupported but appear to have been reversed. The results suggest that PROPAGE is not a significant influencing factor, and that the age of tenant (TENAGE) is more important in influencing residential property repair expenditures. However, following from (Olubodun's 1996) work , the ageing influence exerts itself more significantly on some building components (damaged goods and wall ties) rather than the whole, and possibly synergises with some other influence to exert significant bearing on the building.

The direction of this influence can be explained in three ways. Firstly, older tenants are least likely to have children leaving with them, and where they do, they are not likely to be very young children, who may tend to generate more repairs by way of

accidental damage to vulnerable building components. Also, because dwellings with older tenants are likely to be of lesser occupation density, condensation related problems associated with higher density may not be more than off set by longer hours at home for this category of tenants (older tenants). Secondly, even though MOVEPLAN is not here found to be a significant variable, it is plausible that because younger household tend to be more mobile, they are less likely than older ones to commit personal expenditure on dwelling, which is then passed on to housing management. Thirdly, with a major proportion of their time devoted to work and tending younger children, younger households would have less time at their disposal to carry out DIY duties on the property in comparison with older households. Hence work which may well have been carried out by the tenant for personal gratification (rather than for statutory requirements) would end up being passed on to housing management team.

CONCLUSION

The study has demonstrated that all the significant factors in the final maintenance expenditure model pertain to tenants' attributes. This suggests that none of dwelling type, design, construction and age is an important indicator of the day-to-day maintenance expenditure requirements of housing stock. Housing maintenance managers would therefore be well advised to pay serious attention to their statistics on how long tenant has lived in dwelling, the age of tenant, presence of disability in dwelling and occupancy turnover rate.

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Appendix

Initial regression equation on maintenance cost

A: The initial variables entered

```
          * * * *   M U L T I P L E   R E G R E S S I O N   * * * *
Listwise Deletion of Missing Data

Equation Number 1    Dependent Variable..   MAINTCST   cost of repairs in last 5

Block Number  1.  Method:  Enter
   LENTLIVE MOVEPLAN LENTLAST RESREPIR RESVANDL HSGOFFS  RESREPIR REPIRATT
   GENDER   TENAGE   DISABLE  PROPAGE  SIZE     BED      LOCATION FLAREA
   CLASS1   RELET1   VANDAL   RTBCOMP  CHILDCT

Variable(s) Entered on Step Number
   1..    CHILDCT   Number of children in dwelling
   2..    VANDAL    NEW VARIABLE DERIVED FROM VANDALISM INDE
   3..    RESREPIR  council's response to repair
   4..    REPIRATT  attitude to repair problems
   5..    PROPAGE   age of property
   6..    LOCATION
   7..    RTBCOMP   COMPRESSED RTB
   8..    HSGOFFS   assessment of service from housing office
   9..    GENDER
  10..    DISABLE   presence of disability or limiting illne
  11..    RELET1
  12..    MOVEPLAN  likelihood of moving from present home
  13..    RESVANDL  council's response to vandalism
  14..    LENTLAST  length livedin last home
  15..    LENTLIVE  Length lived in current home
  16..    FLAREA    floor area
  17..    TENAGE    tenant's age
  18..    CLASS1    collapsed class
  19..    BED       number of bedrooms
  20..    SIZE      size of property
```

A1: The initial outputs

```
Multiple R           .77593
R Square             .60206
Adjusted R Square    .52824
Standard Error   1288.19987
Analysis of Variance
                    DF      Sum of Squares      Mean Square
Regression          20     180765797.18766    9038289.85938
Residual           162     268832342.58283    1659458.90483

F =       5.44653       Signif F =  .0000



* * * *   M U L T I P L E   R E G R E S S I O N   * * * *

Equation Number 1    Dependent Variable..   MAINTCST   cost of repairs in last 5


------------------- Variables in the Equation ------------------

Variable              B        SE B       Beta         T  Sig T

LENTLIVE      24.007668   10.403702    .203760     2.308  .0223
MOVEPLAN     -97.234418  104.819027   -.065804     -.928  .3550
LENTLAST       7.722416    8.205887    .068205      .941  .3481
RESREPIR     -25.280748   53.004032   -.031452     -.477  .6340
RESVANDL      50.591023   32.062873    .110955     1.578  .1165
HSGOFFS      -58.678160   45.581401   -.085752    -1.287  .1998
REPIRATT      96.719162   93.388921    .068787     1.036  .3019
GENDER       114.314680  206.907355    .036422      .552  .5814
TENAGE      -495.003745  150.023268   -.346737    -3.300  .0012
DISABLE    -1165.261360  239.522070   -.333317    -4.865  .0000
PROPAGE        8.203113    6.898755    .102649     1.189  .2362
SIZE         241.881324  350.998906    .147188      .689  .4917
BED         -410.431012  462.048862   -.189406     -.888  .3757
LOCATION     -69.295699  111.795086   -.043726     -.620  .5362
FLAREA          -.229373    1.336660   -.029152     -.172  .8640
CLASS1       115.211423  272.800908    .055832      .422  .6733
RELET1     -1894.658681  364.113538   -.393113    -5.203  .0000
VANDAL         33.027868   25.978855    .087654     1.271  .2054
RTBCOMP      242.382759  265.306919    .059452      .914  .3623
CHILDCT      153.924584  335.564557    .040946      .459  .6471
(Constant)  6219.034598 1194.136894               5.208  .0000
```

```
End Block Number   1   All requested variables entered.
```

Final regression equation on maintenance cost

B: The significant variables on T-values entered in the final model

```
Variable(s) Entered on Step Number
   1..    RELET1
   2..    DISABLE   presence of disability or limiting illne
   3..    LENTLIVE  Length lived in current home
   4..    TENAGE    tenant's age
```

B1: The initial outputs

```
Multiple R           .70448
R Square             .49629
Adjusted R Square    .28465
Standard Error   1292.41103

Analysis of Variance
                    DF      Sum of Squares      Mean Square
Regression           4     170188333.00822   42547083.25205
Residual           242     404218955.98774    1670326.26441

F =      25.47232       Signif F =  .0000


------------------ Variables in the Equation ------------------

Variable              B        SE B       Beta         T  Sig T

LENTLIVE      13.730517    7.098941    .124357     1.934  .0543
TENAGE      -439.795654   98.686161   -.304883    -4.457  .0000
DISABLE    -1233.060329  188.514388   -.357797    -6.541  .0000
RELET1     -1286.729636  285.146408   -.283350    -4.513  .0000
(Constant)  7087.276230  591.423418               11.983  .0000


End Block Number   1   All requested variables entered.
```