Technical Efficiency in Property Finance Intermediaries: An Application Using the Australian Building Society Industry

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TECHNICAL EFFICIENCY IN PROPERTY FINANCE INTERMEDIARIES: AN APPLICATION USING THE AUSTRALIAN BUILDING SOCIETY INDUSTRY

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Maximum-likelihood estimates of an econometric cost function incorporating technical efficiency effects are obtained for twenty-two Australian building societies in the period 1992-1995. Cost inefficiency scores indicate that building societies' costs were fifteen percent above what could be considered necessary. The results also indicate that asset size is not a significant influence on the level of technical inefficiency; though branch and agency networks, capital adequacy restrictions, and non-core commercial activities are. At the industry level that there has been an improvement in the level of technical efficiency of Australian building societies during the period in question.

I. INTRODUCTION.

At least four salient points characterise existing research into financial institution efficiency. First, all commentators concerned concede that in the financial services industry, the analysis of individual institutional efficiency is of paramount importance. For instance, the efficiency of an individual institution is intimately associated with the concepts of profitability and competitiveness, amongst others. However, the ability of these financial institutions to operate in an efficient manner affects not only their own condition, but also that of the economy in general; not least being the provision of quality financial intermediation, and the demands placed upon regulatory authorities and ultimately taxpayers (Berger *et al.*, 1993, p. 221). Second, "...most of the research into the efficiency of financial institutions has focussed on North American institutions...[and] in general, the motivation of this research has been to investigate the nature of economies of scale and scope" (Drake and Weyman-Jones, 1992, p. 1). In this regard, "relatively little attention has been paid to measuring what appears to be a much more important source of efficiency differences - X-inefficiencies, or deviations from the efficient frontier" (Berger *et al.*, 1993, p. 222). Even when such avenues of investigation have been pursued, few studies have attempted to relate financial institutions' X-efficiency to possible determinants such as; agency problems; regulation, organisational and legal structures; and the scale and scope of operations (Berger *et al.*, 1993). Third, the efficiency of thrift institutions, like building societies and credits unions, has not been studied extensively to date [for exceptions, see Hardwick, 1989, 1990; Field, 1990; Drake and Weyman-Jones, 1992; Piesse and Townsend, 1995, all in the UK]. Whilst commercial banks remain the major financial institution sector, the concentration of thrift institutions in areas such as consumer banking and property finance demands some attention (Berger *et al.*, 1993). Finally, econometric techniques employed in all areas have in the main failed to recognise the competitive and institutional realities facing multi-product financial institutions, especially since the 1980s wave of financial deregulation (Hardwick, 1990; Piesse and Townsend, 1995). It is with these considerations in mind, that the present study has been framed.

The use of Australian building societies to address these issues is appropriate for a number of reasons. First, since the 1980s the fortunes of the building society industry have directly reflected the changing regulatory environment in Australia. In particular, as the competitive restrictions on the federally-regulated banks were relaxed - opening hours, interest rates on deposits, percentage valuation on loans, etc. - the state-regulated building societies once sound niché market has been progressively eroded. Accordingly, by a process of merger and acquisition, and the procurement of banking licenses, the building society sector is now characterised by large regionally-based institutions.[1] The extent to which these modifications in the institutional and competitive environment have affected the efficiency of those institutions which remain, either willingly or unwillingly, is as yet unquantified. Second, unlike credit unions, which have achieved a high degree of interstate and industry-wide cooperation and integration, building societies have apparently failed to capitalise on the opportunities presented by changes in the fee structure of the major commercial banks. A similar line holds for the highly diversified property finance market. However, despite this, building societies still account for some six to seven percent by value of all housing finance, both construction and purchase. The issue thus arises as to whether technical efficiency is, at least a contributory factor in this scenario. Third, an adequate amount of statistical information is an obvious *sine qua non* for estimations of this type. Fortunately sets of extensive, comparable and consistent data exist for building societies; a requirement that is somewhat less likely to hold for Australian commercial banks for instance. Finally, there is some degree of correspondence between the situation facing Australian building societies and the decline of the US savings and loans (S&Ls) industry. In the latter's case, "the most often cited factors contributing to this downfall have been interest rate risk, deregulation, and the economic decline of specific geographic markets [and] more recently, the possibility of X-inefficiency in the use of inputs and outputs has been offered"

[1] Indeed, from 1978 to 1990 the number of individual societies fell from 153 to 52: even the in period 1993-1995, the number of individual societies fell from 39 to 28.

(Berger *et al.*, 1993). It is apparent that these same factors are also found in the Australian financial services industry.

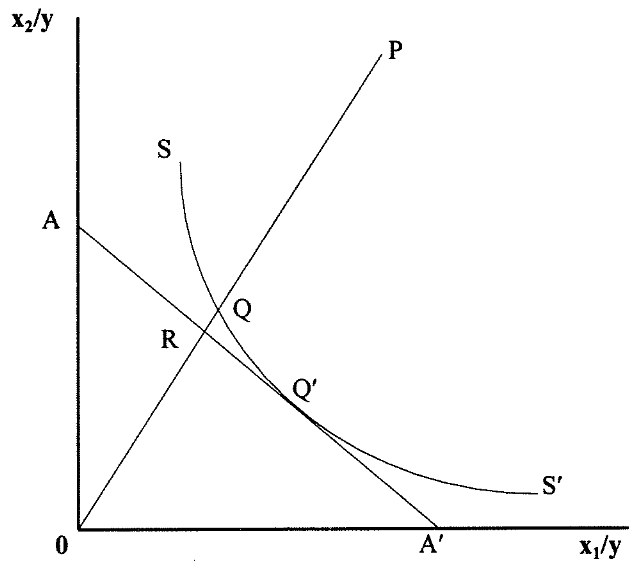
The paper itself is divided into four main areas. Section 2 provides a synopsis of the econometric techniques employed in evaluating financial institution efficiency. Section 3 deals with the empirical methodology employed in the current paper, and the results are discussed in Section 4. The paper ends with some brief concluding remarks in Section 5.

II. MODEL SPECIFICATION

The recent history of efficiency measurement begins with Farrell (1957) who defined a simple measure of firm efficiency which could account for multiple inputs. In this approach, Farrell (1957) proposed that the efficiency of any given firm consisted of two components: technical efficiency, or the ability of a firm to maximise output from a given set of inputs, and allocative efficiency, or the ability of a firm to use these inputs in optimal proportions, given the respective prices (Coelli, 1995, p. 2). Combining the two measures provides a measure of total or economic efficiency.

The essence of Farrell's (1957) argument may be derived from Figure 1 (Drake and Weyman-Jones, 1992, p. 2; Coelli, 1995, p. 3). Here two inputs, x_1 and x_2 are utilised to produce a single output y, under an assumption of constant returns to scale. The isoquant of the fully efficient firm SS' permits the measurement of technical efficiency. For a given firm using quantities of inputs defined by point P, to produce a unit of output, the level of technical efficiency may be defined as the ratio OQ/OP, "which is the proportional reduction in all inputs that could be theoretical achieved without any reduction in input" (Coelli, 1995, p. 2). Point Q on the other hand is technically efficient since it already lies on the efficient isoquant. Extending the model when the input price ratio AA' is known, then allocative efficiency at point P is the ratio OR/OQ, where the distance RQ is the reduction in production costs which would occur if production occurred at Q' - the allocatively and technically efficient point, rather than Q - the technically efficient, but allocatively inefficient point. Hence, the total economic efficiency is the ratio OR/OP, with the cost reduction achievable being the distance RP. Attempts to estimate the efficient isoquant under a number of alternative assumptions are the subject of significant and protracted debate; suitable surveys are to found in Førsund, Lovell and Schmidt (1980), Seiford and Thrall (1990), Greene (1993), Lovell (1993), Bauer *et al.*, (1993), and Ali and Seiford (1993).

Figure 1. *Technical and Allocative Efficiencies*



In terms of the estimation technique which follows, the Battese and Coelli (1993) stochastic frontier cost function approach using panel data, is employed.[2] As shown in Table 1, the most notable features of this model are: (i) the estimation of a cost, rather than a production function, (ii) the use of panel, or pooled time-series, cross-sectional data, and (iii) the use of firm-specific variables to identify the sources of technical inefficiency.[3]

In the first instance, an alternative dual form - such as a cost or profit function - of the production technology is to be preferred for at least two reasons. First, more often than not the explicit assumption of the production function approach that input levels are fixed, and that managerial inputs are attempting to maximise output, will not hold. In particular, one would expect that for a financial institution, such as a building society, the imposition of capital adequacy requirements would tend to restrict the amount of output possible in any one time period. Hence, a suitable behavioural objective for these institutions would be that of cost minimisation, rather than output maximisation. Second, building societies are multiple output concerns, encompassing both loans (consumer, property, commercial) and investment in financial assets (cash, governmental securities,

[2] "In this cost function the Ui[t] now defines how far the firm operates above the cost frontier. If allocative efficiency is assumed, the Ui[t] is closely related to the cost of technical inefficiency...thus we shall refer to efficiencies measured relative to a cost frontier as 'cost' efficiencies" (Coelli, 1994, p. 6).

[3] A three-step estimation procedure is employed in the model. These are: (i) OLS estimates of the function are obtained, (ii) the conduct of a two-phase grid search set to the OLS values, and (iii) these values are used as starting values in an iterative procedure to obtain maximum likelihood (ML) estimates.

bank bills and negotiable certificates of deposit). The argument for a cost function is enhanced *a fortiori,* given the necessity of integrating multiple financial outputs (Cebenoyan *et al.*, 1993; Mester, 1987, 1993; McKillop and Glass, 1994; Piesse and Townsend, 1995).

Table 1. *Econometric Cost Function Incorporating Technical Efficiency Effects*

$Y_{it} = x_{it}\beta + (V_{it} + U_{it})$	$i = 1,....,N$, $t=1,....,T$. for N firms and T time periods.
where	Y_{it} is the logarithm of the total cost of production of the i-th firm in the t-th time period;
	x_{it} is a $k\times1$ vector of transformations of the input prices (P) and output (Q) of the i-th firm in the t-th time period;
	β is a vector of unknown parameters;
	V_{it} are random variables assumed to be iid $N(0,\sigma_v^2)$ and independent of
	U_{it} which are non-negative random variables assumed to account for the cost of technical inefficiency in production and are assumed to be independently distributed as truncations at zero of the $N(m_{it}, \sigma_U^2)$ distribution; where:
	$m_{it} = z_{it}\delta$ is a $p\times1$ vector of variables (Z) which may influence the efficiency of a firm; and δ is an $1\times p$ vector of parameters to be estimated.

In the second instance, panel - or pooled time-series, cross-sectional - techniques offer a number of advantages over traditional cross-sectional estimations. Not least amongst these is: the ability to increase the degrees of freedom for parameter estimations; the provision of consistent estimators of firm efficiencies; the removal of the necessity to make particular assumptions about the behaviour of cost efficiencies, and the ability to simultaneously investigate the impact of technical change and technical efficiency over time (Coelli, 1995, p. 8). In the case of building societies, the small number of institutions, and the relative importance of technological advances in the industry, point to the use of this data form (Cornwell, Schmidt and Sickles, 1990; Atkinson and Cornwell, 1993).

Finally, not content with merely estimating firm-level efficiencies, many studies have attempted to identify the sources of said inefficiencies. More often than not, this has involved regressing the predicted inefficiencies on firm-specific variables, such as managerial inputs, agency issues, and financial structure (Cebenoyan *et al.*, 1993; Mester, 1993). Given that this "..two-stage estimation procedure is unlikely to provide estimates which are as efficient as those that could be obtained using a single-stage estimation procedure" (Coelli, 1994, p. 6), the Battese and Coelli (1993) model incorporating technical efficiency effects is selected.

III. HYPOTHESES

Quarterly data for twenty-two continuously operating building societies in the period September 1992 to September 1995 is obtained from the Australian Financial Institutions Commission (AFIC). Primarily in the form of quarterly profit and loss (income) statements and balance sheets, this information provides all inputs necessary for the calculations detailed in Table 2.

Table 2. *Model and Variables*

Model

$$\ln(TC_{it}/P3_{it}) = \beta_0 + \beta_1\ln(Q1_{it}) + \beta_2\ln(Q2_{it}) + \beta_3\ln(Q3_{it}) + \beta_4\ln(Q4_{it}) + \beta_5\ln(P1_{it}/P3_{it}) + \beta_6\ln(P2_{it}/P3_{it}) + (V_{it} + U_{it})$$

Variable	Name	Parameter	Description
TC	Total cost		Operating + interest expenses of the i-th building society in the t-th time period (\$).
Q1	Personal loans	β_1	Personal loans and consumer credit facilities (\$) held by the i-th building society in the t-th time period (\$).
Q2	Property loans	β_2	Property and real estate loans held by the i-th building society in the t-th time period (\$).
Q3	Commercial loans	β_3	Commercial loans held by the i-th building society in the t-th time period (\$).
Q4	Other securities	β_4	Governmental securities, BBs and NCDs, deposits with other building societies and banks, held by the i-th building society in the t-th time period (\$).
P1	Price of physical capital	β_5	Sum of physical capital expenditures (office and equipment expenses, etc.) divided by the book value of net total office premises and equipment (including office buildings and land, leasehold improvements, furniture and fixtures, capitalised leases) the i-th building society in the t-th time period.
P2	Price of deposits	β_6	Total interest expense divided by total deposits and other borrowings for the i-th building society in the t-th time period..
P3	Price of labour		Total expenditures on employees divided by the number of full-time equivalent (FTE) employees for the i-th building society in the t-th time period.
Z1	Assets	δ_1	Total financial and nonfinancial assets of the i-th building society in the t-th time period.
Z2	Capital	δ_2	Total capital divided by total assets of the i-th building society in the t-th time period.
Z3	Branches	δ_3	Number of branches operated by the i-th building society in the t-th time period.
Z4	Agencies	δ_4	Number of agencies operated by the i-th building society in the t-th time period.
Z5	Time	δ_5	Time trend
Z6	Commercial	δ_6	Total commercial loans held divided by total assets of the i-th building society in the t-th time period.

The variables selected follow the intermediation approach to financial institution operations (Elyasiani and Mehdian, 1990; Hardwick, 1990; Drake and Weyman-Jones, 1992; Cebenoyan *et al.*, 1993; Piesse and Townsend, 1995).[4] Under this approach, a financial institution, in this case, a building society, "...uses physical capital, deposits and other borrowings, and labour as inputs to produce earning assets as outputs" (Cebenoyan *et al.*, 1993, p. 157). Given the model detailed above, building societies are thus characterised as incurring operating and interest costs (TC), whilst producing four categories of output (Q), using three input prices (P), and operating under six selected explanatory variables (Z). The incorporation of the first three categories of variables closely follows Drake and Weyman-Jones (1992), Cebenoyan *et al.* (1993), and Piesse and Townsend (1995). The model is estimated using a Cobb-Douglas formulation.[5] To impose the appropriate linear homogeneity in input price restrictions, total costs (TC), the price of deposits (P2), and the price of physical capital (P1) are normalised by dividing them by the price of labour (P3) (Mester, 1993: Cebenoyan *et al.*, 1993). The specification of the error structure is found in Table 1.[6]

The six explanatory variables are included to identify sources of technical inefficiency in Australian building societies. The first variable, total assets (Z1), is intended to control for the overall size of a building society (Hardwick, 1990; Drake and Weyman-Jones, 1992; Mester, 1993). It may be argued that larger building societies direct more managerial inputs into identifying and resolving technical inefficiency; *ex ante* one would expect a negative coefficient when cost inefficiency is regressed against total assets. The second explanatory variable included is the firm's capital to asset ratio (Z2). All other things being equal, "moral hazard theory suggests [the capital asset ratio] should be inversely related to inefficiency" (Mester, 1993, p. 282). The number of branches (Z3) and agencies (Z4) of each building society are also included, generating two somewhat conflicting hypotheses. The first is that under the intermediation approach, branches and

[4] In the alternative production approach, financial institutions utilise capital and labour inputs to produce the outputs of loans and deposit accounts. Outputs are measured by the number of deposit and loan accounts, and costs include operating expenses, but exclude interest. The intermediation approach is preferred on the basis that it; (i) incorporates all expenses (of which interest expenses are generally the most significant), and (ii) recognises that deposits are more accurately inputs into financial intermediation, rather than outputs (Elyasiani and Mehdian, 1990, p. 543).

[5] Whilst the Cobb-Douglas functional form is the most commonly used in frontier estimation - largely due to its simplicity - it does suffer a number of restrictions. "Most notably, returns to scale are restricted to take the same value across all firms in the sample, and the elasticities of substitution are assumed equal to one" (Coelli 1995: 6). An alternative functional form for financial institutions is the translog, as detailed in Mester (1987) and Cebenoyan *et al.* (1993), amongst others.

[6] A primary characteristic of the stochastic frontier methodology is a two-component error structure. One component represents random, uncontrollable factors (V_{it}), whilst the second component measures the individual firm deviation due to factors within a manager's control, such as technical and allocative efficiency (U_{it}).

agencies are recognised as "...central to the intermediation process for most building societies, it may also be the case that differences in the intensity of branching may be an important factor" (Drake and Weyman-Jones, 1992, p. 5). Accordingly, the number of branches are closely related to the level of financial intermediation provided - a negative coefficient is inferred. The second hypothesis is that the number of branches and agencies are a critical, and possibly negative factor, in the ability of head offices to promote technically efficient behaviour. In this case, we would expect a positive coefficient, *ceteris paribus.*[7] The next variable (Z5) is a time trend to identify the general direction of changes in efficiency/inefficiency over the period in question. The coefficient would necessarily depend on the relative impact of technological change over the period, and the impact of institutional and structural considerations, amongst other factors. No *a priori* coefficient is postulated. Finally, the extent of non-core lending activity is proxied by the level of commercial loan activity (Z6). The hypothesis here is that exposure to non-core loan activity may serve to "impose market discipline" (Mester, 1993, p. 282) on building society managers - thus a negative coefficient is hypothesised.

IV. RESULTS

The maximum-likelihood estimates for the parameters of the normalised Cobb-Douglas cost frontier detailed in Table 2 are presented in Table 4. All of the parameter estimates for this model are significant and conform to *a priori* expectations. The parameter estimates for the stochastic frontier cost function indicate the elasticity for personal loans to be 0.02, commercial loans 0.01, property loans 0.31, and other securities 0.49. The elasticity for the input prices of physical capital and deposits are -0.09 and -0.34 respectively.

Sample inefficiency scores using the calculations in Table 1 are presented in Table 3. In terms of building society efficiency, the stochastic cost function technique employed produces efficiency scores ranging from unity to infinity ($1 < EFF_{it} < \infty$); in economic terms the inefficiency scores presented ($EFF_{it} - 1$) indicate how far above the cost function the building society is operating.[8] As shown in Table 3, the mean inefficiency score varied in four sample quarters from 0.104 to 0.178

[7] A further view exists that "...building society branching should be regarded as an output jointly supplied with accounts...more branches improve the accessibility of building society services" (Hardwick, 1990, p. 451).

[8] The measure of cost efficiency relative to the cost frontier is defined as: $EFF_{it} = E(\exp(Y_{it}^*)|U_{it},X_{it}) / E(\exp(Y_{it}^*)|Uit=0,X_{it})$, where $\exp(Y_{it}^*)$ is the cost of the i-th firm.

(cost inefficiencies of 10.4 to 17.8 percent); the overall mean inefficiency for the entire sample being 0.152 - suggesting that the typical building society produces its products at a cost that is approximately 15.2 percent greater than necessary during the period in question. The scores during the entire thirteen quarters ranged from 0.000 to 0.610 indicating a wide variety of inefficiency in the building society sample. However, there does appear to be some consistency in ranking, as shown in Table 3. In particular, trends exist in efficiency ratings, more than likely the result of fixed managerial inputs. Moreover, there has been a general improvement in both the average level of efficiency, and level of dispersion of efficiency, during the period in question. Whilst these results are consistent with those of Cebenoyan *et al.* (1993), Mester (1993), and others in the analysis of non-bank financial institution efficiency, variance in samples and estimation techniques precludes valid comparison.

Table 3. *Selected Efficiency Scores and Ranks*

Institution	Sept-92	Rank	Sept-93	Rank	Sept-94	Rank	Sept-95	Rank
1	0.091	8	0.094	5	0.140	10	0.116	14
2	0.169	17	0.207	19	0.234	17	0.147	21
3	0.073	5	0.074	3	0.092	4	0.093	8
4	0.181	18	0.169	16	0.252	18	0.223	22
5	0.189	19	0.245	20	0.380	21	0.142	20
6	0.067	3	0.082	4	0.114	6	0.093	8
7	0.233	21	0.152	15	0.185	15	0.072	5
8	0.111	14	0.100	7	0.187	16	0.077	7
9	0.079	6	0.104	9	0.119	8	0.076	6
10	0.108	13	0.187	18	0.163	14	0.124	16
11	0.119	15	0.133	11	0.328	20	0.062	3
12	0.194	20	0.248	21	0.322	19	0.096	11
13	0.370	22	0.334	22	0.452	22	0.128	17
14	0.079	6	0.095	6	0.133	9	0.100	12
15	0.071	4	0.181	17	0.151	13	0.120	15
16	0.097	10	0.116	10	0.112	5	0.094	10
17	0.100	11	0.150	14	0.075	3	0.055	2
18	0.102	12	0.100	7	0.148	11	0.136	19
19	0.160	16	0.149	12	0.118	7	0.132	18
20	0.054	2	0.060	2	0.068	2	0.065	4
21	0.091	8	0.149	12	0.150	12	0.110	13
22	0.000	1	0.000	1	0.000	1	0.045	1
Mean	0.124		0.142		0.178		0.105	
Std. Dev.	0.077		0.073		0.109		0.040	
Maximum	0.370		0.334		0.452		0.223	
Minimum	0.000		0.000		0.000		0.045	

Following the Battese and Coelli (1993) technical efficiency approach, the relationship between firm inefficiency and building society organisational form is also evaluated in Table 4. The signs of all six variables conform to their *a priori* coefficients, with only the coefficient on assets being insignificant. The null hypothesis that the inefficiency effects are absent from the model (H_0: $\gamma = \delta_1 = \delta_2 = \delta_3 = \delta_4 = \delta_5 = \delta_6 = 0$) is rejected using the generalised likelihood-ratio test statistic with chi-square distribution found in Battese and Coelli (1993, p. 12). Likewise, the null hypothesis that the inefficiency is not a linear function of the explanatory effects (H_0: $\delta_1 = \delta_2 = \delta_3 = \delta_4 = \delta_5 = \delta_6 = 0$) is also rejected.[9]

Table 4. *Maximum-Likelihood Estimates*

Parameter	Variable	Coefficient	Standard Error
β_0	CONSTANT	-14.8989	0.4382
β_1	Q1	0.0218	0.0050
β_2	Q2	0.3190	0.0819
β_3	Q3	0.0106	0.0044
β_4	Q4	0.4934	0.0949
β_5	P1	-0.0957	0.0125
β_6	P2	-0.3457	0.0119
σ^2_S	Sigma-squared	7.1993	0.9279
γ	Gamma	0.9873	0.0025
δ_1	Z1	-0.1424E-08	0.1036E-08
δ_2	Z2	-50.1782	3.5148
δ_3	Z3	-0.0896	0.0363
δ_4	Z4	0.0022	0.0006
δ_5	Z5	-0.3596	0.0477
δ_6	Z6	-63.3719	3.4775
Log (likelihood)		-300.6149	

A number of points can be made. First, it would appear that branch and/or agency networks have a dramatic impact om overall building society efficiency. In the case of extensive branch networks the ability of central offices to control costs and promote revenues is not mitigated, whilst the reverse would seem to hold for building societies which rely on agencies. The results contrast sharply with Cebenoyan *et al.* (1993) who found the coefficient associated with the number of branches to be insignificant. Second, the negative coefficient of the time variable suggests that the cost efficiency of Australian building societies has improved. Associated with this observation, one may recognise the possible influences of technological advances, as well as the changing institutional and competitive structure of the industry. Drake and Weyman-Jones (1992, p. 6)

[9] The parameters $\sigma^2_S \equiv \sigma^2_V + \sigma^2$ and $\gamma \equiv \sigma^2 / \sigma^2_S$ are associated with the variances of the random variables, V_{it} and U_{it} respectively (Battese and Coelli, 1993, p. 12).

rationalise similar findings in the UK scenario "as an indication that the intensification of competition...and the associated increase in merger activity has resulted in a marked improvement in the overall level of efficiency within the building society industry". Third, in terms of assets, larger organisations do not appear to have a significant advantage in managing institutional operations. This accords with Cebenoyan *et al.* (1993, p. 164) where "inefficiency differences across [non-bank financial institutions] does not appear to be related to firm size". However, this finding must to some extent be qualified by the positive impact of branches - a condition most likely to be found in firms with larger assets. Fourth, the coefficient on capital/assets accords with the "moral hazard" view of firm behaviour. As detailed by Mester (1993, p. 283) in the case of US thrifts, higher levels of capitalisation are associated with higher levels of efficiency. Finally, the coefficient for commercial loans suggests that the discipline imposed by non-core assets has positive impacts for the efficiency of the building society in general , similarly to the results of Mester (1993).

V. CONCLUDING REMARKS

The present study uses a stochastic econometric cost frontier approach to investigate the efficiency of Australian building societies during the period 1992 to 1995. The current paper extends existing empirical work in this area in three ways. First, it incorporates pooled time-series, cross-sectional data; permitting consistent estimators of firm efficiency, across both firms and time. Second, the study evaluates non-bank financial institution efficiency in an Australian context, complementing the existing US and UK institutional focus. Finally, the present paper incorporates a model for the single-stage estimation of inefficiency effects. The evidence provided suggests that, on average, Australian building societies operated at a high level of cost efficiency during the period in question. Moreover, it would appear that the overall level of efficiency has also improved over time. With the incorporation of technical efficiency effects, the paper also sheds some light on the relationships between financial institution efficiency and structure. In this respect, the evidence suggests that branch and agency networks, capital levels (and by insinuation, capital adequacy regulation), and non-core commercial activities have a significant influence on efficient outcomes.

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