Long-Term Effects of Firm Size on Life Insurer Mortgage Investment

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Abstract

In this paper the reoccurring question of whether the life insurance industry's largest insurers possess and benefit from unique mortgage investment opportunities is examined. A portfolio adjustment model is presented which incorporates mortgage commitment behavior. Using this model and data for 15 insurers, speed of adjustment parameters are estimated for each insurer. The speed of adjustment, which is utilized as a measure of mortgage lending efficiency, is found to be invariant with respect to insurer size. This evidence suggests that the likelihood of significant aggregation bias in previous econometric work on life insurer mortgage investment is quite low.

Amidst the vast and growing literature on bank and nonbank demand for financial assets, only a few studies have pursued questions concerning individual firm investment behavior. This preoccupation with aggregate analysis is surprising to the extent that the framework for financial modeling, first introduced by Meigs [23], DeLeeuw [12], and Goldfield [14], evolved from the fixed capital investment literature where models of aggregate behavior generally follow from investigations of how individual economic units behave.[1] To assume incorrectly that firms behave in much the same way will not, in accordance with the doctrine of positive economics, invalidate the theory underlying the model. To assume incorrectly homogeneous behavior among firms may, however, lead to specifications bias and inconsistent estimates of model parameters.

In this paper, the empirical question of homogeneous firm behavior is examined for life insurer mortgage lending activity. The purpose of the investigation is to consider the reoccurring question of whether certain ''very large" [26, p. 559, n.15] or "super large" [8, p. 269] life insurers possess and benefit from unique mortgage investment opportunities among firms in the industry. The examination is conducted using a partial adjustment model which specifically incorporates determinants of forward commitment behavior in the adjustment from desired to actual mortgage stocks. The empirical analysis uses annual data from 15 insurers over the period 1951 through 1977.

[1]'Jorgensen's [20] review of the fixed capital investment literature contains an excellent presentation of theory and the development of micro-level and macro-level empirical work prior to 1971.

Prior Considerations

The partial adjustment model of portfolio behavior is derived from the notion that firms incur disequilibrium costs in adjusting from actual to desired positions in their stocks of financial assets. A life insurer, for example, would impute the cost to itself of not being at a desired position and recognize that it faces proportionally higher costs for accelerating the rate of adjustment [32]. The model has the general form

$$(M - M_{-1}) = \lambda\ (M^* - M_{-1}) \qquad (1)$$

where M is the current stock of a financial asset, M_{-1} is the stock lagged one period, M* is the long-run equilibrium stock (desired) and λ is the speed of adjustment parameter.

Firm Size and Speed of Adjustment

The life insurance industry, like many other competitive industries, is characterized by a high concentration of wealth in a few firms. Of the 50 life insurers with the largest accumulation of assets in 1977, the preeminent firm (Prudential) had approximately 50 times the assets of the 50th largest firm (IDS Life) and seven times the assets of the tenth largest firm (Massachusetts Mutual) [11].[2] Moreover, among 1,762 life insurers operating in the United States during the same year, the top five firms controlled 44 percent of the assets and 42 percent of the industry's mortgage holdings [21].

This dimensional stratification may be reflected as structural differences in the mortgage investment equation of firms in two ways. First, super large insurers, given their

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[2] In comparison, the largest bank in the United States [Bank America] had only about 23 times the assets of the 50th largest bank [Mercantile Texas] and less than four times the assets of the 10th biggest bank [Western Bankcorp] [15].

prodigious flows of investible funds, are faced with the industry's "most pressing investment problem" [7, p. 109]. During those relatively infrequent periods of reduced demand for mortgage funds, these insurers may experience problems in maintaining a fully invested position in mortgages, thus implying slower speed of adjustment in their long-run equations.[3] In contrast, super large insurers are more often credited with having economic advantages in mortgage lending because of their ability to attract highly skilled analysts of the type required for ''income property'' investment [19, p. 521].[4] This capacity for direct lending on income properties has been cited as important in differentiating the investment behavior of super large insurers from other life insurers [8]. The advantage of direct lending is "its efficiency in terms of loan generation'' [8, p. 286] suggesting that super large insurers have been operating with comparatively rapid speeds of adjustment.

If these super-large insurers are able to effectuate more rapid speeds of adjustment, either by their ability to absorb the higher costs of faster rates or by some other special lending arrangements, they are uniquely positioned among firms in the industry to capitalize on opportunities in the mortgage market as well as to avoid its risks, particularly with respect to interest rate changes. Yet, such conclusions formulated on the basis of scale economies are contrary to the notion that mortgage markets are highly competitive. In a noncompetitive environment one would expect smaller life insurers, incurring

[3] While Robinson [30] concluded that the demand for mortgage funds was inconsequential in explaining aggregate mortgage flows from life insurers, a. recent analysis of data from the 1970's leads to the opposite conclusion [9].
[4] 'The proportion of life insurer forward commitments for new income property mortgages has increased from a level under 40 percent of all commitments in 1953 to over 90 percent in 1977 [28].

comparatively higher risks without commensurate returns, to be driven from the mortgage market.

Previous Research

No empirical studies are known to exist that specifically test for the presence of scale factors in the mortgage loan operation of life insurers. Stowe [35], using a chance-constrained partial adjustment model to explain the proportion of mortgages to total assets, found a negative coefficient on the lagged total assets variable indicating the absence of significant economies of scale in the life insurer mortgage loan function. This cross sectional, time series analysis, however, does not directly contrast the mortgage investment behavior of individual life insurers and suffers from a serious model misspecification in that it fails to consider adequately mortgage commitments.[5]

Conventional economies of scale investigations of life insurer operations and other financial institutions have contributed mixed findings. Benston [2], in a review of the research on commercial bank and savings and loan associations, surmises that consistent and significant economies of scale have been present in the overall operations of both types of financial institutions. Also, Benston [3], and Bell and Murphy [1] have presented evidence of scale economies in commercial bank real estate loan functions. Commercial banks, like life insurers, have concentrated on nonresidential and multifamily residential mortgage lending during the past two decades. From

[5] Supplies of mortgage funds from life insurers, and the proportion of mortgages to total assets in life insurer portfolios, are influenced by economic determinants at the time mortgage funds are committed and not, in any meaningful way, when they are disbursed. Lintner, Piper, and Fortune [22] estimate that between 90 and 95 percent of mortgage flows since 1960 originated from forward commitments.

studies of life insurer operations, Houston and Simon [16] and Pritchett [26, 27] present some evidence of economies of scale. Conclusions from these studies, however, are cautiously guarded. Pritchett [26] is careful to mention that the mean differences found in expense ratios for the various size categories are only summary findings of values which span the sample range in each category. Both Houston and Simon and Pritchett [27] find an L-shaped long-run average cost curve and determine that the optimum size of a life insurer lies in a range which encompasses all but the smallest firms in the industry. Finally, Geehan [13], in perhaps the most rigorous investigation of this type, rejects the idea of significant returns to scale in the Canadian life insurance industry, partially from mixed empirical evidence, but mainly on theoretical grounds.

Portfolio Adjustment Model

Theories of financial asset investment developed from fixed capital investment theory encounter two interrelated questions: (1) how the firm decides upon the desired stock of proportional share of its portfolio in a particular financial asset and (2) how the asset stock is adjusted when it differs from the desired level. In cases where funds are committed well in advance of disbursement, the specification of the portfolio adjustment model clearly becomes more problematic. Life insurers acquire most of their mortgages via forward commitments in keeping with the construction financing-permanent financing arrangements in real estate markets. Specifying the determinants of the desired stock of mortgages and the form of the adjustment process for life insurers, therefore, must be handled either by modeling commitment behavior directly or by formulating a distributed lag adjustment model from mortgage stocks.

Confronted with the problem of incorporating commitment behavior in a supply of residential mortgage funds equation for the FRB-MIT-Penn econometric model, Jaffee [18] adopted the former approach by estimating a commitment equation as an intermediate step to determining mortgage flows. The model used in the present study relies upon this conceptual formulation of life insurer mortgage investment behavior, but, for reasons given below, is reformulated as a distributed lag adjustment model of mortgage stocks.

Relationship of Mortgage Commitments to Mortgage Stocks

Following Jaffee, life insurers are assumed to have no significant control over prices in the mortgage markets, but do set premium rates and the composition of their portfolios so as to induce profit maximizing levels of deposits. The mortgage investment model depicts the determinants of forward commitments as essential antecedents of changes in residential mortgage stocks within a conventional stock adjustment framework.[6] The equation for desired mortgage stocks

$$M^* = [a_o + a_1(RM-RC)]D \tag{2}$$

makes the desired position a function of the intermediary's deposits, D, (actually policy reserves less policy loans for life insurers) and the difference between the mortgage interest rate, RM, and the rate on a competing asset, RC.[7]

[6] Although Jaffee [18] only modeled life insurer behavior for residential mortgage investment, the model has also been shown to apply to income property mortgage commitments [9].

[7] Three restrictive assumptions accompany equation (2). First, a single yield is used to measure returns on competing assets so as to avoid excessive multicolinearity. Second, the own rate and the opportunity rate are assumed to have opposite signs, but not equal in absolute value. Third, the scaling of mortgages by deposits excludes the equity base and other liabilities as long-run wealth constraints.

The equation for the desired change in mortgage stocks, written in the form of a partial adjustment model, includes the change in deposits, ΔD, 0as a short-run wealth constraint

$$\Delta M = g_o(M^* - M_{-1}) + g_1 \Delta D \tag{3}$$

where .ΔM is the change in the stock of mortgages, M* is the desired stock, ΔM is the stock of mortgages lagged one period, and ΔD is the change in deposits. Adding repayments, R, to both sides of equation (3) provides an expression for intended gross mortgage flows, ΔMg.

Since life insurers acquire a large proportion of their mortgage portfolios via forward commitments, the current volume of mortgages for a given period may not precisely coincide with the desired volume for the period. This is because current volumes are the result of (1) direct acquisitions, MM, (2) "take downs" of previously issued commitments, OC, and (3) take downs from new commitments, NC. By assuming that direct placements are in constant proportion to gross mortgage flows such that MM = b ΔMg and that take downs of new and outstanding commitments are also proportionally constant, the following identity for desired gross mortgage flows can be written:

$$\Delta Mg = b\ \Delta Mg + d\ NC + c\ OC_{-1} \tag{4}$$

where b ,c, and dare constants representing the proportions described above.

By substitution, the equation for new commitments can be presented as

$$NC = \frac{(1-b)g_o}{d} \left[a_o + a_1(RM-RC)D - M_{-1}\right] + \frac{(1-b)g_1}{d} \Delta D + \frac{(1-b)}{d} R - \frac{c}{d} OC_{-1} \tag{5}$$

The original intent was to estimate directly mortgage commitment equations for individual insurers, but unsuccessful attempts to obtain new and outstanding mortgage commitment data at the firm level made it necessary to pursue a slightly different course. The alternative approach, which relies upon the adjustment of mortgage stocks, imposes some limitations on the findings. These limitations, however, are not considered serious since the new model embodies the essential determinants of mortgage commitments and incorporates the lag between commitment and disbursement of mortgage funds.

Instead of making use of the identity for desired gross mortgage flows (4), the desired change in mortgage stocks (3) is now expressed as a distributed lag on current and prior changes to represent forward commitment activity

$$\Delta M = \sum_{i=0}^{N} \delta_i \, \Delta M_{t-1} \tag{6}$$

where δ is the lag parameter. If the duration of the lag is made sufficiently long, then the determinants of desired changes in mortgage stocks will fully reflect commitment behavior. The mortgage investment equation thus takes the following alternative form for purposes of empirical testing:

$$(M/A)_t = \sum_{i=0}^{N} \delta_i \, g_o \, a_o \, D_{t-i} + \sum_{i=0}^{N} \delta_i \, g_o \, a_i \, (RM-RC)_{t-i} + \sum_{i=0}^{N} \delta_i g_i \, \Delta D_{t-i} - (1-\lambda_i) \, M_{-1} + u_t \tag{7}$$

where $(M/A)_t$ is the stock of mortgages scaled by total assets, and u_t is a random error term

$$\lambda_i = \sum_{i=0}^{N} \delta_i \, g_o$$

Method and Empirical Results

The empirical analysis of firm size and mortgage investment behavior in the life insurance industry used annual data for 15 life insurers over the period 1951 through 1977.[8] The 15 insurers are the same firms that comprise the sample maintained by the American Council of Life Insurance for its mortgage commitment survey [17].[9] This set of life insurers is reasonably well suited for this type of investigation. The five largest insurers in the industry are included, each with over 15 billion dollars in assets, as well as five insurers with less than 3 billion dollars in assets.

Equation (7) is estimated for each of the 15 insurers in the sample. The variables are scaled by assets to remove unwanted dimensional characteristics that would appear in the coefficients if the equation were to be estimated in its present form.[10] The relevant opportunity rate for mortgage investment is posited to be the commercial paper rate [9]. Estimation is performed under the assumption that the error term follows a first-order autoregressive scheme (the Cochrane-Orcutt corrective procedure is implemented). Almon lags are used in estimating the distributed lag structures where the length of each lag is assumed to be three years. While this may seem excessive, the disbursement lag for nonresidential mortgages has

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[8] The data and sources are as follows: Stock of mortgages scaled by assets, (M/D), [4, 24], Deposits (policy reserves-policy loans), D, [4, 24], Forward commitment rate on commercial mortgages issued by life insurers, RM, [17], and Prime rate on four to six month commercial paper, RC, [28].

[9] These insurers, ranked in order of the dollar value of assets owned in 1978, are Prudential, Metropolitan, Equitable Life Assurance, New York Life, John Hancock Mutual, Connecticut General Life, Mutual of New York, Mutual Benefit, Penn Mutual, National Life and Accident (Nashville), Phoenix Mutual, National Life (Montpelier), Provident Mutual, and Fidelity Mutual. Five additional firms have recently been included.

[10] The fundamental concern lies with determining structural differences that exist in the firm's equations and not with the effects of size per se.

been shown to extend through eight quarters [25, p. 1113]. An end-point constraint is imposed at period t + 1 for each distribution and, after some experimentation, a second degree polynomial was selected for use in the analysis.

Long run trends in the relationship of mortgages to total assets for the sample of 15 life insurers are presented in Figure 1. Two distinct patterns emerge from the three graphs. First, a majority of the small insurers and the largest insurer (Prudential) have secularly reduced the proportion of mortgages in their portfolios since the late 1950's. The predominant behavioral pattern, however, has been an increase in the proportion from the early 1950's until the middle to late 1960's followed by a steady decline through the middle 1970's. Differentiating the insurers in the sample by their wealth of assets fails to distinguish recognizable patterns of long-run mortgage investment behavior. The five smallest insurers have changed the proportion of mortgages in their portfolios over time in much the same way as the super large insurer.

Results of the regressions for the 15 insurers are presented in Table 1.[11] In general, the distributed lag portfolio model performs well since standard errors are less than two percent for 13 insurers and less than five percent in all cases. Some equations, however, have consistently incorrect signs on the distributed lag parameters suggesting that this form of the model is not a correct specification in all cases. The estimates for the annual speed of adjustment parameters range from .8650 to 1.2224 for super large insurers, .8331 to 1.2670 for the

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[11] As an aid for interpreting Table 1, the estimated form of the Prudential (PRU) equation is given as

$$\begin{aligned} PRU\text{-}(M/A)_t = {} & .0099\, D_t + .0173\, D_{t-1} + .1844\, D_{t-2} + .3490\, D_{t-3} \\ & - .0018\, (RM\text{-}RC)_t - .0012\, (RM\text{-}RC)_{t-1} + .0019\, (RM\text{-}RC)_{t-2} \\ & + .0074\, (RM\text{-}RC)_{t-3} + .1048\, \Delta D_t + .1482\, \Delta D_{t-1} \\ & + .1301\, \Delta D_{t-2} + .0506\, \Delta D_{t-3} - (1-.9271)(M/A)_{t-1}. \end{aligned}$$

middle five firms, and .6988 to 1.4850 for the five smallest insurers.[12] In over one half of the cases, insurers in the sample fully adjusted the mortgage components of their portfolios to a desired position within one year. More importantly, the estimated speeds of adjustment are clearly within the same range for the group of super large insurers as for the other groups of insurers.

Conclusion

The main conclusion to be drawn from this investigation is that firm size, within the context of super large vis à vis other life insurers, has little effect upon mortgage investment behavior. Evidence in support of this conclusion is from two sources. (1) Long-term trends in the proportions of mortgages to total financial assets for 15 life insurers are invariant with respect to insurer size. Moreover, no evidence could be found to indicate that small life insurers are being systematically driven from the income property mortgage market. (2) Speeds of adjustment in the mortgage investment equations of the 15 life insurers are no different for super large insurers than for smaller life insurers in the long-run.

Though contrary to the findings of some related investigations of financial institutions, these results are consistent with those from recent empirical studies of life insurer operations. Most importantly, the evidence suggests that the likelihood of significant aggregation bias in previous econometric work on life insurer mortgage investment [5, 6, 10, 18, 22, 25, 29, 31, 33, 34, 35] is quite low.

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[12] Parameters greater than unity result from imposing a three year duration on the lag distributions. A three year duration was found to be necessary with annual data to capture the within period disbursement pattern.

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FIGURE I

Trends in the Proportion of Mortgage Stocks to Total Assets by Size Category for 15 Insurers

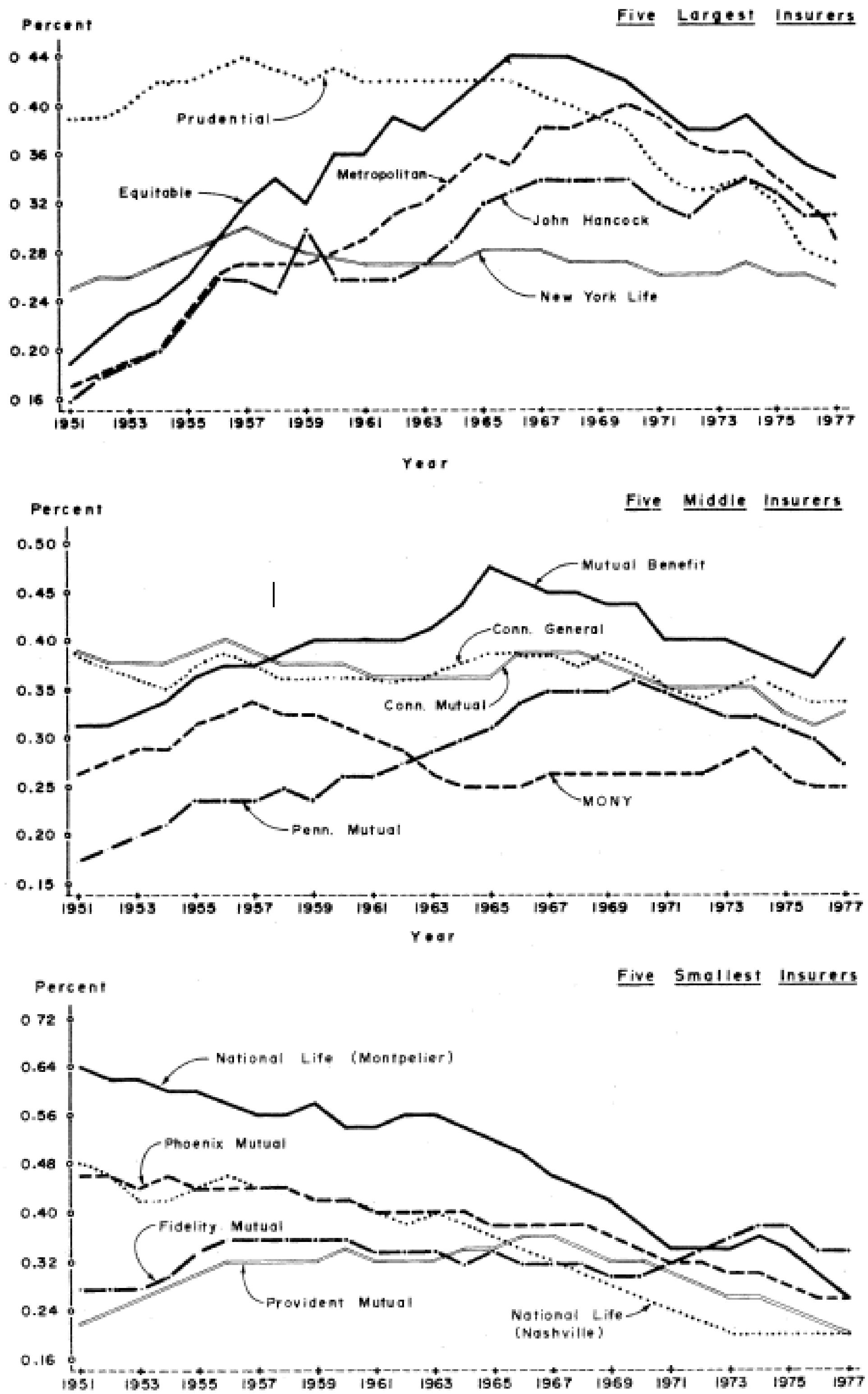

TABLE 1

Regression Results for Individual Insurers from
a Distributed Lag Portfolio Adjustment Model

Dependent Variable: Stock of Mortgages Scaled by Assets (M/A)

Insurer[a]	Coefficients[b] Intercept	D 0	D 1	D 2	D 3	D Sum	RM-RC 0	RM-RC 1	RM-RC 2	RM-RC 3	RM-RC Sum	AD 0	AD 1	AD 2	AD 3	AD Sum *	λ^c	R^2	D.W.	Rho	SE
1. PRU	-.3234	.0099	.0173	.1844	.3490	.6147	-.0018	-.0012	.0019	.0074	.0062	.1048	.1482	.1301	.0506	.4337	.9271	.9944	2.32	-.59	.0038
	(-4.51)	(.07)	(.50)	(3.00)	(1.74)	(3.01)	(-1.22)	(-.78)	(2.78)	(2.43)	(2.78)	(.83)	(.90)	(1.15)	(.42)	(1.01)					
2. MET	-.4756	.3761	.5133	.4115	.0708	1.3721	-.0007	-.0018	-.0035	-.0056	-.0116	.0872	.0024	-.2544	-.6833	-.8482	1.2224	.9627	2.12	-.32	.0089
	(.75)	(1.41)	(1.55)	(1.69)	(.20)	(1.69)	(-.39)	(-.756)	(-1.30)	(-1.46)	(-1.30)	(.250)	(.05)	(-.53)	(-1.30)	(-.53)					
3. EQU	.0790	.1722	.2233	1.536	-.0370	.5121	.0008	.0015	.0019	.0023	.0066	.1296	.1435	.0417	-.1757	.1391	.9295	.9810	2.59	-.76	.0079
	(2.24)	(6.26)	(6.94)	(9.84)	(-1.19)	(9.84)	(1.19)	(1.46)	(1.76)	(1.62)	(1.76)	(7.98)	(7.32)	(3.34)	(-8.59)	(3.35)					
4. NYL	-.0746	-.2422	-.2198	.0673	.6193	.2246	-.0009	-.0007	.0005	.0030	.0018	.3869	.4987	.3352	-.1032	1.17	1.0551	.9458	3.07	-.64	.0027
	(-1.29)	(-2.67)	(-2.18)	(.98)	(3.60)	(.98)	(-2.36)	(-1.65)	(1.71)	(4.27)	(1.71)	(2.81)	(2.85)	(2.95)	(-1.52)	(2.95)					
5. JHA	.8522	.0896	.1358	.1391	.0992	.4637	-.0067	-.0103	-.0108	-.0081	-.0360	-.1549	-.2462	-.2738	-.2378	-.9129	.8650	.8775	1.44	.00	.0113
	(2.29)	(.846)	(1.13)	(.983)	(.296)	(.983)	(-2.55)	(-2.51)	(-2.14)	(-1.21)	(-2.14)	(-.466)	(-.549)	(-.795)	(-2.72)	(-.795)					
6. CGE	.4313	-.1114	-.1184	-.0210	.1808	-.0700	-.0007	-.0019	.0036	-.0052	-.0114	-.0138	-.0109	.0085	.0448	.0286	1.2670	.8961	3.15	-.77	.0051
	(9.06)	(-1.40)	(-1.24)	(-.436)	(2.66)	(-.436)	(-1.18)	(-2.24)	(-4.87)	(-5.43)	(-4.87)	(-.281)	(-.166)	(.160)	(1.05)	(.160)					
7. MON	.3381	-.1116	-.1583	-.1402	-.0571	-.4674	.0011	.0007	-.0010	-.0043	-.0034	-.0129	-.0106	.0068	.0395	.0228	1.2055	.9692	2.26	-.38	.0049
	(1.89)	(-.743)	(-.841)	(-1.11)	(-.414)	(-1.11)	(1.03)	(.467)	(-.510)	(-1.71)	(-.510)	(-.124)	(-.082)	(.076)	(.303)	(.076)					
8. MBE	2.337	1.300	.5968	-2.111	-6.824	-.038	.0165	.0318	.0460	.0589	.1533	-3.151	-3.230	-.2361	.5831	-.7871	.8331	.7468	1.98	-.43	.0417
	(2.31)	(3.05)	(1.15)	(-3.19)	(-4.83)	(-3.19)	(1.82)	(2.94)	(5.00)	(3.15)	(5.00)	(-3.18)	(-2.79)	(-.427)	(5.23)	(-.427)					
9. CMU	-.5476	2.489	3.251	2.266	-.4068	7.621	.0188	.0273	.0255	.0133	.0851	.0907	.1037	.0390	-.1033	.1303	.8906	.3525	1.95	-.31	.0452
	(-.944)	(2.24)	(2.49)	(3.62)	(-.340)	(3.62)	(2.03)	(2.35)	(2.45)	(.735)	(2.45)	(.298)	(.254)	(.118)	(-.417)	(.118)					
10. FEN	-.7310	.2591	.8665	1.821	3.125	6.073	-.0094	-.0111	-.0050	.0088	-.0166	1.760	1.908	.4453	-2.629	1.484	1.1457	.9051	1.58	.84	.0199
	(-.811)	(.118)	(.331)	(1.19)	(1.19)	(1.19)	(-1.17)	(-1.02)	(-.566)	(1.35)	(-.566)	(.929)	(.807)	(.303)	(-1.99)	(.303)					
11. NLN	.0097	-.3235	-.2671	.1693	.9859	.5645	-.0000	.0013	.0042	.0086	.0141	.8982	1.295	1.190	.5846	3.968	.6988	.9847	2.12	-.38	.0116
	(.500)	(-.579)	(-.628)	(.624)	(1.15)	(.624)	(.029)	(.409)	(1.09)	(1.91)	(1.09)	(1.19)	(1.42)	(2.24)	(.690)	(2.24)					
12. PHM	.0734	.1876	.2492	.1848	-.0054	.6162	.0029	.0038	.0028	-.0000	.0066	.3383	.4417	.3103	-.0560	1.034	.8070	.9790	2.28	-.70	.0081
	(.862)	(.700)	(.781)	(1.04)	(-.017)	(1.04)	(1.51)	(1.34)	(.957)	(-.031)	(.957)	(1.32)	(1.28)	(1.13)	(-.295)	(1.13)					
13. NLM	-.8671	1.854	2.532	2.033	.3588	6.779	-.0016	.0032	-.0047	-.0061	-.0157	.2010	.1719	-.0875	-.5771	-.2917	1.4850	.9666	2.23	.39	.0191
	(-1.97)	(1.92)	(2.25)	(3.43)	(.292)	(3.43)	(-.504)	(-.733)	(-1.22)	(-1.36)	(-1.22)	(.206)	(.132)	(-.089)	(-.624)	(-.089)					
14. PRO	-.0764	-.1299	-.1536	-.0712	.1173	-.237	.0007	.0016	.0027	.0038	.0090	.0431	.0277	-.0462	-.1787	-.1540	1.0224	.9487	2.13	.01	.0095
	(-.278)	(-.421)	(-.460)	(-.354)	(.224)	(-.354)	(.479)	(.307)	(1.01)	(.720)	(1.01)	(.107)	(.055)	(-.125)	(-.909)	(-.125)					
15. PMU	.1566	.1567	.1496	0.0241	-.3564	-.0714	-.0001	.0006	.0025	.0053	.0084	-.0155	-.0896	-.2220	-.4129	-.7402	1.0712	.7701	2.56	-.20	.0094
	(1.46)	(.477)	(.399)	(-.099)	(-.659)	(-.099)	(-.137)	(.362)	(1.13)	(1.63)	(1.13)	(-.033)	(-.152)	(-.542)	(-.990)	(-.542)					

[a] See footnote 9

[b] Figures in parentheses are asymptotic t-statistics

[c] Adjustment coefficient (1 year)