# Unitary Thrifts:
# A Performance Analysis

by James B. Thomson

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## Introduction

**T**itle IV of the Financial Services Modernization Act of 1999 closed an important loophole in U.S. banking law: the unitary thrift holding company exemption from laws that prevented the mingling of banking and commerce.[1] The loophole had allowed nondepository institutions, including nonfinancial corporations, to own unitary thrift holding companies (UTHCs). Only depository institutions could own multiple bank and thrift holding companies or unitary bank holding companies. The period over which the exemption was in force provides us with the opportunity to examine the implications of commingling banking and commerce.

The focus of this paper is a comparison of the performance of thrifts in UTHCs with that of other thrifts. Because little stock market data on UTHCs is available, this study constructs performance measures using balance sheet and income statement data from Thrift Financial Reports.[2]

Overall, we find important differences between UTHC subsidiaries and other thrifts. UTHC thrifts tend to outperform other thrifts during the sample period studied. Moreover, UTHC thrifts appear to have more diversified revenues streams, loan and asset portfolios, and funding sources than do non-UTHC thrifts. Furthermore, differences do not

suggest UTHC thrifts pose a greater risk to the federal financial safety net; UTHC thrifts produce similar returns on book equity as non-UTHC thrifts but with higher levels of capitalization. Therefore, we find no evidence consistent with a need to close the UTHC loophole, which could reduce the contestability of banking markets. Overall, these results suggest that some limited commingling of banking and commerce might not pose undue risks to the federal financial safety net. But because thrifts have limited commercial lending powers, these results must be interpreted cautiously when evaluating less restrictive environments.

## I.  History of the Unitary Thrift Loophole

**H**olding companies grew in importance in the 1940s and early 1950s as banks used this organizational form to circumvent regulatory restrictions on branching and other activities. Most thrifts could not adopt the holding company form. Subsidiary depository institutions of the holding company had to be stock chartered, but most savings institutions—and all federally chartered thrifts—were

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■  **1**  Public Law No. 106-102.

■  **2**  Most UTHCs are wholly owned subsidiaries of larger organizations, so stock market data do not exist for these firms.

organized as mutuals. Nonetheless, thrifts that were stock-chartered used the holding company form.

Concerned about the growth of multibank holding companies, Congress passed the Bank Holding Company Act of 1956 to regulate them and extended the regulation to unitary bank holding companies in 1970. The regulations restricted the ownership of holding companies, their interstate expansion, and the activities permitted to nonbank subsidiaries. The Reigle-Neal Act of 1994 and the Financial Services Modernization Act of 1999 reduced or eliminated these restrictions, except the restrictions on ownership.

Congressional attempts to reign in the growth of thrift holding companies began with the Spence Act of 1959. This act placed a moratorium on the formation of multiple thrift holding companies and the acquisition of additional thrifts by existing holding companies. The act did not extend to multithrift holding companies that already existed, and it did not prohibit the formation of UTHCs or regulate their behavior. The 1967 Savings and Loan Holding Company Amendments removed the moratorium and subjected multithrift holding companies to regulation. Despite the objection of the Federal Home Loan Bank Board, the federal regulator of thrifts and thrift holding companies, Congress exempted UTHCs from regulation.[3]

Three factors likely played into the decision to exempt UTHCs from regulation. First, at the time thrift holding company regulations were enacted, unitary bank holding companies were also exempt from holding company regulation. Second, thrifts had very restricted lending powers, and allowing nondepository firms to own unitary thrift holding companies would not give rise to the concerns about conflict of interest and concentration of power that the commingling of commercial banking and commerce would.[4] Finally, rising interest rates in the second half of the 1960s threatened the solvency of a number of thrift institutions. Instead of acting to resolve the statutorily induced duration mismatch between thrift assets and liabilities, policymakers took a series of actions aimed at providing thrifts with access to inexpensive deposits—including extending Regulation Q ceilings to savings deposits in thrifts. In other words, policymakers limited the ability of small savers to earn positive real rates of return on their savings in order to assure the funding of the housing finance industry.[5] In this environment, it is not surprising that policymakers would continue to allow nondepository financial firms and nonfinancial firms (henceforth, nonbanks) to own UTHCs. The UTHC exemption would be viewed as a method of providing

additional sources of equity capital for the thrift industry as it provided a limited form of entry into banking by nondepository institutions.

## II. Empirical Strategy and Sample

**T**his paper investigates whether thrifts in UTHCs perform differently than other types of thrifts, and if so, why. It is possible that the UTHC form is a more efficient arrangement because it gives the firm greater flexibility in arranging links between commercial and banking activities. On the other hand, the links could give the thrifts an advantage only at the expense of taxpayers, by extending the federal financial safety net subsidy to the nondepository owners.[6]

We compare the earnings, leverage, and portfolio risk of UTHC thrifts and non-UTHC thrifts.[7] We also compare the performance of thrifts owned by depository and nondepository institutions. Ideally, we would directly test for differences in risk-adjusted return on equity and the likelihood of failure. However, using balance sheet and income data from Thrift Financial Reports precludes us from constructing direct measures of risk variables, and the sample period does not contain sufficient numbers of thrift closings to fit a hazard function to the data. Hence, our tests measure dimensions of risk and return using proxy variables that are drawn (in large part) from the bank performance and bank failure and early warning literature.[8] The list of variables used and their definitions appears in table 1.

The sample consists of all SAIF-insured thrift institutions that filed at least one complete OTS Thrift Financial Report between March 31, 1993, and December 31, 1999, and also were not in conservatorship. The sample period begins after the Thrift Financial Report was substantially revised as a result of the Federal Deposit Insurance Corporation Improvement Act of 1991 and ends before the UTHC exemption was closed by the Financial Services Modernization Act of 1999. Thrifts are divided into three groups, those in UTHCs, those in

■ **3**   See Office of Thrift Supervision (1998a, 1997).

■ **4**   See Office of Thrift Supervision (1998a) and Boyd, Chang, and Smith (1998).

■ **5**   See Kane (1970, 1977, and 1985, chapter 4).

■ **6**   The empirical strategy is similar to that used by Valnek (1999) to compare the performance of stock retail banks and mutual building societies in the United Kingdom.

■ **7**   For a discussion of alternative ways to gauge performance using accounting data, see Sinkey (1998, chapter 3).

■ **8**   See Cole (1972), Gillis et al. (1980), and Thomson (1991, 1992).

## T A B L E   1

### Variable Definitions

| | |
|---|---|
| CAPA | Equity capital/total assets |
| LAGCAPA | CAPA lagged one quarter |
| CLASSASM | Classified assets/earning assets |
| FEESHR | Fee income/operating income |
| FIXEDA | Fixed assets/total assets |
| FHLBADVA | Federal Home Loan Bank advances/total assets |
| INSDEPA | Insured deposits/total assets |
| INSLNA | Loans to insiders/total assets |
| INTSHR | Interest income/total income |
| LGAP (Liquidity gap) | Total cash, deposits due from depository institutions, and investment securities minus borrowings/total assets |
| LIABHERF (Liability Herfindahl index) | $10000 \cdot [(\text{deposits/total liabilities})^2 + (\text{borrowings/total liabilities})^2 + (\text{other liabilities/total liabilities})^2]$ |
| LNHERF (Loan Herfindahl index) | $10000 \cdot [(\text{credit card receivables/total loans})^2 + (\text{other consumer loans/total loans})^2 + (\text{home equity loans/total loans})^2 + (\text{commercial loans/total loans})^2 + (1\text{–}4 \text{ family mortgage loans/total loans})^2 + (\text{other mortgage loans/total loans})^2 + (\text{all other loans/total loans})^2]$ |
| MPSA | Mortgage pool securities/total assets |
| MDERA | Mortgage derivative securities/total assets |
| NIM | Interest income minus interest expense/earning assets |

| | |
|---|---|
| NTCHRGOF | Net charge-offs/earning assets |
| OVRHD | Operating expense/total assets |
| QTL | Mortgage-related assets/total assets |
| REGLIQR (Regulatory liquidity) | Liquid assets meeting criteria set forth by the Office of Thrift Supervision/total liabilities |
| ROA | Net income after taxes and extraordinary items/total assets |
| ROE | Net income after taxes and extraordinary items/common equity |
| SBLA | Total small business loans/total assets |
| SIZE | Natural log of total assets |
| SUBDEBTA | Subordinated debt/total assets |
| TIER1CAP | Tier 1 capital/total assets |
| TRUSTA | Trust assets/total assets |

### Intercept and Slope Dummy Variables

| | |
|---|---|
| DUMUT | 1 if thrift is in a UTHC, 0 otherwise |
| DUMUD | 1 if thrift is in a UTHC owned by a depository institution, 0 otherwise |
| DUMUN | 1 if thrift is in a UTHC owned by a nondepository institution, 0 otherwise |
| XXXXUT | XXXX • DUMUT |
| XXXXUD | XXXX • DUMUD |
| XXXXUN | XXXX • DUMUN |

multithrift holding companies, and independent thrifts. Thrifts in the UTHC sample were further partitioned into two groups according to affiliation, using the Office of Thrift Supervision's holding company file. The first consists of UTHCs owned or controlled by depository institutions (henceforth, banks), and the second consists of thrifts in UTHCs that are affiliated with nonbanks.[9]

## III.  Results

### Differences in Return on Equity

The simplest method for evaluating performance is to examine differences in return on equity (ROE) across the different types of thrifts in the sample. As seen in table 2, the ROE of thrifts owned by UTHCs does not differ significantly from that of other thrifts during the full sample period. But when assessing whether the UTHC loophole represented a dangerous mixing of banking and commerce, differences across UTHCs by ownership

■ **9**  The thrift holding company database can be found on the Office of Thrift Supervision Web site, <www.ots.treas.gov/applications.html>.

**T A B L E   2**

**Return on Equity**

|  | Non-UTHC Thrifts | UTHC Thrifts | Nonbank UTHCs | Bank UTHCs |
|---|---|---|---|---|
| Mean | 0.0181 | 0.0200 | 0.0251 | 0.0195 |
| Std. error | 0.0013 | 0.0016 | 0.0020 | 0.0017 |
| P-value | 0.3566 | | 0.0375 | |

SOURCES: Office of Thrift Supervision, Thrift Financial Reports; and author's calculations.

**T A B L E   3**

**Components of ROE**

**ROA**

|  | Non-UTHC Thrifts | UTHC Thrifts | Nonbank UTHCs | Bank UTHCs |
|---|---|---|---|---|
| Mean | 0.0018 | 0.0019 | 0.0028 | 0.0018 |
| Std. error | 0.0000 | 0.0001 | 0.0008 | 0.0001 |
| P-value | 0.3680 | | 0.2561 | |

**CAPA**

|  | Non-UTHC Thrifts | UTHC Thrifts | Nonbank UTHCs | Bank UTHCs |
|---|---|---|---|---|
| Mean | 0.1037 | 1.1110 | 0.1621 | 0.1061 |
| Std. error | 0.0004 | 0.0010 | 0.0079 | 0.0007 |
| P-value | <0.0001 | | <0.0001 | |

SOURCES: Office of Thrift Supervision, Thrift Financial Reports; and author's calculations.

does not provide sufficient information to understand the underlying factors driving the performance of earnings measures such as ROE. For example, the higher ROE for UTHCs owned by nondepository firms may reflect a conflict of interest arising from the commingling of banking and commerce (albeit on a limited basis), a superior set of real options held by the nondepository UTHCs, or simply a higher degree of leverage employed by these firms.

### Differences in Return on Assets and the Ratio of Capital to Assets

The first step in sorting out the different possible influences on ROE is to decompose it into its main components: return on assets (ROA) and the amount of capital per dollar of assets (CAPA).

$$(1) \qquad ROE = \frac{ROA}{CAPA}$$

The optimum degree of risk borne by a firm is a function of the risks emanating from its asset portfolio and the degree of leverage employed. Equation (1) illustrates how ROE is driven by these two simultaneous sets of decisions by the thrift's management, with the investment/operating decision represented by ROA and the financing decision embodied on CAPA.

Overall, the first stage of ROE decomposition reported in table 3 suggests that thrifts in UTHCs, particularly those in UTHCs owned by nonbanks, perform better because they have higher ROA, not higher leverage. While we can't reject the hypothesis that higher risk produced the higher ROE, these univariate results are not consistent with increased leverage driving the results. The first column of table 3 shows that the difference in ROA between UTHC thrifts and non-UTHC thrifts is not statistically significant. UTHC thrifts have higher capital-to-asset ratios than non-UTHC thrifts, and the difference is significant during the sample period.

Insignificant differences in ROE and the significantly higher level of CAPA for the UTHC thrifts relative to other thrifts suggest that performance-related differences between UTHC thrifts and non-UTHC thrifts are due to differences in ROA. That is, differences in performance across these two samples are driven by differences in operating/investment decisions and not by leverage. A comparison of tables 2 and 3 shows that in all three samples, higher ROE is accompanied by lower leverage (higher CAPA).

Similar results hold for the two UTHC subsamples. Thrifts in nonbank UTHCs have higher ROA, although the difference is not statistically significant, and they have significantly higher CAPA. Taken together, these findings suggest that important differences in performance exist across the UTHC

type are probably more relevant. After all, ownership of a UTHC expands the set of activities a nondepository institution can engage in, while UTHC ownership by banks and thrifts represents a more modest expansion of their existing franchise. Thrifts in nonbank-UTHCs outperformed thrifts in bank-UTHCs during the sample period, and the difference is significant.

Unfortunately, simple comparisons of ROE can be misleading. Given the positive relationship between risk and required return, a higher ROE may simply reflect higher risk. Even after controlling for risk, comparing the ROE of the different subsamples

subsamples, and these differences are related to operating and investment decisions. Decomposing ROE further should tell us more about how ROA affects ROE.

## Differences in the Factors That Affect Return on Assets

The second stage of the ROE decomposition examines the underlying controllable factors that drive ROA—business mix, income production, asset quality, expense control, and tax management—by specifying and estimating the following equation:

$$
\begin{aligned}
(2)\ \mathrm{ROA}_{it} =\ & \beta_0 + \beta_1 \mathrm{NIM}_{it} + \beta_2 \mathrm{NTCHRGOF}_{it} \\
& + \beta_3 \mathrm{OVRHD}_{it} + \beta_4 \mathrm{SIZE}_{it} \\
& + \beta_5 \mathrm{LAGCAPA}_{it} + \beta_6 \mathrm{FEESHR}_{it} \\
& + \beta_7 \mathrm{LGAP}_{it} + \beta_8 \mathrm{QTL}_{it} + \beta_9 \mathrm{INSDEPA}_{it} \\
& + \beta_{10} \mathrm{DUMUT}_{it} + \beta_{11} \mathrm{NIMUT}_{it} \\
& + \beta_{12} \mathrm{NTCHRGOFUT}_{it} \\
& + \beta_{13} \mathrm{OVRHDUT}_{it} + \beta_{14} \mathrm{SIZEUT}_{it} \\
& + \beta_{15} \mathrm{LAGCAPAUT}_{it} + \beta_{16} \mathrm{FEESHRUT}_{it} \\
& + \beta_{17} \mathrm{LGAPUT}_{it} + \beta_{18} \mathrm{QTLUT}_{it} \\
& + \beta_{19} \mathrm{INSDEPAUT}_{it} + \varepsilon_{it}
\end{aligned}
$$

Table 1 explains how these variables were constructed. To proxy for business mix, we included variables for the proportion of a thrift's assets that are mortgage related (QTL), the proportion of its funding that comes from insured deposits (INSDEPA), the proportion of its income that comes from fee-based services (FEESHR), and the size of its liquidity gap (LGAP). Asset quality is captured by the proportion of net charge-offs to interest-earning assets (NTCHRGOF), although this variable may also be related to tax management or expense preference behavior—where the reporting of losses is delayed until profits are higher than average to reduce taxes (see Greenwalt and Sinkey [1988]). Income production is proxied for primarily by the spread between interest income and interest expense scaled by average assets (NIM), although income from fee-based services (FEESHR) may also be related. The ratio of operating expenses to assets (OVRHD) is included to capture expense control. We included a measure of the relative size of the thrift's overall balance sheet (SIZE) because economies of scale may play a role in providing a number of financial products and services. The previous quarter's capital-to-asset ratio (LAGCAPA) is included because the investment/operating decision and the financing decision of depository institutions are not independent. To test the hypothesis that earnings-related measures of performance don't differ across the groups of thrifts, we include intercept and slope dummy variables for the thrift type. For thrifts in the UTHC sample, the effect of each independent variable is measured by combining its coefficient and the coefficient on the corresponding dummy variable.

Equation (2) is estimated using ordinary least squares. The results are presented in table 4 and appear to reject the hypothesis that no performance differences exist, as the coefficients on all the dummy variables except the proportion of mortgage-related assets (QTLUT) are significant at the 1 percent level. A closer inspection of the results, however, is needed to ascertain whether performance-related differences stem from extensions of the federal safety net or an increased set of options available to UTHCs. To do this, we examined differences between UTHC and non-UTHC thrift ROA as captured by the proxies for business mix, asset quality, and the financing decision.

The regression results show business mix is important in determining the earnings performance of thrifts; all of the variables that proxy for this factor are significant. Three of the four corresponding dummy variables are significant and of opposite sign, indicating that differences in business mix between thrifts in UTHCs and other thrifts drive differences in earnings performance. In fact, the dummy variables for fee income and liquidity gap are larger in absolute value, meaning these variables affect ROA in opposite ways and to different degrees depending on the type of thrift.

Non-UTHC thrifts appear to have lower ROA if they rely more heavily on fee income for revenues (FEESHR is negative and significant). One should be careful, however, in interpreting these results in terms of performance. If fee income and interest income are sufficiently uncorrelated, thrifts with higher levels of fee income may have less variable revenues and higher risk-adjusted returns. However, the coefficient on FEESHRUT and the combined effect of FEESHR for UTHC thrifts is significantly positive. The different relationship between FEESHR and earnings for UTHC thrifts may trace to scale economies in the production of fee-based lines of business—the mean of SIZE for UTHC thrifts is significantly larger than for non-UTHC thrifts during the sample period—or to economies of scope and cross-selling opportunities with other businesses conducted in the holding company or by its parent firm. If we accept the argument that fee income is not highly correlated with interest income—that is, fee income reduces the variability of revenues—then the fact that fee-based services generate better performance for UTHC thrifts than for other thrifts is not consistent with the hypothesis that performance differences trace to increased risk and safety-net subsidies.

The positive and significant sign on LGAP suggests that non-UTHC thrifts benefit from the flexibility option associated with liquidity (as measured by the difference between liquid assets and short-term nondeposit liabilities), and they perform better the higher it is. For UTHC thrifts, liquidity

**Dependent Variable: ROA**

|  | Coefficient | t-Statistic | Prob > t |
|---|---|---|---|
| Intercept | −0.0014 | −2.26 | 0.024 |
| NIM | 0.6308 | 83.58 | <0.0001 |
| NTCHRGOF | 0.0895 | 13.00 | <0.0001 |
| OVRHD | −1.0328 | −126.68 | <0.0001 |
| SIZE | 0.0001 | 2.90 | 0.0037 |
| LAGCAPA | 0.0127 | 23.69 | <0.0001 |
| FEESHR | −0.0002 | −1.95 | 0.0517 |
| LGAP | 0.0023 | 8.38 | <0.0001 |
| QTL | 0.0013 | 3.62 | 0.0003 |
| INSDEPA | −0.0012 | −8.40 | <0.0001 |
| DUMUT | −0.0131 | −9.59 | <0.0001 |
| NIMUT | 0.4028 | 13.70 | <0.0001 |
| NTCHRGOFUT | −0.2689 | −31.15 | <0.0001 |
| OVRHDUT | 1.0474 | 101.56 | <0.0001 |
| SIZEUT | 0.0004 | 5.70 | <0.0001 |
| LAGCAPAUT | −0.0177 | −14.06 | <0.0001 |
| FEESHRUT | 0.0026 | 4.68 | <0.0001 |
| LGAPUT | −0.0050 | −11.06 | <0.0001 |
| QTLUT | 0.0007 | 1.06 | 0.2892 |
| INSDEPAUT | 0.0007 | 2.70 | 0.007 |

| | |
|---|---|
| R-Square | 0.6265 |
| Root MSE | 0.0063 |
| Dependent mean | 0.0014 |
| Coeff Var | 438.5867 |
| F value | 2,259.58 |
| Prob > F | <0.0001 |
| Number of observations | 25,614 |

SOURCES: Office of Thrift Supervision, Thrift Financial Reports; and author's calculations.

has the opposite effect on ROA; the coefficient on LGAPUT and the net effect of LGAP on ROA for UTHC thrifts is significantly negative. There are two possible explanations for why this is so. On one hand, the parent holding company may serve as a source of strength and liquidity for its thrift subsidiary, so UTHC thrifts do not need as much on-balance-sheet liquidity to conduct their operations. That is, holding companies may provide their thrift subsidiaries with access to other funding sources which, at the margin, may be less expensive than raising additional retail deposits.[10] In addition, UTHC thrifts are larger and more likely to face deposit constraints than non-UTHC thrifts. On the other hand, UTHC thrifts may find it desirable to take on more liquidity risk to increase the value of their federal deposit guarantees. Obviously, the first explanation would be consistent with the greater-options hypothesis, while the latter would be consistent with the safety-net-subsidy

hypothesis. But differences in leverage and the composition of nondeposit funding between the two samples of thrifts do not support the safety-net-subsidy hypothesis. After all, UTHC thrifts are significantly less leveraged than non-UTHC thrifts, and a large part of the funding difference arises because UTHC thrifts rely more on Federal Home Loan Bank advances.[11]

It is somewhat curious that for non-UTHC thrifts, the proportion of assets funded by insured deposits is significantly negatively related to ROA. Moreover, while the dummy variable for this factor is positive, it is smaller in absolute value than INSDEPA, and the relationship between INSDEPA and ROA for percentage of funding remains negative and significant for UTHC thrifts. Care needs to be taken in interpreting these results since insured deposits are a stable funding source and are likely to reduce profit variability. UTHC thrift earnings appear to be less sensitive to changes in the insured deposit base than other thrifts (the coefficient on INSDEPAUT is positive). This may be due to funding advantages associated with holding company affiliation, which reduces the marginal cost of funding additional assets. In other words, differences in earnings performance based on INSDEPA are not likely to trace to increased safety-net subsidies but to greater availability of deposit substitutes (enhanced funding options) associated with using the holding company organizational form.

ROA is positively related to the concentration of thrift assets in mortgage-related loans and securities (QTL). This positive relationship may indicate thrifts have specialized expertise in mortgage-related assets and a competitive advantage in housing-finance markets. On the other hand, the Competitive Equality Banking Act established a qualified-thrift-lender requirement that required a minimum level of investment in qualified assets (primarily housing-finance-related assets and, after 1996, small business and agricultural loans). Given the qualified-thrift-lender requirement, the positive and significant coefficient on QTL may be proxying for regulatory taxes—that is, thrifts with high QTL would be less subject to regulatory interference. The coefficient on QTLUT is not significant, however, and this sheds some doubt on that interpretation. If a thrift in a UTHC fails to meet the QTL test, the UTHC is subject to more stringent and invasive bank holding company regulation. In the case of nonbank-UTHC

■ **10** Most of the difference in the liquidity gap between samples derives from differences in funding, as liquid assets made up similar portions of both group's assets—20 percent for non-UTHC thrifts and 18 percent for UTHC thrifts.

■ **11** Over the sample period, thrifts in the UTHC sample financed 12 percent of their assets with Federal Home Loan Bank advances on average, while advances were 4 percent of non-UTHC thrifts' assets.

thrifts, penalties for failing the qualified-thrift-lender test could include forced divestiture of the thrift subsidiary.

The positive and significant effect of the proportion of a thrift's net charge-offs to interest-earning assets suggests that non-UTHC thrifts perform better the more they engage in expense preference behavior—the timing of loss recognition to smooth income for tax purposes. Note that the opposite is true for UTHC thrifts (the coefficient on the dummy variable is negative and significant, and the overall effect for UTHC thrifts is significantly negative), which is consistent with low net charge-offs as an indicator of asset quality. The net charge-off variable might operate differently across the subsamples because holding companies are able to utilize leverage at the parent-company level to arbitrage taxes. Thus, thrifts in holding companies have less of an incentive to engage in expense preference behavior. Unfortunately, because non-UTHC thrifts also engage in this behavior, it is impossible to interpret differences in the coefficients on NTCHRGOF across the two groups of thrifts as an indicator of differences in asset quality.

The coefficient on LAGCAPA is significantly positive—which is consistent with the findings in table 3 that firms with high ROE also had high capital-to-asset ratios. The negative coefficient on LAGCAPAUT indicates that UTHC-thrift earnings are less sensitive to the level of capital than non-UTHC thrifts. Two factors likely drive these results. First, UTHC thrifts have higher levels of capital than independent thrifts. Second, to the extent that the parent holding company serves as a source of strength to its thrift subsidiary, we would expect the thrift-level financing decision to have less of an impact on performance.

Three other differences emerge from the ROA decomposition. First, UTHC-thrift earnings performance is significantly more responsive to changes in the net interest margin than non-UTHC thrifts. The coefficient on the proxy for efficiency, OVRHD, has a large negative effect on ROA. However, this earnings factor has no effect on earnings performance for UTHC thrifts (the coefficient on OVRHDUT is of the same magnitude and of opposite sign as the coefficient on OVRHD). Finally, larger thrifts have higher earnings, and this effect is significantly greater for UTHC thrifts (the coefficients on SIZE and SIZEUT are both positive and significant).

## Differences between Bank- and Nonbank-UTHC Thrifts

Overall, the results of the ROA decomposition over the full sample of thrifts are consistent with the hypothesis that performance-related differences exist between UTHC thrifts and non-UTHC thrifts. However, the nature of the differences across these two samples does not provide sufficient information to decide which of the two possible causes is responsible. Given that the UTHC exemption may be more valuable, or at least the bundle of real options associated with owning a UTHC thrift is likely different, for nonbank owners of UTHCs than for depository institutions, we perform the ROA decomposition again, but over the UTHC sample only. We re-estimate equation (2), including intercept and dummy variables for type of UTHC ownership to explore differences between thrifts owned by nonbank UTHCs and those owned by bank UTHCs. The results of this regression are presented in table 5.

## Business Mix

Because we are exploring differences based on ownership type, we focus on the coefficients of the nonbank ownership dummy variables. We first consider whether different choices of business mix are responsible for differences in performance. The results of this regression suggest that nonbank UTHC thrifts use a different business mix than bank UTHC thrifts. Interest income appears to be a less important determinant of ROA for thrifts owned by nonbank firms (NIMUN is negative and significant, but of smaller magnitude than NIM). Fee income seems more important (the coefficients on FEESHRUN and SIZEUN are positive and significant, and the overall relationship between the share of fee income and ROA for nonbank-UTHC thrifts is positive). These results are consistent with nonbank UTHCs holding a different set of real options than depository institutions. In other words, as the logit regression analysis that follows will confirm, it is the options other than lending powers afforded by depository institution charters—such as access to the payments system—that have the most value to the nonbank acquirers of UTHCs.

Several other important differences emerge between nonbank UTHCs and bank UTHCs. First, asset quality matters more to earnings performance for nonbank-UTHC thrifts than for bank-UTHC thrifts (the signs on NTCHRGOF and NTCHRGOFUN are significantly negative). Second, the coefficients on OVRHD and OVRHDUN are significant and of opposite sign. The overall impact of efficiency for nonbank-UTHC thrifts is positive and significant. In other words, the lack of a significant efficiency effect on earnings performance in the first estimation of equation (2) for UTHC thrifts was due to conflicting effects within the UTHC sample. Given that OVRHD is constructed as the ratio of operating expense to total assets, the differences in the effect of this proxy on

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**OLS Re-estimation of Equation 2**

**Dependent Variable: ROA**

|  | Coefficient | t-Statistic | Prob > t |
|---|---|---|---|
| Intercept | 0.0010 | 0.67 | 0.5028 |
| NIM | 1.2667 | 34.60 | <0.0001 |
| NTCHRGOF | –0.1240 | –19.57 | <0.0001 |
| OVRHD | –0.3590 | –23.63 | <0.0001 |
| SIZE | 0.0001 | 1.52 | 0.1298 |
| LAGCAPA | –0.0105 | –6.36 | <0.0001 |
| FEESHR | –0.0038 | –5.74 | <0.0001 |
| LGAP | –0.0036 | –8.35 | <0.0001 |
| QTL | –0.0014 | –1.78 | 0.0755 |
| INSDEPA | –0.0004 | –1.51 | 0.1301 |
| DUMUN | –0.0872 | –19.69 | <0.0001 |
| NIMUN | –0.2580 | –3.08 | 0.0021 |
| NTCHRGOFUN | –1.1784 | –8.08 | <0.0001 |
| OVRHDUN | 0.5198 | 28.96 | <0.0001 |
| SIZEUN | 0.0040 | 15.42 | <0.0001 |
| LAGCAPAUN | 0.0105 | 3.62 | 0.0003 |
| FEESHRUN | 0.0347 | 17.40 | <0.0001 |
| LGAPUN | 0.0097 | 5.76 | <0.0001 |
| QTLUN | 0.0012 | 0.72 | 0.4729 |
| INSDEPAUN | –0.0062 | –2.93 | 0.0034 |
| | | | |
| R-Square | 0.5007 | | |
| Root MSE | 0.0069 | | |
| Dependent mean | 0.0020 | | |
| Coeff Var | 350.51 | | |
| F value | 375.37 | | |
| Prob > F | <.0001 | | |
| Number of observations | 7,132 | | |

SOURCES: Office of Thrift Supervision, Thrift Financial Reports; and author's calculations.

earnings across the nonbank- and bank-UTHC samples may reflect differences in business mix and strategy. If nonbank-UTHC thrifts place greater emphasis on fee-based products and services, higher levels of OVRHD may be picking up increased activity in these areas, and increases in operating expenses per dollar of assets would be positively related to earnings performance. Hence, the significantly positive sign on OVRHDUN is consistent with the hypothesis that nonbank UTHCs hold a different set of real options than bank UTHCs and non-UTHC thrifts.

Bank-UTHC thrifts exhibit a significantly negative relationship between ROA and the previous quarter's capital-to-assets ratio (LAGCAPA) and a negative but not significant relationship between ROA and the share of insured deposits (INSDEPA).

For nonbank-UTHC thrifts, ROA is significantly negatively related to the share of insured deposits (the coefficient on INSDEPAUN is negative and significant). However, the net effect of the capital-to-assets ratio on earnings is not significantly different from zero for nonbank-UTHC thrifts (the coefficient on LAGCAPAUN is positive and significant and of the same magnitude as the coefficient on LAG-CAPA). Finally, liquidity has opposite effects on ROA in the two groups. It is negative for bank-UTHC thrifts and positive for nonbank-UTHC thrifts (the coefficients on LGAP and LGAPUN are significantly negative and positive, respectively). The impact of differences in the financing decision on performance as proxied for by ROA for the bank-UTHC thrifts and the nonbank-UTHC thrifts is not consistent with the hypothesis that this commingling of banking and commerce increases the loss exposure of the taxpayer to the federal financial safety net.

Finally, the fact that the concentration of mortgage-backed assets (QTL) is negative and marginally significant and QTLUN is positive but not significant is not consistent with our earlier interpretation of QTL as a regulatory variable. Bank-UTHCs would already be subject to the more stringent bank holding company regulation, and thus penalties associated with the violation of the qualified-thrift-lender test would have less impact on bank UTHCs than nonbank ones.

## Level of Risk

The second part of examining differences in performance is to look at the level of risk of the institutions according to their organizational structure. A lack of market data and a relatively short time series for the accounting data make a direct examination of risk problematic. Consequently, we pursue an alternative strategy of examining differences in a number of risk proxies constructed from thrift balance sheet data. The approach is to devise an empirical model that explains organizational type using proxy variables for different risk characteristics and business strategies constructed from thrift balance sheet and income statement data. Equations (3) and (4) specify the model.

To control for thrift-level structural effects that may be related to holding company affiliation, such as scale of operation and geographic presence, we include, regressors for business volume (SIZE) and proportion of fixed-to-total assets (FIXEDA). (See table 1 for a description of the variables.) Because measures of capital adequacy and liquidity have been shown to be related to the probability that a bank will be closed, we include regressors for the ratio of capital to assets (TIER1CAP) and regulatory liquidity (REGLIQR). These are also included to capture regulatory restrictions on leverage and liquidity.

To capture the diversification of loan portfolio and funding sources, the Herfindahl indicies LNHERF and LIABHERF are included. Higher levels of these variables suggest higher levels of balance sheet risk. Diversification of revenue streams is proxied for by the proportion of interest income to total income (INTSHR)—we assume that interest income and noninterest income are not highly correlated. Higher levels of INTSHR would suggest higher variability of revenues. Subordinated debt has been held up by some as a potential source of market discipline for depository institutions, so we included the proportion of it to total assets (SUBDEBTA). The ratio of Federal Home Loan Bank advances to total assets (FHLBADVA) is included to proxy for funding strategy because this type of funding represents a subsidized alternative to deposits for funding assets, albeit to the extent the thrift has sufficient eligible collateral in the form of mortgage assets. Two regressors are included to proxy for asset quality, the ratio of insider loans to total loans (INSLNA) and the ratio of classified assets to total earning assets (CLASSASM). Both loans to insiders as a percent of assets and measures of problem assets have been shown to be positively related to bank closings. To capture thrifts' use of alternative business lines, we include two proxies. The proportion of small business loans to total assets (SBLA) represents thrifts' new small business and agricultural lending powers, and the proportion of trust assets to total assets (TRUSTA) represents fee-based activities. Finally, because mortgage derivative securities represent potential hedges against risks arising from mortgage lending, the thrift's proportion of these securities (MDERA) is included, and because mortgage pool securities represent an alternative to direct mortgage holdings—an asset that is typically more liquid but riskier than a traditional home mortgage loan—the proportion of these (MPSA) is included as well.

Equation (3) seeks to explain differences between UTHC and non-UTHC thrifts, and (4) examines differences between bank-UTHC and nonbank-UTHC thrifts. Using the logistic regression procedure in SAS, we estimate equations (3) and (4) over the full sample and the UTHC sample, respectively. The results appear in table 6.

$$
\begin{aligned}
(3)\ DUMUT_{it} = \ &\phi_0 + \phi_1 SIZE_{it} + \phi_2 TIER1CAP_{it} \\
&+ \phi_3 LNHERF_{it} + \phi_4 LIABHERF_{it} \\
&+ \phi_5 FIXEDA_{it} + \phi_6 SBLA_{it} \\
&+ \phi_7 INTSHR_{it} + \phi_8 SUBDEBTA_{it} \\
&+ \phi_9 FHLBADVA_{it} + \phi_{10} INSLNA_{it} \\
&+ \phi_{11} REGLIQR_{it} + \phi_{12} TRUSTA_{it} \\
&+ \phi_{13} MDERA_{it} + \phi_{14} MPSA_{it} \\
&+ \phi_{15} CLASSASM_{it} + \mu_{it}
\end{aligned}
$$

$$
\begin{aligned}
(4)\ DUMUD_{it} = \ &\phi_0 + \phi_1 SIZE_{it} + \phi_2 TIER1CAP_{it} \\
&+ \phi_3 LNHERF_{it} + \phi_4 LIABHERF_{it} \\
&+ \phi_5 FIXEDA_{it} + \phi_6 SBLA_{it} \\
&+ \phi_7 INTSHR_{it} + \phi_8 SUBDEBTA_{it} \\
&+ \phi_9 FHLBADVA_{it} + \phi_{10} INSLNA_{it} \\
&+ \phi_{11} REGLIQR_{it} + \phi_{12} TRUSTA_{it} \\
&+ \phi_{13} MDERA_{it} + \phi_{14} MPSA_{it} \\
&+ \phi_{15} CLASSASM_{it} + \mu_{it}
\end{aligned}
$$

The results from equation 3 show important differences between UTHC thrifts and others in the proxies for balance sheet structure and risk. Twelve of the 15 regressors and the intercept term are significant, a result that is not consistent with the hypothesis that no differences in performance exist between the two types of thrifts. UTHC thrifts are significantly larger and hold significantly more tier 1 capital than thrifts in the non-UTHC sample. In addition, the negative and significant coefficient on LNHERF is consistent with UTHC thrifts having a more diversified loan portfolio. None of these results is consistent with the hypothesis that UTHCs increase taxpayer risk.

It is also interesting to note that the coefficient on LIABHERF is negative and significant, which is consistent with UTHC thrifts having more diversified funding sources. However, to the extent that the lower-liability Herfindahl results from a higher dependence on Federal Home Loan Bank advances ——as indicated by the positive and significant coefficient on FHLBADVA—UTHC thrifts do not necessarily rely less on funding sources subsidized by implicit U.S. government guarantees.

UTHC thrifts appear to have a higher ratio of fixed assets to total assets, which may indicate that they maintain larger branching networks (FIXEDA is positive and significant). Given that thrifts have more liberal branching powers than banks, both before and after the Reigle-Neal Act of 1994, this result is not surprising. Moreover, the positive and significant coefficient on SBLA is also consistent with this explanation. That is, it is commonly held that an office presence in the community is needed to make the relationship-based small business loan. Therefore, we would expect thrifts with higher investments in fixed assets, presumably branches, to also have higher levels of small business loans.

Thrifts in UTHCs have significantly lower ratios of qualifying liquid assets[12] to liabilities than non-UTHC thrifts. In other words, the negative and significant coefficient on REGLIQR is consistent with the higher levels of liquidity risk undertaken by UTHCs. However, some caution should be used in interpreting this result. First, to the extent that UTHC thrifts have larger branch networks than

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■ **12**  Liquid assets for purposes of regulatory liquidity must conform to the eligibility criteria as expressed in OTS Regulations 566.1(g).

**Equation 4:  Full Sample**

**Dependent Variable:  DUMUT**

**Equation 5:  UTHC Sample**

**Dependent Variable:  DUMUD**

| | Parameter estimate | Chi-Square | Prob > Chi Square | Parameter estimate | Chi-Square | Prob > Chi Square |
|---|---|---|---|---|---|---|
| Intercept | −5.3877 | 218.4102 | <0.0001 | −0.3226 | 0.1428 | 0.7055 |
| SIZE | 0.6370 | 1457.7063 | <0.0001 | 0.0327 | 0.5675 | 0.4513 |
| TIER1CAP | 10.0303 | 686.6470 | <0.0001 | −1.1386 | 2.1779 | 0.1400 |
| LNHERF | −0.0002 | 407.9386 | <0.0001 | −0.0001 | 36.1343 | <0.0001 |
| LIABHERF | −0.0003 | 183.2916 | <0.0001 | 0.0001 | 2.6080 | 0.1063 |
| FIXEDA | 7.7109 | 26.0477 | <0.0001 | 7.7869 | 2.8527 | 0.0912 |
| SBLA | 1.1632 | 5.3536 | 0.0207 | 1.2726 | 0.6252 | 0.4291 |
| INTSHR | −0.0384 | 0.6350 | 0.4255 | 2.5124 | 40.8492 | <0.0001 |
| SUBDEBTA | 7.7712 | 2.1190 | 0.1455 | −19.6167 | 15.8421 | <0.0001 |
| FHLBADVA | 1.7655 | 21.3132 | <0.0001 | 1.7099 | 6.1526 | 0.0131 |
| INSLNA | −6.8246 | 5.3927 | 0.0202 | 46.0876 | 9.6365 | 0.0019 |
| REGLIQR | −0.0035 | 6.7873 | 0.0092 | −0.0005 | 0.0223 | 0.8812 |
| TRUSTA | 0.1395 | 28.4154 | <0.0001 | −0.0134 | 0.5456 | 0.4601 |
| MDERA | 1.1045 | 19.5965 | <0.0001 | −0.3963 | 0.7169 | 0.3972 |
| MPSA | −0.7827 | 24.7668 | <0.0001 | 2.3233 | 23.6342 | <0.0001 |
| CLASSASM | −0.1634 | 0.1335 | 0.7149 | −2.9886 | 11.5626 | 0.0007 |
| | | | | | | |
| "−2 LOG L" | | 21,931.422 | | | 3,777.77 | |
| AIC | | 21,963.422 | | | 3,753.194 | |
| Likelihood ratio | | 8,376.3025, | DF: 15 | | 84.5255, | DF: 15 |
| Prob > Chi Square | | <0.0001 | | | <0.0001 | |
| Number of observations | | 25,655 | | | 7,122 | |

SOURCES:  Office of Thrift Supervision, Thrift Financial Reports; and author's calculations.

non-UTHC thrifts, UTHC thrifts would need a secondary reserve less. Second, because holding companies are a source of liquidity for their subsidiary thrifts, we would also expect thrifts in holding companies to need liquid assets as a secondary reserve less.

The positive and significant sign on the proportion of trust assets (TRUSTA) indicates that UTHC thrifts are more active in services that generate fee income. Note, proxies for other fee-related business lines were omitted from this regression because of the high degree of colinearity between these variables and TRUSTA—that is, thrifts that engaged in one fee-based activity tend to be engaged in the others. This result is consistent with FEESHR being more important for UTHC thrifts as a determinant of ROA in the equation (2) regression. Moreover, increased reliance on nonlending business is likely to reduce the variability of revenues and the risk of loss to depositors and deposit insurance funds. This result does not support the hypothesis of no performance-related differences.

Three other regression coefficients suggest that UTHC thrifts may hold less risk than their non-UTHC counterparts. First, UTHC thrifts hold more mortgage derivative contracts (MDERA is positive and significant). To the extent that these are used to hedge risks, such as prepayment risks, from the mortgage portfolio, UTHC thrifts would hold less risk than their less-hedged counterparts. Second, non-UTHC thrifts have higher holdings of mortgage pool securities than UTHC thrifts (MPSA is negative and significant). Finally, UTHC thrifts appear less likely to have risk exposure to insiders (INSLNA is negative and significant). Thomson (1991, 1992) interprets the ratio of inside loans to total loans as an indicator of fraud and shows that INSLNA is related to the probability of bank failure. Hence, the INSLNA result could indicate potential problems in asset quality for non-UTHC thrifts.

Finally, it is important to note that the data could not discriminate between UTHC and non-UTHC thrifts in three areas: the share of revenues represented by interest income (INTSHR), the reliance on subordinated debt as a funding source (SUBDEBTA), and the proportion of assets classified by regulators as problems (CLASSASM).

Overall, the results of the logit regression over the full sample suggest that some important differences exist between UTHC thrifts and other thrifts. However, none of the significant differences between the two samples suggests that UTHC thrifts engage in riskier activities or pose a greater expected loss to the financial safety net than non-UTHC thrifts. In fact, just the opposite appears to be true. UTHC thrifts are more diversified in terms of their lending portfolios and sources of revenue. In addition, UTHC thrifts are less leveraged and appear to hedge more of their nondiversifiable risks than do non-UTHC thrifts.

As noted above, the UTHC loophole would be of most value to nonbank owners of UTHC thrifts. Therefore, before we draw definitive conclusions, we need to examine differences between UTHC thrifts by ownership type. To do this, we estimate equation (4) over the UTHC sample. Interestingly, eight of the fifteen regression coefficients and the intercept term are not significantly different from zero—as opposed to three for equation (3). Moreover, all three of the insignificant regressors from equation (3) are significant explanatory variables in equation (4).

The regression results suggest that bank-UTHC thrifts hold slightly more diversified loan portfolios than nonbank-UTHC thrifts (LNHERF is negative and significant). But bank-UTHC thrifts also hold higher levels of mortgage pool securities (MPSA is positive and significant), and this likely offsets increased loan portfolio diversification and results in a higher concentration of their mortgage-related risks. In addition, nonbank-UTHC thrifts rely less on interest income than bank-UTHC thrifts (INTSHR is positive and significant). Overall, these results suggest that the asset portfolios of nonbank-UTHC thrifts are less exposed to mortgage-related risks and that their revenue streams are more diversified than bank-UTHC thrifts. These results are not inconsistent with the hypothesis that performance differences trace to different real options held by nonbank UTHCs.

Two important differences between our two samples of UTHC thrifts emerge from the funding side of their balance sheets. First, bank-owned UTHCs rely more heavily on subsidized Federal Home Loan Bank advances (FHLBADVA is positive and significant). Second, nonbank-UTHCs appear to be more influenced by market-based forms of discipline than bank-owned UTHCs (SUBDEBTA is negative and

significant). To the extent that subordinated debt serves as a source of market discipline, the positive and significant coefficient (albeit at the 90 percent level) on SUBDEBTA is not consistent with the hypothesis of no performance-related differences.[13] However, it is possible that this variable is picking up a preference by banks to issue subordinated debt at the holding-company level instead of the level of the thrift subsidiary.

Finally, two conflicting effects are found for asset quality. As noted before, previous research finds INSLNA to be positively related to the probability of failure. Hence, the positive and significant coefficient on INSLNA for bank-UTHC thrifts indicates they have potential asset quality problems. On the other hand, the negative and significant coefficient on CLASSASM suggests nonbank-UTHC thrifts have higher levels of substandard assets on their books.

In general, the results from equations (3) and (4) do not appear to be consistent with the hypothesis that the UTHC loophole increases the risk to taxpayers by extending the safety-net subsidy to nondepository firms. We find no evidence from balance-sheet proxies that the asset and liability decisions of UTHC thrifts, particularly nonbank-UTHC thrifts, pose higher risks. In fact, we tend to see that nonbank-UTHC thrifts rely less on mortgage-related assets and more on nonsubsidized sources of funds than their counterparts.

## IV. Policy Conclusions

Debates over the merits of commingling banking and commerce have focused on the potential efficiency gains associated with enhanced bundles of real options afforded by cross-industry mergers. These efficiency gains are weighed against potential efficiency losses due to possible conflicts of interest, extension of the financial safety net (and the attendant moral hazard incentives) to nonfinancial activities, and increased concentration of economic power.

The UTHC exemption represents the commingling of banking and commerce in the United States. The degree of commingling is limited because the commercial lending powers of thrift institutions are restricted and because nonbanks must satisfy the qualified-thrift-lender requirement to own UTHCs. The Financial Services Modernization Act of 1999 effectively eliminated this exemption, preventing the formation of additional nonbank-owned UTHCs.

This paper examines the merits of the UTHC exemption as a limited form of commingled banking and commerce. It tests for differences in performance of non-UTHC thrifts and two categories of UTHC thrifts. While performance differences are found,

■ **13** See Federal Reserve System (1999).

none suggests nonbank ownership of thrift holding companies poses a risk to the federal financial safety net, at least no greater a risk than a bank-owned UTHC or an independent thrift poses. Furthermore, we find evidence of performance differences that suggest nonbank-UTHC thrifts hold a different set of real options than unaffiliated thrifts and hence have the potential for gains in economic efficiency. Therefore, our results do not provide an economic justification for the Financial Services Modernization Act's elimination of the UTHC exemption. Given the limited scope of powers afforded to nonbank owners of UTHCs, these results do not extend to proposals for more general forms of universal banking.

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# The Sources and Nature of Long-Term Memory in Aggregate Output

by Joseph G. Haubrich and Andrew W. Lo

## Introduction

**Q**uestions about the persistence of economic shocks currently occupy an important place in economics. Much of the recent controversy has centered on "unit roots," determining whether aggregate time series are better approximated by fluctuations around a deterministic trend or by a random walk plus a stationary component. The mixed empirical results reflect the general difficulties in measuring low-frequency components. Persistence, however, has richer and more relevant facets than the asymptotic behavior at the heart of the unit root debate. In particular, fractionally differenced stochastic processes parsimoniously capture an important type of long-range dependence midway between the quick decay of an ARMA process and the infinite persistence of a random walk. Fractional differencing allows something of a return to the classical NBER business cycle program exemplified by Wesley Claire Mitchell, who urged examinations of stylized facts at all frequencies.

Though useful in areas such as international finance (Diebold, Husted, and Rush [1991] and Baillie, Bollerslev, and Mikkelsen [1993]), fractionally differenced processes have had less success in macroeconomics. For GDP at least, it is hard to estimate the appropriate fractional parameter with any precision.

One promising technique (Geweke and Porter-Hudak [1983] and Diebold and Rudebusch [1989]) also has serious small-sample bias, which limits its usefulness (Agiakloglou, Newbold, and Wohar [1993]). Although both Deibold and Rudebusch (1989) and Sowell (1992) find point estimates that suggest long-term dependence, they cannot reject either extreme of finite-order ARMA or a random walk. The estimation problems raise again the question posed by Christiano and Eichenbaum (1990) about unit roots: do we know and do we care? In this paper we provide an affirmative answer to both questions.

Do we know? Applying the modified rescaled range (R/S) statistic confronts the data with a test at once both more precise and more robust than previous estimation techniques. The R/S statistic has shown its versatility and usefulness in a variety of different contexts (Lo [1991] and Haubrich [1993]). Operationally, we can determine what we know about our tests for long-range dependence by using Monte Carlo simulations of their size and power. Not surprisingly, with typical macroeconomic sample sizes we cannot distinguish between fractional exponents of 1.000 and 0.999, but we can distinguish between exponents of 0 and 0.333.

Do we care? Persistence matters directly for making predictions and forecasts. It matters in a more