Limits to Relative Performance Evaluation: Evidence from Bank Executive Turnover[1]

Irina Barakova and Ajay Palvia[2]
Risk Analysis Division
Office of Comptroller of Currency
Washington, DC 20219

October 2008

Abstract

To the extent that executives' contribution to firm performance is independent of exogenous factors, theory suggests that managers should be evaluated based on firm performance only after filtering out average peer-firm performance. Past empirical literature, however, provides no conclusive evidence that either compensation or turnover is fully independent of exogenous industry shocks. We argue that top management's actions are not likely to be independent of economic conditions, which implies that relative performance evaluation (RPE) may not be applicable. We test for the presence of RPE in a large sample of community banks and find that exogenous factors do influence bank executive turnover. Furthermore, this sensitivity of turnover to exogenously determined performance is more pronounced for better governed banks. Our findings reject the RPE hypothesis and are consistent with the view that executives, especially in cyclical industries such as banking, are expected to anticipate and prepare for exogenous shocks.

Key words: relative performance evaluation, bank management turnover, governance
JEL codes: G30, G28

[1] The authors would like to thank the Office of the Comptroller of Currency seminar participants for many helpful comments.
[2] The opinions expressed in this paper reflect those of the authors only and do not necessarily reflect those of the Office of the Comptroller of Currency or the Treasury Department. The authors can be reached via e-mail at ajay.palvia@occ.treas.gov and irina.barakova@occ.treas.gov.

1. Introduction

Although company boards generally cannot observe the ability or effort of top management, forcing out badly performing top management is one of their most important responsibilities. It is imperative, therefore, that boards are able to accurately evaluate top management performance. Because firm profits are determined in part by factors beyond management's control, profitability, by itself, may not be an adequate measure of management's quality.

Exogenous factors affecting a firm's performance are likely to affect the performance of similar firms at the same time. Thus, observing the simultaneous performance of peer-firms provides a measure of the exogenous environment. Holmstrom (1979, 1982) formalizes this reasoning and presents a model showing that common uncertainty can be informative of management's actions and, in doing so, provides a theoretical foundation for relative performance evaluation (RPE).[3] Gibbons and Murphy (1990) further show that, if management's actions are independent of exogenous factors, an optimal management compensation package should fully filter out factors outside management's control. Most empirical studies on RPE, however, find that evaluation of management is not fully independent of exogenous events.[4]

In this paper, we argue that one possible explanation for past evidence not fully supporting RPE is that firms expect management to anticipate and adequately plan for adverse conditions or economic downturns. In particular, we argue that the simplifying assumption that management's actions are independent of exogenous factors may not be realistic for top management. Using a large sample of community banks, we provide evidence that bank

[3] Relative performance evaluation (RPE) is employed in many contexts in which the goal is to identify the level of knowledge, ability, skills or effort. Since these are characteristics intrinsic to an individual, they can be identified independent of the difficulty of the test.

[4] A partial list of the RPE empirical literature includes Barro and Barro (1990), Janakiranam et al.(1992), Aggarwal and Samwick (1999), Bertrand and Mullainathan (2001), Jenter and Kanaan (2006), Garvey and Milborn (2006).

executive turnover depends on the exogenous environment and that better governed banks are more likely to punish management for weak exogenously driven performance than poorly governed banks. Overall, the evidence is consistent with the explanation that RPE may not be applicable in the context of top management.

We base our empirical study on a large sample of community banks for three reasons. First, most of the previous studies of RPE use cross-industry data that treats each industry as a peer group; this may lead to heterogeneity within peer groups and introduce sufficient measurement error, putting the rejection of RPE results in question (Parrino (1997)). Second, because banking is highly cyclical, bank management is more likely than management in other industries to plan for adverse conditions. To the extent that firms do in general expect management to prepare for bad times, we are more likely to identify it in a cyclical industry such as banking. Finally, in order to track firm performance, previous studies have generally been limited to public companies. But negative media and analyst coverage during economic downturns may lead to top management taking the blame for losses.[5] For example, it has been observed that market forces could affect the payoff (turnover and compensation) of top management, preventing the use of RPE (Fisman et al. (2005)). Our paper, which focuses primarily on private banks, is unaffected by these concerns.

The primary contribution of this paper is that it offers new evidence rejecting the main RPE hypothesis and providing evidence suggesting that evaluations of top management, at least in cyclical industries such as banking, is independent of exogenous shocks. We further show that relaxing the assumption made in Gibbons and Murphy (1990) and others, that management actions are independent of exogenous effects, leads to cases in which RPE is not optimal. Confirming our alternative hypothesis, we find evidence that for better governed banks RPE is

[5] For bearing that risk, top managers are also compensated significantly in the form of generous severance packages.

even less likely, and turnover is more affected by exogenous factors. Collectively, these results suggest that firing for poor performance during bad times may imply punishing for poor planning and not punishing for bad luck as other literature has asserted.

A secondary contribution of this paper is to examine RPE in the context of primarily private firms. To our knowledge, this is the first paper to do so; the distinction is important because the absence of large numbers of public firms in our sample suggests that market pressure does not explain the lack of RPE in prior studies.

Finally, this paper adds to the literature on RPE in banks. There are only two other empirical investigations of RPE for senior management at banks. Barro and Barro (1990) examine 83 publicly traded banks over a few years, while Blackwell et al. (1993) tests RPE only within a multi-bank holding company. Our paper, which uses a more broad-based sample of banks, includes about 75 percent of the industry and directly tests the RPE hypothesis as it has been defined in the literature. Following Jenter and Kanaan (2006) our approach also more precisely separates management-driven bank performance from the exogenously determined bank performance.

In the next section we review the theoretical foundation and empirical evidence for RPE. Section three outlines our empirical research design. The data is described in section four followed by the results and robustness. Section six concludes.

2. Theory and Evidence

The theoretical foundation of RPE is laid out in Holmstrom (1982, 1979) in a principal-agent setting with asymmetric information. The agent takes actions which impact her output but are not observable by the principal. In order to align the agent's incentives with the objectives of

the principal, the agent's payoff must be a function of her actual output.[6] However, if in addition the output of different agents is correlated because of dependence on a common exogenous factor, then joint performance is informative of this exogenous factor. For a large number of agents, the average performance is an estimate of the exogenous factor which helps reveal the actual actions taken by each agent. As an application of this sufficient statistic result, Holmstrom (1982) shows that in such setting a contract based on both the individual and the average peer performance is superior to a contract based only on individual performance. The result is obtained when both principal and agent are risk-neutral and holds for risk-averse agents.[7] We use this general result as the basis for our empirical tests.

Let firm output y be stochastic function of agent's action α and exogenous factor x. As in Holmstrom (1982) we assume that all components are normally distributed such that output is normally distributed as well. The random disturbance ε is independent of both x and α by definition. Without loss of generality we can assume that each component has zero mean and output is derived from a linear technology: [8]

[6] Another way to think about the misalignment of incentives in this principal-agent setting is in terms of horizons. Managers have much shorter horizons, and the optimal action under a short horizon may not be optimal under a longer horizon.

[7] If the agent is risk-averse, then not only is the joint performance informative of the agent's actions but it also allows the contract to be independent of the risk of exogenous factors. In particular, just relating the contract terms to individual and/or joint performance exposes the agent to exogenous risk for which she has to be compensated given her risk aversion. The payoff can depend only on the individual actions filtering out the impact of the exogenous factor which is estimated by the average peer performance. This risk aversion-based reasoning is used to derive the optimality of rank order-based evaluation in Lazear and Rosen (1981) and has been the main form of RPE tested in the empirical literature. However, risk aversion may not be a reasonable explanation of the actions of top management. In fact Garvey and Milbourn (2003) find evidence that CEOs are well-positioned to hedge their idiosyncratic risk making them risk neutral for practical purposes.

[8] Although the coefficients on α and x are set to one, this is a very general form since any coefficient on α can be interpreted as part of α and the loading on the systematic factor can be assumed to be the same for all firms in the peer group. Thus, without loss of generality, the coefficient can be set to one. In our construction of peer groups, we use characteristics that imply homogeneous exposure to exogenous factors.

$$y_{it} = \alpha_{it} + x_t + \varepsilon_{it} \text{ where } x, \alpha, \varepsilon \sim N(\vec{0}, \Sigma) \text{ and } \Sigma = \begin{bmatrix} \sigma_x^2 & \sigma_{\alpha x} & 0 \\ \sigma_{\alpha x} & \sigma_\alpha^2 & 0 \\ 0 & 0 & \sigma_\varepsilon^2 \end{bmatrix} \quad (1)$$

The main result states that the optimal contract depends on both individual and weighted average peer output:[9]

$$S_i = f(x_i, \sum_{j=1}^{N} k_j x_j) \quad (2)$$

Under the assumed normality, as in Gibbons and Murphy (1990), we can derive the conditional expectation of the agent's action for a given realization of individual and peer firm output:

$$\mathrm{E}(\alpha_i \mid \mathrm{y}_{1t} \ldots \mathrm{y}_{Nt}) = \frac{\sigma_{\alpha x}}{\sigma_x^2} x_t + \frac{\sigma_x^2 \sigma_\alpha^2 - \sigma_{\alpha x}^2}{\sigma_x^2 \sigma_\alpha^2 + \sigma_x^2 \sigma_\varepsilon^2 - \sigma_{\alpha x}^2} \left(\mathrm{y}_{it} - \hat{\beta} \sum_{i=1}^{N} \mathrm{y}_{it} \right) \quad (3)$$

$$\textit{where} \qquad \hat{\beta} = \frac{2\sigma_{\alpha x} + \sigma_x^2}{\sigma_\alpha^2 + \sigma_\varepsilon^2 + N\sigma_x^2 + 2N\sigma_{\alpha x}}$$

Assuming that whether or not an agent is terminated depends on her own actions, i.e., her value added rather than exogenous factors, the question of interest is whether the expected action value added is related to the weighted average peer performance. Given the above-derived conditional expectation, the covariance of expected management action quality and average peer-firm performance is non-zero:

$$\mathrm{Cov}(\mathrm{E}(\alpha_i \mid \mathrm{y}_{1t} \ldots \mathrm{y}_{Nt}),\ \hat{\beta} \sum \mathrm{y}_{it}) = \mathrm{N}\, \hat{\beta}\, ((\sigma_{ax}^2 + \sigma_x^2\, \sigma_{ax})/\sigma_x^2) \neq 0 \quad (4)$$

[9] This contractual form is shown to also apply to a nonlinear output technology of the form:

$$\mathrm{y}_{it} = \alpha_i\, (\mathrm{x}_t + \varepsilon_{it})$$

In fact, if σ_{ax} is negative, which in the context of banking may be interpreted as risk management, then the above covariance would be positive for $\sigma_{ax} > -\sigma_x^2$. The covariance of conditionally expected action and the output residual ($y_{it} - \hat{\beta} \sum y_{it}$) or the idiosyncratic component of output is also positive since $Cov(E(\alpha_i | y_{1t} \ldots y_{Nt}), (y_{it} - \hat{\beta} \sum y_{it}) > 0$ by the Cauchy-Schwarz inequality. This implies that management turnover should be negatively correlated with both the weighted average peer performance and the idiosyncratic residual level of performance.

However, Gibbons and Murphy (1990) assume explicitly independence between the actions α and the exogenous factor x such that $\sigma_{ax} = 0$. In this way, α_i represents a fixed quality of management, which can be interpreted as ability or quality. This assumption simplifies the conditionally expected agent's α as:

$$E(\alpha_i \mid y_{1t} \ldots y_{Nt}) = \frac{\sigma_\alpha^2}{\sigma_\alpha^2 + \sigma_\varepsilon^2}\left(y_{it} - \hat{\beta}\sum_{i=1}^{N} y_{it}\right) \qquad where \quad \hat{\beta} = \frac{\sigma_x^2}{\sigma_\alpha^2 + \sigma_\varepsilon^2 + N\sigma_x^2} \qquad (5)$$

Gibbons and Murphy's RPE test is based on the observation that the conditional expectation of management's ability under RPE is positively related to the individual firm's performance and negatively related to the average peer firm performance. This is the weak form of the hypothesis, since even though the paper does not reject RPE, it does not imply that there is complete filtering of the exogenous factors from executive evaluation.[10] Gibbons and Murphy (1990) cannot reject RPE in general but reject it in a model of accounting returns. Janakiraman et al (1992) apply a

[10] In a linear model of turnover under a correlated peer performance as the following:
$TURNOVER_{i,t} = \gamma_1 PERF_{i,t-1} + \gamma_2 PEER\_PERF_{i,t-1} + \zeta_{i,t} = \gamma_1(\alpha_{i,t-1} + \beta_1 PERF\_PEER_{i,t-1}) + \gamma_2 PEER\_PERF_{i,t-1} + \zeta_{i,t}$
there is an identification problem since $\gamma_2 = -\gamma_1 \beta_1$ and the failure to reject the weak form of RPE could be driven by the level of β_1.

constraint test to the coefficients from Gibbons and Murphy (1990) using the same executive compensation data and reject RPE.

A more narrow interpretation of RPE is tested in Barro and Barro (1990) which imposes that $\beta_i = 1/N$. Using 83 public banks during the period 1982-1987, they reject RPE in most specifications. However, the Holmstrom (1982) result does not imply that the contract must depend only on the difference between the performance of the agent and the average performance of her peers.

Bertrand and Mullainathan (2001) derive the testable implication from the above conditional expectation of α_i in (5) as $Cov(E(\alpha_i | y_{1t} \ldots y_{Nt}), \hat{\beta} \sum y_{it}) = 0$ by property of independence of regression residuals and covariates. In essence, they use the systematic factor as an instrumental variable for the unobservable ability, which is expected to be correlated both with firm performance and with compensation or turnover. The identifying assumption is that peer average provides no information on each firm's management ability. They find a significant coefficient for this variable and thus reject RPE in a model of executive compensation, which they interpret as evidence of pay for luck.

Jenter and Kanaan (2007) also use the fact that the expected management value added is positively correlated with the idiosyncratic component of performance shown in (5) as the other testable implication. Under this interpretation of RPE, turnover should be correlated only with average peer-firm performance. [11] They also reject RPE in a model of turnover in cross-industry public firms.

Our null hypothesis for testing RPE follows the same established interpretation of the general Holmstrom (1982) result. However, there is no reason to believe that the actions of

[11] The weak form of the RPE hypothesis test considers as testable the implication that turnover is positively related to a firm's own performance and negatively to the performance of peers. We motivate the use of the strong form of the test similar to Jenter and Kanaan (2006).

management are independent of the exogenous factors, especially if the exogenous factors are relatively cyclical as in banking. If the objective of the principal is to encourage the agent to counteract the negative realizations of the exogenous factors, then the agent's payoff should in part depend on the average peer performance as an estimate of the exogenous factor. Consistent with a negative relationship between the actions of management and the exogenous factor, our alternative hypothesis is that turnover is negatively related to the weighted average peer performance.

A stronger link between performance and payoff (compensation and turnover) in general is associated with better governance (see Weisbach (1987), Goyal and Park (2002)). Bertrand and Mullainathan (2001), Garvey and Milbourn (2006) suggest that poor governance may be responsible for the evidence of lack of RPE; however, variation in quality of governance does not explain the data fully. To further examine whether the lack of RPE in the context of top management is optimal, we compare the extent of RPE in better governed and worse governed firms. If RPE is not optimal, we expect that the effect of exogenous performance on turnover should be stronger for the subset of firms that are better governed.

3. Research Design

To test for the presence of RPE, we decompose firm performance in terms of its exogenously determined and idiosyncratic components and then evaluate the impact of each component on the likelihood of executive turnover. Following Jenter and Kanaan (2006) we use a two-stage approach. The first stage is a model of firm performance and the second stage is a model of executive turnover.

3.1 First Stage Model

In cross-industry studies where the explicit exogenous factors might be too numerous to directly control for, the average industry performance is the only performance benchmark used

(Bertrand and Mullainathan (2001), Jenter and Kanaan (2006)). Since our analysis is focused on one industry segment, we can control for both the explicit exogenous factors driving profitability and the peer average performance which can be interpreted as the implicit factor. Similar to Jenter and Kanaan (2006), we estimate a model of performance as a function of exogenous factors but using a multi-factor model which allows us to better identify the exogenously determined component of performance. Our first stage specification is as follows:

$$PERF_{i,t} = \beta_0 + \beta_1 PERF\_PEER_{i,t} + \beta_2 FACTORS + \upsilon_{i,t} \quad (1)$$

Using the estimates, we can forecast the exogenously determined component of performance or expected performance given average peer group performance and other exogenous factors discussed in the next section. To the extent various exogenous factors are correlated, the use of multiple exogenous factors may lead to biased coefficients. Since the first stage model is to be used for forecasting only, we are only interested in the overall estimate and any potential bias in the individual coefficients does not pose a problem. Our estimate of exogenous performance is shown in equation (2).

$$EX\_PERF_{i,t-1} = \hat{\beta}_0 + \hat{\beta}_1 PERF\_PEER_{i,t-1} + \hat{\beta}_2 FACTORS_{t-1} \quad (2)$$

The residual, ($PERF_{i,t}$ - $EX\_PERF_{i,t}$) is orthogonal to $EX\_PERF_{i,t}$ by definition and can be interpreted as the idiosyncratic component of performance or top managements' value added. For the test of RPE, we evaluate the sensitivity of turnover to both these components.

The performance of the model relies on the definition of homogeneous peer groups for estimating (1) such that the average peer performance $PERF\_PEER_{i,t}$ is a good measure of the

exogenous factors for each bank. The size of the firm determines to a large extent its vulnerability to external factors (Albuquerque (2006)). In a way, a well-defined homogeneous peer group should yield the same coefficients if estimated for each firm individually. In fact, Jenter and Kanaan (2006) do estimate separate coefficients for each firm's performance regressed on the industry average and find that the coefficients vary significantly but do not investigate the impact of that further. In our case, the sample for testing RPE is already relatively homogeneous. Focusing on one industry and a particular sector, e.g., community banks, ensures that the banks in the sample are affected by the same exogenous factors. Although the banks in the sample are already small, there is still size variation, which could impact bank's ability to withstand exogenous shocks. Therefore, we further segment peer groups by size.[12]

Certainly, the first stage has a number of omitted variables because all the bank-specific characteristics that determine performance are aggregated in the error term. Given that the model is a linear regression, such omission does not cause a problem if the individual bank characteristics impacting performance are independent of explicit and implicit exogenous factors. However, if performance is autocorrelated, then the lagged dependent variable is an omitted variable that is also correlated with the lagged exogenous factors. This is particularly an issue when using accounting returns rather than market returns and will lead to biased and inefficient coefficient estimates. A way to address serial correlation is to model change in performance rather than level of performance. Thus, like Barro and Barro (1990), who also tested RPE in the banking context, we use change-in-performance rather than level, although no particular theory implies that change rather than level of performance drives turnover.

[12]. We do not use further segmentation for peer definition since this introduces too much noise but we do account for geographic location by controlling for local market conditions in the first stage. Note also that size is highly correlated with the rural/urban location of the bank.

3.2 Second Stage Model

Bertrand and Mullainathan (2001) test in two separate executive compensation regressions the effect of actual and expected exogenous performance, and reject RPE on evidence that expected performance has similar coefficients to actual performance. In a logistic regression model of turnover, the coefficient estimates for the exogenously determined performance would be biased if the idiosyncratic component of performance is excluded.[13] Similar to Jenter and Kanaan (2006), we include both the exogenously determined and the idiosyncratic component of performance. Unlike the weak test of RPE, our test can interpret the coefficients since the two components are not correlated. Thus, our main specification is the following logistic regression:

$$\ln(TURNOVER_{i,t} / (1 - TURNOVER_{i,t}) =$$

$$= \gamma_0 + \gamma_1 (PERF_{i,t-1} - EX\_PERF_{i,t-1}) + \gamma_2 EX\_PERF_{i,t-1} + \gamma_3 CONTROLS + \zeta_{i,t} \qquad (3)$$

The standard RPE null hypothesis is that exogenously determined performance does not affect likelihood of turnover, i.e., $\gamma_2 = 0$. Our alternative hypothesis is that the impact of the exogenous and idiosyncratic components should be directionally similar, i.e., $\gamma_2 < 0$. We expect that management is required to anticipate and prepare for unfavorable exogenous conditions. In order to verify that indeed a negative coefficient is not a result of the board mistakenly attributing exogenously determined performance to management's quality, we estimate the second stage (3) while interacting the two performance components with firms' governance

[13] When this second stage involves a logistic regression as in a model of binary turnover variable, the use of the forecasted portion of performance $EX\_PERF_{i,t-1}$ alone is not sufficient. The reason is that the residual differences between the actual and the exogenously determined performance which represent the idiosyncratic component of performance become an omitted variable. Unlike a linear regression, a logistic regression that omits a variable, even if it is uncorrelated with the rest of the covariates, leads to bias in the coefficients. For further discussion, see Yatchev and Griliches 1985, Jenter and Kanaan 2006.

quality. We cannot reject our alternative hypothesis if for firms with stronger governance the dependence between turnover and the exogenously determined performance is also stronger. We turn next to discussion of the variables used in the model.

4. Data

All U.S. commercial banks with assets of $100 million or less were required to report the turnover of senior management on a quarterly basis between 1985 and 1994. This paper makes use of this unique turnover data, obtained from publicly available bank statements of income and condition (i.e., call reports), to examine the extent of relative performance evaluation in community banks.[14] Though our study is limited to the years 1985 to 1994 because of reporting requirements, the enormous variation in industry financial condition and long time span of these data are ideal for examining the effects of exogenous and idiosyncratic factors on performance and executive turnover. During this period, even with $100 million asset size restriction, our data set covers around 75 percent of the banking industry. These are mostly private banks, which allow us to ascertain whether RPE occurs in the absence of market pressure affecting the large publicly traded firms.

Like the turnover data, all our financial data and most governance variables come from bank statements of income and condition (i.e., call reports). Other data is taken from multiple sources. We obtain data on state branching restrictions from Berger et al. (1995). Unemployment data is taken from the Bureau of Labor Statistics, and Treasury bill rates from the Federal Reserve. Finally, proprietary supervisory ratings, which we use to create key governance variables, are obtained from the Office of Comptroller of the Currency for all national banks.[15]

[14] Although no formal definition exists for "community banks," these types of institutions are generally characterized as smaller and geographically concentrated banks. Consistent with our available data, we define community banks as commercial banks with assets of $100 million or less.

[15] National banks, overseen by the Office of Comptroller of Currency, make up roughly one-fourth of all U.S. commercial banks.

The final dataset consists of 89,778 bank-year observations in the first stage (where we do not utilize the supervisory ratings data) and 20,895 bank-year observations in the second stage. These data form an unbalanced panel because banks remain in the sample for different lengths of time during the observation period (as new banks come into being and some existing banks grow, merge or exit during the period). We did not restrict the sample to banks remaining in the sample over the entire period because this would have greatly reduced the sample size and would lead to considerable survivorship bias.

4.1. Variables – Estimation of Idiosyncratic and Exogenous Performance

The first stage regressions, as described in the previous section, estimate idiosyncratic and exogenous performance by peer group. Because our study is focused on private firms, we measure performance using accounting returns rather than stock returns. Our primary measure of profitability is return on assets (ROA). Given the high level of autocorrelation of accounting returns, we model the change in ROA, rather than ROA, to minimize model specification issues described in the previous section. We also use annual data to reduce the seasonality in the data. In the first stage we model the change in bank's ROA as a function of explicit and implicit exogenous factors.

The explicit factors used in the first stage of the analysis include the average three-month Treasury bill rate (TBILL3M), an indicator of restrictive branching in a state (RESTBR), the number of banks in the state (BANKS_ST), and the unemployment rate (URATE). The inclusion of TBILL3M and URATE helps control for the effects of economic conditions on profitability, whereas RESTBR and BANKS_ST control for the effect of the competitive environment on bank profits.[16] Variables indicating year-over-year changes in each of these characteristics are

[16] The most common measure of competition in banking is the Herfindhal index, but it is not available for the whole period of our analysis while these two other variables in addition to the local economic conditions capture the conditions supporting competition. They also indirectly control for the geographic location of the bank.

also included in these regressions. All financial variables are windsorized at the bottom 1 percent and top 1 percent levels to minimize the effect of noise and erroneous data points. Table 1A has descriptive statistics for the set of explanatory variables used in the first stage of the analysis.

Table 1A. Full sample for first stage

Summary statistics in this table are based on call report data from 1985 to 1994 for all banks with at most $100 million in assets. Local and macroeconomic variables are from the Bureau of Labor Statistics and the Federal Reserve. Restricted branching indicator is developed based on Berger et al (1995).

Variable	Definition	N	mean	sd	p5	p50	p95
PEERROA	Mean Peer Return on Assets	89778	0.67%	0.35%	-0.09%	0.73%	1.15%
CH_PEERROA	Change in Peer Return on Assets	89778	0.04%	0.24%	-0.36%	0.08%	0.35%
RESTBR	Restricted Branching State	89778	66.60%	47.16%	0.00%	100.00%	100.00%
CH_RESTBR	Change in Branching Restrictions	89778	-5.43%	22.67%	-100.00%	0.00%	0.00%
URATE	State Unemployment Rate	89705	6.22%	1.69%	3.77%	6.17%	9.23%
CH_URATE	Change in State Unemployment Rate	89705	-0.19%	0.83%	-1.40%	-0.30%	1.40%
BANKS_ST	Banks in State	89778	672	506	133	546	1725
CH_BANKS_ST	Change in Banks in the State	89778	-27	56	-120	-14	10
TBILL3M	Treasury Bill Rate (3 month)	89778	5.90%	1.66%	3.13%	6.07%	7.99%
CH_TBILL3M	Change in Treasury Bill Rate (3 month)	89778	-0.45%	1.55%	-2.54%	-0.69%	2.30%
PEERPDUE90	Mean Peer Loans 90 Days Past Due	89778	1.15%	0.38%	0.57%	1.05%	1.75%
CH_PEERPDUE90	Change in Peer Loans 90 Days Past Due	89778	-0.09%	0.15%	-0.27%	-0.11%	0.25%

Table 1B. Only national banks and variables for second stage

Summary statistics in this table are based on call report data from 1985 to 1994 for national banks with at most $100 million in assets. Regulatory variables are derived from data obtained from the Office of Comptroller of the Currency.

Variable	Definition	N	mean	sd	p5	p50	p95
EXTURN	Turnover for Any of Top 3 Executives	20895	26.59%	44.18%	0.00%	0.00%	100.00%
DIVHIGH	High Dividend to Asset Ratio (above median)	20895	50.18%	50.00%	0.00%	100.00%	100.00%
NINSLIAB_HIGH	High Non-Insured Liabilities Ratio (above median)	20895	54.90%	49.76%	0.00%	100.00%	100.00%
HCTMULT	Multi-Bank Holding Company	20895	26.17%	43.96%	0.00%	0.00%	100.00%
MANRATBAD	Managerial Rating Poor (i.e., 3, 4, or 5)	20895	28.70%	45.24%	0.00%	0.00%	100.00%
DGRADE	Managerial Rating Downgrade in Year	20895	12.83%	33.44%	0.00%	0.00%	100.00%
LGASSET	Log of Assets	20895	10.57	0.65	9.39	10.65	11.49
CH_LGASSET	Change in Log Assets (1 Year)	20895	0.06	0.13	-0.09	0.04	0.26
CAPRAT	Capital Ratio	20895	8.84%	3.15%	4.92%	8.35%	14.44%
BANKS_ST	Banks in State	20895	758	560	136	554	2,066
ACQUIRE	Acquired Another Bank in Last Year	20895	2.04%	14.15%	0.00%	0.00%	0.00%
OWNCHANGE	Change of Ownership of Bank	20895	5.81%	23.38%	0.00%	0.00%	100.00%
DENOVO	Chartered within Past 5 Years	20895	8.37%	27.69%	0.00%	0.00%	100.00%

The implicit primary exogenous factor used in the first stage is the average performance in the peer group and the change in peer performance over the last year (PEER_ROA and CH_PEERROA). In addition, we use the average percentage of loans past due 90 days or more for all banks in a peer group (PEERPDUE90) and the year-over-year change in this measure (CH_PEERPDUE90) as proxies for the credit environment.

4.2 Variables – Estimation of the Effect Performance Components on Turnover

We measure management turnover using a variable indicating any change in senior executives during the year (EXTURN). Consistent with the available data, a senior executive officer is defined as of the top three officers in the bank; these officers, regardless of their official titles, perform the functions of a chief executive officer, president, or senior lending officer. A limitation of these data is that we are not able to exclude voluntary resignations, retirement, or death as reasons for change in top management. Since there is no reason to believe these alternative causes of executive turnover will be correlated with performance, the limitation of the indicator variable we use introduces noise rather than bias in the results which we discuss in the next section. Table 1B describes the national banks and variables used in the second stage of the analysis.[17]

We control for bank governance since effective monitoring mechanisms are an established factor in executive turnover (Borokovich et al.(1996), Dahya et al. (2002), Fiseman et al. (2005), Weisbach (1988)) and because of previous work arguing that RPE and governance are linked (Bertrand and Mullainathan (2001), Garvey and Milbourn (2006), DeFond and Park (1999)). Because our data-set includes a large panel of predominantly private banks, typical governance data used in earlier studies is not available. Instead, we exploit a rich set of regulatory and financial data to create five measures of bank governance.

[17] As a robustness check, we also use the full sample of banks with assets less that $100 million to estimate the second stage without controlling for the regulatory ratings of management.

Several past works have argued that regulatory oversight is a driver of management turnover (Cook et al.(2004), Houston and James (1993), Palvia (2008), Prowse (1995)). Implicitly or explicitly, these studies suggest regulatory censure or weak regulatory ratings are associated with poor governance. Consistent with this view, our first two measures of governance are derived from regulatory ratings of bank management which ranges from 1 (best) to 5 (worst).[18] As with most past literature, we define a "good" rating as a rating of 1 or 2 and a "poor" rating as a rating of 3, 4, or 5. All else equal, we expect a poor management rating (positive BADRAT) to be associated with higher supervisory pressure on management and thus higher turnover.[19]

Regulatory ratings are most informative when they are fresh. DGRADE identifies whether the supervisory rating for management has become worse in the last year; it thus captures a different dimension of supervisory oversight than BADRAT. While a poor supervisory rating suggests to the board of directors that management may be deficient, a sudden deterioration in supervisory confidence may give the board new information upon which to evaluate executive performance.

Our third measure of governance is based on the well-known argument that banks that pay more dividends have less free-cash flow and therefore are likely to have lower non-pecuniary expenditures and better governance (see Jensen (1986)). Based on this view, we include the variable DIVHIGH, which indicates dividends higher than the median level of dividends scaled by assets.

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[18] The supervisory rating of management is the M component of supervisory CAMEL ratings (Capital, Asset quality, Management, Earnings, Liquidity). Each component of CAMEL, as well as the overall composite CAMEL, are rated on a scale of 1 (best) to 5 (worst).

[19] Regulatory ratings of bank management are primarily based on regulatory opinion of management competence, leadership, administration ability, planning ability, depth and succession, and self-dealing tendencies. As pointed out in Palvia (2008), these ratings are informative about bank governance and probably more related to governance than other components of CAMEL.

Our fourth measure of governance is based on the fact that uninsured bank debt is known to lead to better market discipline. In general, if a bank's performance deteriorates, depositors and other creditors are likely to abandon the bank because of the added risk to their investments. However, insured depositors have less incentive to monitor bank performance because they know that they will receive their money back even if the bank does not perform well. Reduced monitoring by depositors could lead to greater consumption of perks by management and reduced efficiency of the bank. We measure the level of discipline imposed by bank creditors as NINSLIAB_HIGH, which indicates whether uninsured liabilities to total liabilities are higher than the median value.

Our fifth measure of governance is an indicator of whether a bank is affiliated with a multi-bank holding company. We argue that a multi-bank holding company, because of its multiple subsidiaries, increases management competition, since the holding company has a larger pool of middle managers to choose from for high-rank positions (e.g., Stein, 1997).[20] In addition, because banks in a holding company have an additional layer of board oversight, i.e., the holding company board, and because they are more heavily regulated, belonging to a holding company would mean more discipline to commercial banks' managers. This may work to better align their incentives with company value maximization. [21]

Several other variables were included in the second stage to control for basic bank attributes. We include the capital ratio, based on tier-1 capital (CAPRAT), to represent the financial leverage or the level of safety cushion that the institution has. We control for size with the log of total assets (LGASSET). In addition, since the size of the entire banking organization

[20] In these data the banks under an MBHC are actually more profitable as well, which minimizes concerns that MBHCs could lead to mismanagement of their subsidiaries.

[21] U.S. commercial banks are overseen directly by a primary federal regulator (i.e., the Federal Reserve, FDIC, or OCC). Banks that are members of holding companies are faced with additional regulatory oversight from the Federal Reserve.

may influence the level of shareholder discipline and regulator attention, we include the variable LGHCASSET, which indicates the log assets of the bank holding company.

Finally, we include a set of variables to control for organizational factors that may explain turnover. First, we include a dummy indicating whether the bank has acquired another bank during the year (ACQUIRE); banks that have acquired other banks are more likely to have redundant management and are more likely to have higher executive turnover. Since the effects of market competition may have an effect on managerial turnover, we also include an indicator of whether branching is restricted in the state (RESTBR); a state is said to restrict branching if it prohibits statewide branching or all branching. More banks in the area implies more outside employment opportunities and a bigger pool of potential replacements; thus, we control for the number of banks in the state (BANKSSTATE). Additionally, because newer banks are likely to have less experienced management, the likelihood of management turnover could be different for these banks, which we account for with a dummy indicating that the bank was chartered within the last five years (DENOVO).[22] Though we cannot obtain ownership structure for our sample of banks, we can identify whether an unaffiliated bank becomes a member of a bank holding company, whether a bank changes its affiliation from one holding company to another, and whether a bank in a holding company becomes unaffiliated. Using this available information, we construct a measure of change in ownership, OWNCHANGE, indicating any of the above changes. To the extent these changes lead to redundant management or insufficient management, executive changes may result.

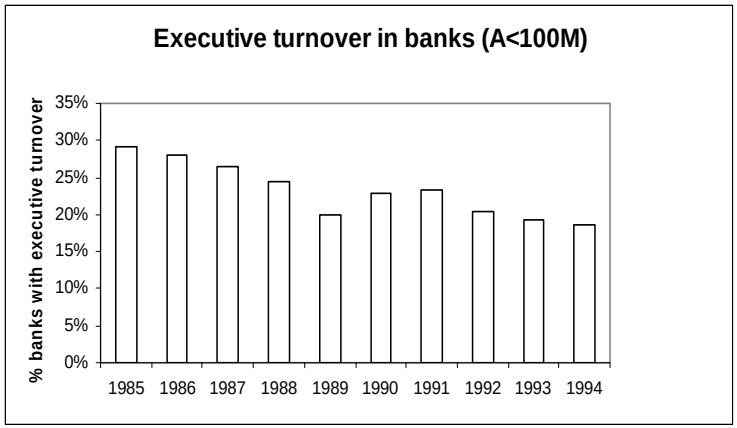
5. Results and Interpretations

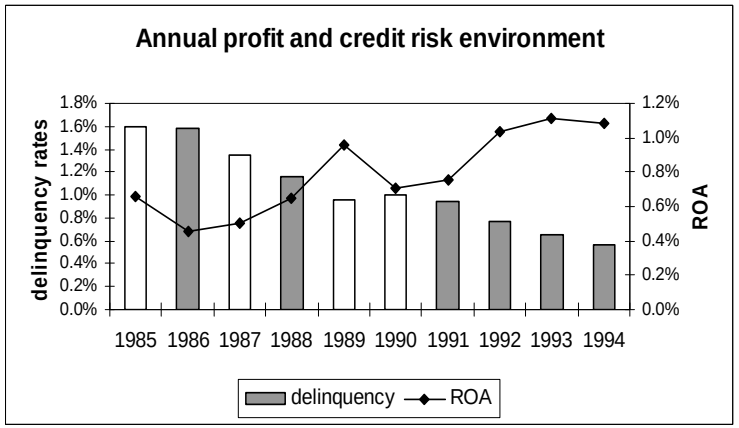
Both bank performance and turnover in community banks are cyclical, as can be seen in the top two panels of Figure 1. This by itself provides some contradiction of RPE, since the

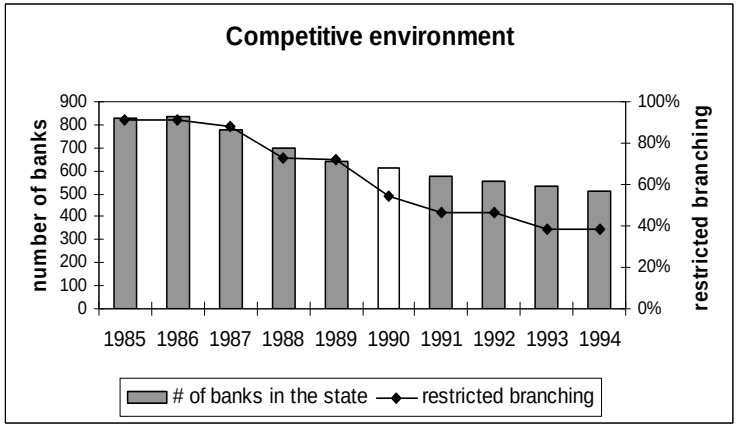
[22] Given that these banks can differ significantly in many ways, we have also confirmed our results when excluding the DENOVO banks.

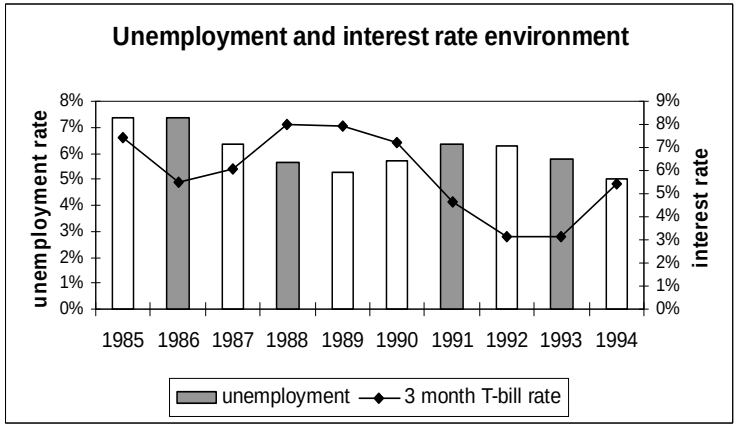
Figure 1. The cyclicality of executive turnover, average bank performance, and macroeconomic conditions

The following figures are based on turnover data for all banks with at most $100 million in assets. Annual ROA and loans 90 days past due are taken from the call report. Unemployment and interest rate statistics are from the Bureau of Labor Statistics and the Federal Reserve respectively. The competitive environment is based on average number of banks in the state and the branching restrictions in the state as in Berger et al. (1995).









assumed independence of management quality and exogenous shocks imply that the portion of managers who are poor in quality is not expected to be clustered across time. The bottom two panels of Figure 1 also show the changes in the competitive environment, unemployment and interest rates for the period. The length of the period allows for sufficient dynamics of the exogenous factors to exhibit a relationship with management turnover and these graphs, taken together, clearly suggest that turnover is not driven entirely by RPE. Our two-stage empirical model tests these observed relationships in a more complete multivariate framework.

5.1 First Stage Analysis

Performance varies across banks since it depends on their ability to absorb shocks. The peer groups described in the previous section are created to provide a proper benchmark for expected bank performance. Table 2A shows summary statistics for each of the four peer groups indicating that they are different. We can see from this table that peer performance depends on size, because smaller banks have larger increases in ROA and larger banks have larger absolute values for ROA. Similarly, market conditions (as proxied by URATE and RESTBR) suggest that banks of different sizes are affected by shocks differently.

The model in the first stage of our analysis (3) estimates the loadings on the different exogenous determinants of performance. The fit of the model is relatively good for a regression of change in accounting performance. There are numerous individual characteristics which could improve the explanatory power of the model, but this is not the purpose of the first stage. Rather we want to include only the factors beyond management's control — at least not in management's control in the short-term. The coefficients from the first stage are hard to interpret due to multicollinearity since the industry and peer performance, unemployment, and interest

rates are all significantly correlated.[23] In table 2B we report univariate correlations with all the exogenous factors in the model for each of the peer groups in order to show the difference in

Table 2A. Peer group summary statistics

The table summarizes the mean of the exogenous variables used in the first stage regression showing the difference across the four peer groups defined by size quartile.

	Size 1 (Smallest)	Size 2	Size 3	Size 4 (Largest)
	(N=20,779)	(N=22,348)	(N=22,819)	(N=23,832)
PEERROA_D4	0.06%	0.06%	0.02%	-0.01%
PEERROA	0.52%	0.71%	0.83%	0.94%
URATE_D4	-0.18%	-0.18%	-0.19%	-0.19%
URATE	5.82%	6.23%	6.34%	6.46%
RESTBR_D4	-4.88%	-5.29%	-5.54%	-5.93%
RESTBR	73.25%	68.51%	64.85%	60.69%
RESTBR_D4	-4.88%	-5.29%	-5.55%	-5.94%
RESTBR	73.25%	68.51%	64.84%	60.66%
PEERPDUE90_D4	-0.07%	-0.04%	-0.04%	-0.01%
PEERPDUE90	1.20%	1.14%	1.11%	1.01%

Table 2B. Exogenous factors univariate correlation by peer group

The table shows the univariate correlations of the dependent variable, change in ROA, with the exogenous variables used in the first stage regression. The results show that the four peer groups defined by asset size quartile differ in their dependence on exogenous factors.

	Size 1 (Smallest)	Size 2	Size 3	Size 4 (Largest)
	(N=20,779)	(N=22,348)	(N=22,819)	(N=23,832)
PEERROA_D4	8.54%	13.16%	13.25%	11.66%
PEERROA	4.01%	4.86%	6.38%	9.47%
ROADATE_D4	8.30%	9.03%	10.62%	11.60%
ROADATE	3.88%	5.03%	6.93%	9.13%
URATE_D4	-3.00%	-1.89%	-5.63%	-9.25%
URATE	-1.03%	-2.74%	-4.62%	-5.72%
TBILL_D4	3.66%	0.39%	1.98%	2.27%
TBILL	-1.72%	-4.89%	-5.13%	-6.59%
RESTBR_D4	-0.67%	0.86%	0.29%	-0.34%
RESTBR	-3.36%	-4.96%	-3.87%	-4.60%
BANKS_STATE_D4	-1.08%	0.60%	0.78%	-0.54%
BANKS_STATE	-0.88%	-4.12%	-6.31%	-9.21%
PEERPDUE90_D4	-8.27%	-7.50%	-8.43%	-8.52%
PEERPDUE90	-4.72%	-5.67%	-6.53%	-8.47%
PEERPDUE90DATE_D4	-7.83%	-6.24%	-6.19%	-6.16%
PEERPDUE90DATE	-5.13%	-5.58%	-6.42%	-8.27%

[23] Multicollinearity is not an issue when using the model estimates for forecasting, which is our main purpose, i.e. to disentangle the exogenously determined from the idiosyncratic component of performance.

factor loadings across factors and across peer groups. The results suggest that the impact of exogenous factors depends on bank size, confirming that segmenting by size is reasonable.[24] For example, peer performance tends to have a much larger impact for larger banks, from 4 percent to 9 percent. Similarly, for larger community banks, performance is more correlated with the sector average performance than for small banks, while small banks' performance is more dependent on changes in the local unemployment rate.

The forecasted performance from the first stage estimates represents the expected or exogenously determined performance. The difference between the actual and exogenously determined performance is the idiosyncratic component of performance. By design the two components are orthogonal, and regressing them on the management turnover indicator yields coefficients that represent the impact of each component separately and allow us to directly test the RPE hypothesis established in the literature.

5.2 Second Stage Analysis

The results from the main specification of the turnover model are presented in the first column in Table 3. The coefficients on individual and exogenous performance are both negative and significant; thus, we reject the RPE hypothesis. Unlike in Jenter and Kanaan (2006), who provide cross-industry evidence, we find that for community banks the effect of the exogenously determined performance change on likelihood of turnover is at least as large as the performance change that can be attributed to management.

Prior literature has suggested that the lack of RPE evidence may be due to top management's entrenchment and poor firm governance. We compare our results of the turnover model with and without controlling for bank governance. Although the relationship between the

[24] As a robustness test we also define peer groups in terms of tertiles and quintiles of size.

Table 3. Turnover model main specification

The dependent variable, in each of the multivariate logit regressions summarized in this table, is EXTURN (executive turnover in the current quarter). Regulatory oversight, the individual and exogenously determined components of performance, and financial condition regressors are lagged. All regressions include bank fixed effects. Columns (1) and (3) include control variables for bank governance quality. Columns (3) and (4) include time dummies. The reported R-squares represent pseudo R-squares for the logistic regressions. T-stats are presented in parentheses below each regression coefficient. The asterisks indicate significance of the regression coefficients. Significance at the 1% level is indicated by ***. Similarly ** and * indicate significance at the 5% and 10% levels respectively.

	(1)	(2)	(3)	(4)
Individual-ROA_D4	-8.9094 ***	-10.3539 ***	-9.0727 ***	-10.4289 ***
	-(5.88)	-(6.90)	-(6.00)	-(6.96)
Exogenous-ROA_D4	-26.3169 *	-33.6218 **	-29.0601 **	-33.4110 ***
	-(1.71)	-(2.20)	-(2.46)	-(2.86)
DIVHIGH	-0.1147 **		-0.1155 **	
	-(2.12)		-(2.14)	
NINSLIAB_HIGH	-0.0560		-0.0570	
	-(1.15)		-(1.18)	
HCTMULT	0.3197 ***		0.2968 ***	
	(3.25)		(3.07)	
MANRAT BAD	0.2908 ***		0.2831 ***	
	(5.05)		(4.94)	
DGRADE	0.3042 ***		0.3061 ***	
	(5.31)		(5.37)	
LGASSET	-0.3752 ***	-0.4754 ***	-0.4718 ***	-0.5392 ***
	-(3.15)	-(4.06)	-(4.63)	-(5.43)
CHLGASSET	-0.79 ***	-0.93 ***	-0.79 ***	-0.92 ***
	-(4.63)	-(5.47)	-(4.71)	-(5.49)
CAPRAT	-0.54	-2.45 **	-0.82	-2.68 **
	-(0.46)	-(2.11)	-(0.70)	-(2.35)
ACQUIRE	0.39 ***	0.38 ***	0.37 ***	0.36 ***
	(2.77)	(2.75)	(2.65)	(2.61)
OWNCHANGE	0.30 ***	0.33 ***	0.31 ***	0.33 ***
	(4.00)	(4.44)	(4.02)	(4.41)
BANKSSTATE	0.00 **	0.00 **	0.00 ***	0.00 ***
	(2.37)	(2.49)	(3.64)	(3.52)
DENOVO	0.06	0.07	0.06	0.06
	(0.65)	(0.70)	(0.63)	(0.66)
Time Dummies	+	+		
Bank Dummies	+	+	+	+
Number of Observations	15900	15900	15900	15900
Adjusted R-Square	0.0250	0.0157	0.0246	0.0154
Chi-Sq-Statistic	311.86	195.10	306.78	191.74

likelihood of turnover and performance is weaker when we include all governance controls, the general RPE result is preserved. The second and forth columns demonstrate that the rejection of RPE is not due to poor governance.[25]

As expected, worse supervisory ratings and rating downgrades are associated with more turnover. We do not have a clear expectation of the sign of the governance variables DIVHIGH, HCTMULT, and NONINSLIAB, but we expect that they affect the coefficients of the performance variables of interest. For example, since DIVHIGH indicates better governance, it may lead to more discipline and firings of bad management. On the other, DIVHIGH may be associated with better management being hired in the first place, which may lead to better performance and fewer firings. A similar argument can be made for HCTMULT and NONINSLIAB.

Given that there could be other firm-specific characteristics for which we do not control, we include firm fixed effects. However, estimating the logistic regression with bank fixed effects leads to significant reduction of the number of observations due to the nature of the specification.[26] In order to be certain that the results are not driven by the sub sample used in the fixed effect logistic regression, we estimate a linear model and confirm the rejection of RPE. [27]

We also control for time period by including time fixed effects; this may be especially important given that there is a change in the regulatory regime during the period with the introduction of FDICA in 1991. A concern is that the impact of the exogenously determined performance could carry the effect of the different times. The results appear robust to time fixed effects, as shown in the third and fourth columns of table 3.

[25] Note that the governance variables are not correlated with the exogenous performance variable.

[26] The logit fixed effect procedure can only compute a fixed effect for banks with at least one turnover event over the duration of the sample period. This results in a loss of about 25 percent of the observations.

[27] Although a linear probability model has known problems (such as the possibility of estimates going below 0 or higher than 1), it still produces good estimates for common values of the explanatory variables and thus can serve as a good robustness check.

Table 4. Turnover model with the exogenous and idiosyncratic effects interacted with good/poor governance for five different measures of governance

The dependent variable, in each of the multivariate regressions summarized in this table, is EXTURN (executive turnover in the current quarter). Regulatory oversight and the individual and exogenously determined components of performance are lagged. Each performance component is interacted with the governance proxy. Each column represents the same model but with a different measure of governance indicated above the column. T-stats are presented in parentheses below each regression coefficient. The asterisks indicate significance of the regression coefficients. Significance at the 1% level is indicated by ***. Similarly ** and * indicate significance at the 5% and 10% levels respectively.

Governance Interaction Variable	(1) DIVHIGH		(2) NINSLIAB_HIGH		(3) HCTMULT		(4) RATBAD		(5) DGRADE	
Good Gov/Individual-ROA_D4	-20.2492	***	-9.8934	***	-9.2317	***	-15.1021	***	-10.7823	***
	-(4.78)		-(4.42)		-(2.85)		-(5.55)		-(5.97)	
Poor Gov/Individual-ROA_D4	-7.1636	***	-8.0702	***	-8.8291	***	-6.0189	***	-4.0370	
	-(4.42)		-(3.86)		-(5.19)		-(3.29)		-(1.34)	
Good Gov/IExogenousROA_D4	-36.6462	*	-29.7350	*	-51.1711	**	-32.9225	*	-30.5223	*
	-(1.69)		-(1.74)		-(2.06)		-(1.92)		-(1.89)	
Poor Gov/IExogenousROA_D4	-24.8289		-19.8294		-18.5671		-18.9482		-11.0481	
	-(1.46)		-(0.94)		-(1.12)		-(0.88)		-(0.41)	
DIVHIGH	-0.1254	**	-0.1149	**	-0.1139	**	-0.1171	**	-0.1144	**
	-(2.30)		-(2.12)		-(2.10)		-(2.16)		-(2.11)	
NINSLIAB_HIGH	-0.0557		-0.0547		-0.0571		-0.0554		-0.0581	
	-(1.15)		-(1.13)		-(1.18)		-(1.14)		-(1.20)	
HCTMULT	0.3139	***	0.3206	***	0.3278	***	0.3178	***	0.3204	***
	(3.19)		(3.26)		(3.32)		(3.23)		(3.26)	
RATBAD	0.2900	***	0.2909	***	0.2915	***	0.2806	***	0.2939	***
	(5.03)		(5.05)		(5.06)		(4.85)		(5.09)	
DGRADE	0.2957	***	0.3047	***	0.3039	***	0.3184	***	0.3179	***
	(5.16)		(5.32)		(5.31)		(5.55)		(5.52)	
Other Controls	+		+		+		+		+	
Time Dummies	+		+		+		+		+	
Bank Dummies	+		+		+		+		+	
Number of Observations	15900		15900		15900		15900		15900	
Adjusted R-Square	0.0257		0.0251		0.0252		0.0257		0.0254	
F-Statistic	320.54		312.41		313.50		319.90		316.08	

Another robustness check for our results is using all banks instead of just the national banks in the second stage to ensure that our findings are not specific to national banks. Similarly we confirm that the general result holds when using ROE instead of ROA as a measure of performance in the first stage.

Consistent with this alternative RPE hypothesis that top management is punished for poor planning, we expect that for better governed banks the impact of exogenously determined performance on executive turnover should be stronger, i.e., they are more likely to punish for poor planning. We use the five different measures of governance introduced in the previous section and interact the performance variables with them in five separate regressions. Each column of table 4 shows that indeed better governed banks exhibit a much stronger relationship between exogenously determined performance and turnover. Consistent with prior literature the better governed banks also exhibit a stronger link between the firm-specific component of performance and turnover.[28]

6. Concluding Remarks

Our evidence rejects the RPE hypothesis for top management turnover in small private banks and adds to prior evidence that rejects RPE for CEOs of publicly traded firms. Our results suggest that prior empirical findings have not been driven purely by measurement error or are relevant only to public firms. Controlling for governance, competition, and outside opportunities does not diminish our results. Our evidence calls into question the applicability of RPE for top management.

Because top managers play a strategic role in the firm and part of their responsibility is to anticipate and prepare for downturn conditions, it may not be realistic to expect that their evaluation should be independent of the exogenous conditions as expected under RPE, especially

[28] A higher sensitivity of turnover to individual performance for better governed banks also serves as a check that our governance variables are adequate measures of bank governance.

in homogeneous and cyclical industries like banking. Our evidence against RPE in community banks implies that top management's value-added may not be independent of the exogenous conditions. The findings in this paper reveal that the theoretical foundation of executive evaluation (compensation and turnover) needs to clearly account for the unique role that executives play in the firm.

References

Albuquerque, A. (2006). "Who Are Your Peers? A Study of Relative Performance Evaluation," working paper, Boston University.

Barro, J., Barro, R. (1990). "Pay, Performance, and Turnover of Bank CEOs," *Journal of Labor Economics* 8(4), pp. 448-481.

Berger, A., Kashyap, A., Scalise, J. (1995). "The Transformation of the U.S. Banking Industry: What a Long, Strange, Trip It's Been," *Brookings Papers on Economic Activity* 2, pp. 55-218.

Bertrand, M, Mullainathan, S. (2001). "Are CEOs Rewarded for Luck? The Ones Without Principals Are," *The Quarterly Journal of Economics*, pp. 901-932.

Borokhovich, K., Parrino, A., Trapani, T.(1996). "Outside Directors and CEO Selection," *Journal of Financial and Quantitative Analysis*, 31, pp. 337-355.

Cook, D., Hogan, A. , Kieschnick, R. (2004). "A Study of the Corporate Governance of Thrifts," *Journal of Banking and Finance* 28 , pp. 1247-1271.

Dahya J., McConnell J.J., and Travlos N. (2002). "The Cadbury Committee, Corporate Performance and Top Management Turnover," *Journal of Finance, 57 (1),* pp. 461-483.

DeFond, M., Park, C. (1999). "The Effect of Competition on CEO Turnover," *Journal of Accounting and Economics*, 27, pp. 35-56.

Fisman, R. Khurana, R. , Rhodes-Kropf M. (2006). "Governance and CEO Turnover: Do Something or Do the Right Thing?" working paper, Harvard University**.**

Garvey, G., Milbourn, T. (2006). "Asymmetric Benchmarking in Compensation: Executives Are Rewarded for Good Luck but Not Penalized for Bad," *Journal of Financial Economics* 82, pp. 197-225.

Gibbons, R., Murphy, K. (1990). "Relative Performance Evaluation for Chief Executive Officers," *Industrial and Labor Relations Review* 43(3), pp. 30S-51S.

Goayal, V., Park, C. "Board Leadership Structure and CEO Turnover," *Journal of Corporate Finance* 8(1), pp. 49-66.

Holmstrom, B. (1979). "Moral Hazard and Observability," *The Bell Journal of Econometrics 10(1),* pp. 74-91.

Holmstrom, B. (1982). "Moral Hazard in Teams," *The Bell Journal of Econometrics 13(2),* pp. 324-340.

Houston, J., James, C. (1993). "Management and Organizational Changes in Banking: A Comparison of Regulatory Intervention with Private Creditor Actions in Non-bank Firms," *Carnegie-Rochester Conference Series on Public Policy* (38), pp. 143-178.

Janakiraman, S., Lambert, R., Lacker, D. (1992). "An Empirical Investigation of the Relative Performance Evaluation Hypothesis," *Journal of Accounting Research* 30(1), pp. 53-69.

Jenter, D., Kanaan, F. (2006). "CEO Turnover and Relative Performance Evaluation," NBER working paper.

Jensen, M. (1986). "Agency Cost Of Free Cash Flow, Corporate Finance, and Takeovers," *American Economic Review 76(2)*, pp. 323-329.

Lazear, E. and Rosen, S. (1981). "Rank-Order Tournaments as Optimal Labor Contracts," *Journal of Political Economy*, 89(5), pp. 841-864.

Song, F., Thakor, A. (2006). "Information Control, Career Concerns, and Corporate Governance," *Journal of Finance* 61(4), pp. 1845-1896.

Palvia, A. (2007). "Management Turnover, Regulatory Oversight, and Performance: Evidence from Banks," working paper, Office of the Comptroller of the Currency.

Parrino, Robert (1997). "CEO Turnover and Outside Succession a Cross-Sectional Analysis," *Journal of Financial Economics* 46(2), pp. 165-97.

Weisbach, M. "Outside Directors and CEO Turnover," *Journal of Financial Economics*, 20 (1988), 431-460.

Wolfers, J. (2002). "Are Voters Rational? Evidence from Gubernatorial Elections," Research Paper Series, Graduate School of Business, Stanford University.

Yathcev, A., Griliches, Z. (1985). "Specification Error in Probit Models," *The Review of Economics and Statistics* 67(1), pp. 134-139.

Viral, A., Yorulmazer, T. (2008). "Information Contagion and Bank Herding," *Journal of Money, Credit and Banking 40 (1)*, pp. 215–231.