# AN EMPIRICAL INVESTIGATION OF THE IMPACT OF LUCK ON SMALL BUSINESS PERFORMANCE: DYNAMIC PANEL DATA EVIDENCE

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**ABSTRACT**

*Luck is a critical variable in small business strategy. However, there is little empirical evidence about the role of luck. This study responded to calls for empirical research using nonstandard statistical techniques to probe the dynamic trajectory of luck on firm performance. We analyze six-year annual panel data, elicited from eleven small business owner/managers. We use the Generalized Method of Moments, GMM-Systems, econometric technique. The results provide statistically significant empirical evidence suggesting that Luck was a determinant of small business economic performance. In previous research, luck was not found to be a significant determinant of firm performance. However, previous performance was found to be a significant determinant of the current level of small business performance.*

**JEL:** MOO, M1, M2.

**KEYWORDS:** Luck, Resource-based View, GMM, AR1, AR2

## INTRODUCTION

The primary objective of strategic management research is to identify why some organizations outperform others. In turn managers can use this information to improve the performance of their organizations (e.g., Rumelt, 1974; Barney, 1991, 1997). In this respect, it is known that luck explains why some organizations outperform others. A solid literature has emerged, starting from economics (Alchian, 1950; Demsetz, 1973; Mancke, 1974; 1977) to contemporary strategic management (Barney, 1986; 1991;Caves, Gale & Porter, 1977; Lippman & Rumelt, 1982; Lieberman & Montgomery, 1988; Reed & DiFillippi, 1990; Rumelt & Wensley, 1981; Makadok & Barney, 2001; Cockburn, Henderson & Stern, 2000; Denrell, 2004). This literature provides a strong theoretical grounding that luck is a major factor explaining inter-firm performance differences.

While in theory we know significant amounts about luck, empirical knowledge of strategic luck is meager (Barney, 1997). Strategy researchers have estimated the amount of variance in inter-firm performance attributable to firm-effects and industry-effects (see, e.g., Snow, Miles & Miles, 2005:431). In contrast, the amount of variance in firm performance attributable to luck or the luck-effect remains largely unknown (Barney, 1997:16). Yet, luck is a major strategy variable in determining firm performance (Rumelt & Wensley, 1981; Barney, 1986; Dierickx & Cool, 1989; Makadok & Barney, 2001). Interestingly, Barney (1997) explained the lack of empirical research focusing on luck: "*The major challenge facing researchers is to develop rigorous methods for rejecting the luck alternative in favor of some other alternative explanation of these [inter-firm performance] differences (1997:17).*"

Commenting further on this empirical challenge, Barney (1997) suggested that "standard statistical techniques" would be woefully inappropriate in probing the theorized role of luck in strategy, and suggested the use of panel data to investigate the dynamic trajectory of the effects of luck on firm performance (p. 17).

A humble beginning is to start with the following empirical research questions: 1) Are managers aware of luck as a strategic asset? 2) If they aware of it, do they call it luck or some thing else? 3) What ever they call it, do managers believe that luck determines their firm performance? 4) If they do, how then can managers acquire luck as a strategic asset?

The primary purpose of the present paper is three-pronged albeit related. First, the paper investigated whether luck was a determinant of firm performance. If luck was a determinant of firm performance, then the paper investigated whether previously accumulated luck determines current level of firm performance? Third, conditional on luck predicting firm performance, the paper investigated whether previous levels of firm performance can determine current levels of firm performance. In other words, the paper posed the question: given that luck is a predictor of firm performance, is there state dependence in firm performance?

Answers to these questions will be useful to managers seeking information on the role luck plays on firm performance. Academically, answers to these empirical questions will contribute to theory development in strategic management. On a related note, this study contributes to theory development in the resource-based view (RBV) of the firm. In this realm it has been explicitly established that luck is the epicenter of the RBV of the firm (Cockburn, Henderson and Stern, 2000), and that luck is a strategic resource that may confer sustainable performance advantages (c.f., Barney, 1997:18).

We organize the reminder of the paper as follows. The literature review section continues the discussion of the interdisciplinary academic genesis of the concept of luck. It highlights rebuttal and counter-rebuttal contributions of scholars on the concept of luck. Drawing on these works, we specify the hypotheses to be tested. The methodology section discusses the study sample, construct measurements, and the analytical techniques used. Finally, the paper concludes with a discussion and implication section underscoring the academic and managerial significance of the study.

## LITERATURE REVIEW

The social construct called *luck* was first explicitly mentioned by Alchian (1950) in an attempt to explain his scientific argument that the outcome of any random process is governed by a stochastic distribution unknown a priori. Alchian (1950) argued that, conditional on foresight being ruled out, the outcome of any event governed by a stochastic process is called luck, or equivalently, the outcome of such an event can only be explained by luck. Following Alchian's postulations, because uncertainty results from lack of foresight, economic investments by managers without foresight can only result in superior performance if and only if, such managers are lucky. Superior performance under uncertainty, zero foresight, is attributed to luck, and nothing but luck! Strikingly, this is the prescription of the resource-based view of strategic management (e.g., see: Cockburn, Henderson and Stern (2000:1128) as well as most evolutionary theories in economics (Nelson & Winter, 1982) and organization studies (Hannan & Freeman, 1977). Then, one may ask: does it follow that, if the concept of luck is falsified the entire scholarly edifice built around the resource-based view of strategic management, will collapse? Could this be true?

Consequently, luck became a critical variable in the equation for market share and profit linkages. The argument runs as follows. To establish a product/market position with a superior market share and hence a superior profit margin, the manager must first ensure the existence of economy of large scale production that allows fixed cost to be spread over large amount of product units. This way, assuming that elasticity of demand is favorable, the drop in average costs of production may translate into a lower price passed over to consumers to sustain the superior market share position. However, this is only the beginning of the problem in the market share-profit debate because other important variables enter the equation. Of all these other variables, luck is chief (Mancke, 1974). For example, Barney (1997:15) paraphrased Mancke

(1974) as saying that: *"…luck may be a more parsimonious explanation of differences in firm performance than any of the then popular industrial-organization explanations."*

As the reader understands, this excerpt overturns the massive conceptual and empirical literature on industrial organization (I/O) economics. As may be expected, however, Mancke's postulations about the role of luck in explaining firm performance differences were challenged both conceptually and empirically. In particular, Caves, Gale and Porter (1977) fit an empirical model using the PIMS secondary data set. They found that luck is only one among other factors explaining differences in firm performance. They showed the amount of firm performance differences explained by luck and non-luck effects could be separately estimated to permit the conclusion that luck is a partial determinant of firm performance. However, Mancke (1977) insisted that the model fit by Caves, Gale and Porter (1977) was questionable.

Rumelt and Wensley (1981) designed and executed a simultaneous equation model whose efficiency was enhanced by a seemingly unrelated regression (SUR) for the sole objective of uncovering "the causal structure underlying the association between market share and business profitability." Strikingly, all in all, their finding appeared to support Mancke's (1974, 1977) work. Rumelt and Wensley (1981:6) wrote:
*"Having found instead strong stochastic effects and virtually no evidence of direct effects, we must conclude that market share is not, in and of itself, a factor of production…Ceterus parabus, the business with a larger market share has had a larger portion of luck and/or unexpected management talent revealed."*

Clearly then, the empirical results by Rumelt and Wensley (1981) suggest that market share-profitability link is seemingly strong, but once the stochastic factor or exogenous luck enters the equation the share-profitability link varnishes. Their research also has a strong theoretical merit to back the results. They argued that there is an exogenous variable impacting simultaneously on market share and on business profit, and that exogenous factor could be christened *luck.* Therefore, conditional on the presence of exogenous luck (or stochastic randomness), the direct relationship between market share and business profit is nothing more than spuriousness.

Barney (1986) was another landmark work that brought the concept of luck eloquently into the strategic management focus. He argues, luck is the positive value of the difference between the ex post value of implemented strategy and the ex ante value of the resource used to implement that strategy. Barney (1986) would say, consider a situation where there are two separate entities in a transaction: the strategist and the controller of the resource to implement the strategy. In time t, the strategist buys the resource from the controller to implement the strategy. At this time t, both the strategist and the controller lack information about the future (ex post) economic value of the strategy in time t +1(i.e., post-strategy implementation). Then, Barney defined luck as the positive economic value of the strategy in time t + 1 in excess of the economic value of the resource in time t. In this setting, the strategist appropriates luck, not the controller who sold the resource below the future (ex post) economic value of the strategy. In sum, Barney's (1986) conceptual analyses on luck suggest that: (a) luck is exogenous to managerial control, and (b) luck is a determinant of superior firm performance.

Barney (2003) convincingly established that the resource-based view of the firm is a derivative of the evolutionary theories wherein the latter has more eloquently recognized the role of luck in explaining firm performance differences or superior performance. In that conceptual setting, Barney (2003) concluded that even though "luck can have important managerial implications" based on the *evolutionary roots* of the resource-based view (RBV), the RBV never proactively positioned luck as a strategic variable. This is chiefly because the RBV has exclusively concerned itself with empirical understanding of strategy variables within managerial control, and luck does not belong to managerial control. It is noteworthy here that Barney (2003) eloquently reiterated that researchers in the RBV framework sidetracked luck as a strategy variable for firm performance because luck is considered to be beyond managerial manipulation.

Is this really true? Interestingly, however, Barney (2003) argued to encourage RBV researchers and theorists not to be afraid of luck. They should do more work on luck as a determinant of superior firm performance (Cockburn, Henderson and Stern, 2000:1128).

From a managerial perspective, since luck is at the core of the RBV (Cockburn et al., 2000), the paucity of research on it should not be surprising given that managers need guidance on how they can acquire information on luck to form their expectations on the expected returns of their strategies before they acquire the resources to implement them (Barney, 1986). More importantly, because luck cannot be traded in the factor market (Barney, 1986), and its accumulation process is assumed to be unknown (Makadok & Barney 2001; Dierickx & Cool, 1989). Then, an exploratory beginning could be the use of primary data to investigate the extent of small business managers' perception of luck as a determinant of firm performance. Such an exploratory research question is anchored theoretically on the preceding literature reviewed here. In addition, given this literature, if luck should positively impact firm performance, the link between luck and firm performance must be positive. Hence, we hypothesize as follows

*Hypothesis 1: There is a direct positive relationship between luck and small business performance.*

Likewise, beyond there being a direct and positive relationship between luck and small business performance, luck should independently determine variations in small business performance, other variables held constant. Thus, we hypothesize as follows

*Hypothesis 2: Controlling other factors affecting firm performance, luck is a determinant of firm performance.*

Drawing theoretical anchor from the capital assets accumulation theory and research (Dierickx & Cool, 1989), it is to be expected that the dynamic impact of luck on current levels of firm performance should be positive and significant. That is, conceptually, we expect that previous stocks (Dierickx & Cool, 1989) of luck should positively impact current levels of firm performance. Nonetheless, we still tested the following hypothesis:

*Hypothesis 3: Previous stock of luck is a determinant of current level of small business performance.*

Finally, the dynamic effect of past firm performance on the current levels of firm performance should be investigated for a number of reasons (Godfrey & Hill, 1995; Coleman, 1968; Spanos et al., 2004), including to capture idiosyncratic firm competencies (Godfrey & Hill, 1995), to capture omitted factors that may influence firm performance (Coleman, 1968), to capture other unobservable firm effects (Jacobson, 1988, 1990; Jacobson & Aaker, 1985; Szymanski, 1993) as well as dynamic adjustment process if there is persistence in performance (Maddala, 1977) as one should expect because performance is inherently a growth variable (Spanos, 2004). Hence, we hypothesize as follows

*Hypothesis 4: Conditional on luck as a predictor of firm performance, lagged (previous) firm performance is a determinant of the current level of firm performance.*

## DATA AND METHODOLOGY

Over the period 2002 to 2007, completed annual questionnaire responses were elicited from fifteen small business owner/managers who were members of a Christian organization located in the State of Alabama, USA. Because two firms went out of business and another two relocated to another state, we had complete information on eleven firms used in this study (the base year (2000) was routinely excluded by

*Stata* techniques used for data analysis). Respondents were assured of absolute confidentiality, and thus, they guaranteed us their honest and accurate information about their business operations.

Acknowledging that firm performance especially for small businesses is multidimensional with metric and non-metric indicators, we conducted a preliminary pilot survey on a select five of the owner-managers about firm performance. The result indicated that while the literature is replete with the use of growth as a proxy for small business performance (e.g., Wiklund & Shepherd, 2005:80 and citation therein), some respondents for this study indicated that while growth of their business is a good strategy, there are other "life style" (Beaver, 2002) strategies more important to them than business growth. When we asked them to sincerely mention those strategies they would pursue beyond business growth, they mentioned things like: 1) Serve others to serve Lord Jesus Christ, 2) Serve humanity, 3) Serve the USA 4) Autonomy being my own boss, and 5) Fulfill life dream, and so on.

Despite this, we still included "Business Growth" in the three items five-point Like scale we used to elicit perceptual data for this study on small business performance. Notably, because of the sensitivity of eliciting business performance information from owner/managers, the yearly data on small business performance included two methodological considerations. First, owner/managers' responses on business performance were elicited using structured interviews on simple questionnaires on a different time period (Sunday service) than the rest of the data from these respondents. Second, because of the business performance sensitivity issues, owner/managers were asked to compare their business performance with those of their competitors in the most recent time they can clearly recall. The three scale items ranged from (1) much worse than our competitors" to "much better than our competitors" Consequently, a factor analysis of the responses yielded surprisingly a single factor solution, presented below.

Measurement of Variables

Our reason to measure luck with a single item was dual. First, we had no previous measurement of luck relevant to business operations to borrow from. Second, we reasoned that a single item measure may be sufficient for the exploratory study we conducted. Future studies may want to develop a psychometrically sound measure of what we shall call "strategic luck." To the best of our knowledge, none exists at this time**.** Therefore, drawing conceptual clue from Barney (1986), the item read: "Strategic Luck improves my business performance". Responses ranged from (1): Never to (5): Absolutely.

Our respondents repeatedly mentioned that they do not believe in what they called "the World View of luck"**.** We first asked the respondents whether they believed in luck, and whether they believe that luck is a determinant of their small business performance. Almost all respondents echoed verbally that the word "luck" is nonexistent to them as Christians. In fact, some cited some cited Deuteronomy 8 which says that "God gives power to make wealth". Then, if this is true, as they argued, luck or chance is ruled out. Therefore, their own luck comes from their God, Jesus Christ, especially when they pray for to Him, and so on.

The following control variables were used in the analysis. Firm Age entered directly in the statistical analyses to control for its effect on luck. Firm Age was computed as the linear difference between the founding year and the current year. Firm Size, measured as the two consecutive year mean of the number of employees reported by the owner/managers. State-Level Disposable Personal Income was entered into the model to control for the effects of yearly changes in customer buying power on luck. Some of the data were thankfully donated by Annette Jones Waters, Center for Business and Economic Research, The University of Alabama, USA.

Analytical Techniques

Following the call by Barney (1997: 17) to use "nonstandard statistical techniques" to probe the trajectory effect of luck on firm performance, the GMM-SYSTEM technique was used (Arellano & Bond, 1991; Arellano & Bover, 1995; Blundell & Bond, 1998). The goal is to answer our research questions even if the regressors are correlated with the individual effects. This may be the case with our Model 1, technical details are provided elsewhere (Roodman, 2005; Bond 2002). Thus, for this study, some of the attractive capabilities of GMM-SYS are briefly summarized as follows.

GMM-SYS is robust and efficient with variables' measurement errors and simultaneity bias induced by endogenous regressors (c.f.,Hempell, 2004:441) as well as some regresssors having poor variability (Blundell & Bond, 1988; Rodriguez, 2006). Second, GMM-SYS efficiently exploits the panel structure of data by imposing a set of restrictions on the moments for the equations in differences and similarly for the equations in level form. It then simultaneously estimates the two sets of equations without loss of information due to differencing (Blundell & Bond, 1988, 2000). Specifically, obviating the need for "outside" instruments, the GMM-SYS (as in ordinary GMM) allows the equations in differences to be instrumented by suitably lagged differences. Likewise, the equations in level form are instrumented by suitably lagged differences. Third and important for this study, Blundell and Bond (1988, 2000) established how the GMM-SYS estimator is more efficient than its first difference counterpart if: (a) the panel is short in times as in this study, and (b) if the panel has persistent time series. Finally, assumptions of whether each instruments used is endogenous, predetermined, or exogenous is critical for the validity the instrument used. Hence, the validity of instrument assumption should be tested using the Sargan test of over-identifying restriction.

In this study, the following assumptions were made. First, if owner/managers experienced a decline (shock) in their performance, and then responded to it by praying to their God for luck, then luck would be correlated with the disturbances from the dependent variable (firm performance). When this happened, as some of the managers indicated that they prayed for luck, then this action by them would render luck endogenous. Hence, in our model for this study, luck was assumed to be an endogenous variable. Second, like the first reason above, if management's decision to increase sales (recruiting more sales persons) occurs as a reaction to a shock in business performance, then firm size (measured as the mean of two consecutive years' of the number of employees) is determined prior to firm performance. That is, firm size is a predetermined variable (roughly stated, it is a vehicle for firm performance). Then, firm size would be endogenous as is the case for the first reason stated above. Third, once a firm is founded, its age is beyond the control of management. Hence, firm age is predetermined or exogenous. Finally, the state-level personal disposable income is assumed strictly exogenous to managerial control.

Finally, the following steps were used in the estimation. First, we used Stata's xtabond2 (Roodman, 2005) to fit the GMM- SYS with the assumptions discussed above. Second, we fit the GMM Difference by simply entering the *noleveleq* option which automatically turns the GMM-SYS to GMM-DIFF (Baum, 2006:234-236; Roodman, 2005). Both results are supposed to be similar but not identical (Baum, 2006:234-236; Roodman, 2005). Then, the GMM-DIFF was estimated with robust standard errors for both one-step and two-step types. To ensure clarity and understanding, we report GMM-DIFF first and then we report GMM-SYS.

## EMPIRICAL RESULTS

In this study, David Roodman's Stata program called xtabond2 was used (Roodman, 2005). Descriptive statistics and simple correlations among the study variables are reported in Table 1. Table 1 suggests that all the variables are positively correlated with the sole independent variable and some, including firm performance, are significantly so. Therefore, hypothesis 1 is supported.

To statistically evaluate the validity of the internal instrument (IV) used, the Sargan's test statistic suggested that the instruments used were valid. In contrast, the Arellano-Bond test of first order autocorrelation (AR1) that was supposed to be significant, was indeed not significant. Even though luck was significant, lagged performance was insignificant and negatively related to current performance.

Table 1: Descriptive Statistics and Correlation among All Study Variables

| | Mean | SD | (L) | (A) | (S) | (N) | (Y) |
|---|---|---|---|---|---|---|---|
| **Independent Variables** | | | | | | | |
| Luck (Jesus Blessing (L) | 2.166 | 0.119 | 1 | | | | |
| **Control Variables** | | | | | | | |
| Firm Age (A) | 2.17 | 0.80 | 0.25** | | | | |
| Firm Size (S) | 1.42 | 0.48 | 0.03 | -0.05 | 1 | | |
| Income (N) | 0.29 | 0.14 | 0.03 | -0.08 | -0.08 | 1 | |
| **Dependent Variable** | | | | | | | |
| Firm Performance | 1.09 | 1.8 | 0.22** | 0.21** | -0.29*** | -0.33*** | 1 |

*Table 1 above reports the descriptive statistics and simple correlation between the study variables, the mean and the standard deviation of variables appear in the first and second columns, respectively. The rest of the columns are simple correlations among the study variables, ***, **, * indicate significance at 1, 5 and 10 levels, respectively.*

Table 2 shows the dynamic panel data estimation using one-step difference GMM. The Sargan's test result suggested that internal instruments (IV) used, were valid. In contrast, however, the Arellano-Bond test of first order autocorrelation (AR1) that was supposed to be significant, was indeed not significant. Even though luck was significant as the sole independent variable, lagged performance was insignificant and negatively related to current performance.

Table 2 Dynamic Panel Data Estimation: One-step Difference GMM

| **Dependent Variable: First Difference of Firm Performance** | | | |
|---|---|---|---|
| **Variable** | **Coefficient** | **t** | **P>\|t\|** |
| Lagged (y) (Performance) | -0.14(0.17) | -0.81 | 0.43 |
| Luck: Independent Variable | 0.46(0.15) | 3.09 | 0.00*** |
| Lagged Luck: | 0.24(0.15) | 1.63 | 0.13 |
| Firm Age | -0.00(1.7) | -0.22 | -0.00 |
| Firm Size | -0.03(1.4) | -0.02 | 0.98 |
| Disposable Income | -12.86(7.32) | -1.75 | 0.10 |
| | Prob. Values | | |
| Sargan's Test of Overidentifying restrictions | 1.00 | | |
| Arellano-Bond Tests | | | |
| 1st order autocorrelation (AR1) | 0.089 | | |
| 2nd order autocorrelation (AR2) | 0.96 | | |

*Table 2 above reports GMM-DIFF one-step estimation results, ***, **, * indicate significance at 1, 5 and 10 levels, respectively.*

Because of the mixed results reported in Table 2, we fit dynamic GMM-DIFF. two-step approach, as reported in Tables 3. Our additional motivation for this two-step approach was that it allowed the use of Windmerjer (2005) finite-sample correction to the covariance matrix. However, like the one-step results, the two-step results suggested that the instruments used were valid but first order autocorrelation (AR1) was not significant when, in fact, it is supposed to be significant. Additionally, the lagged performance was significant at the 10% level (0.063) yet it was negatively related to current performance. The sole independent variable of interest, luck, was not significant. We deliberately preferred not to report the significance or lack thereof of the control variables because they are not of immediate interest.

With these results in mind, we fit dynamic one-step GMM-SYS, as stated earlier all models incorporate the assumptions we made about each variable as discussed earlier in this paper. The results of the

dynamic one-step GMM-SYS are reported in Table 4. Notice that heteroskedastic-robust t-values (Stata's z-values) are reported in Tables 3 to 4, such that (.) reported next to each coefficient is Stata's "Corrected Std. Error).

Table 3 Dynamic Panel Data Estimation: Two-step Difference GMM

| **Dependent Variable: First Difference of Firm Performance** | | | |
|---|---|---|---|
| **Variable** | **Coefficient** | **z** | **P>\|z\|** |
| Lagged (y) (Performance) | -0.5(0.32) | -1.86 | 0.063 |
| Luck: Independent Variable | 0.14(1.33) | 0.11 | 0.911 |
| Lagged Luck: | 1.10(0.71) | 1.57 | 0.11 |
| Firm Age | 15.9(6.7) | 2.37 | 0.018*** |
| Firm Size | 4.43(5.14) | 0.86 | 0.38 |
| Disposable Income | -34.87(11.36) | -3.07 | 0.002*** |
| | Prob. Values | | |
| Sargan's Test of Overidentifying restrictions | 1.00 | | |
| Arellano-Bond Tests | | | |
| 1st order autocorrelation (AR1) | 0.128 | | |
| 2nd order autocorrelation (AR2) | 0.103 | | |

*In Table 3 above, ***, **, * indicate significance at 1, 5 and 10 levels, respectively.*

Table 4 Dynamic Panel Data Estimation: One-step System GMM

| **Dependent Variable: Firm Performance** | | | |
|---|---|---|---|
| **Variable** | **Coefficient** | **t** | **P>\|t\|** |
| Lagged (y) (Performance) | 0.42(0.17) | 2.38 | 0.03** |
| Luck: Independent Variable | 0.55(0.12) | 4.53 | 0.00*** |
| Lagged Luck: | -0.11(0.14) | -0.79 | 0.44 |
| Firm Age | -0.05(0.23) | -0.22 | 0.83 |
| Firm Size | -0.57(0.39) | -1.46 | 0.17 |
| Disposable Income | -13.0(8.84) | -1.48 | 0.17 |
| | Prob. Values | | |
| Sargan's Test of Overidentifying restrictions | 0.99 | | |
| Arellano-Bond Tests | | | |
| 1st order autocorrelation (AR1) | 0.006*** | | |
| 2nd order autocorrelation (AR2) | 0.413 | | |

*In Table 4 above, ***, **, * indicate significance at 1, 5 and 10 levels, respectively.*

Unlike the results of the dynamic GMM-DIFF discussed thus far, the results of the dynamic one-step GMM-SYS appeared to be the best fit to the data. First, the validity of the instrument is supported by the Sargan's test statistics, indicating that conditional on a correctly specified model and on one of the instruments being a valid instrument, evidence to reject the validity of these IV is ruled out. Second and additionally, Arellano-Bond tests for first (AR1) and second order (AR2) serial correlation in the first-differenced residuals, was performed. Notice that, only in the Table 4 case does this test statistic suggested that we should reject the null hypothesis of no first order serial correlation (see, 0.006) but we should not reject the null of no second order serial correlation (see, 0.413).

Luck was a highly statistically significant predictor of small business performance (see, 0.000). This result holds conditional on the control variables of the study and on the robust estimation framework we used. Hence, Hypothesis 2 was supported indicating that luck was a determinant of firm performance in this study. However, previous (lagged) luck was not a statistically significant determinant of small business performance. In fact, the coefficient on this variable is negative, suggesting that previous luck diminish current firm performance (Table 4). Accordingly, Hypothesis 3 is not supported. We shall return to this presently because this result reflects the Christian belief expressed by the respondents about what luck means to them or their own understanding of what luck means to them, as indicated earlier in this paper.

Finally, previous (lagged) performance is a statistically significant (0.03) determinant of the current level of firm performance. In statistical lexicon, firm performance has state dependence or has autoregressive nature (AR1) that is non-explosive in that the coefficient is less than unity in absolute terms. Past studies on firm performance appears to suggest some similarity with the present study (e.g., see: Spanos et al, 2004). Accordingly, Hypothesis 4 was supported.

## DISCUSSION AND IMPLICATIONS

Conceptually, it is established that the social construct christened luck may be a primary determinant of organizational economic performance, in economics studies (e.g., Alchian, 1950; Mancke, 1974, 1977), entrepreneurship studies (e.g., Demsetze, 1983), strategic management studies (e.g., Rumelt & Wensley, 1981; Barney, 1986, 2003, Cockburn, Henderson, & Stern, 2000; Makadok & Barney, 2001), organizational studies (e.g., Hannan & Freeman, 1977), evolutionary studies of organizations (e.g., Nelson & Winter, 1982), and so on.

In contrast, empirically research on luck is a Herculean task that dwarfs standard statistical techniques. Barney (1997) called on strategic management researchers to conduct empirical studies using sophisticated statistical techniques capable of unearthing the trajectory of the impact of luck on firm performance. In response to this call, our uses previously ignored primary data to answer our research questions on the influence of luck on small business performance.

We found that when other variables that may impact luck are controlled, luck directly positively impacts small business performance in the sense of causing variations in small business performance. Second, we found strong evidence that previous levels of small performance can determine current levels of small business performance. That is, economic performance of small businesses is autoregressive in nature, indicating it lingers on for some time. Finally, in sharp contrast, we did not find evidence suggesting that previous levels luck determine current levels of small business economic performance. Instead we found evidence suggesting that current levels of luck positively impact small business performance.

This study's result suggests that luck is a determinant of small business performance. This finding corroborates the impact of luck on firm performance conducted by Rumelt and Wensley (1981) using PIMs secondary data on aggregate industries. In contrast, however, our study used primary data obtained from small business owner/managers. As a consequence of the primary data framework, we were able to address the question: Can managers proactively influence luck or accumulate it?

Mainstream evolutionary economics and RBV scholars compellingly argue that luck is beyond managerial control Barney (2003). However, most of the participant owner/managers in our study indicated they acquire luck by praying to their God called "Lord Jesus Christ." Undoubtedly then, once the Christians' perspective of luck enters the analyses luck becomes an endogenous variable within managerial control. This is contrary to the exogenous view of luck entertained by the mainstream academic business strategists (e.g., see: Barney, 1986, 1997, 2003; Makadok & Barney, 2001; Rumelt & Wensley, 1981; Rumelt, 1984; Cockburn, Henderson, & Stern, 2000; Nelson & Winter, 1982; Denrell, 2004).

Academically, our study contributes to theory development in strategic management as it explored the Christians' perspective of luck as a blessing from their God "Lord Jesus Christ", and thus, luck is an endogenous variable within managerial manipulation. This is a major result of this study which has far-reaching academic and managerial implications. Managerially, small business managers should be informed of this result because the primary reason strategic management research is conducted is to

identify why some small businesses outperform others. Managers can use it to improve the performance of their organizations (Barney, 1991, 1997; Rumelt, 1974).

The inverse relationship between current levels of small business performance and previous stock of luck has solid support in Christian Commandments attested to by our owner/mangers respondents who insisted that Christians are commanded to expect and receive fresh blessings daily in all areas of their life and never to be chained backwards to past luck. One respondent said, "Lord Jesus Christ gives us fresh blessings daily. To be hung-up on past blessing is a sin because it questions the self-sufficiency of Jesus Christ to His people." However, academically, this view departs from the widely cited work by Dierickx and Cool (1989) suggesting that in strategic management, every flow variable must be accompanied by a stock. Our study provides evidence of a flow without a stock. Thus, our study makes yet another contribution to theory development. Managerially, this information is important to small business managers grappling with the issue of how to acquire and deploy strategic luck to boost their organizational performance. It is our duty to relay this information to managers (see, e.g., Rumelt, 1974), especially with the exploding industry and academic interests in spirituality and religion in the workplace (see Journal of Management Spirituality, & Religion now institutionalized by the Academy of Management).

Finally, to the best of our knowledge, this study is the first to find that small business performance is autoregressive, or that it has a state dependence. By way of managerial implication, when strategic investments to leverage small business performance lead to improved performance, then previous performance boosts subsequent levels of performance beyond the immediate period. Again, this is a contribution to theory development in small business strategy. Managers of small business firms should be informed that when strategic investments to improve performance is realized, the positive effects to subsequent performance lingers.

Of course, like any other empirical research, this study has a limitation that its results cannot be generalized to the population of all small business organizations. This limitation calls for a replication of this study to small business firms owned and managed by non-Christians. Likely, the objective of such a replication will be to investigate whether their findings will corroborate the results of this study or not. If they do, then cumulative evidence as the hallmark of scientific enquiry---will be emerging.

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