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Volume 16 includes two issues, one being a special issue on sustainability and innovation, and published nine articles. We received many high-quality papers with a 43.5 percent acceptance rate. The articles were written by authors, whose primary affiliations include 23 institutions from 5 countries - **India**, **Malaysia, Saudi Arabia,** and the **United States**. Turnaround time took, with 34.8 percent of the editorial decisions, less than or 30 days, 47.8 percent between 31 and 90 days, 17.4 percent, between 91 and 200 days.

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Searching for the P/E Mean Reversion Affinity – An Application of the Flexible Fourier Approximation

By MASOUD MOGHADDAM AND YUE LI*

The S&P 500's Price/Earning mean reversion phenomenon seriously threatens foundations of the efficient market hypothesis. Using the Fourier approximation and regime switching models, the P/E mean reversion issue has been further investigated. The empirical findings of the threshold autoregressive model during 1871:12–2016:3, suggest that the P/E mean reversion tendency can be justified only in an economic expansion during which the P/E ratio stays afloat above its likely long-run threshold. However, the speed of adjustment toward the historical long-run equilibrium is practically non-existent in contractionary periods during which the P/E ratio tends to be below its estimated threshold.

Keywords: P/E Ratio, Mean Reversion, Fourier Approximation, TAR and MTAR Models, Speed of Adjustments

JEL Classification: C4, G1

I. Introduction

It has been argued that the monthly stock price index proxied by the S&P 500's (P)/12-month average returns (E), the so-called P/E ratio, can be utilized to predict the future movements of P and E. If so, it implies the existence of mean reversion for P/E, which in and of itself contradicts the efficient market hypothesis (EMH). The EMH asserts that the stock price is sensitive to the minuscule newly emerging information in the market and that the movements of stock prices are volatile and unpredictable. Accordingly, there should not be a momentous discrepancy between the optimal forecast and actual (equilibrium) stock prices, so that the likelihood of making abnormal profits in the stock market is asymptotically zero.

In the finance and macroeconomics literature, the P/E mean reversion issue has been investigated extensively, and the empirical evidence for and against such a tendency has been presented. For example, Campbell and Shiller (1988) contend that if the mean reversion makes a brief appearance unexpectedly, the valuation ratios, such as P/E and the dividend-price ratio, fluctuate back and forth in a valuation tunnel. Eventually though, when such ratios reach an exceptionally high/low value, any lopsided move should not last long and the market fundamentals bring these ratios back into the normal range. In other words, the valuation ratios are apt to remain stable around their corresponding historical mean values – especially the P/E ratio with the embedded mean reversion feature. Campbell and Shiller's argument (among others) has been used as evidence that the stock market may not be fully efficient.

More recently, Becker *et al*. (2012) state that the existence of non-linear stationarity in the P/E ratio time series is also able to substantiate the mean reversion, implying that the P/E ratio

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gradually returns to the historical equilibrium mean value. Implementing the Fourier unit root test, they robustly reject the non-stationarity of the P/E ratio, while observing downturns tracked by the sine function term are negligible and statistically insignificant.[1] Moreover, in order to authenticate their Fourier's findings, they use the Markov switching model in which the P/E time series switches from one regime into another depending on the conditionally estimated probability of each. By changing the frequency of the P/E data (3-month/3-month average, 6-month/6-month average, and 12-month/12-month average), they estimate six Markov models. The authors conclude that the transitional probability of P/E residing in regime 1 (P11, the default regime) in which the P/E valuation metric is stationary, is much higher than in regime 2 (P22, transitory regime) in which P/E is non-stationary.[2] As such, the Markov model's findings that assume structural changes are generally stochastic are quite in line with those of the Fourier trigonometric approximation that presume such changes are mainly deterministic. Moreover, their computed recurring cycles in the 1881-2003 sample period is 3.7, and the interval between two consecutive cycles crossing the long-run equilibrium mean values is 33-years. Based on this conclusion, investors can follow the P/E movements, make a prediction of the P/E ratio, and further forecast the stock price index. Their findings suggest that structural breaks with recursive occurrence play a major role in directing the apparent stationarity of the P/E ratio. The advantage of this approach is that there is no need to figure out how many structural breakpoints have been embedded, where exact breakpoints have been located, or what pattern the P/E series has taken - linearly or cyclically. Most importantly, allowing for unknown structural breakpoints is vital for rendering the conclusion of stationarity entrenched in the P/E ratio time series, implying that an increase in the P/E ratio should be followed by either lower P or higher E.

On the other hand, there are a number of researchers who steadfastly argue for the P/E mean aversion propensity – see for instance Glassman and Hassett (2000), and Elias (1999)[3]. Their key argument is that the P/E ratio inherits a great deal of non-stationarity from the stock price random walk tendency and, as a consequence, its predictability power is markedly poor. Clouding this matter even further, the most recent financial market experience provides an added support for the alleged stock market inefficiency. The market started plunging drastically in 2008 after the stock price climbing high up to the crest stage in 2007:10, followed by an abrupt decline in 2009:03. The overwhelmingly unexpected losses, in the stock market in particular and in capital markets in general, provide a picture of inefficiency in their operations.

To validate the stationarity of a time series, researchers have made a great deal of progress on tests for structural changes, ranging from a single break to multiple breakpoints, and from level break(s) to non-linear break(s). With that in mind, the econometric scope of some of these tests is quite limited in that some cannot capture the characteristic of a series with more than one or two breaks, see Perron (1989), Lee and Strazicich (2003). Some, as referred to by Prodan (2008), are not capable of predicting the series without knowing the exact number, locations, and magnitude of multiple breaks. However, Enders and Lee (2012) present a variant of the Fourier approximation

[1] They also utilize the ADF, along with TAR and MTAR unit root tests for which a threshold of zero has been hypothesized.

[2] Note that the main difference between the Markov and TAR models revolves around these estimated conditional probabilities. As such, if P11 > P22 substantially, then regime 1 is quite dominant – and thus, the estimates for regime 2 are questionable. Furthermore, the degree of persistence is also affected by the estimated auto-regression coefficients (ρ) in each regime in that if $\rho 1 > \rho 2$ and P11 > P22, the process is mainly trapped in regime 1 and regime 2 is quite irrelevant. Finally, the unconditional probabilities of being in each regime (P1 and P2, respectively), are also affected because for regime 1, P1 = (1-P22)/ (2 – P11 – P22).

[3] See Becker *et al.* (2012) for more information.

to account for both the unknown structural breakpoints, and a non-standard F-test for linearity – provided that there is no residual autocorrelation in the approximation process. The Fourier test utilizes a dynamic (time variant) deterministic intercept term, consisted of sine and cosine functions to grasp the essence of the process, no matter what the global pattern of a variable is, or whether there is a breakpoint/non-linear trend. They focus on the specific data-generating regression model with the smallest sum of squared residual at the most appropriate frequency, as well as a more precise approximation including multiple (cumulative) frequencies.

If the P/E ratio shows the characteristic of non-linearity, it is quite reasonable to inquire whether or not the series is still stationary and mean reverting. If so, how long should it take for this valuation metric to return to its historical mean value? To provide a viable answer to the above inquiry and to grasp the essence of market efficiency, this paper expands the work of Becker *et al.* (2012). Most importantly, if the P/E ratio follows a non-random walk in an expanded sample using an entirely different regime switching environment, at what speed of adjustment does it move toward its long-run unconditional mean? If the estimated speed of adjustment for this valuation ratio is substantial and significantly different from zero at a sensible significance level, then the mean reversion theory is confirmed. However, if the adjustment process is sluggish and insignificant, that might imply the P/E mean aversion phenomenon. As such, the main contribution of this research is the addition of the Threshold Auto-Regressive (TAR) and Momentum Threshold Auto-Regressive (MTAR) models, which enable estimating the speed of adjustments not only for the P/E ratio, but also for its components (P & E). It is widely believed that P tends to be volatile (non-stationary), while E is relatively tranquil (stationary) and more predictable. Ultimately, whether P/E is mean reverting or averting is mainly determined by the dominant trait of its component. Toward that end, the empirical findings are presented in Section II. The threshold modeling along with related findings are discussed in Section III, followed by concluding remarks in Section IV.

II. Empirical Findings

To follow up on the research of Becker *et al*. (2012), the monthly data are obtained from Shiller's (2016) website. The P/E ratio is a monthly time series, extended for about 14 years starting from December 1871 to March 2016. The P/E time series has been computed by dividing the monthly averages of daily stock price index (S&P 500's) by the 12-month moving average of composite earnings. As is common in this literature (i.e., as a stepping stone), we start by using the traditional Augmented Dickey Fuller (ADF – 1979) unit root test to examine the stationarity of the P/E ratio as follows.

$$\Delta(P/E)_t = \alpha_1 + \beta_1 (P/E)_{t-1} + \beta_2 \text{ Trend} + \theta_i \Delta(P/E)_{t-i} + \varepsilon_{1t} \qquad (1)$$
$$i = 1, 2, 3, \ldots,$$

where Δ is the first differencing operator, α_1 is the intercept, Trend is a deterministic linear time trend, β_1, β_2, and θ_i are the regression coefficients, and ε_1 is a white noise error term. If the P/E ratio time series data are stationary (a necessary condition for the P/E mean reversion), then the estimated *t*-statistics for β_1 should be significantly larger than the Dickey-Fuller τ-value. The findings are presented in Table 1.

Table 1: The ADF Unit Root Test

Variable	Coefficient	*t*-statistics	Probability
α_1	0.2721	4.8605	0.0000
$(P/E)_{t-1}$	-0.0240	-7.0082	0.0000
$\Delta(P/E)_{t-1}$	0.6733	28.4006	0.0000
$\Delta(P/E)_{t-2}$	-0.0155	-0.5397	0.5894
$\Delta(P/E)_{t-3}$	-0.0538	-2.2333	0.0257
TREND	0.0001	2.8137	0.0050
R^2	0.4248		
Q-statistics	3.16 (Probability = 0.2063)		

Note: The critical τ–values are -3.41 and -3.96 at the 5 and 1 percent significance levels, respectively.

As can be seen, the null hypothesis of non-stationarity for the P/E ratio is resoundingly rejected at any significance level. Moreover, the Breusch-Godfrey Lagrange Multiplier test (Q-statistics) indicates that there is no significant evidence of residual autocorrelation. However, the ADF unit root test is deficient in that its dynamic adjustments are predominantly linear, and thus it is incapable of dealing with potential breakpoints in the P/E time series. Luckily, there is a way to tackle a single-breakpoint problem if we can pinpoint its exact location. That is, by splitting the sample dataset into sub-periods, one can observe whether the P/E ratio moves in a stable way or otherwise in each of these sub-periods. For example, the P/E ratio reached the historical high value of over 80 in October 2009, which is an appropriate breakpoint within the sample period. To explore this approach further, the time series data can be divided into two smaller samples: 1871:12-2009.10 and 2009.11-2016.03. Then, a dichotomous dummy variable can be established to represent the lift change that can be incorporated into the ADF unit root test. However, since the known breakpoints are found by a visual observation rather than a formal statistical testing, two questions are warranted. First, are there other structural breaks in the time series besides those detected? Secondly, are those moving patterns containing breakpoints behaving in the form of gradual or abrupt structural breaks?

To deal with the above inquiries, as proposed by Enders and Lee (2012), the flexible Fourier approximation is an appropriate and versatile mechanism. Most notably, the dominant feature of this test is a deterministic intercept term, including sine and cosine functions which are capable of not merely keeping track of the non-linear cyclical changes, but also the structural breakpoints. Substituting for $\alpha_1 = \alpha_t$ its Fourier's approximation results in:

$$\Delta(P/E)_t = [\alpha_0 + \sum_{k=0}^{n} \mu(k) \sin\left(\frac{2\pi kt}{T}\right) + \sum_{k=0}^{n} \nu(k) \cos\left(\frac{2\pi kt}{T}\right)] + \beta_3 (P/E)_{t-1} + \beta_4 \text{Trend} + \theta_{1i} \Delta(P/E)_{t-i} + \varepsilon_2. \quad (2)$$

In Equation (2), the term in square brackets is the deterministic intercept (α_t), which is a function of time (t), n represents the number of recursive frequencies, k is a specific frequency, T is the number of observations, β_3 - β_4, μ, and ν are the regression coefficients to be estimated, and ε_2 is a classic error term. The sine function terms are for keeping track of abrupt falling breakpoints or the cyclical downturns, while the cosine function is focusing on the sudden uplifting break changes or gradual upturns.

Suppose there are no breakpoints detected in which case the coefficients of sine and cosine terms are zero, i.e., $\mu(k) = \nu(k) = \cdots = 0$ and thus, the conventional ADF-test would be powerful enough to check the stationarity proposition. However, if there are some certain types of breaks, either abrupt or cyclical, then at least one of the sine or cosine functions is different from zero. By practicing trial-and-error experiments, in order to capture the structural changes and patterns at the optimal frequency, we use a single-frequency testing regression model. Subsequently, by looking at the statistical characteristic of k = 1 to k = 5 models, it has been concluded that k = 4 is the optimal one, yielding the smallest sum of squared residuals (SSR). The findings are summarized in the first two columns of Table 2.

Table 2: Fourier's Unit Root Tests

Explanatory Variables	Optimal Frequency (k=4)		Cumulative Frequencies	
	Coefficient	***t*-statistics**	**Coefficient**	***t*-statistics**
Intercept	0.3675	5.7085	0.6001	4.9512
$\Delta(P/E)_{t-1}$	-0.0311	-7.4845	-0.0462	-9.1971
TREND	0.0001	3.1421	0.0001	1.2657
sin(8πt/T)	-0.0665	-2.1475	-0.1179	-3.3181
cos(8πt/T)	-0.1081	-3.5243	-0.1509	-4.7842
sin(6πt/T)	-	-	-0.0858	-2.3667
cos(6πt/T)	-	-	-0.0427	-1.5139
sin(4πt/T)	-	-	-0.0355	-0.8461
cos(4πt/T)	-	-	0.0526	1.8444
sin(2πt/T)	-	-	0.0009	-0.0145
cos(2πt/T)	-	-	0.1438	4.5111
Augmentation terms - omitted	6		6	
Sum of squared residuals (SSR)	1165.033		1146.218	
Akaike Information Criterion (AIC)	2.458		2.448	
Q-statistics	2.06 (Probability = 0.36)		1.71 (Probability = 0.43)	
Linearity Test:	$F_k = 7.55$			

Notes: For the single-frequency Fourier unit root test, the critical *t*-values are -3.63 and -4.24, whereas for cumulative frequencies they are -6.05 and -6.57 at the significance level of 5 percent and 1 percent, respectively. For the Q-test, the optimum lagged residual terms have been determined by minimizing the AIC. The critical value of F(ǩ) for the linearity test with a sample size of 2500 is 7.50 at the 1 percent significance level. See Enders and Lee (2012).

Unmistakably, we can reject the null hypothesis of a unit root for P/E at any significance level due to the fact that *t*-statistics = -7.4845. The coefficient of -0.0311 implies that the current $\Delta(P/E)_t$ is negatively related to the previous moving direction – and eventually becomes negligible in a waving pattern. Both the sine and cosine functions are statistically significant at the 5 percent level. This illustrates that there are four non-linear cycles embedded in the P/E ratio time series. Furthermore, the linearity test delves into the idea that those 4-optimal breaks are non-linear breakpoints. The estimated $F_k = 7.55$ is larger than the corresponding critical value. This feature concurs with the substantial upward trend, which is determined by the coefficient of trend 0.0001 and its respective significant *t*-statistics. Finally, when the P/E ratio sample period lasts over

145 years, it would take the series about 35 years to repeat itself, which is slightly longer than that of Becker *et al*. (2012) (33-year-long cycles).[4]

The results with multiple frequencies shown in the last two columns of Table 2 also profoundly reject the non-stationarity of the P/E ratio. The sine and cosine functions for k = 1, 2, and 3 are added to the previous regression model. As demonstrated, the significant *t*-statistics for the sine function (k = 3 and 4) and cosine functions (k = 1, 2, and 4) are helpful in interpreting the behavior of the P/E ratio. Similar to the optimal single-frequency Fourier test (k = 4), the cumulative approximation process also attaches importance to those five consecutive patterns. In addition to the five significant frequent cycles, there are a handful of less frequent motion curves. Most notably, both the mono-chronic (k = 1) and bi-chronic (k = 2) moving cycles are energetic recovering upturns, resulting from the estimated cosine terms for k = 1, k = 2, and significant *t*-statistics (4.5111 and 1.8444, respectively). Consistent with the findings on moving patterns by the optimal single-frequency Fourier model, the cumulative model is able to detect those five more frequent and three infrequent breakpoints as non-linear abrupt lift changes, rather than linear or gradual moves. Even though both single frequency and cumulative models are able to grasp the stationarity of the P/E ratio, the latter has much improvement in reducing the variation of SSR and the AIC. As such, there appears to be adequate evidence to surmise that the versatile multiple frequencies regression model is more practical in testing the stationarity of the P/E ratio. Lastly, in both approximations, the underlying autocorrelation issues have been dealt with by adding appropriate augmentation terms.

III. Regime Switching Speed of Adjustments

In accordance with the estimated cumulative Fourier approximation, the P/E ratio is a stationary process with non-linear speed of adjustments and a realized insignificant linear uptrend. Wherever the current P/E ratio is, it would be inevitably returning to the unconditional historical mean. However, even the multiple frequencies model does not have the competency to assert how soon the P/E ratio will "hit the home runs," reaching its equilibrium value in the long run. Consequently, in this section, an outlet has been introduced in order to gauge the speed at which the P/E ratio moves toward its historical unconditional mean.[5] The outlet mainly combines the Non-linear Error Correction Modeling (NLECM) with partitioning of the P/E time series relative to its threshold. Subsequently, the estimated NLECM enables us to comprehend the behavior of P/E in different domains, and the mechanism by which it approaches the long-run destination. The threshold here is the long-run equilibrium (unconditional mean), splitting the P/E ratio into the higher-value (expansionary) regime and the lower-value (recessionary) regime as depicted by model (3).

$$\Delta(P/E)_t = \rho_1 \, IND \, [(P/E)_{t-1} - \Gamma)] + \rho_2 \, (1\text{-}IND) \, [(P/E)_{t-1} - \Gamma)] + \sum \theta 2_i \, [\Delta(P/E)_{t-i}] + \varepsilon_3 \quad (3)$$
$$i = 1, 2, 3, \ldots,$$

[4] The findings are available upon request.

[5] As a side note, both P and E are integrated of order one and in line with the Engle/Granger theorem, a linear combination of them should be co-integrated. Indeed, both the Engle and Granger (1987) and Johansen (1995) tests depict a co-integrating vector between these two variables and thus, one can be considered as a rational forecast of the other. The empirical findings are available upon request. See also Stock and Watson (1993), Elliott *et al*. (1996), and MacKinnon (1996).

where Γ is the long-run equilibrium (threshold) for the P/E ratio, ρ_1 and ρ_2 are the auto-regression coefficients depicting the speed at which P/E adjusts to its long-run equilibrium (given the threshold, Γ). Moreover, the augmentation term $\sum(\theta 2)$ tackles the autocorrelation problem, IND is an indicator that identifies whether the P/E ratio is in the higher-value scenario (generally, indicative of a prosperous economy), while (1-IND) is correspondingly a potential recessionary identifier. The specified Heavyside indicator functions are IND = 1 if $(P/E)_{t-1} \geq \Gamma$, and 0 otherwise [i.e., $(P/E)_{t-1} < \Gamma$] for TAR, and IND = 1 if $\Delta(P/E)_{t-1} > 0$, and 0 otherwise [i.e., $\Delta(P/E)_{t-1} \leq 0$] for MTAR. Assuming the existence of an attractor by rejecting the null hypothesis that $\rho_1 = \rho_2 = 0$ (based on the non-standard F-test), rejecting $\rho_1 = \rho_2$ (based on the standard F-test) is indicative of non-linear (asymmetric) dynamic adjustments. In essence, the NLECM is a logical generalization of Equation (3) by way of incorporating appropriate lagged values of both the dependent and independent variables.[6]

The numerical value of Γ would have to be estimated in the same way as the numerical values of ρ_1 and ρ_2. A consistent estimate of Γ has been obtained in accordance with the procedure explicated by Chan (1993). The Chan approach precludes ± 15 percent of the observations and also ranks them in an ascending fashion. Moreover, using OLS, Equation (3) has been estimated recursively within ± 15 percent constraint. The estimated model whose sum of squared residual is minimal produces a consistent estimate of Γ, which can be used to estimate Equation (3) suitably.[7]

The NLECMs for the ingredient of the P/E ratio are also established separately. The idea is to find out how quickly/slowly the factoring variables move toward their own equilibrium points in the two pre-determined regimes. The relative movement of the numerator (P) compared to that of the denominator (E), would eventually determine how long it would take for P/E to reach the intended destination. The coherence in the pace of P and E drives the P/E ratio to persist, while irrational volatility and inconsistency of the component would render an unstable P/E in the long run. In practice, these two ingredient regressions make use of the same Heavyside indicators as those of the P/E ratio. The NLECMs are specified below.

$$\Delta P_t = \rho_3 \, IND \, [(P/E)_{t-1} - \Gamma] + \rho_4 \, (1\text{-}IND) \, [(P/E)_{t-1} - \Gamma] + \sum \delta_i \, \Delta P_{t-i} + \sum \varphi_i \, \Delta E_{t-i} + \varepsilon_{t4} \qquad (4)$$

$$\Delta E_t = \rho_5 \, IND \, [(P/E)_{t-1} - \Gamma] + \rho_6 \, (1\text{-}IND) \, [(P/E)_{t-1} - \Gamma] + \sum \delta 1_i \, \Delta P_{t-i} + \sum \varphi 1_i \, \Delta E_{t-i} + \varepsilon_{t5} \qquad (5)$$
$$i = 1, 2, 3, \ldots,$$

where $\rho_3 - \rho_6$ are the speed of adjustment parameters, δ_i and φ_i are the augmentation term coefficients, and ε_4 and ε_5 are white noise error terms. The Chan (1993) estimation procedure provides the conditional mean (Γ = 19.70) with the smallest sum of squared residual for TAR. The estimated threshold makes it possible to explore the moving pattern of the P/E ratio in the aforementioned two domains. The findings are reported in the upper portion of Table 3.

[6] For more information, see Enders and Granger (1998).

[7] The detailed estimation and findings are available upon request.

Table 3: Empirical Findings of the TAR and MTAR Models

TAR – Explanatory Variable	**$\Delta(P/E)_t$**	**ΔP_t**	**ΔE_t**
IND{[$(P/E)_{t-1}$, P_{t-1}, or $E_{t-1} - 19.70$]}	-0.035	-0.3061	0.0329
(*t*-statistics)	(-6.8853)	(-2.7631)	(11.5456)
(1– IND){[$(P/E)_{t-1}$, P_{t-1}, or $E_{t-1} - 19.70$]}	-0.0057	-0.0681	0.0001
(*t*-statistics)	(-1.8903)	(-1.0802)	(0.0941)
Akaike Information Criterion (AIC)	2.4092	8.4822	1.1953
Schwarz Baysian Criterion (SBC)	2.4282	8.5169	1.2206
Augmentation terms - omitted	6	6(E) and 5(P)	4
Q-statistics	0.57	1.15	0.34
[Probability]	[0.44]	[0.28]	[0.56]
Attractor: Non-standard F-Test	25.12	4.40	66.66
Linearity: Standard F-Test	25.08	3.48	98.65
MTAR – Explanatory Variable	**$\Delta(P/E)_t$**	**ΔP_t**	**ΔE_t**
IND{[$(P/E)_{t-1}$, P_{t-1}, or $E_{t-1} - 18.21$]}	-0.0023	-0.0642	0.0202
(*t*-statistics)	(-0.5619)	(-0.7749)	(9.4187)
(1– IND){[$(P/E)_{t-1}$, P_{t-1}, or $E_{t-1} - 18.21$]}	- 0.0315	-0.1736	-0.0013
(*t*- statistics)	(-7.3094)	(-1.9442)	(-0.54)
Akaike Information Criterion (AIC)	2.4558	8.4658	1.2090
Schwarz Baysian Criterion (SBC)	2.4779	8.5037	1.2407
Augmentation terms - omitted	6	7(E) and 6(P)	4(E) and7(P)
Q-statistics	2.50	3.45	2.15
[Probability]	[0.29]	[0.18]	[0.83]
Attractor: Non-standard F-Test	26.83	2.19	44.59
Linearity: Standard F-Test	23.97	0.81	46.42

Notes: Numbers in parentheses are the estimated *t*-values and unless otherwise specified, the significance level is assumed to be 5 percent. Numbers in square brackets are the estimated probability. To correct for autocorrelation, different lagged residuals are deemed necessary in the six models reported.

During prosperous times in which $(P/E)_{t-1} \geq \Gamma$, the TAR model is significantly capable of closing down the discrepancy between $(P/E)_{t-1}$ and the long-run equilibrium (Γ) at the rate of 3.5 percent on a monthly basis (42 percent annually). The driving force in this case appears to be an increase in ΔE, while ΔP is noticeably falling. However, during the precipitating downswing $(P/E)_{t-1} < \Gamma$, the speed of adjustment is negligible though significant at the 5 percent level, to which ΔP and ΔE do not contribute anything noteworthy. Overall, the price in both scenarios is unstable and unreliable, and the P/E ratio in recession inherits very little from the random walk property of stock prices in the numerator. Both the composite price index and respective earnings lose their rights to speak for the volatility of P/E below the threshold. Furthermore, the null hypotheses of the lack of an attractor and linearity are rejected at any significance level, but accepted

simultaneously for the composite stock price index.[8] Those two significant F-tests demonstrate the presence of non-linear dynamic adjustments in the P/E ratio time series, and illustrate the persistence of the P/E ratio in the high-value stage, which is mostly determined by the contemporary annualized earnings. Based on the high probabilities of the estimated Q-statistics, the autocorrelation problem has been taken care of at the 5 percent level in the estimated NLECMs.

The estimated threshold for the MTAR model using the same procedure as mentioned before is $\Gamma = 18.21$. The findings of the MTAR model, as can be seen in the lower portion of Table 3, are noticeably different from those reported for the TAR model. In this scenario, during a recessionary period, $\Delta(P/E)_t$ tends to decrease in response to $(P/E)_{t-1} < \Gamma$ significantly at the rate of about 3.1 percent per month (37.2 percent annually). However, there is no significant speed of adjustment when $(P/E)_{t-1} > \Gamma$ even at the 10 percent significance level, while ΔE is significantly rising. Note also that both the estimated AIC and SBC for the MTAR model in which P/E can have different rates of autoregressive decaying, are slightly larger than those of the TAR model. Moreover, the MTAR modeling comes in handy since the P/E time series purportedly has a tendency (momentum) to move more in one direction than the other. In short, since the exact nature of the apparent non-linearity has not been determined *a priori*, the estimated TAR is "marginally" the preferred model. As was the case with TAR, the null hypotheses of both linearity and the absence of an attractor for the P/E ratio and E are decisively rejected at any significance level.[9] Additionally, the reported MTAR models appear to be devoid of significant residual autocorrelation at the 5 percent level.

IV. Concluding Remarks

This paper reexamines the stationarity (the mean reversion property) of the P/E ratio time series, which has profound implications for the efficient market hypothesis. The issue has been explored by employing the Fourier approximation. The Fourier unit root test is capable of flexibly keeping track of potential breakpoints embedded in the P/E time series. The findings suggest that the P/E ratio persists in the long run and unquestionably has an affinity for the long-run equilibrium. To explore this matter further, the estimated P/E thresholds are incorporated in each of the two non-linear error correction models. The TAR and MTAR models agree with the verdict that when the P/E ratio stays afloat in the higher/lower value regime respectively, the stationary process of P/E is confirmed. Indeed, the P/E ratio eventually heads back to its historical mean value (threshold). However, in the lower value regime, the "marginally" preferred TAR model shows that the P/E ratio series has very little tendency for approaching its long-run destination.

In line with the findings presented in this study, the mean reversion property of the P/E ratio (extensively reported in the finance and economic literature), is justifiable if its ingredients (price and monthly earnings) display such a tendency. With that in mind, both TAR (below its long-run equilibrium) and MTAR (above its long-run equilibrium) models provide empirical evidence suggesting that the P/E ratio is indeed mean averting, to which the stock price and monthly earnings donate absolutely nothing. Consequently, solid empirical evidence for the mean reverting characteristic of the P/E ratio with its profound market efficiency implications remains elusive.

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[8] For over 250 observations and 4 augmentation terms, the critical values for the TAR model are 6.29, 7.15, and 8.35 at the significance level of 5, 2.5 and 1 percent, respectively, see Enders (2010), p. 494.

[9] The critical values of ϕ_m, for the MTAR model with more than 250 observations and 4 augmentation terms are 5.54, 6.39, and 7.61 at the significance level of 5, 2.5 and 1 percent, respectively. See Enders (2010), p. 494.

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After Acquiring Innovation and Sustainability: Executive Effects

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An extensive body of research supports that firms acquire other firms in order to innovate and/or become more sustainable. Extant theory posits that power in top management teams is among many determinants of success of acquisitions. This study focuses on and empirically investigates the relationship between power in top management teams and post-acquisition performance. Our results show that expert power and prestige power in the combined top management team are positively related to post-acquisition performance in both related and unrelated acquisitions. The study concludes with implications for future research and managerial practice.

Keywords: Acquisition, Innovation, Sustainability, Executive Effects

JEL Classification: M10

I. Introduction

The research in mergers and acquisitions reveals that 70 percent of all mergers and acquisitions (M&A) produce no benefit for the shareholders (Bruner, 2005; DePamphilis, 2012; Gaughan, 2011). Some M&A failures have been dramatic. The AOL-Time Warner deal lost 93 percent of its value during the integration period as the internet service provider merged with the publishing company in an attempt to combine content with delivery. VeriSign, another internet-related services company, lost $17 billion of its 2000 $20 billion acquisition of Network Solutions and its stock fell 98 percent. It is not just the fallout from dot.com acquisition failures that lose money. A classic example of failure – and one where the very basic elements of business intelligence were ignored – is Quaker Oats, the food and beverage company founded in the nineteenth century. In 1994, they acquired Snapple, a quirky fruit-drinks company, for approximately $1.9 billion, thus becoming the third largest producer of soft drinks in the United States. Less than three years later, in 1997, Quaker Oats sold its Snapple division for just $300 million. Despite this trend, companies the world over have continued to consolidate and combine in unprecedented numbers. According to the Economic Intelligence Unit (2008), global M&A deals peaked in 2007 at $1.76 trillion falling to $1.57 trillion in 2008, with much of the M&A activity driven by consolidation in industries such as energy, financial services, utilities, healthcare, and media, despite the difficult financial conditions in late 2008. One explanation for

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the continued and unabated interest in M&A activity, despite the evidence to date, is that established firms can increase their innovation output through M&A by acquiring firms that can unleash innovation and synergies with the acquirers, a post-acquisition outcome that top-management teams (TMTs) strive to achieve (Boston Consulting Group, 2004; Sevilir and Tian, 2012). For M&A to lead to innovation for the acquirers, a certain degree of knowledge transfer is necessary (Birkinshaw *et al.*, 2010; Valentini and Di Guardo, 2012), and the top management teams facilitate innovation success by providing complementary resources (King *et al.*, 2003; Cassiman and Colombo, 2006) to achieve sustainable post-acquisition gains. Innovation is seen by top management teams as a significant determinant of sustainable organizational performance (O'Reilly III and Pfeffer, 2000; Hess and Kazanjian, 2006; Thoenig and Waldman, 2007; Gottfredson and Schaubert, 2008; Simons, 2008; Tappin and Cave, 2008; Spear, 2009).

The main rationale behind an acquisition is the expectation that the consolidated organization can realize operational, financial, or strategic synergies (Chatterjee, 1986; Krishnan and Park, 2002; Soofi and Zhang, 2014). However, for the acquisition to result in any meaningful synergy, it is necessary to surmount the problems of acquisition integration. This is where most firms fail. One of the main reasons cited by researchers for the failure of mergers and acquisitions is the lack of compatibility between the partners (Porter, 1987; Haspeslagh and Jemison, 1991; Datta, 1991). This compatibility is an important issue particularly at the top levels of the organization. Often, the two top management groups do not work toward common goals, resulting in large scale turnover among the acquired firm managers (Walsh, 1988). Thus, the anticipated operational or financial synergy does not materialize. For example, AT&T's major decision to restructure into three separate entities is largely based on its failure to generate synergies through its acquisitions of NCR Corporation and McCaw Cellular Communications.

The success of any acquisition to a large extent depends on the top managers. Several researchers have argued that in trying to understand the role of top management it is important to understand the power enjoyed by them in the organization (Pfeffer, 1981; Ravenscraft and Scherer, 1987). Power manifests itself in the form of behavior and has considerable influence on the decisions taken by the manager (MacMillan, 1978). It is surprising that given the vast literature in the area of top management power and in the area of mergers and acquisitions, empirical studies linking top management team power and post-acquisition performance are relatively rare. To date, one of the few studies in this area is the empirical investigation carried out by Hambrick and Cannella (1993). They looked at power in the context of relative social standing and its effects on top management team turnover among managers of the acquired entity. They did not empirically test for the effects of relative social standing on performance, but provided strong arguments that suggest that power can have an impact on post-acquisition performance. Bauer *et al.* (2016) make a fervent call for research that shows that TMT power drives innovation post-acquisition.

The purpose of this study is to establish a linkage between power in top management teams and post-acquisition performance. To address this issue, we will first briefly look at the literature on acquisition integration and top management team power. It is hoped that this research will shed new light on the acquisition process.

II. Theoretical Background

Researchers have not been able to arrive at a consensus regarding the determinants of acquisition performance. The issue that has not been resolved despite extensive research in this area is whether related acquisitions outperform unrelated acquisitions. There are three schools of thought in this area. One school argues that related acquisitions outperform unrelated ones because there is more scope for transfer of operational synergies in the former (Rumelt, 1974; Bettis and Hall, 1982). These researchers argue that because related firms operate in common product-markets, the managers have extensive knowledge of the business. This knowledge can be transferred or shared between business units, resulting in a competitive advantage for the organization. According to the second school of thought, unrelated acquisitions outperform related ones because the organization is able to reduce its risks and balance the growth in its portfolio by acquiring unrelated units (Michel and Shaked, 1984). By transferring financial resources across business units and at the same time giving autonomy to units, the organization is able to realize financial synergies. The third school of thought argues that the success of any acquisition depends on how well the two firms are integrated (Jemison and Sitkin, 1986; Porter, 1987; Palich *et al.*, 2000). Both related and unrelated acquisitions can succeed if the two partners are able to integrate well after the acquisition. Haspeslagh and Jemison (1991) and Markides and Williamson (1994) argue that both related and unrelated acquisitions can have a great need for strategic interdependence and therefore, can benefit from transfer and/or sharing of skills and resources.

There are several factors which determine the success of any acquisition. One of the main factors, according to a meta-analytical review by Certo *et al.* (2006), is the influence of the top management team (TMT). The TMT is not only responsible for setting the direction of the company; it is also responsible for marshaling the resources of the organization toward its objectives. Adapting to and exploiting change is essentially a creative and entrepreneurial effort and carries with it significant risks of failure (Rosenbusch *et al.*, 2011). That is, some firms are successful and some are not. In creating new growth platforms, top management teams need to reallocate and also find new sources of resources (Bogner *et al.*, 1996; Laurie *et al.*, 2006). Child (1972) argues that top managers play an important role in positioning the organization in its environment. It is this positioning that can result in a competitive advantage for the firm. Building on the strategic choice perspective of Child (1972), Hambrick and Mason (1984) proposed an upper echelons theory (refined later by Hambrick, 2007) where they argued that the demographic and psychological attributes of top managers can influence organizational outcomes. Researchers have tested this theory in different organizational settings. These include not only the influence of top management characteristics in single business enterprises but also its influence in firms diversifying through acquisitions. The key to acquisition success lies in the composition of the top management team and how these managers use their skills and resources to the advantage of the organization.

While some researchers have studied the impact of TMT composition on organizational outcomes, others have studied the impact of TMT compatibility between acquiring and acquired firms on post-acquisition performance (Bunderson, 2003; Bunderson and Sutcliffe, 2002; Carpenter *et al.*, 2004; Finkelstein and Hambrick, 1996; Pelled *et al*., 1999). Specifically, Michel and Hambrick (1992), Wiersema and Bantel (1992), and Auh and Menguc (2006) found that the demographic characteristics of top management team can have an impact on organizational outcomes in diversified companies. Miles and Cameron (1982), in a sample of six tobacco firms, found that managerial power affects the acquisition decisions of the firm. In another study

involving the impact of managerial characteristics on resource allocation decisions in strategic business units, Gupta and Govindarajan (1986) found that general managers characterized by lower average age and shorter tenure were more inclined to increase spending for their business units. Srivastava and Lee (2008) present a synthesis of existing research on TMT demographics-performance relationship that reveals little consensus.

In the second set of studies, researchers have attempted to demonstrate that there is a link between TMT characteristics and post-acquisition performance. Datta (1991) looked at the top management teams of the acquiring and acquired firms at the time of the acquisition and concluded that if the two teams had similar managerial styles, it would result in superior postacquisition performance. Building on the theoretical arguments of Porter (1987) and Barney (1988), Haspeslagh and Jemison (1991) conducted several case studies to study the impact of TMT characteristics on post-acquisition performance. They found that acquisitions can result in positive synergies if organizations can create a climate for the transfer of skills from the acquiring firm to the acquired firm and vice versa. They argue that similar or complementary teams can have a positive impact on post-acquisition performance.

In the context of acquisitions it is important to look at the two management teams (i.e., the acquiring and acquired teams) as a combined entity and how the composition of this combined team can affect performance (Zaleznik, 1970; Jemison and Sitkin, 1986; Porter, 1987). That is, it is important to investigate not just the complementarity of the two teams and its impact on performance as prior researchers have done, but also how the combined team affects post-acquisition performance. This is because, after the acquisition, in most cases, the operations of the acquired firm are consolidated into the operations of the acquiring firm (Kitching, 1967; Porter, 1987). Decisions are taken jointly by the two sets of managers. In firms that rely on acquisitions as the major growth strategy, it is not unusual for highly skilled top managers to be rotated around the different units of the organization. These managers are now responsible for the organization as a whole. The demographic and psychological attributes of this combined team can therefore have a considerable influence on performance (Hambrick and Mason, 1984).

In acquisitions, one managerial attribute considered to be crucial is power (Zaleznik, 1970; Buono *et al*., 1985; Pfeffer, 1992). This is due to the fact that power can have a considerable influence on post-acquisition performance. There are several reasons to support this notion. Diversification via acquisition is a major corporate strategy and hence, the top managers play a crucial role in establishing the direction of the company. Power in the TMT can influence the decisions that its members take (Hambrick, 1981; Smith *et al.*, 2006). Second, power is closely linked to the organizational culture (Buono *et al*., 1985). Keeping employees motivated and ensuring that they work for the organization's goals is the role of the top managers. Power is necessary to mobilize the political support and resources to get things done in the organization (Pfeffer, 1992). This is crucial in turbulent situations like acquisitions where powerful teams can ensure that the organization surmounts the problems of acquisition integration (Perry, 1986). During this time, employees look up to the top managers for their leadership and guidance, which ultimately have an impact on organizational performance. Another reason power may have a positive impact on performance is derived from the fact that power accrues to a person through his/her background (French and Raven, 1959). The manager's experience, education, and status enable him/her to manage inter-organizational boundaries and also serve as a signaling mechanism to the rest of the organization.

Pfeffer (1992) argues that managerial power is a crucial determinant of performance. Buono *et al*. (1985) argue that many acquisitions fail because in an ensuing power struggle between the

two management teams, the casualties are usually the top managers of the acquired firm. Some of them may get forced out. Feeling "powerless" in the new organization, many of them may even choose to leave on their own. Jemison and Sitkin (1986) argue that one of the main reasons acquisitions fail is because the acquiring firm brings in a new management group to handle the operations of the acquired unit. Not only do these managers tend to be more bureaucratic, they often lack the skills required to handle the operations of the acquired unit. He further argues that it is important that the acquiring group recognizes the reality of power assymetries. If the acquiring firm ensures that both the firms are equal in psychological power (which is derived from managerial expertise), it could have a positive effect on performance (Haspeslagh and Jemison, 1991). Ramos-Garza (2009) found that TMT consensus is more crucial for firms operating in complex environments than for those in simple environments.

Many researchers have argued that successful acquisitions are those which tap the skills of its top managers. This is a major requirement for collective power. Several researchers argue that one of the major determinants of post-acquisition performance is resource and skill sharing and team interactions within the organization (Cannella and Holcomb, 2005; Carpenter, 2002; Haspeslagh and Jemison, 1991). This skill sharing comes about by consolidating the management teams. The combined team may result in a unique combination of skills which may not be available to other bidding firms (Barney, 1988). This uniqueness can be harnessed for long-term competitive advantage. What is important here is not just the skills of the individual members of the team but the skills in the consolidated team. To ensure that these managerial skills are used to the benefit of the organization, it is important that there be power sharing in the top management team (Hambrick, 2007). Hence, it is important to consider the collective power in the TMT.

Power is defined by a set of networks, and it is important to study the conditions under which it can be employed (Dalton and Dalton, 2005). Power manifests itself in the form of behavior and is defined as the ability to exert one's will and influence outcomes (MacMillan, 1978; Pfeffer, 1981). Several typologies have been constructed to measure managerial power (French and Raven, 1959; Hambrick, 1981; Finkelstein, 1992). These typologies include expert power, prestige power, and hierarchical power. However, in the context of acquisitions, expert power and prestige power are considered particularly crucial (Hambrick and Cannella, 1993).

Expert power. Expert power is derived from the core functional expertise of a manager and reflects the manager's ability to cope with environmental uncertainties (French and Raven, 1959; Hambrick, 1981; Yetton and Bottger, 1982). The full array of strategic decisions within the organization is based on the expert power that accrues within the top management team (Hambrick, 1981; Finkelstein, 1992). Zaleznik (1970) argues that expertise is an important source of power because affirmation of a manager's position in the organization comes from the lower levels. Mintzberg (1984) attempted to link power configurations with organizational life cycles. He argues that a managerial team characterized by a meritocracy power configuration (i.e., where power is derived through professional expertise) is likely to steer the organization towards success.

A team that has considerable diversity in functional backgrounds among its top managers is a valuable asset to the consolidated organization for several reasons (Cannella *et al.*, 2008; Bunderson, 2003; Porter, 1987; Ravenscraft and Scherer, 1987). These managers are better able to cope with organizational uncertainties and get things done because they bring different skills and expertise to the team (Pfeffer, 1992). Consequently, a greater number of alternatives are generated before arriving at decisions. Functional heterogeneity among the members makes the organization more innovative, enhances the search for knowledge, and promotes cooperation among the members (Dutton and Duncan, 1987). Zaleznik (1970) argues that in acquisitions, the conflict of

interests can be severe. Therefore, a team that has capable managers can have considerable power. Furthermore, he states that if power is vested in the TMT and not just in one or two individuals, it can serve as a guard against blind spots. This benefits the combined organization. It is the combined capacity of the members of top management teams that influences long-term success (Carpenter *et al*., 2004).

A second reason that greater expert power benefits the combined organization is because it reduces TMT turnover among acquired firm managers (Walsh, 1988; Cannella and Shen, 2001; Cho, 2006; Simsek, 2007). It is important to retain the acquired firm managers because of their knowledge of the business. Wagner *et al.* (1984) argue that if every member is moderately dissimilar from other members in the group, there will be less differentiation and conflict than if they are similar. On the other hand, in a homogeneous TMT, there is a lot of competition for scarce resources, accelerating the departure of some of its managers. Therefore, a TMT that has considerable expert power (reflected in its functional heterogeneity) is likely to lead to superior post-acquisition performance.

Hypothesis 1: *There is a positive relationship between expert power among the TMT members and post-acquisition performance.*

Prestige Power. Prestige power is derived from a manager's ability to absorb uncertainty from the institutional environment (D'Aveni, 1990; Finkelstein, 1992; Certo, 2003; Jackson and Hambrick, 2003; Brockmann *et al.*, 2004). Possession of prestige or high social status enables a manager to confer legitimacy to the organization. This legitimacy often engenders trust from the members of the organization and/or from its external stakeholders. This trust and respect within the organization can be a valuable resource to an organization, particularly in times of uncertainty.

Hambrick and Cannella (1993) and McDonald *et al.* (2008) argue that possession of prestige power among top managers has several advantages. First, through enhanced social status it creates identification with the organization as a whole. Second, prestigious executives often are highly regarded in the business community, which leads to board positions in other organizations (Carpenter and Westphal, 2001). The learning that comes from this place of privilege and prestige can contribute to the organization's success (Westphal *et al.*, 2006; Westphal, 1999).

The trend to redefining organizational boundaries started with the merger wave of the 1980s (Hirschhorn and Gilmore, 1992). To cope with such acquisition activity, the organization needs managers who can manage inter-organizational boundaries and relationships. In such situations, possession of prestige power among top managers can have an important signaling effect to the employees of the organization. Krackhardt (1992) argued that strong external ties are desirable because they aid in the development of trust and reciprocity, what he referred to as *philos*. *Philos* enable firms to effectively deal with uncertainties (Hansen, 1999; Cohen and Prusak, 2001). Also, lower level employees tend to trust these highly networked top managers as able managers who can contain conflicts within the organization. It also signals that they would be able to manage inter-organizational boundaries by being able to network with directors and top managers of other organizations. The above arguments suggest that the prestige power of the TMT will be positively related to post-acquisition performance.

Hypothesis 2: *There is a positive relationship between prestige power among the TMT members and post-acquisition performance.*

Although possession of expert power among top managers is expected to result in better performance in both related and unrelated acquisitions, the impact of these differences may differ across the type of acquisition. Related acquisitions entail acquiring businesses that build on, draw strength from, and/or strengthen some core competence (Rumelt, 1974). This usually involves the two management teams working together. Functional heterogeneity among top managers facilitates transfer of skills in related acquisitions because a common core of unity may be present (Lubatkin, 1987; Singh and Montgomery, 1987). Also, it is possible for the merged firm to increase its bargaining power over buyers and suppliers. For these reasons, both financial and operational synergies can be realized in related acquisitions (Kitching, 1967; Porter, 1985; Chatterjee, 1990; Pehrsson, 2006). This suggests that the combined expert power in the TMT may have a considerable impact on performance in related acquisitions. In contrast, the likelihood of realizing operational synergies is limited in unrelated acquisitions. This is because the two firms operate in different industries. Buono and Bowditch (1989) observe that as the goal in unrelated acquisitions is financial synergies, the firm may be organized as a decentralized conglomerate. Therefore, the two top management teams may interact only on a limited basis. Thus the combined expert power in the TMT may not be as beneficial to the organization as it would in related acquisitions.

Hypothesis 3: *The strength of the impact of expert power on post-acquisition performance will be greater for firms pursuing a related acquisition strategy than for firms pursuing an unrelated acquisition strategy.*

III. Methodology

The sample of acquired firms and their acquirers for acquisitions completed between 1986 and 1987 was obtained from the *Journal of Mergers and Acquisitions*. All acquirers who were subsequently acquired and all foreign companies were excluded from the sample. We chose the years 1986 and 1987 because the *Brooking Report* on takeovers suggests that these two years offer a tranquil period after the hyper-inflation period of 7 years that preceded them, thus minimizing the potential impact of macroeconomic factors on the takeover phenomenon (Bhagat *et al.*, 1990). In particular, Jensen (1988) points to 1986 and 1987 as the period that is unadulterated by the global acquisitions that cut across international boundaries, which have become so common in today's world, and hence can provide extra insights into the dynamics of predominantly domestic mergers and acquisitions. Finally, the fourth merger wave (1985-1989) deserves more analysis to tease out lessons that are potentially useful for future mergers and acquisitions because it is difficult to collect and analyze "in-progress" (2013-2015) mergers and acquisitions due to difficulties in attributing power dynamics to the target and bidding firms (Ravenscraft, 1987). The TMT was defined for the parts of the two firms brought together during the acquisition. Data on TMT members for the acquiring and acquired firms were obtained from the *Dun & Bradstreet Reference Book of Corporate Managements.* Consistent with the approach adopted by earlier researchers, the top management team was defined as all managers who occupied the rank of senior vice president and above (Michel and Hambrick, 1992) in the two firms at the time of the acquisition. The selection criteria included the chief executive officer, the president, the chief operating officer, the chief financial officer, and senior vice presidents. The *Dun & Bradstreet Reference Book of Corporate Managements* provides information on top managers for the acquiring firm and on top managers of all its subsidiaries. In most cases, the acquired unit is treated

as a subsidiary of the acquiring firm. Firms for which the data on TMT were not available were excluded from the sample. The final sample used in the study consisted of 72 firms.

In measuring power, both objective and subjective measures have been used in prior research. However, one of the main problems associated with measuring power using subjective indicators is that it reflects only the perceptual notions of managerial power (Finkelstein, 1992). It may not be an indication of true power. Therefore, in this study, power was measured using objective indicators.

A. Independent Variables

Expert Power. One way of measuring expert power is to examine the functional expertise of top managers. In a top management team, if the managers have expertise in different functions, the team would be functionally heterogeneous, and therefore, the team would have greater expert power (Finkelstein, 1992). To measure expert power, a variation of the Herfindal-Hirschman index was used (Scherer, 1970; Michel and Hambrick, 1992). The equation used was $H= \Sigma Si^2$. In this equation, H is the homogeneity and Si is the percentage of managers with dominant functional track. Hitt and Tyler (1991) suggest that although top executives often have experience in multiple functions, they usually have a dominant experience in one major function. The functional background of the TMT members for the combined organization was assessed by categorizing the manager as belonging to one of the seven major functional areas if s/he had spent more than half of the career in a particular function. The functional areas considered in this study were production/operations, R&D/engineering, finance/accounting, general management/general administration, marketing, legal, and personnel/labor relations. H can have a value from 0 to 1, where a high value indicates that a top management team is homogeneous (i.e., low expert power) and a low value indicates that a team is heterogeneous (i.e., high expert power). The information required for categorizing functional areas was available in *Dun & Bradstreet Reference Book of Corporate Managements* using data for the year of the acquisition.

Prestige Power. To measure prestige power, the approach advocated by Finkelstein (1992) was adopted. It was measured as the number of corporate boards a top manager served on. The prestige score for the firm was arrived at by summing the scores for individual members in a top management team, and then dividing this number by the size of the top management team. The higher the score, the higher the prestige power for that group.

B. Control Variables

Relative Size. Several researchers have argued that the relative sizes of the acquiring and acquired firm can influence organizational performance. More specifically, greater the ratio, poorer the performance (Kusewitt, 1985). The data on relative size were calculated for the year of the acquisition from *Moody's Industrial Manual*.

TMT turnover in the acquired firm. There is considerable evidence in the literature linking TMT turnover in the acquired firm with poor performance. Many acquisitions are characterized by TMT turnover which results in the acquiring firm losing valuable expertise (Walsh, 1988 and 1989). Even if the acquisition is in a related area, the acquiring firm may still lack the unique skills necessary to deal with the operations of the acquired firm. Not only will the managers of the acquiring firm have to deal with the operations of the acquired firm, they are also responsible for integrating the two firms. This may result in their not having the time and resources to deal with the operations of the acquiring firm. All this can have a negative impact on post-acquisition

performance. TMT turnover in the acquired firm was measured as follows. The names of the TMT in the acquired firm were obtained for two time periods: (1) the TMT members during the time of the acquisition; and (2) the TMT members three years after the acquisition. TMT turnover was measured as the proportion of change between the two time periods 1 and 2, similar to the approach adopted by Walsh (1988). This information was collected from the *Dun & Bradstreet Reference Book of Corporate Managements.* The data on TMT members for the acquiring and acquired firms in the sample were also obtained from the SEC company annual reports and filings.

Prior Performance. The prior performance of the acquiring firm can also have an impact on its subsequent performance (Hambrick and Schechter, 1983; Tushman and Romanelli, 1985). When firms perform poorly, they may seek to engage in acquisitive activity to improve their performance. They may want to acquire a successful firm with the hope of generating synergies through consolidation of activities. Data on the acquiring firms' prior performance, measured as the return on assets averaged for a period of three years before the acquisition, were collected from *Moody's Industrial Manual*.

Industry Performance. The performance of the firm relative to its industry can have a significant impact on post-acquisition performance. One of the reasons for the success of some acquisitions is the fact that they operate in industries characterized by high growth conditions (Christensen and Montgomery, 1981). Data on industry performance at the 2-digit SIC level, measured as the three year average ROA prior to the acquisition, were collected from *Fortune* (Industry Medians and Totals).

Acquisition Type. Based on Rumelt's (1974) two major categories of related and unrelated, Harrison *et al.* (1991) classified two merging firms as being related to each other if they belonged to the same dominant 2-digit SIC category prior to the acquisition. A similar procedure was adopted in this research by classifying firms based on their 2-digit SIC categories. That is, if the two firms belonged to the same dominant 2-digit SIC groups at the time of the acquisition, they were classified as related, and unrelated otherwise.

C. Dependent Variable

Post-Acquisition Performance. The post-acquisition performance of the consolidated organization was chosen as the dependent variable. It was measured as the return on assets (ROA) averaged for a period of three years immediately following the acquisition. This time period is sufficient to realize most of the effects associated with synergy. Prior research supports the use of accounting measures of performance such as the ROA because managers use this measure very frequently in decision making (Bromiley, 1986). These data were collected from *Moody's Industrial Manual*.

IV. Results

Ordinary least squares multiple regression analysis was used to test the hypotheses. The descriptive statistics and inter-correlations for all the variables are presented in Table 1. Using the approach suggested by Belsey *et al.* (1980), the data were tested for multicollinearity. An examination of the condition indexes revealed no significant multicollinearity among the variables.

Table 1: Descriptive Statistics and Pearson Correlations (N=72)

Variables	Mean	S.D.	1	2	3	4	5	6	7
1. Post-Acquisition Performance	3.13	4.7	1.0						
2. Prior Performance	5.12	4.77	0.49****	1.0					
3. Relative Size	38.59	99.73	0.06	-0.00	1.0				
4. Industry Profitability	5.28	2.49	0.08	-0.04	-0.10	1.0			
5. TMT Turnover	0.43	0.25	-0.26	-0.03	-0.04	-0.20	1.0		
6. Expert Power	0.74	0.06	0.35***	0.29**	-0.05	-0.06	-0.21*	1.0	
7. Prestige Power	1.18	0.56	0.43***	0.26*	0.19	-0.07	-0.26*		1.0

**** p<0.001
*** p<0.005
** p<0.01
* p<0.1

The results of the regression analyses are reported in Table 2. Model 1 shows the impact of control variables on the dependent variable. The control variables together explained 30% of the variance in the dependent variable and the overall model was highly significant (p<.0001).

Table 2: Results of Multiple Regression Analyses (N=72)

	Dependent Variable = Post-Acquisition Performance			Dependent Variable = Post-Acquisition Performance Residuals	
Variable	**Model 1**	**Model 2**	**Model 3**	**Model 4**	**Model 5**
Intercept	1.77 (0.00)	-10.0 (0.00)	-1.57 (0.00)	-9.97 (0.00)	-2.38 (0.00)
Prior Performance	0.48**** (0.48)	0.42**** (0.43)	0.41**** (0.41)		
Relative Size	0.00 (0.06)	0.00 (0.07)	0.00 (0.01)		
Industry Profitability	0.12 ().06)	0.15 (0.08)	0.17 (0.09)		
TMT Turnover	-4.28* (-0.23)	-3.47 (-0.18)	-2.8 (-0.15)		
Expert Power		15.5* (0.19)		13.45** (0.20)	
Prestige Power			2.43*** (0.19)		2.00*** (0.29)

**** p<0.001
*** p<0.005
** p<0.01
* p<0.1

Model 2 in Table 2 shows the impact of expert power on performance. The overall model is highly significant ($F=6.8$; $p<.0001$), and it explains about 34% of the total variance in the dependent variable. The value for expert power is significant ($p<.10$), supporting Hypothesis 1, which predicts that expert power has a positive impact on performance. Hypothesis 2, which predicts that prestige power is positively related to post-acquisition performance, was also supported, and this relationship was highly significant ($p<.0001$) as revealed in Model 3. The control variables and prestige power together explained about 38% of the variance in performance.

Since the control variables (especially prior performance and TMT turnover) explained a large portion of the variance in post-acquisition performance, further tests were conducted by partialing out the effects of these variables and using the residuals for further analyses. The dependent variable was measured as the residuals from a regression of the control variables on post-acquisition performance consistent with prior researchers (MacMillan *et al.*, 1982). An analysis of residuals revealed that they were normally distributed and that the regression results were not influenced by outliers. Results in Table 2 (models 4 and 5) reveal that both expert power and prestige power were significantly and positively related to post-acquisition performance residuals ($p<0.05$ and $p<.0l$ respectively), supporting Hypotheses 1 and 2.

To test Hypothesis 3, which predicts that the strength of the impact of expert power varies across acquisition type, t-tests were conducted. There were 43 related and 29 unrelated acquisitions in the sample. Results reveal that the group means for neither the performance term nor the expert power term were statistically significant. This confirms the arguments advanced by several researchers that related acquisitions do not outperform unrelated acquisitions (Porter, 1987; Haspeslagh and Jemison, 1991).

V. Discussion

The literature reveals that most acquisitions end in failure due to lack of compatibility among top managers. The results of this study show that in providing an explanation for post-acquisition performance it is important to consider the composition of the combined team. The power of this combined team can have a positive impact on post-acquisition performance. Our results reveal that both expert power and prestige power were positively related to performance, reinforcing the notion that the diversity in the functional backgrounds of top managers and the influence that they exert can be harnessed for acquisition success and in turn to long term competitive advantage.

There are several reasons supporting the notion that managerial power affects post-acquisition performance. Not only does the top team directly influence post-acquisition performance, it also has an indirect effect on performance through reduced TMT turnover. TMTs with high expert power (reflected in their functional heterogeneity) are more innovative and consider a greater number of alternatives before arriving at decisions. The managers in such teams bring a wide range of skills and expertise. When organizations deal with the problems of acquisition integration, all functional activities need to be adequately addressed. TMTs that combine functions as diverse as marketing, operations, R&D, legal, general administration, finance, and personnel relations are better able to handle integration problems. A consequence of effective post-acquisition integration is a positive impact on performance.

TMTs characterized by high prestige power can have a positive impact on performance through the prestige and status of their members. By serving on a number of corporate boards, these managers are able to network well with managers of other organizations. They are better able to manage interdependencies and deal with environmental uncertainties. It is also possible that

these board positions exist in firms that may be major suppliers or customers to the acquiring firm. Fostering good relationships with such companies can have a positive impact on acquisition success and organizational performance. Gulati (2007) defines this relationship-capital as *network resources* and Möller *et al.* (2005) call this relationship-capital as *strategic business nets*; these are resources that accrue to a firm from its ties with external constituents including – but not limited to – partners, suppliers, and customers, and thus exist outside a firm's boundaries.

Evidently, there is also an indirect relationship between managerial power and performance. A team characterized by high functional heterogeneity is less likely to lead to turnover. Acquired firm managers are valuable assets, and if they believe that they would continue to enjoy some power after the acquisition, they would be motivated to stay on in the organization and contribute to its success. This reduced turnover among acquired managers is positively associated to post-acquisition performance (Walsh, 1988). The above arguments are also in accord with the observations of Cannella and Hambrick (1993) that acquired managers are an intrinsic component of the acquired firm's resource base and that the loss of their experience cannot be recovered easily.

The above arguments are readily evidenced in two well publicized acquisitions, one of which was a failure and the other a success. In 1998, the German automaker Daimler-Benz acquired the American automaker Chrysler for $36 billion only to sell 80.1% of its equity in Chrysler for only $7.4 billion nine years later to a private venture capital firm. In 2005, the consumer goods giant Procter and Gamble (P&G) acquired Gillette for $57 billion, making the combined company the world's largest consumer products firm. The Daimler-Chrysler merger was characterized by significant missteps in the post-acquisition process that failed to capture synergies between the firms. While touted as a merger of equals, autocratic leadership from Daimler left little autonomy for the combined TMT at Chrysler. "You had two companies from different countries with different languages and different management styles come together yet there were no synergies. It was simply an exercise in empire-building by Juergen Schrempp, the then Daimler CEO" (Woods, 2007). In stark contrast, the P&G/Gillette merger ensured a smooth post-acquisition integration by empowering the combined TMT to realize synergies estimated in the 18-month long pre-merger due-diligence (Berner, 2005). Expertise power in the combined TMT was harnessed to realize almost all of the estimated synergies. Despite the age of the data in our study, our theory stands the test of time as evidenced from the Chrysler/Daimler debacle and the P&G/Gillette success.

The results of our study support the argument that both related and unrelated acquisitions can result in superior performance. This is because, irrespective of the type of acquisition, related or otherwise, the acquiring firm would be interested in retaining managers with high expertise (Haspeslagh and Jemison, 1991; Hambrick and Cannella, 1993). Possession of expert power is associated with knowledge of and skill in using that power in acquisition integration (Pfeffer, 1981). Also, expert power, reflected in the functional heterogeneity of top managers, is unique to a firm and not to the industry type (Haspeslagh and Jemison, 1991; Cannella and Hambrick, 1993). In addition to the uniqueness of skills, there is also the issue of culture and how to motivate the remaining employees. Even if the acquiring firm managers were familiar with the acquired business, they would retain the acquired firm managers for their ability to keep the rest of the employees motivated. These results reinforce the importance of examining the influence of functional heterogeneity in any decision making process.

VI. Future Research

One of the major contributions of this study is the investigation of managerial power to provide an adequate explanation to post-acquisition performance. It measures power distribution in the new TMT after the acquisition and its impact on subsequent post-acquisition performance. Power is a complex phenomenon and empirical studies investigating its role in acquisitions are relatively rare. This is one of the few studies in this area with a research focus on the combined TMT and a prolonged time frame that extends into three years after acquisition. Several interesting issues emerge out of this study for future research. First, we suffer from the same limitation as in Cannella *et al.* (2008) in our TMT expert power measured via functional diversity. Because we did not have data on the time spent in each function, we equally weighted each function with the proportion of the total number of functional areas an executive had experience in. In this respect, our measure is coarser than that used by Bunderson and Sutcliffe (2002). Hence, future research should replicate the results of our study using both objective and subjective measures of power. Second, this study only measured the possession of power among top managers and not its application. An area for future research is the investigation of the effects of the actual exercise of power on post-acquisition performance. Third, it is also important to consider the impact of psychological attributes, which are important sources of power. Finally, the profile of power configurations is not static, and therefore longitudinal studies are required to study its impact on performance. For practitioners, the implications of the our findings are clear in that expert power (functional heterogeneity) as well as prestige power (network resources) positively contribute to post-acquisition performance in both related and unrelated acquisitions. Thus, complementary (and internal) knowledge resources and external network resources must be retained during acquisitions to ensure post-acquisition success.

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Millennials Through The Looking Glass: Workplace Motivating Factors

By RUSSELL CALK AND ANGELA PATRICK*

For the first time in history, organizations today have a workforce composed of four distinct generations of employees. Millennials are the latest and potentially largest generational group to enter the workforce. Organizations are struggling to recruit and retain talent from the Millennial generation. This study examines the factors influencing Millennials' workplace motivation. Findings show that Millennial workers are motivated by basic needs and the desire for belonging, and seek actualization through challenging and meaningful work. The generation is, however, very diverse with respect to their motivating factors.

Keywords: Millennials, Motivation, Work Motivation Inventory

JEL Classification: M5

I. Introduction

Numbering approximately 76 million and aged 28 and younger, Millennials, or Generation Y, have a significant impact on the size and characteristics of the United States labor force (Toossi, 2009). Based on dates provided by Strauss and Howe (1991) Millennials are one of four distinct generations comprising the current workforce: the Silent Generation born from 1925 to 1942, the Baby Boomers born from 1943 to 1960, Generation X born from 1961 to 1981, and Millennials born after 1982. Millennials are the most recent and potentially largest generation to enter the workforce. This generation is well educated but seems to have substandard decision-making and communication skills (Crumpacker and Crumpacker, 2007). Millennials tend to focus more on individual needs rather than on organizational ones (Rosenzweig, 2010). A current challenge for many organizations involves recruiting, retaining, and motivating Millennial employees (Jenkins, 2008).

For the first time in history, most organizations have four distinct generations with an age range spanning more than 60 years working together (Macon and Artley, 2009; Birkman, 2010). Each generational cohort brings varying beliefs, work ethics, values, attitudes, and expectations to organizations (Niemiec, 2000). Older workers from the Baby Boomers generation born between 1943 and 1960 are retiring, but Millennial employees who are in the early stages of their careers have not made long-term commitments to their organizations, causing potential leadership voids within organizations (Lancaster and Stillman, 2002). Organizations must continue to change and adapt to the work values of a multigenerational workforce in order to recruit, motivate, and retain both today's and tomorrow's leaders (Scandura and Williams, 2000). Birkman (2010) asserts that

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organizations struggle to understand and adapt to the needs and working styles of the four different generations comprising their workforce.

It is still debatable how Millennials perceive workplace motivation (Lancaster and Stillman 2002). Smola and Sutton (2002) urge more analysis examining Millennials' workplace motivation. Through understanding what motivates Millennials, the potentially largest and least understood of the four generations in the workforce, an organization can take advantage of recruiting and retaining the unique strengths and talents this generation has to offer (McDonald, 2008). The purpose of this study is to investigate perceptions of workplace motivation among Millennials preparing to enter the workforce.

II. The Millennial Generation

Mead (1970) was the first to use the term "generation gap" to describe differences in attitudes and beliefs between generations. The generation theory suggests that the era in which a person was born may affect their generational world views and development (Codrington, 2008). Lyons, *et al.* (2005) argue that some discrepancy exists in defining each generation, but each generation shares a unique set of significant historical and social life events that shape their attitudes and beliefs, thereby creating generation gaps. Managing those generation gaps provides unique challenges and opportunities for organizations (Lancaster and Stillman, 2002).

To be effective in today's world, organizations must be able to identify with a multi-generational workforce with varying beliefs, work ethics, lifestyles, values, attitudes, and expectations (Niemiec, 2000). Many readily available articles and books discuss the different aspects of managing organizations given the existing generation gaps (Denham and Gadbow, 2002). The main interest of many authors such as Howe and Strauss (2007) is to try to understand the history of each generation in hopes of better understanding the generation gaps thereby allowing organizations to think strategically and implement best practices to retain, manage, and utilize each distinct generation's talents.

Millennials are the newest and fastest growing segment of the workforce. By 2018, the Millennial workforce is expected to reach 38.8 million people and comprise half of all employees in the world (Toossi, 2009; Meister and Willyerd, 2010). At 32.0%, compared to 31.2% for Generation X, 30.6% for Baby Boomers, and 6.2% for the Silent Generation, Millennials now compose the greatest share of the United States labor market (Deloitte, 2016). They also have greater diversity than any other generation with 44.2% belonging to a minority group (United States Census Bureau, 2015).

Millennials differ from other generations in several ways. They have always had access to technology and view it as an integral part of their lives. They are realistic and place value on positive reinforcement, diversity, and autonomy (Lancaster and Stillman, 2002). They also value teamwork, personal productivity, self-management, personally fulfilling work, and social consciousness (Meister and Willyerd, 2010). Henderson (2012) cites research showing that Millennials are willing to take a lateral career move to gain beneficial work experience, are willing to travel frequently for work, prioritize intrinsic job satisfaction over the bottom line, value making a difference over professional recognition, and rate a positive work environment over pay.

Some research shows that Millennials are quicker to change jobs, and organizations experience great difficulty motivating and retaining Millennial employees who exert tremendous pressure for radical change in how organizations function (Solomon, 2000). More recent studies suggest that Millennials' perceived lack of loyalty to their employers is a function of prevailing

economic conditions and the age/stage of life of the Millennials being studied (Buckley *et. al.*, 2015). Lancaster and Stillman (2002) suggest that organizations can gain a competitive advantage by better understanding and adapting to Millennials' workplace motivation. By understanding the perceived motivational factors for Millennials, organizations will be able to increase workforce commitment, reduce turnover, and fill the leadership void.

III. Research Design

The purpose of this study is to investigate factors affecting workplace motivation among Millennials preparing to enter the workforce to start their careers. More specifically, this study examines Millennials' perceptions of five motivational needs identified in the 2000 update to the Work Motivation Inventory (WMI) first developed in 1967 (Hall and Williams, 2000). The WMI has been used extensively across a variety of organizations ranging from large, publicly traded corporations to public accounting firms, universities, and governmental entities. The original instrument has been revised and updated five times in 1980, 1986, 1994, 1995, and 2000. The WMI is a 60-item inventory that uses a forced-choice, paired comparison technique to create a motivational profile of an individual's values and needs considered important in making workplace decisions. The WMI is modeled after Maslow's (1943) Hierarchy of Needs and Herzberg's (1959) Hygiene-Motivator Model of Satisfaction and measures five workplace motivational needs: basic, safety, belonging, ego-status, and actualization. Given the robust history of the WMI as well as the broad application and the instrument's theoretical foundation of widely accepted basic human needs and motivations detailed by Maslow and Herzberg, the WMI is a valid model for examining Millennials' workplace motivation. Exhibit 1 provides a brief description of each motivational need captured by the WMI.

Exhibit 1: Five Motivational Needs of the Workplace Motivation Inventory

Basic	Reflected in concerns for pleasant working conditions, more leisure time, more luxurious personal property, increased salary, and avoidance of physical strain or discomfort
Safety	Reflected in concerns for performance standards, safe working conditions, and fringe benefits such as insurance and retirement plans
Belonging	Reflected in concerns for friendly colleagues, opportunities for interaction with others, and team membership
Ego-status	Reflected in concerns for recognition and rewards for performance and opportunities for job advancement
Actualization	Reflected in concerns for more challenging and meaningful work that allows for creativity and leads to a sense of personal fulfillment

To investigate Millennials' workplace motivation, the WMI was administered to full-time students, as defined by Willamson (2009), at a private, liberal arts university in the Southwestern United States. The university has a total enrollment of approximately 3,000 students. The majority, 81%, of the students are under 25 years of age and thus are within the Millennial generation. The university gender ratio is 55% female and 45% male. A total of 341 surveys were distributed among randomly selected lower-division and upper-division classes across the university's six colleges. Of the 341 surveys distributed, 121 were returned for a response rate of approximately 35%. A total of 33 of the returned surveys were not completed in their entirety and were, therefore, excluded from the analysis. A final sample size of 88 surveys, 26% of the surveys distributed, were useable for the purpose of this study.

According to Cozby (2009), college students are increasingly diverse, and Herzberg (1959) asserts that motivation is ultimately an individual decision. Prior research has shown perceived motivational differences between genders (Lambert, 1991). The notion of a generational cycle suggests that as multiple generations work together, they find that they have much in common (Codrington, 2008). This is relevant in that the American Council on Education (2006) found that 60-80% of traditional college students have at least some part-time work experience and will have, therefore, interacted with prior generations in a work setting. It is also reasonable to assume that a student majoring in business and planning to enter a professional career might have different motivational factors than a student majoring in arts or education. Thus, in addition to the WMI, the survey instrument included demographic variables for gender, age, major, and prior work experience.

IV. Data Analysis and Results

Table 1 provides frequency distributions for the demographic variables. The survey sample closely resembles the university as a whole. The majority of respondents, 61%, were female. While only 33% had full-time work experience, 71% had worked part-time. The vast majority of respondents were from the College of Business (33%), the College of Nursing (21%), or the College of Education (16%). The respondents' ages ranged from 18-25 with a mean (standard deviation) of 19.97 (1.52).

Table 1: Frequency Distributions for Demographic Variables

Variable	*n*	%
Gender		
Female	54	61
Male	34	39
Full-time experience		
Yes	28	33
No	57	67
Part-time experience		
Yes	60	71
No	25	29
College		
Business	33	38
Education	16	18
Humanities	6	7
Nursing	21	24
Science	6	7
Visual and Performing Arts	6	7

The five motivational needs in the WMI are measured on a scale of 0 – 100 with a higher score indicating greater importance of the particular need. Table 2 presents the ranges, mean scores and standard deviations of the aggregate sample for each motivational need. Respondents scored highest on the basic, belonging, and ego-status motivational needs. The basic and ego-status motivational needs had the narrowest range of scores, while the belonging motivational need had the widest with scores ranging from a low of 29 to a high of 97. Clearly, individuals vary greatly on the motivational need for belonging in particular.

Table 2: Descriptive Statistics for WMI Motivational Needs

Motivational N	Mean (std dev)	Range
Basic	60.72 (9.57)	36 – 86
Safety	55.31 (9.12)	30 – 84
Belonging	61.86 (13.15)	29 – 97
Ego-status	62.19 (8.33)	44 – 92
Actualization	59.91 (10.36)	30 – 85

Results indicate statistically significant differences between the mean responses for the five motivational needs. See Table 3. The pairwise comparisons[1] in row 2 of Table 3 show that Millennials scale higher on all of the other four motivational needs as compared to safety. In particular, the basic and ego-status motivational needs scale significantly higher at the 0.001 level. These results are consistent with research showing that Millennials are willing to take career-related risks to experience more meaningful and satisfying work as long as they are able to meet basic needs (Twenge *et al.*, 2010). Stable, secure jobs with predictable salaries and a suite of benefits are not likely to be attractive to Millennials who scale low on the safety motivational need. It is worth noting that participants in this study were traditional college students. Buckley *et al.* (2015) show that as Millennials mature and evolve in both their professional and personal lives, they become much more committed to their employer. We might, therefore, expect to see the safety motivational need increase in importance over time. Such evidence is beyond the scope of this study.

[1] It is reasonable to assume that Millennials could consider the motivational needs in combination rather than independently. The analysis of the results, however, did not reveal any significant interactions among the motivational needs variables. Thus, a one-by-one pairwise comparison of the motivational needs is appropriate.

Table 3: Pairwise Comparisons of Workplace Motivation Needs

		t-statistic	Standard Error
Basic	Safety	5.40**	1.27
	Belonging	-1.15	2.01
	Ego-status	-1.48	1.43
	Actualization	0.81	1.87
Safety	Basic	-5.40**	1.27
	Belonging	-6.55	1.98
	Ego-status	-6.69**	1.46
	Actualization	-4.60	1.74
Belonging	Basic	1.15	2.01
	Safety	6.55	1.98
	Ego-status	-0.34	2.00
	Actualization	1.96	1.95
Ego-status	Basic	1.48	1.43
	Safety	6.89**	1.46
	Belonging	0.34	2.00
	Actualization	2.29	1.32
Actualization	Basic	-0.81	1.87
	Safety	4.60	1.74
	Belonging	-1.96	1.95
	Ego-status	-2.29	1.32

*significant at $p<0.05$ **significant at $p<0.01$

Obviously, the individual respondents vary greatly. Table 4 presents MANOVA results for differences between the motivational needs scores given the respondents' gender ($p = 0.615$), major college ($p = 0.196$), part-time work experience ($p = 0.463$), and full-time work experience ($p = 0.762$). None of these demographic variables appear to be significant in explaining respondents' motivational needs scores. The variation in the individual responses is not attributable to gender, college of major[2], or work experience differences among respondents.

Table 4: MANOVA and ANOVA Comparisons of Workplace Motivational Needs For Demographic Variables

		ANOVA F(1, 86)				
Variable	MANOVA F(4, 83)	Basic	Safety	Belonging	Ego-Status	Actualization
Gender	0.67	0.00	1.67	0.05	0.07	1.31
Full-time	0.46	0.19	0.60	0.45	0.25	0.56
Part-time	0.97	2.27	0.28	0.12	0.19	2.89
College	1.27	1.03	1.28	0.60	1.21	2.03

*significant at $p<0.05$ **significant at $p<0.01$

[2] The results presented here are at the college level. At the major level, small cell sizes prevented meaningful analysis and conclusions. The results for differences across majors were no different than the results for differences across colleges.

V. Conclusion

The results presented here are consistent with prior research that Millennials are an eclectic group that differs from other generations but are difficult to generalize in terms of their motivational needs. The relatively high scores for belonging are consistent with Josiam *et al.* (2009) who conclude that Millennials are more positive and collaborative than previous generations. The low score on safety reinforces a willingness to change jobs in search of more leisure or a more challenging and satisfying work environment as long as basic needs are met (Josiam *et al.*, 2009; Twenge *et al.,* 2010).

To achieve long-term success, today's organizations must meet the challenge of managing a diverse workforce composed of multiple generations but increasingly populated by Millennials. For this reason, it is essential to understand what motivates Millennials and develop a work environment that addresses those needs. The results of this study suggest that to recruit and retain Millennial workers, organizations should promote a collaborative, team-based work environment (belonging) along with challenging and meaningful work (ego-status) instead of predictable salary, insurance, retirement, or other benefits (safety). Beyond that, results of this study reinforce the notion that Millennials are diverse in their motivators thus making it difficult for organizations to adopt a one-size-fits-all approach to recruiting and retention. Certainly by finding ways to appeal to Millennials' motivating factors, organizations will be able to tap into the potential of a new generation of leaders.

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Erratum: Monetary Policy Transparency as an Exchange Rate Determinant: Evidence from the United States

By Mason Hardman

There are two errors in Hardman (2016): (i) The τ-stat value for variable debtgdp in Table 3 (p. 9) should be -0.84 rather than -3.65. (ii) The first line of the first paragraph on p. 13 incorrectly references Table 5. The correct table is Table 6.

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