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CONTENTS

SPOUSAL PURCHASING BEHAVIOR AS AN INFLUENCE ON BRAND EQUITY

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ABSTRACT

A debate has been gaining notice between Wall Street (financial market) and Main Street (consumer market) as to what level the firm's brand equity actually is. Married household purchasing is a large segment of the retail sector and important to brand strategy. Furthermore, a thirty-year trend has been that more husbands are not working and more wives are. This has impacted marital shopping roles and its influence on branding efforts. This is a Main Street (consumer, retail market) study of customer-based brand equity that focuses on married males and females. Using comparative (t-test) and multivariate (regression) analysis of 263 hypermarket shoppers, particular influences are significant to brand equity. Store image, price deal, distribution intensity and purchase experience are important factors to married males and females and to build household brand equity. The results have implications for branding researchers and brand managers.

KEYWORDS: Branding, marketing strategy, household purchase behavior

JEL: M31

INTRODUCTION

Consumer markets have reached greater competitive intensiveness from such factors as rapid changing technology, increasing levels and methods of marketing communications, fragmented purchase behavior and more recently the declining global economic conditions. These factors coupled with the family structure, specifically, married and single households, are impacting firms as to how business is conducted and how consumers' brand purchase decisions are made (or postponed or not at all made) that is likely to have a lasting effect in the United States and global markets.

The United States consumer markets have experienced a changing socio-demographic characteristic – the family structure – during the past several decades. Since 1970 more women have entered the workforce (U.S. Bureau of the Census, 2000, 2007), and "the proportion of the population made up by married couples with children decreased, and the proportion of single mothers increased, while the median age at first marriage grew over time" (American's Families and Living Arrangements, 2001, p. 1). Total households have almost doubled (now 116 million) and non-married households more than tripled (now 57 million) since 1970 while married households increased by only 31% (now 58 million). Furthermore, there has been a significant increase in the number of working wives. In 1980, there were an average of 8.3 husbands and 5.8 wives employed in every 10 married households. By 2007, fewer husbands (7.9) and more wives (6.5) were working in these households. This higher number of working wives has contributed to an increase of an average household having 1.41 in 1980 to 1.44 in 2007 working spouses (U.S. Bureau of the Census, 2000, 2007). The once viable, growing 2 or more person married household market has now become one with slow growth and the trend of declining number of working husbands and an increase of working wives has influenced household purchased decisions.

As the end of the first decade of the 21st century approaches, businesses worldwide are facing not only the accustomed competitive consumer markets, but also economies that are in a recession. As consumers decrease spending resulting from lower household earned income or even unemployment, and increasing personal debt (Colvin, 2008), retailers during 2008 experienced only a .9% sales increase, the lowest in 50 years (D'Innocenzio, 2009). While retailers are using discounts and other markdown methods as new or seasonal products are introduced and at peak retailing periods (O'Connell and Dodes, 2009), consumer product manufacturers are experiencing a decline in sales resulting from consumers buying down from national brands to private, or store brands (Neal, 2009). Electronics and digital media retailer Circuit City with the second largest market share has liquidated (Bustillo, 2009). Construction material and home improvement retailers are taking investment and cost reduction actions, e.g., Lowe's reducing new store opening by 50%, Home Depot closing its upscale division (Expo Design Centers stores) (Lloyd, 2008). The economic recession impact has spanned all industry sectors from the manufacturers and suppliers to retailers to the consumer.

Branding, on the other hand, has experienced through the 1990s and well into the 2000s enormous growth from consumers' preferences and for increased business financial value. This brand equity has risen to as high as 80% of some firms' financial value, e.g., Nike (Gerzema and Lebar, 2008). As expected, during the economic recession consumers' purchases have been for bargain-priced brands. Consumer product manufacturers with a large product mix are able to minimize revenue loss by having multiple brands in product categories. For example, Procter & Gamble has had a 10% increase for its lower priced Gain detergent while a similar decline for its market leading Tide brand (Byron, 2008). However, retailers, e.g., Target, have not had this advantage, and most of them have experienced a lost customer base to low price competitors, e.g., Wal-Mart (Bustillo and Zimmerman, 2008). The challenge is to recapture the brand preference consumers and their household purchases in the next decade's post-recession market.

The purpose of this research is to establish the consumers' characteristics, retailers' marketing strategy and branding relationship as perceived by married men and women. The objective is to identify and analyze the comparative links between husbands and wives, the marketing mix (product, price, place, promotions) and retail brand equity (brand loyalty, brand awareness, perceived quality, brand association). Furthermore, the study determines the shoppers' (husbands and wives) characteristics, retailers' marketing mix that leads to, or cause, brand equity. This study is to determine: Are there different influences between husband and wife purchase decisions that impact brand equity? What are the personal and shopping characteristics of the husband or wife and the marketing strategies that influence brand equity? The study includes a review of the theoretical and empirical literature, the methodology, data analysis results, and the discussion, conclusions, limitations and future research opportunities.

LITERATURE REVIEW AND CONCEPTUAL FRAMEWORK

Consumer decision-making progresses through seven steps (model) – need recognition, search for information, pre-purchase evaluation of alternatives, purchase, consumption, post-consumption evaluation and divestment (Blackwell, Miniard and Engel, 2006). Blackwell et al. (2006) identify five environmental influences – family, situation, personal influences, social class and culture – on decision making. Finally, individual consumer differences occur – consumer resources, motivation, knowledge, attitudes, and personality, values and lifestyle – that impact the brand decision-making process (Blackwell et al. 2006).

Household purchasing brings on decision-making roles (Gil, Andrés and Salinas, 2007). In a study of Belgian married households, Davis and Rigaux (1974) theorized that the decision-making roles changes between spouses in each phase (problem recognition, search, decision) of the buying process. The empirical results determined that there were, in fact, changes and established the decisions by automatic, husband-dominated, wife-dominated, and joint (syncratic) roles. Furthermore, these roles have implications to marketing strategy, branding and brand selections. The marketing mix as a strategy has been well established in research and marketing practices (McCarthy, 1960; Kotler and Keller, 2006). Yoo, Donthu and Lee (2000) recognize the marketing mix elements (marketing efforts) as antecedents of brand equity, and operationalized the retail marketing mix as (1) price, (2) advertising spending, (3) price deals, (4) store image, and (5) distribution intensity.

Brand equity may be established by two perspectives. First, investors place an intangible value for a firm's worth of which brand equity is a major component. On the other hand, consumers of that firm's products also view its brands as having a level of value to them. The methods are from two very different perspectives, and naturally will not have the same brand equity (value). A recent research study has found an alarming difference between Wall Street (financial markets) and Main Street (consumer markets) with investors placing a much higher value on brand value than consumers (Gerzema and Lebar, 2008). For this study, consumer-based brand equity (CBBE) is the basis and is empirically tested for husbands and wives' value of brands. Therefore, branding includes the consumers' (1) brand loyalty, (2) brand awareness, (3) perceived quality and (4) brand association dimensions (Aaker, 1991; Keller, 1993). Furthermore, branding is applicable to retail brands, e.g., retail and store image, perceived retail brand association, as well as to retail brand equity measurement (Ailawadi and Keller, 2004). For this study, the customer is either a married male or female retail shopper. Hence, this research is within the framework of the husband-wife consumer decision making role (Davis and Rigaux, 1974) and process (Blackwell, et al., 2006), retailers' marketing strategy (McCarthy, 1960) that influence customer-based brand equity (Aaker, 1991; Keller 1993).

Loyalty in the context of branding is "a deeply held commitment to rebuy or repatronize a preferred product/service consistently in the future, thereby causing repetitive same-brand or same brand-set purchasing, despite situational influences and marketing efforts having the potential to cause switching behavior" (Oliver, 1999, p. 34). Brand loyalty is influenced by the value, e.g., low or competitive price, coupons, convenience, that consumers place on a specific product or store which results in continuous purchases. Married consumers are more likely than single shoppers to economize and view price more a determinate of loyalty (Zeithaml, 1985), and wives are more price sensitive and efficient shoppers than husbands are (Strober and Weinberg, 1980). Furthermore, coupons and other short-term price deals increase shopping frequency and purchase decisions (Arndt, 1967) that increases brand loyalty (Jacoby, Szybillo and Berning, 1976). Convenience and time constraints impact repeat purchases. Longer the time between making purchases, the more likely the consumer will not make the same buying decision at the time of the next purchase (Jacoby et al., 1976).

Brand awareness is the "customers' ability to recall and recognize the brand, as reflected by their ability to identify the brand under different conditions ……. linking the brand – the brand name, logo, symbol, and so forth – to certain associations in memory" (Keller, 2003, p. 76). Brand awareness relies on marketing communications and to provide effective retrieval cues from consumers' memory for specific brands (Lynch and Srull, 1982). Married shoppers use information more in purchase decisions than non-married consumers do (Zeithaml, 1985). In married households, product information may be used by one spouse or the other which depends on their particular interests or household roles/responsibilities (Davis and Rigaux, 1974). The product message should be targeted to the user who may, or may not be the purchaser. The spouse who uses the product usually makes the decisions as to what brand and at which store, but not necessarily makes the purchase. For example, wives generally have been the spouse to prepare meals and perform housekeeping duties, while husbands tend to decide on less often purchased products, e.g., automobiles, insurance, electronics (Davis and Rigaux, 1974). Furthermore, two working spouse households with greater time constraints would more likely know, or seek information for retail stores with large product assortments to reduce purchase time (one stop shopping). Therefore, product or retailer communications to married households is critical to inform and to build image.

Perceived quality is the "customer's judgment about a product's overall excellence or superiority ……. (that) is (1) different from objective or actual quality, (2) a higher level abstraction rather than a specific attribute of a product, (3) a global assessment that in some cases resembles attitude, and (4) a judgment usually made within a consumer's evoked set" (Zeithaml, 1988, pp. 3 and 4). Consumers' perceived quality might be influenced by "personal product (service) experiences, unique needs, and consumption situations" (Yoo et al., 2000, p. 197). These can be functional and psychological experiences resulting from the brand or store image. For retailers, this would require an interest and effort for store layout, pricing strategies, product offerings and assortment, retail format and service level that meets the expected (perceived) quality by the consumers (Lindquist, 1974-1975). Also for the retailer, these may be more of a challenge targeting the wife consumer than for her husband. For example, females, generally, rate service delivery lower than males (Snipes, Thomson and Oswald, 2006). Besides store image, advertising spending is viewed as an effort to build brands, and has been associated with consumers' perceived quality of brands (Cobb-Walgren, Ruble and Donthu, 1995).

Brand association "consists of all brand-related thoughts, feelings, perceptions, images, experiences, beliefs, attitudes" (Kotler and Keller, 2006, p. 188), and "is anything 'linked' in memory to a brand" (Aaker, 1991, p. 109). By definition, store image is a critical influence on brand association. The psychological attributes of store image, e.g., sense of belonging, feelings, excitement/atmosphere (Lindquist, 1974-1975), are important to brand association. Emotional, e.g., pleasantness, arousal, dominance, and cognitive, e.g., quality and variety of merchandise, value of money, price spending, factors also influence purchase decisions (Donovan, Rossiter, Marcoolyn and Nesdale, 1994). Female "shoppers' emotional states within the store predict actual purchase behavior – not just attitudes or intentions …. (and) …. emotional variables (relative) to (in-) store behavior is independent of cognitive variables" (Donovan et al., 1994, p. 291).

TESTABLE HYPOTHESES

Thus, husband and wife shoppers may have differing degrees of brand loyalty, awareness, perceived quality and association that result in varying degrees of customer-based brand equity. From the preceding literature, the following hypotheses are tested for this study.

There is a relationship between value, e.g., price and price deals (Arndt, 1967; Zeithaml, 1985) and distribution intensity, e.g., availability (convenience) (Jacoby et al., 1976) with brand loyalty (Jacoby et al., 1976; Zeithaml, 1985; Oliver, 1999). Therefore,

H_1 Price, price deals, distribution intensity positively, and significantly influence brand loyalty.

From the literature, there is a relationship between price (Zeithaml, 1985), marketing communications, e.g., advertising spending (Lynch and Srull, 1982), price deals (Arndt, 1967), store image (Lindquist, 1974-1975; Yoo et al., 2000) and distribution intensity (Davis and Rigaux, 1974) with brand awareness (Lynch and Srull, 1982; Keller, 2003). Therefore,

H_2 Price, advertising spending, price deals, store image, distribution intensity positively, and significantly influence brand awareness.

Furthermore, there is a relationship between advertising spending (Cobb-Walgren, Ruble and Donthu, 1995), store image (Lindquist, 1974-1975; Snipes, Thomson and Oswald, 2006), distribution intensity (Jacoby et al., 1976) with perceived quality (Zeithaml, 1988; Cobb-Walgren, Ruble and Donthu, 1995; Yoo et al., 2000). Therefore,

H_3 Advertising spending, store image, distribution intensity positively, and significantly influence perceived quality.

There is a relationship between price (Zeithaml, 1985), price deals (Arndt, 1967), store image (Lindquist, 1974-1975; Donovan et al., 1994), distribution intensity (Jacoby et al., 1976) with brand association (Donovan et al., 1994). Therefore,

H_4 Price, price deals, store image, distribution intensity positively, and significantly influence brand association.

Finally, all predictor variables of price (Zeithaml, 1985), advertising spending (Lynch and Srull, 1982), price deals (Arndt, 1967), store image (Lindquist, 1974-1975; Snipes, Thomson and Oswald, 2006), distribution intensity (Jacoby et al., 1976) have a relationship to brand equity (Zeithaml, 1988; Aaker, 1991; Keller, 1993, 2003; Cobb-Walgren, Ruble and Donthu, 1995; Oliver, 1999). Therefore,

H_5 Price, advertising spending, price deals, store image, distribution intensity positively, and significantly influence brand equity.

In addition, we are proposing certain shoppers' characteristics (e.g., age, education, occupation, income) and select shopping experiences (e.g., purchase amount, prior purchase experience, shopping frequency, retail store) that could further explain differences in husband and wife brand equity. Therefore, this study examines shopper and shopping characteristics, marketing strategies as perceived by the consumer and customer-based brand equity.

DATA AND METHODOLOGY

During 2008 and into 2009, the global economy has experienced the most severe recession since the Great Depression of the 1930s. This has caused retail stores to close, chains to consolidate or to go out of business (Bustillo, 2009; Rohwedder, 2009). At the same time, retail shoppers have become more price sensitive by reducing purchases and/or switching to low-price mass market merchandisers (Bustillo and Zimmerman, 2008). Furthermore, there has been a trend of slow growth in married households and an increase in wives being employed (U.S. Bureau of the Census, 2000, 2007). The current competitive retail environment provides an opportunity to investigate and find factors that lead to increasing brand equity from adult household members – husbands and wives. Consumer products and retailers may target this segment to gain greater success in a post-recession market. Moreover, global retailers, e.g., Wal-Mart, Carrefour, Tesco, continue to expand with new store openings in long-term growth markets, e.g., China (Fong, 2009).

Data were collected in a major Taiwan city at four major mega-retailers, or hypermarkets. The sample design was proportionate as to the respective estimated market share – Carrefour (35%), R-T Mart (30%), Costco (25%) and Géant (10%) – and across shopping times of weekdays and weekends, as well as daytime and evening periods. The questionnaire included three parts. First, the researcher developed a 9-question shopper demographic profile and shopping characteristics section. Second, a 15-item retail marketing mix instrument developed by Yoo, Donthu and Lee (2000) was used in their product branding study. The retail marketing mix elements (price, advertising spending, price deals, store image and distribution intensity) were measured by a 5-point Likert-type scale (1 = Strongly Disagree to 5 = Strongly Agree). Third, a 23-item instrument developed by Pappu and Quester (2006) was used in their customer-based brand equity (CBBE) (brand loyalty, brand awareness, perceived quality and brand association) study of specialty and department stores. This CBBE section items were measured by a 7-point Likert-type scale (1 = Strongly Disagree to 7 = Strongly Agree).

The sample includes 263 participants with near equal representation of husbands (n=132) and wives (n=131). See Table 1. About two-thirds of the males and 78% of the females were between the ages of

Table 1: Married Shopper Characteristics

Characteristics	Husband Shopper		Wife Shopper		Total	
	No.	**%**	**No.**	**%**	**No.**	**%**
Total	132	50.2	131	49.8	263	100.0
Age						
18-24	2	1.5	1	.8	3	1.1
25-34	36	27.3	49	37.4	85	32.3
35-44	52	39.4	53	40.5	105	40.0
45-54	23	17.4	18	13.7	41	15.6
55 and Older	19	14.4	10	7.6	29	11.0
Educational Level						
College Graduate Degree	5	3.8	7	5.3	12	4.6
College Undergraduate Degree	37	28.0	59	45.0	96	36.5
Attended College (No Degree)	7	5.3	3	2.3	10	3.8
High School Graduate	66	50.0	52	39.7	118	44.9
Less Than High School Graduate	17	12.9	10	7.7	27	10.2
Occupation						
Corporate Executive & Manager	5	3.8	12	9.2	17	6.5
Administrative Personnel	13	9.8	9	6.9	22	8.4
Sales, Technician, Clerical	75	56.9	50	38.0	125	47.5
Skilled Labor	10	7.5	48	36.7	58	22.0
Unskilled Labor	29	22.0	12	9.2	41	15.6
Income (Monthly)*						
US$640 or Less	26	19.7	5	3.8	31	11.8
US$641-$1,120	48	36.4	16	12.2	64	24.3
US$1,121-$1,600	26	19.7	67	51.1	93	35.4
US$1,601-$2,080	9	6.8	25	19.1	34	12.9
US$2,081-$2,560	10	7.6	9	6.9	19	7.2
US$2,561 or More	13	9.8	9	6.9	22	8.4
Avg. Purchase Amount (Per Visit)*						
US$16.00 or Less	11	8.3	12	9.2	23	8.7
US$16.01-$48.00	39	29.5	39	29.7	78	29.7
US$48.01-$80.00	41	31.1	30	22.9	71	27.0
US$80.01-$112.00	19	14.4	17	13.0	36	13.7
US$112.01-$144.00	12	9.1	20	15.3	32	12.2
US$144.01 or More	10	7.6	13	9.9	23	8.7
Purchase Experience						
Not Purchased at This Hypermarket	12	9.1	12	9.2	24	9.1
Purchased at This Hypermarket	120	90.9	119	90.8	239	90.9
Hypermarket Shopping Frequency						
Less Than Once Per Week	87	65.9	94	71.8	181	68.8
1 to 3 Times Per Week	38	28.8	27	20.6	65	24.7
4 or More Times Per week	7	5.3	10	7.6	17	6.5
Shopper By Hypermarket						
Carrefour	44	33.3	45	34.3	89	33.8
RT-Mart	34	25.8	42	32.1	76	28.9
Costco	35	26.5	33	25.2	68	25.9
Géant	19	14.4	11	8.4	30	11.4

*This table depicts the husbands and wives demographic profile and shopping habits. Both number and percentage within each characteristic is presented that assists in not only knowing the sample but also to understand the results and findings for the study. It is noted that * indicates 1 NT (Taiwan Dollar) = US$.032 at time of survey.*

25 and 44 years. The men were less educated (50% high school and 32% college graduates) as compared to women (40% high school and 45% college graduates). Almost 65% of the husbands and 75% of the wives were employed in sales, clerical, technician and skilled labor positions, but the females earned higher incomes (84% over US$1,120 per month as compared to 44% for males). The majority of husbands (60%) and wives (53%) purchased between US$16.00 and US$80.00 per shopping visit, and had similar shopping frequency and were generally repeat customers (91%) to that hypermarket.

To examine construct validity, varimax rotations with Kaiser-Meyer-Olkin criterion (eigenvalue greater than 1.0) were used to extract items for the retail marketing mix and customer-based brand equity instruments. Of the 15-item marketing mix instrument, there are three items for price, four items for advertising spending, three items for price deals, three items for store image, and two items for distribution intensity. The 23-item brand equity instrument includes six items for brand loyalty, four items for brand awareness, eight items for brand association, and the five items for perceived quality. Each construct and the totals for the marketing mix and brand equity were the mean of the items or constructs (not weighted). For these constructs, Cronbach's alpha reliability scores all easily exceeded the minimum of 0.70 (Hair, Anderson, Tatham, and Black, 1998) with a range for retail marketing mix elements from 0.751 to 0.912 and for customer-based brand equity dimensions from 0.843 to 0.942.

RESULTS

In this comparative, causal study of influences on customer-based brand equity (CBBE), several factors are revealed. The study design is for two purposes. First is a comparison between married men and women for the five retail marketing mix elements (price, advertising spending, price deals, store image, and distribution intensity) and the four CBBE dimensions (brand loyalty, brand awareness, perceived quality and brand association). T-tests (husbands, wives) were performed that include significantly different ($p < 0.05$) and similarity ($p > 0.70$) criterion to determine these contrasts. The sample (N=263) and each of the two sample subsets (n=132 and n=131) exceed the 50 respondent minimum for mean comparison analysis (Hair et al., 1998). Second is the determination of which influences and their strengths leads to and explains husbands and wives' brand equity using multiple regression analysis. Regression equations for independent variables of 8 shoppers' characteristics (age, education, occupation, income, purchase amount, prior purchase experience, shopping frequency, retail store) and 5 retail marketing mix elements and the dependent variables (4 CBBE dimensions and total brand equity) were used with alpha ≤ 0.05 criteria. The sample (N=263) is greater than the required 154 participants minimum for regression modeling, $N \geq 50 + 8m$, where m is the number of predictors (Green, 1991) and within sensitivity tolerance (Hair et al., 1998).

The results comparing these two groups of shoppers find one significant difference ($p < 0.05$) in which husbands feel their hypermarkets have higher prices than wives do. See Table 2. Husbands and wives have similar views ($p > 0.70$) of their store image. Of the marketing mix elements, men had only one higher mean score (price). Females, on the other hand, feel that their stores have higher advertising spending, more price deals, better store image, offer more products (distribution intensity) and higher overall total marketing mix score. Both spouses had their highest mean scores for distribution intensity, but husbands had the lowest mean scores for advertising spending while wives for price. However, the brand equity comparison results were more balanced. The t-tests show no significant differences between married men and women. However, two of the four dimensions (brand loyalty and brand awareness) results were similar ($p > 0.70$). Although not significant (in differences or similarities), husbands were slightly more loyal to their stores and viewed them as having higher perceived quality. Furthermore, wives had more awareness and greater association with their stores, as well as higher mean score for total brand equity. Both spouses had the highest mean scores for brand awareness and the lowest for brand loyalty.

To examine bivariate relationships, a Pearson correlation coefficient was performed for the independent variables of the marketing mix elements (price, advertising spending, price deals, store image, and distribution intensity) and the dependent variables of the brand equity dimensions (brand loyalty, brand awareness, perceived quality and brand association). The results are shown in Table 3. No findings exceed .800, indicating acceptable levels of correlation. Of particular interest, price is negatively correlated with all other variables. Specifically, as price increases, each CBBE dimension decreases, hence lower brand equity. The only other negative correlation is between advertising spending and perceived quality. Price deal, store image and distribution intensity correlations with each dimension are consistent and reasonable strong ranging from .494 to .564, .483 to .741, and .459 to .519, respectively.

Table 2 : Husband-Wife Shopping Comparisons for Marketing Mix and Brand Equity

Elements/Dimensions	Mean For Husband Shopper	Mean For Wife Shopper	Mean Differences
Marketing Mix Elements[1]			
Price	2.980	2.794	0.186*
Advertising Spending	2.909	2.952	0.043
Price Deal	3.210	3.295	0.085
Store Image	3.194	3.214	0.020**
Distribution Intensity	3.246	3.309	0.063
Total Marketing Mix	3.007	3.031	0.024
Brand Equity Dimensions[2]			
Brand Loyalty	4.076	4.043	0.033**
Brand Awareness	5.017	5.025	0.008**
Perceived Quality	4.336	4.257	0.079
Brand Association	4.607	4.782	0.175
Total Brand Equity	4.481	4.517	0.036**

*This table presents the t-Test results of married men and women comparative mean scores by each marketing mix element and brand equity dimension. [1] and [2] indicate marketing mix elements measured by a 5-point Likert-type scale and brand equity dimensions measured by a 7-point Likert-type scale, respectively. * and ** indicate significances of < 0.05 (differences) and > 0.70 (similarities), respectively.*

The 13 independent variables, 8 shoppers' characteristics and 5 retail marketing mix, were further tested using several stepwise (forward) regressions to explain the relationship in creating husband (Table 4) or wife (Table 5) brand equity. Basically, the first major run was for husbands' (1) brand loyalty, (2) brand awareness, (3) perceived quality, (4) brand association and (5) brand equity (total, or all four brand dimensions). See Table 4 for these results. The explained variance for the five equations ranges from 45.3% (brand association) to 58.3% (perceived quality). All variables are significant ($p < 0.05$).

However, two of the marketing mix elements – store image and price deals – are major factors in creating higher husbands' brand equity. Store image is the strongest predictor in four of the five equations as found from the standardized coefficients. Brand awareness is second, logically following purchase experience (having prior shopping visit to that hypermarket). Price deal is included in four of the five equations and the second strongest (standardized coefficient) in three of the four in which it appears. In addition, distribution intensity, an important value offering of hypermarkets, is in three of the five equations, including brand equity. These multivariate results (Table 4) are consistent with, and supported by, those found in the bivariate findings (Table 3), e.g., comparison of store image, price deals and distribution intensity to the four brand dimensions.

Table 3 : Husband-Wife Shopping Correlations for Marketing Mix and Brand Equity

Elements/ Dimensions	Price[1]	Advertising Spending[1]	Price Deal[1]	Store Image[1]	Distribution Intensity[1]	Brand Loyalty[2]	Brand Awareness[2]	Perceived Quality[2]	Brand Association[2]
Price	1.000								
Advertising Spending	-.036	1.000							
Price Deal	-.488**	.234**	1.000						
Store Image	-.169**	-.053	.441**	1.000					
Distribution Intensity	-.237**	.313**	.445**	.446**	1.000				
Brand Loyalty	-.240**	.116*	.506**	.596**	.519**	1.000			
Brand Awareness	-.268**	.172**	.496**	.483**	.459**	.661**	1.000		
Perceived Quality	-.278**	-.060	.494**	.741**	.492**	.786**	.598**	1.000	
Brand Association	-.335**	.161**	.564**	.564**	.486**	.698**	.674**	.742**	1.000

*This table shows the Pearson correlation coefficient bivariate relationships for the marketing mix elements and brand equity dimensions. * and ** indicate significances of < 0.01 and < 0.05 (differences) levels, respectively.*

Table 4: Regression Models for Husband Shoppers Brand Equity

Panel A: Brand Loyalty Only

R^2 = .481 Adjusted R^2 = .461 Standard Error = .87397 F = 23.376 Significant F = .000

Variable	Regression Coefficient	Standard Error	Standardized Coefficient	T	Significant T
(Constant)	-1.142	.499			
Store Image	.677	.137	.366	4.929	.000
Price Deal	.443	.125	.259	3.534	.001
Shopping Frequency	.499	.138	.247	3.615	.000
Purchase Experience	.606	.274	.147	2.211	.029
Purchase Amount	.125	.060	.141	2.067	.041

Panel B: Brand Awareness Only

R^2 = .543 Adjusted R^2 = .525 Standard Error = .72735 F = 29.957 Significant F = .000

Variable	Regression Coefficient	Standard Error	Standardized Coefficient	T	Significant T
(Constant)	2.152	.545			
Purchase Experience	1.586	.230	.434	6.899	.000
Store Image	.514	.108	.313	4.738	.000
Distribution Intensity	.226	.089	.175	2.530	.013
Hypermarket	-.142	.063	-.144	-2.252	.026
Price	-.214	.098	-.137	-2.178	.031

Panel C: Perceived Quality Only

R^2 = .602 Adjusted R^2 = .583 Standard Error = .63587 F = 31.577 Significant F = .000

Variable	Regression Coefficient	Standard Error	Standardized Coefficient	T	Significant T
(Constant)	.222	.404			
Store Image	.686	.101	.448	6.784	.000
Distribution Intensity	.320	.083	.265	3.876	.000
Advertising Spend	-.296	.070	-.262	-4.257	.000
Price Deal	.293	.099	.207	2.954	.004
Purchase Amount	.116	.043	.159	2.687	.008
Occupation	.097	.040	.144	2.446	.016

Panel D: Brand Association Only

R^2 = .470 Adjusted R^2 = .453 Standard Error = .73599 F = 28.150 Significant F = .000

Variable	Regression Coefficient	Standard Error	Standardized Coefficient	T	Significant T
(Constant)	1.728	.573			
Store Image	.564	.114	.365	4.950	.000
Price Deal	.371	.117	.259	3.170	.002
Purchase Experience	.736	.230	.213	3.198	.002
Price	-.263	.106	-.179	-2.479	.014

Panel E: Brand Equity

R^2 = .590 Adjusted R^2 = .577 Standard Error = .59717 F = 45.670 Significant F = .000

Variable	Regression Coefficient	Standard Error	Standardized Coefficient	T	Significant T
(Constant)	.203	.321			
Store Image	.605	.093	.424	6.526	.000
Price Deal	.350	.093	.265	3.776	.000
Purchase Experience	.734	.187	.231	3.930	.000
Distribution Intensity	.170	.075	.151	2.264	.025

This table shows the (forward) stepwise multiple regression results for husband by each brand dimension and for brand equity (all dimensions).

Table 5: Regression Models for Wife Shoppers Brand Equity

Panel A: Brand Loyalty Only

R^2 = .563 | Adjusted R^2 = .549 | Standard Error = .85398 | F = 40.538 | Significant F = .000

Variable	Regression Coefficient	Standard Error	Standardized Coefficient	T	Significant T
(Constant)	-1.271	.466			
Distribution Intensity	.527	.099	.374	5.345	.000
Store Image	.559	.120	.332	4.648	.000
Price Deal	.390	.129	.205	3.024	.003
Purchase Experience	.541	.261	.123	2.072	.040

Panel B: Brand Awareness Only

R^2 = .541 | Adjusted R^2 = .526 | Standard Error = .78314 | F = 37.126 | Significant F = .000

Variable	Regression Coefficient	Standard Error	Standardized Coefficient	T	Significant T
(Constant)	-.045	.427			
Purchase Experience	1.470	.239	.374	6.143	.000
Price Deal	.457	.118	.269	3.871	.000
Store Image	.375	.110	.249	3.403	.001
Distribution Intensity	.309	.090	.245	3.413	.001

Panel C: Perceived Quality Only

R^2 = .670 | Adjusted R^2 = .665 | Standard Error = .65078 | F = 130.211 | Significant F = .000

Variable	Regression Coefficient	Standard Error	Standardized Coefficient	T	Significant T
(Constant)	-.247	.316			
Store Image	1.062	.084	.714	12.646	.000
Price Deal	.331	.095	.197	3.485	.001

Panel D: Brand Association Only

R^2 = .599 | Adjusted R^2 = .586 | Standard Error = .65154 | F = 46.980 | Significant F = .000

Variable	Regression Coefficient	Standard Error	Standardized Coefficient	T	Significant T
(Constant)	.085	.355			
Store Image	.430	.092	.321	4.685	.000
Price Deal	.444	.098	.293	4.519	.000
Distribution Intensity	.318	.075	.283	4.229	.000
Purchase Experience	.880	.199	.252	4.419	.000

Panel E: Brand Equity

R^2 = .703 | Adjusted R^2 = .694 | Standard Error = .55926 | F = 74.632 | Significant F = .000

Variable	Regression Coefficient	Standard Error	Standardized Coefficient	T	Significant T
(Constant)	-.439	.305			
Store Image	.577	.079	.431	7.327	.000
Distribution Intensity	.333	.065	.297	5.160	.000
Price Deal	.394	.084	.261	4.673	.000
Purchase Experience	.771	.171	.221	4.511	.000

This table shows the (forward) stepwise multiple regression results for wife by brand loyalty (Panel A), Brand Awareness (Panel B), Perceived Quality (Panel C), brand association (Panel D) and brand equity (all dimensions) (Panel E). Each independent variable is shown by loading from the stepwise method with regression and standardized coefficients and the respective significance.

The second major multiple regression run was for wives' (1) brand loyalty, (2) brand awareness, (3) perceived quality, (4) brand association and (5) (total) brand equity. See Table 5 for these results. The explained variance for the five equations ranges from 52.6% (brand awareness) to 69.4% (brand equity). All variables are significant ($p < 0.05$).Three variables – store image, price deal, and distribution intensity – are primary predictors for wives' brand equity. Store image is included in all equations and has the highest standardized coefficient (strength) in three regression models, including brand equity and first of only two for perceived quality. Price deal, too, is included in all five equations, and the second strongest of only two variables for perceived quality. Distribution intensity is a predictor in four of the five models, including the strongest predictor for brand loyalty. The wife brand equity regression results (Table 5), as they were for husbands, are supported by the Pearson correlation coefficient results (Table 3).

In summary, the comparison between husband and wife brand equity is consistent from the regression results. The explained variances are similar but all are higher for wives as compared to husbands for each brand dimension and total brand equity. Besides the importance of the independent retail marketing mix, store image, price deal and distribution intensity variables, purchase experience is included in four equations for each spouse. As shown in Table 6, husband brand equity has 10 out of the 13 predictors in at least one equation, while wife brand equity has only four (store image, price deal, distribution, distribution intensity, purchase experience). Perceived quality has particularly interesting results. Wives perceived quality could be explained with an R^2 of 66.5% by only two independent variables – store image and price deal. On the other hand, husbands' perceived quality could be explained with an R^2 of 58.3% by six independent variables – store image, price deal and four others. In addition, married males were the only one with inverse relationships (coefficients). Price was inversely related to brand awareness and brand association, hypermarket to brand awareness and advertising spending to perceived quality.

Table 6 : Regression Models Summary for Husband-Wife Shoppers Brand Equity

Brand Dimensions	**Husband**		**Wife**	
	Explained Variance	Significant Factors	Explained Variance	Significant Factors
Brand Loyalty	46.1%	Store Image Price Deal Shopping Frequency Purchase Experience Purchase Amount	54.9%	Distribution Intensity Store Image Price Deal Purchase Experience
Brand Awareness	52.5%	Purchase Experience Store Image Distribution Intensity Hypermarket* Price*	52.6%	Purchase Experience Price Deal Store Image Distribution Intensity
Perceived Quality	58.3%	Store Image Distribution Intensity Advertising Spend* Price Deal Purchase Amount Occupation	66.5%	Store Image Price Deal
Brand Association	45.3%	Store Image Price Deal Purchase Experience Price*	58.6%	Store Image Price Deal Distribution Intensity Purchase Experience
Brand Equity	57.7%	Store Image Price Deal Purchase Experience Distribution Intensity	69.4%	Store Image Distribution Intensity Price Deal Purchase Experience

*This table shows the (forward) stepwise multiple regression results summary for husband and wife brand equity. It is noted that * indicates inverse (-) relationship to the brand dimension.*

DISCUSSION

The results of the comparative mean scores (t-tests) between husband and wife consumers revealed minimal significant differences (only price) but several with similarities for the marketing mix (store image) and brand (loyalty, awareness, equity). Furthermore, the retail marketing mix significantly predicted in part or all of the brand dimensions and the brand equity. However, for married male shoppers price (awareness, association) and advertising spending (perceived quality) were negatively related. In addition, all regression equations have R^2 of at least 45% and a significance of less than 0.05.

Hypothesis 1 predicts price, price deals and distribution intensity significantly influences brand loyalty. Price deal appears for both spouses, but price does not for either one. Distribution, however, was the strongest for the married females, but not an influence for husbands. On the other hand, price was anticipated to be included, but was not a significant influence. This could be a result of the sample of only a hypermarket retail format with well-established low prices for the type of product offerings. Store image is a major cause of brand loyalty that was not hypothesized. Generally, H_1 is supported. Furthermore, shopping characteristics were found to influence brand loyalty, and the other dimensions and brand equity. These are expected results. For example, prior research establishes that the more frequently made purchases, the greater likelihood of making the same buying decision in future purchases (Jacoby et al., 1976). In addition, with about 90% of the survey participants having shopped at that hypermarket before (purchase experience), the married spouse would logically be satisfied, or have some degree of loyalty to return.

Hypothesis 2 states price, advertising spending, price deals, store image and distribution intensity significantly influence brand awareness. Store image and distribution intensity are included for both spouses but advertising spending was not for either one. Price deal was a strong predictor for wives, but not at all for husbands. Price was included for married men. However, it was inversely related as was the hypermarket shopping characteristic. This can be explained in that husbands feel their hypermarket is expensive, hence the negative relationship for both variables. Therefore, H_2 is supported. As expected, purchase experience was the strongest predictor for brand awareness.

Hypothesis 3 predicts advertising spending, store image and distribution intensity significantly influence perceived quality. Store image is clearly the most important influence since it was the strongest for both spouses. Distribution intensity and advertising spending only appeared for husbands. However, advertising spending was inversely related, indicating highly ineffective hypermarket perceived quality messages to the targeted married male audience. H_3 is supported. However, price deal is surprisingly a key brand strategy for hypermarkets. Price deal is the second of only two predictors for wives and the fourth strongest for husbands.

Hypothesis 4 states price, price deals, store image and distribution intensity significantly influence brand association. Store image and price deals have the two strongest influences on brand association for both spouses. While distribution intensity only influences married female shoppers, price only influences male shoppers. Again, price is inversely related for husbands, as it is for brand awareness. Therefore, H_4 is supported. Purchase experience is a positive, significant predictor for brand association. Hypothesis 5 predicts price, advertising spending, price deals, store image and distribution intensity significantly influence brand equity. Store image is the strongest predictor for both spouses. Price deals and distribution intensity too are significant, positive influences for brand equity. However, price and advertising are not for either spouse. H5 is supported. Furthermore, purchase experience is a significant, positive influence for brand equity.

Several important findings with brand strategy implications have become apparent from this study. First, store image was a significant, positive influence for all brand dimensions and brand equity for husbands and wives. In addition, purchase experience also was an influence for all brand dimensions and brand equity except for perceived quality. Therefore, it can be inferred that store image is an important driver for married shoppers' retention and repeat purchases. Second, price deal is a significant, positive influence for all brand dimensions and brand equity except for husbands' brand awareness. At the same time, price only appeared as a significant, negative influence for husbands' brand awareness and association. Hence, given the retail format of hypermarkets with large product assortments and the competitive prices for the product offerings, price is not necessarily a driver for hypermarket customer-based brand equity.

Third, studies have shown that married women are more price sensitive and economizer shoppers than husbands are (Zeithaml, 1985). Furthermore, in their traditional role, wives have been the primary shopper for household needs and products that would be offered at hypermarkets. However, in this study husbands, not wives, were more price sensitive with opinions (survey responses) that their hypermarket has higher prices (inverse relationship) for two brand dimensions (awareness, association), while price was not a factor for married women. This could be caused by the recent trend of fewer husbands working and more wives are (U.S. Bureau of the Census, 2000, 2007) that might prevent them with enough time for shopping, and when they do shop, they are not sensitive to price considerations. On the other hand, not working husbands do have time to shop and to better know competitive pricing and household shopping budgets.

The purpose for this study was to determine answers for two questions. First, are there different influences between husband and wife purchase decisions that impact brand equity? Price is the only significant difference ($p < 0.05$) between husband and wife shoppers. Married men clearly felt that their hypermarket was more expensive than women were. However, there were similarities ($p > 0.70$) between husbands and wives in their view of store image and their brand loyalty, brand awareness and brand equity. Therefore, there are many more similarities than differences between married male and female shoppers. Second, what are the personal and shopping characteristics of the husband or wife and the marketing strategies that influence brand equity? Only four factors (store image, price deal, distribution intensity, purchase experience) strongly influenced married females' brand dimensions and brand equity. While these same four factors also strongly influenced married males' brand dimensions and brand equity, there were additional ones, e.g., price (inverse), advertising spending (inverse), hypermarket (inverse), purchase amount, shopping frequency, occupation. For husband and wife consumers, they were all significant and with relatively high explained variance (R^2 ranges from 45.3% to 69.4%). Hence, store image, price deal, distribution intensity and purchase experience are key factors in building husband and wife brand equity.

CONCLUSIONS

This study was to determine shopper characteristics and the retail marketing mix influence to predict brand equity. The general business media often associates brand equity with the financial markets (Wall Street) while no, or little consideration by them for the value placed on brands by consumers (Gerzema and Lebar, 2008), or customer-based brand equity (Keller, 1993). With lifestyle changes occurring worldwide with employment status, stay-at-home dads, househusbands and other factors (American's Families and Living Arrangements, 2001, shopping behaviors and purchase decisions have changed too (Blackwell, et al., 2006). Using a comparative (married men and women) and causal (shopper characteristics and retail marketing mix) design for relationships to brand equity (four dimensions and total), 263 hypermarket shoppers were surveyed in a major Taiwan city. In the comparison study, no significant differences were found but two of the four dimensions (brand loyalty and brand awareness) and (total) brand equity results were similar ($p > 0.70$). For the causal results, husband brand equity has 10 out of the 13 predictors in at least one equation with R-squares ranging from 45.3% to 57.7%. On the other hand, wife brand dimensions and brand equity have only four (store image, price deal, distribution, distribution intensity) with R-squares from 52.6% to 69.4%.

While this study has advanced the understanding of branding and with indications of validity (e.g., high Cronbach's alpha reliability scores and the consistent, expected appearance of shopping experience and price generally not being an influence by hypermarket shoppers), there are certain limitations. First, generalization of the results beyond Taiwan or within that Asian region should be done with caution. Furthermore, the sample was solely from hypermarkets and no inclusion of other types of mega-retailer formats, e.g., office supplies (e.g., Office Depot, Staples), home improvement (e.g., Home Depot, Lowe's). Second, research has shown shopping and purchasing differences between housewives and working wives (Strober and Weinberg, 1980; Zeithaml, 1985). This study did not ask respondents if they were employed. However, indications are that they were, e.g., 131 married females reporting a working occupation and varying levels of income, thus having housewife exclusion sample. The same exclusion is also for married males. Third, family is an important economic unit and important to retailers to understand household consumer behavior. The nature of household purchase decisions does not necessarily mean the decider, user and buyer are the same (Davis and Rigaux, 1974; Gil, Andrés and Salinas, 2007). For this study, it is assumed that the study's participant was the same, in that he/she were shopping at the hypermarket by their choice rather than acting in a "purchasing agent" role.

This study provides the basis for several future research opportunities. For example, a similar research design with sample(s) from different global region(s), e.g., North America, South America, Europe, Middle East, where hypermarkets are common would make findings more generalizable. Alternatively, a similar designed study for different types of mega-retailer stores would offer comparisons. In addition, a study with a balance of working and not working husbands and wives would further an understanding of branding in the nontraditional married households. Furthermore, a study that differentiates between the decider, user and buyer that actually influences customer-based brand equity could be more revealing in its findings. Lastly, this is a cross-sectional study. To capture shifts and trends, e.g., husband and wife employment status, a longitudinal study would be highly beneficial to branding researchers and brand managers.

Brand equity has become a huge component of a firm's financial value. This worth is debatable between Wall Street and Main Street as to what level the firm's brand equity actually is. This study is based on Main Street, customer-based brand equity, that appears to be more conservative, or lower brand equity value (Gerzema and Lebar, 2008), and has found store image, price deal, distribution intensity and purchase experience as primary drivers for spousal purchasing behavior in married households.

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DYNAMIC RESOURCE APPLICATION FOR SUSTAINABLE TECHNOLOGY IMPLEMENTATIONS

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ABSTRACT

Government environmental regulations, along with increasing awareness and demand from customers for firms to be sustainable, are driving firms to implement new technologies to enhance the sustainability practices of their firms. Given a finite implementation horizon and a target improvement level, a project manager must decide when to apply resources to a project. We develop an optimal control model to specify when to apply resources under different operating cost differentials, taking into account resource cost. We find that technologies that are more efficient are optimally implemented with a front-loaded schedule to achieve cost savings quickly. Conversely, technologies that are more expensive, but mandated, are ideally implemented on a back-loaded schedule.

JEL: C02, C61, M10, O21

KEYWORDS: Sustainability, Technology Implementation, Project Management, Green, Resource Loading, Optimal Control

INTRODUCTION

Due to imminent regulation, a market mandate, or a desire to increase market share, a company should want to improve its sustainability levels. Sustainability improvements, after implemented, provide cost savings over time as they reduce waste, rework, and potential liabilities. Implementation of these improvements has a cost; however, using the appropriate amount of resources and minimizing disruption to daily operations are ideal. A project manager needs to determine whether to front-load, back-load, or smooth the implementation resource load. Rather than using limited personal experience or rules of thumb, a project manager can optimally determine how many resources to apply each period over the project horizon to minimize total costs while ensuring that the target improvement is met by the deadline.

We use dynamic optimal control to determine the optimal implementation effort and optimal technological capacity per period. We demonstrate that the expense of implementation resources has an effect on the optimal resource loading. In addition, we investigate the following scenarios: (a) The new technology has a lower operating cost than the legacy technology; (b) The new technology and old technology have equivalent operating costs; and (c) The new technology is more expensive to use, but is mandated by market forces or government regulation.

Our model provides equations to show the technology capability over time, the resources to apply over time, and the marginal benefit (to the technology improvement goal) over time. Regardless of the cost parameters a company faces, our equations hold. Therefore, the final three equations presented can be used in any scenario to provide optimal implementation cost. We continue in the next section with a literature review. We then introduce the model notation and formulas. Next, we show numerical examples to illustrate the three scenarios mentioned above. We conclude with managerial implications and suggestions for future research.

LITERATURE REVIEW

Implementation of environmental management technologies has become an increasingly important topic due to new regulations. For example, the REACH regulation enacted in June 2007 requires businesses that produce, use, and sell significant quantities of chemicals in the European Union to show that those chemicals are safe for both humans and the environment (Lockwood, 2008). One method of categorizing environmental technology includes two categories: end-of-pipe technology and cleaner production (Frondel, Horbach, & Rennings, 2007). End-of-pipe technology is an add-on to existing technology to reduce pollution, and cleaner production decreases pollution at the source. Klassen and Whybark (1999) included a third category, management systems (training, modified procedures, and environmental management systems), along with pollution control (end-of-pipe) and pollution prevention (cleaner production). Frondel et al. (2007) found that companies implemented end-of-pipe technology more frequently as a response to environmental regulations, and cleaner production technology more frequently to reduce costs. Bansal and Gangopadhyay (2005) studied investment in cleaner production technology and determined that when a regulator makes a commitment to an environmental regulation (a standard and a penalty) and then sticks with the commitment regardless of the existing technology at companies, this commitment will motivate companies to invest in R&D and to make environmental investments to attract environmentally aware customers from whom companies can extract greater profits. In addition to the reasons for investing in environmental technology, another issue important to companies is the timing of those investments.

The timing of an environmental investment is critical to both controlling costs and increasing profits. Fischer, Withagen, and Toman (2004) argued that the timing of this investment depends on factors such as the marginal damages of pollution decay rate, the capacity depreciation rate, and the initial state of a company's production environment (clean or dirty). They considered only technologies that are more costly to operate and to create than existing technologies. They concluded that in a clean initial environment, clean capacity would be built up gradually. If depreciation rates were low, environmental technology capacity would be added; and if the marginal damages of pollution were to decrease, clean capacity would be built up gradually. In a dirty initial environment, clean capacity would be added aggressively. Higher marginal damages of pollution would lead also to a quicker increase in investment in capacity. Another study by van Soest and Bulte (2001) recommended that companies postpone investments in energy saving because technological advances are uncertain and irreversible, i.e., a company would be better off by waiting for even better technology. Conversely, Cora (2008) suggested that additional short-term expenditures would lead to more long-term corporate value and that waiting to invest in clean technology (thereby missing regulatory deadlines) would lead to higher long-term compliance costs. Lopez-Gamero, Claver-Cortes, and Molina-Azorin (2008) suggested that proactive managers would want to be the first to adopt environmental practices to create barriers to entry, to attract ethical customers, and to take advantage of subsidies or low-interest financing. Primary options for accelerating the investment and implementation of environmental technology are discussed next.

Two options for accelerating a project's implementation are fast-tracking and crashing. As described by Sommerhoff (2000, p. 51), "In its most literal sense, fast-tracking means delivering a project from design to completion, with a compressed time frame." Sommerhoff (2000) also suggested that fast-tracking is no longer the exception. Some authors (e.g., Cupryk, Takahata, & Morusca, 2007) have argued that crashing a project—decreasing the project's duration by adding more resources—should be considered only after fast-tracking or overlapping all tasks as much as possible. A project manager needs to be careful when crashing by adding more resources or by working overtime. Singh (2003) described how overmanning leads to a reduction in work efficiency due to a decrease in workspace for workers and poor communication, and overtime leads to losses in efficiency along with increased costs.

Prior literature regarding implementation of sustainable technologies seems to have focused primarily on theoretical rules of thumb (Landberg & Simeone, 2002) or team dynamics from a framework perspective

(Yeoh, Koronios, & Gao, 2008). Our research takes a strategic view of this technology implementation and provides specific guidance on how a project manager should load a project over time to minimize costs.

In the next section, we present a model illustrating a closed-form solution to the timing of investment in resources for three different types of sustainable technology scenarios: (1) The new technology reduces operating costs; (2) The new technology has operating costs equal to those of the legacy technology; and (3) The new technology increases operating costs. After that, we provide three numerical examples. Finally, we discuss managerial implications.

MODEL

The model involves three main equations and cost parameters. The first equation defines the level of technology at each point in time (it is a state equation). The second equation shows the resources required at each phase of the project (it is a control equation). The third equation shows the marginal value of improving technology at a given point in time in the project. Along with these equations, there is a cost differential for operating the new technology versus the legacy technology that is being replaced. In addition, there is a cost for resources and a penalty for trying to do too much at any point in the horizon. These three equations define the optimal implementation timing for a project.

Variables

$x(t)$ The level of sustainability capability in place at time t. A state variable.

$u(t)$ The improvement effort at time period t. A control variable.

$x'(t)$ The rate of change of the level of improvement. A state equation.

$x'(t) = u(t)$. The level of improvement effort $u(t)$ is the rate at which our level of capability increases at time t.

$\lambda(t)$ The adjoint variable. Similar to the Lagrange multiplier in calculus. The adjoint variable is interpreted as the marginal value to the objective of an additional unit of the state variable (sustainability capability at time t).

c_1 Cost to implement sustainability improvements per unit ($c_1 > 0$).

c_2 Cost savings per period for a given amount of sustainability capability in place (negative means operating cost savings; positive means increased operating costs).

$x(0)$ The sustainability capability at time 0 (the beginning of the horizon).

$x(T)$ The sustainability capability at the end of the horizon (T).

We want to minimize costs in achieving the required sustainability capability by the end of the desired time horizon (T). The objective function and constraints are shown below:

$$\min \int_0^T [c_1 u(t)^2 + c_2 x(t)]dt \tag{1}$$

s.t.

$$x'(t) = u(t) \tag{2}$$

with *x(0)* = 0 and *x(T)=B. u(t)* ≥ 0 for *t ε [0, T]*. *T* is known.

The quadratic term infers that larger concurrent implementation efforts (resources) are much more disruptive than smaller efforts during any period. This may be disruption to the business or implementation loss of efficiency by having too many resources (Singh, 2003).

Solution

The problem is presented as an optimal control problem. The dynamic change in the state variable is expressed as a differential equation. The Hamiltonian is similar to the Lagrangian in calculus.

The Hamiltonian for our problem is given as:

$$H = -c_1 u(t)^2 - c_2 x(t) + \lambda(t) u(t) \qquad (3)$$

The necessary conditions for optimality with optimal control theory are stated below:

1) $$\frac{\partial H}{\partial u} = 0 \qquad (4)$$

$$-2c_1 u(t) + \lambda(t) = 0 \qquad (5)$$

$$u(t) = \frac{\lambda(t)}{2c_1} \qquad (6)$$

2) $$-\frac{\partial H}{\partial x} = \lambda'(t) \qquad (7)$$

$$\lambda'(t) = c_2 \qquad (8)$$

$$\lambda(t) = c_2 t + k_1 \qquad (9)$$

3) $$\frac{\partial H}{\partial \lambda} = x'(t) \qquad (10)$$

$$x'(t) = u(t) \qquad (11)$$

Combining Equations (6) and (9) provides:

$$u(t) = \frac{c_2 t + k_1}{2c_1} = x'(t) \qquad (12)$$

Integrating x' gives us the expression for x.

$$x(t) = \frac{c_2}{4c_1} t^2 + \frac{k_1}{2c_1} t \qquad (13)$$

It is given that the company needs to reach capability threshold *B* by time *T*, *x(t)* = *B*, which leads to the following:

$$\frac{c_2}{4c_1}t^2 + \frac{k_1}{2c_1}t = B \tag{14}$$

$$k_1 = -2c_2 T + 2c_1 \frac{B}{T} \tag{15}$$

Therefore,

$$x(t) = \frac{c_2}{4c_1}t(t-T) + t\frac{B}{T} \tag{16}$$

$$\lambda(t) = c_2 t - \frac{c_2}{2}T + 2c_1 \frac{B}{T} \tag{17}$$

$$u(t) = \frac{c_2}{2c_1}\left(t - \frac{T}{2}\right) + \frac{B}{T} \tag{18}$$

u(t) is valid only for non-negative values. We can apply only zero or some positive effort towards implementing new technologies. We cannot have negative work effort. Increasing *u* at any particular time *t* is analogous to crashing the project.

We have examined the necessary conditions for optimality in optimal control. We now explore the sufficiency conditions for optimal control. The necessary conditions above for a minimum cost solution are sufficient if any of the following hold:

(i) $-c_1 u(t)^2 - c_2 x(t), \lambda(t)u(t)$ are both concave in *x* and *u;*
λ(t) ≥ 0 for *t ε* [*0, T*]. (19)

(ii) $\lambda(t)u(t)$ is linear in *x* and *u*;
λ(t) is unrestricted;

$-c_1 u(t)^2 - c_2 x(t)$ is concave in *x* and *u* for *t ε* [*0, T*]. (20)

(iii) $-c_1 u(t)^2 - c_2 x(t)$ is concave in *x* and *u*;

$\lambda(t)u(t)$ is concave in *x* and *u*;

λ(t) ≤ 0 for *t ε* [*0, T*]. (21)

The switching time, denoted by *t**, is defined as the time that *u*(*t*) switches from a positive to a zero value, or vice versa. Therefore, we solve for *t** such that u(t*) = 0 holds.

$$u(t^*) = 0 = \frac{\lambda(t^*)}{2c_1} \rightarrow \lambda(t^*) = 0 \tag{22}$$

$$\lambda(t^*) = 0 = c_2 t^* + k_1 \rightarrow k_1 = -c_2 t^* \tag{23}$$

We have introduced another decision variable, t^*, and another condition: $u(t^*)=0$. This new condition permits us to obtain a solution for k_1. Substituting for k_1 into the expression for $\lambda(t)$, we have:

$$\lambda(t) = c_2 t - c_2 t^* \tag{24}$$

This can be rewritten as:

$$\lambda(t) = c_2 (t - t^*) \tag{25}$$

From Equation (25), we know the following about the optimal solution for $u(t)$:

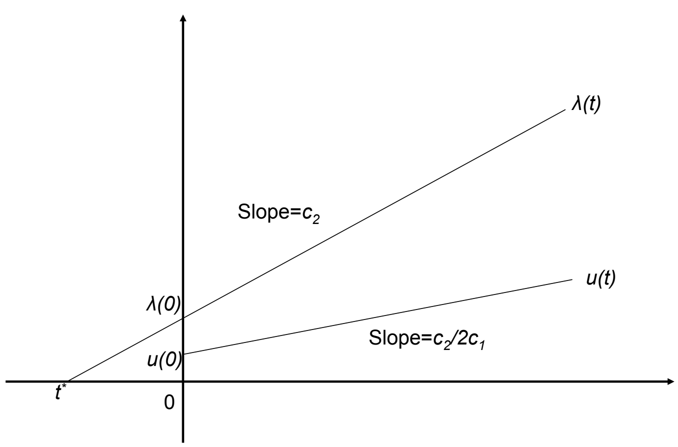
$\lambda(t) > 0$ and $u(t) > 0$ for $t > t^*$, and $\lambda(t) \leq 0$ and $u(t) = 0$ for $t \leq t^*$.

We know $\lambda(t) = c_2 > 0$, so that $\lambda(t)$ increases at a constant rate over time. Therefore, if a switch occurs, the direction of the switch for $u(t)$ is from zero to a positive value.

For $u(t) > 0$, we know $u'(t) = c_2 / 2c_1 > 0$. Therefore, the rate of increase in $u(t)$ over time is less than the rate of increase in $\lambda(t)$, if $c_1 > 1/2$ holds. We have two possible solutions for t^*: 1) t^* ε $[0, T]$, or 2) $t^* < 0$ holds. We do not need to consider $t > T$. If that were the case, then $u(t) = 0$ over the entire horizon and $x(T) = 0$, violating $x(T) = B$. In other words, we know that $t^* \leq T$ holds. This tells us that $\lambda(T) = c_2 (T - t^*) \geq 0$. The two possible cases to consider are shown below.

Case 1: $t^* < 0$ holds so that $u(t) > 0$ over the entire planning horizon.

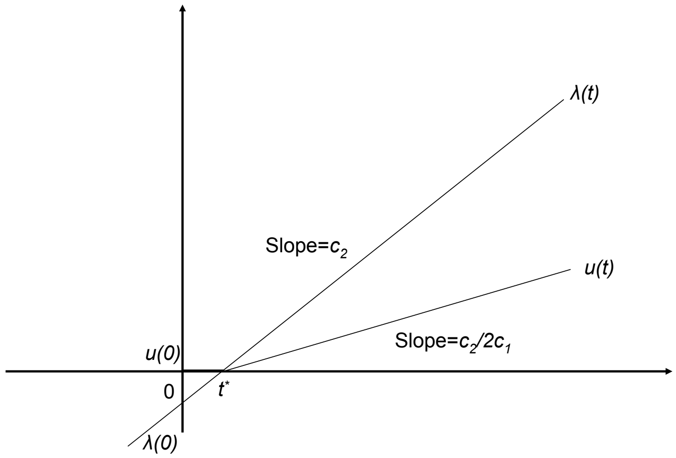
Figure 1: Non-zero Resource Load Applied over Entire Time Horizon



This figure shows the case where the optimal start time of the implementation effort (t) is before time 0. This indicates that at all times during the project time horizon, a positive level of resources (u) should be applied.*

Case 2: $t^* \geq 0$ holds so that $u(t) = 0$ for $t\varepsilon[0,t^*]$ and $u(t) > 0$ for $t\varepsilon[t^*,T]$.

Figure 2: Zero Resource Load Applied over a Portion of the Time Horizon



This figure shows the case where the optimal start time of the implementation effort (t) is beyond the current date (t=0). This indicates that at some portion of the time horizon, no resources (u) will be utilized.*

We use both cases in examples in the following section. Which case applies depends on the sign of $\lambda(0)$. If $\lambda(0)$ is negative, we are in Case 2; otherwise, we are in Case 1. We first solve the problem assuming we are in Case 2, so that $t^* \geq 0$ holds. We obtain the control variable solution:

$$u(t) = \begin{cases} 0, for\ t\varepsilon\ [0, \dot{t}] \\ \frac{c_2\ (t-t^{\cdot})}{2c_1}, for\ t\epsilon\ [\dot{t}, T] \end{cases} \tag{26}$$

From the above and given $x'(t) = u(t)$, we obtain the solution for the state variable *x(t)*, the level of capability implemented at time *t*.

$$x(t) = x(0) + \int_0^t x'(\tau)d\tau = 0 + \int_0^t u(\tau)d\tau \tag{27}$$

Over the time interval $t\varepsilon[0,t^*]$, we know *u(t)*=0 thus *x(t)*=0 for $t\varepsilon[0,t^*]$.

Next, over the time interval $t\varepsilon[t^*,T]$, we have

$$x(t) = x(t^*) + \int_{t^*}^t u(\tau)d\tau = 0 + \int_{t^*}^t \left\{ \frac{c_2(\tau - t^*)}{2c_1} \right\} d\tau$$

$$= \frac{c_2}{4c_1}\left[t^2 - 2t \cdot t^* + t^{*2}\right] \tag{28}$$

$$x(t) = \frac{c_2}{4c_1}\left(t - t^*\right)^2, \text{ for } t\varepsilon[t^*, T] \text{ and } x(t)=0 \text{ for } t\varepsilon[0, t^*]. \tag{29}$$

To find the optimal switching time t^* for the control solution, we use the terminal condition *x(T)=B*.

$$x(T) = \frac{c_2}{4c_1}\left(T - t^*\right)^2 = B \tag{30}$$

$$t^* = T - 2\sqrt{\frac{c_1 B}{c_2}} \tag{31}$$

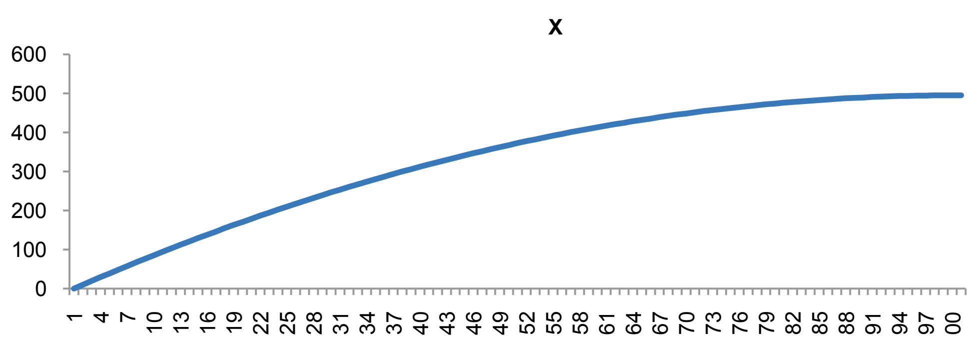
If Equation (31) ≥ 0, then Case 2 holds. Alternatively, if Equation (31) is violated (including where *t** is an imaginary number), we know that *u*(*t*) is positive over the entire planning horizon and, therefore, Case 1 holds.

NUMERICAL EXAMPLES

<u>New Sustainable Technology Reduces Operating Costs</u>

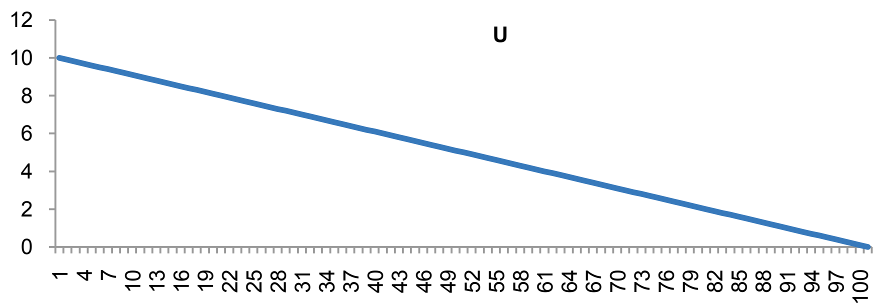
For illustration, assume *B* is a level of 500 and *T* is 100 periods away. Assume that *x(0)* = 0 and we start at level 0. In essence, *B* is the goal, so *x(0)* =100 and a *B* of 600 is then equivalent to *x(0)* = 0 and *B* = 500. We can set *x(0)=0* without loss of generality. If the cost to implement improvements (c_1) is $5 per period and the benefit per unit of improvement is $1 per period ($c_2$ = -1), then we get the following curves (Figure 3):

Figure 3: Level of Technical Capability by Time



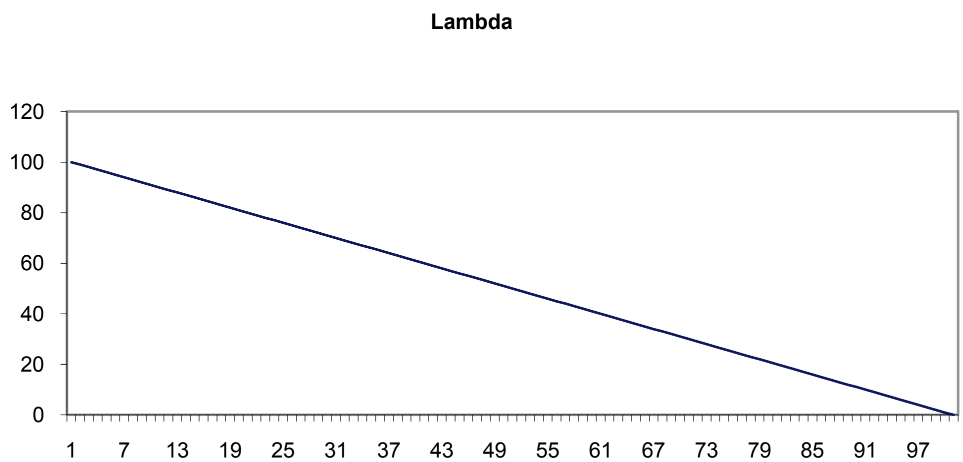
This figure shows an increase in sustainable capability over the entire time horizon. However, because the technology is expensive to operate, it makes sense to implement quickly early in the horizon to reap cost savings as soon as possible.

Figure 4: Implementation Resources Utilized by Time



This figure shows that the project is front-loaded. As mentioned in Figure 3, it is cost beneficial to implement quickly. Therefore, we see that the resources (u) are utilized earlier in the time horizon, diminishing in time.

Figure 5: Marginal Value of Capability Improvement by Time



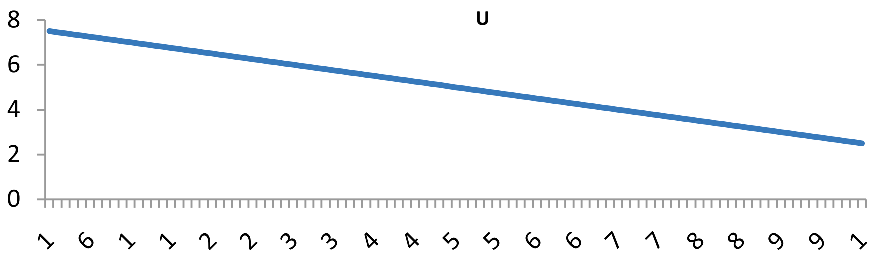
This figure shows that it is worth more to implement the technology improvement earlier, rather than later, in the horizon. Because we can use the less expensive technology as implemented, it follows that it is worth more to begin using the cheaper technology sooner.

We reach our capability goal B at time T, doing more work up front. This allows us to get the new technologies in place and to reap the cost savings throughout the horizon. We linearly decrease our resources applied to the implementation effort. The λ graph shows the marginal value of an additional unit of improvement to the state variable $x(t)$. Notice that is it more cost beneficial to implement the improvement earlier in the horizon so that the cost savings in operations can be utilized throughout the remainder of the horizon.

<u>New Sustainable Technology Reduces Operating Costs (but project resources are very expensive)</u>

If the implementation cost c_1 is increased significantly over the first example ($c_1 = 10$, $c_2 = -1$), the implementation curve (x) is similar in shape to Figure 3, but flatter. This would be a project with a positive net present value, but with a longer payback than the prior scenario. The resource load in the u graph shown in Figure 6 shows that fewer resources are applied during the early part of the project, but more resources are utilized in the latter part of the project compared to Figure 4.

Figure 6: Implementation Resources Utilized by Time on an Expensive Effort



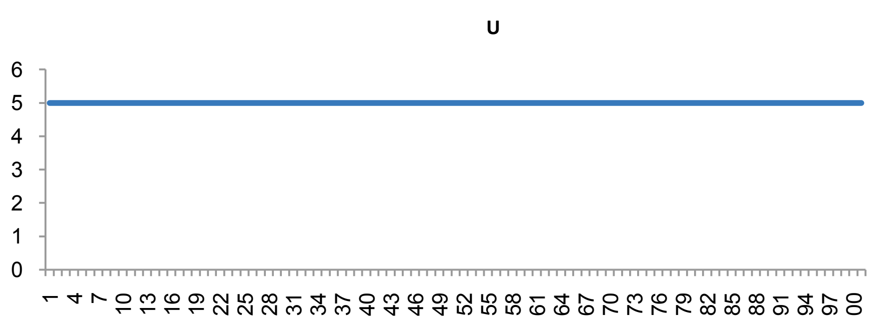
This figure shows that resources are front-loaded as in Figure 4, but the differential between the resources utilized at the beginning of the project and at the end is less.

Notice that we still achieve our goal of B at time T, but do so with the effort spread more smoothly over the time horizon. The curve in the x graph is flatter and indicates that we do not front load the schedule to reap operating improvements early. The cost of disruption from doing too much improvement work per time period offsets any benefits in operating savings due to the new technology. The adjoint variable $\lambda(t)$ is linearly decreasing over time, as in our first case. It is more beneficial to implement the new technology earlier in the horizon.

<u>New Sustainable Technology Has Same Operating Costs as Legacy Technology</u>

If we had to implement the technology to meet a regulation or to placate a customer, but there was no internal payback (reduction in cost due to capability), then we would observe the situation shown below where $c_2 = 0$. The new technology is as efficient to operate as the current technology.Notice that the implementation effort is applied evenly across the horizon to minimize disruption. Recall that the implementation effort cost (c_1) is squared ($c_1 u(t)^2$) to account for the dramatically increasing cost due to disruption from doing too much implementation in a single time period. The lowest cost implementation in this scenario is one that smooths the effort over the entire time horizon. In this case, λ is constant for the entire horizon.

Figure 7: Implementation Resources Utilized by Time on a Parity Implementation

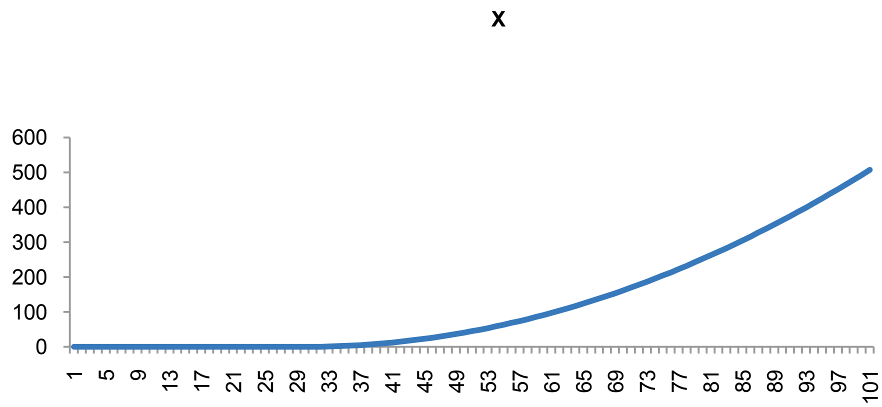


This figure shows the case where the optimal start time of the implementation effort (t) is beyond the current date (t=0). This indicates that at some portion of the time horizon, no resources will be utilized.*

New Technology Is More Expensive to Operate than Legacy Technology

What if the new technology were actually more costly to use than the legacy technology? If c_2 is now 2 (positive indicating that the new technology adds cost – more expensive to operate) and c_1 is at 5, we get the graphs below. We are in Case 2 from section 4 above. An example of this is a retrofit of a HEPA filter on an existing HVAC system. The air quality would improve after the implementation, but the air resistance would increase, consequently the power required to run the system would increase.

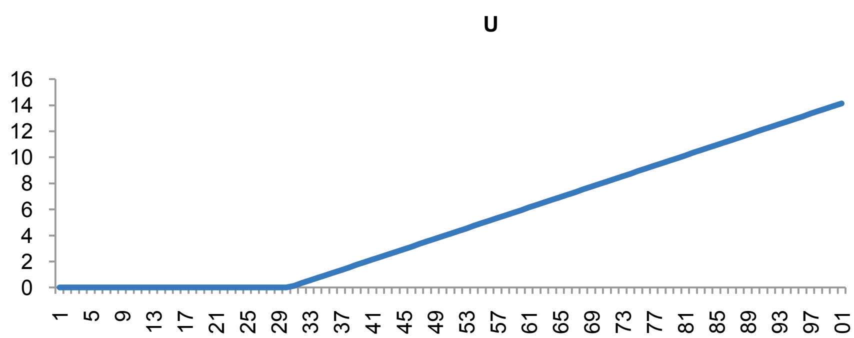
Figure 8: Level of Technical Capability by Time to Replace Low Cost Technology



This figure shows that the optimal strategy is to implement the technology in a just-in-time fashion. The new technology will be more expensive to operate, so we postpone implementation as much as possible to continue using our legacy, less expensive, technology.

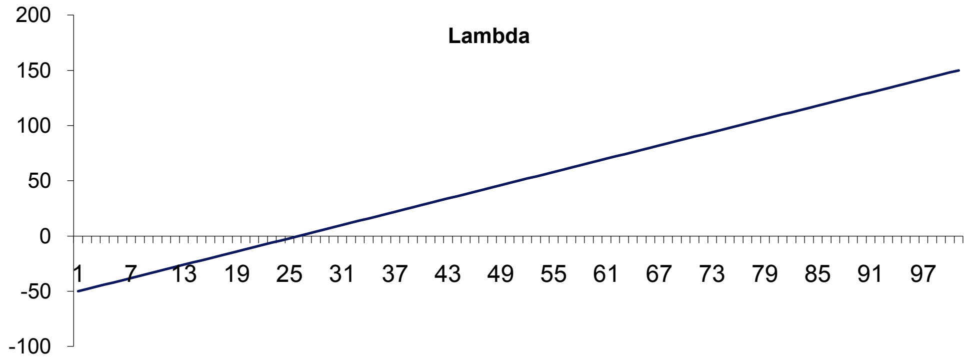
Notice that we increase our capability at an increasing rate after we switch from not implementing at all to beginning the implementation at t^* (at time t = 29.3 in this example). Because the new technology is more expensive to operate than the legacy technology, we delay implementation towards the end of the horizon – a more just-in-time approach. The graph of implemenation effort $u(t)$ shows linearly increasing implementation effort toward the end of the horizon. The λ graph shows that it becomes increasingly more beneficial to implement the new technology later in the time horizon.

Figure 9: Implementation Resources Utilized by Time to Replace Low Cost Technology



This figure demonstrates that we back load the resources (u) to meet our just-in-time implementation schedule shown in Figure 8.

Figure 10: Marginal Value of Capability Improvement by Time to Replace Low Cost Technology



This figure shows that there is no benefit (<=0) to implement the new technology before a certain point in the project time horizon.

Interpretation of Equations

From Equation (16), we know $x(t) = \frac{c_2}{4c_1} t(t-T) + t\frac{B}{T}$.

The final term, $t(B/T)$, is 0 at $t = 0$ and increases linearly until the term equals B at time $t = T$. The first term, when c_2 is negative (operating cost improvements from the new technology), is a concave parabola. When c_2 is positive, the first term is a convex parabola with all points on the line non-positive.

From Equation (17), we know $\lambda(t) = c_2 t - \frac{c_2}{2}T + 2c_1\frac{B}{T}$.

The first two terms can be combined to $c_2(t - T/2)$.

If $c_2 > 0$ (the new technology is more expensive to operate), the term above will be negative for the first half of the horizon *(0, T/2)* and positive for the second half of the horizon (*T/2*, *T*). This term is a line that crosses the x-axis at T/2. Otherwise, when the new technology is less expensive to operate, the above term will be positive for the first half of the horizon and negative for the second half of the horizon.

B/T is positive, as is c_1. Clearly, as the goal *B* increases, the marginal value at any time *t* increases. Because the final term does not vary with t, if $c_2 = 0$, λ does not change over the time horizon. Given the first term includes *t*, if c_2 is > 0, then λ is increasing in time. Conversely, if $c_2 < 0$, then λ is decreasing in time.

From Equation (18), we know $u(t) = \frac{c_2}{2c_1}\left(t - \frac{T}{2}\right) + \frac{B}{T}$.

If c_2 / c_1 is negative (given that c_2 is negative), then *u(t)* is decreasing over time. Conversely, if this ratio is positive (given that c_2 is positive), then *u(t)* is increasing over time.

MANGERIAL IMPLICATIONS AND CONCLUSIONS

Regardless of a company's motivation for embarking on an improvement initiative, meeting the desired capability by the deadline is critical. However, the project implementation cost varies with how the resources are loaded throughout the horizon. We have provided a model that minimizes the total implementation cost by optimizing the resources that need to be applied at each period. Equations for the level of capability, resources, and marginal benefit of applying resources also were given in the prior section.

If the implementation of new, green technologies and capabilities improves operating efficiencies (lowers cost), then implementation front-loaded in the horizon makes sense. The closer the ratio c_2/c_1 is to zero, the flatter the state variable curve $x(t)$ is. This means that as this ratio gets farther from zero, the curve becomes more concave, indicating that the implementation effort should be front-loaded in the horizon. The improvement gap is modeled via the B parameter and is taken into account in our resource allocation per time in Equation (17), directly leading to the capability implemented at time t in Equation (16).

Whether implementing new sustainable technology to lower operating costs, to meet market or regulatory requirements, or due to a mandate from the executive level, there is an optimal way to time the application of resources toward the implementation of the new technology. We have shown the closed-form analytical solution to the timing of the implementation given the cost parameters for implementation resources and operating cost differential between legacy and new technologies.

A limitation of this paper is that it assumes that the capability improvement comes immediately as resources are applied. However, in some situations, there is a time lag between implementation and realized benefit. In addition, we assumed that the number of resources is a continuous variable, whereas in practice resources are added in discrete units. Future research could model this lag to show mathematically how much resources need to be pulled forward in time. Synergistic effects with other green initiatives and competition effects in the marketplace also are suggested as potential research areas.

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BIOGRAPHY

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AN EMPIRICAL INVESTIGATION OF THE MEDIATING ROLE OF ORGANIZATION-BASED SELF-ESTEEM

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ABSTRACT

This study examines the relationship between trait affectivity (i.e., negative -NA and positive affect- PA), organization-based self-esteem (OBSE), and organizational citizenship behaviors (OCB). The current research attempts to augment the field's understanding by demonstrating that the relationship between affect and citizenship is at least partially mediated by OBSE. This paper tests hypotheses using data collected across two different samples: an organizational sample of 105 employees and an amalgam sample of 187 working adults. Findings indicate that OBSE mediates the NA – OCB relationship in the amalgam sample. OBSE also at least partially mediates the PA-OCB relationship in both samples. The paper concludes with a discussion of relevant strengths, limitations, directions for future research, and practical implications.

JEL: M12, M14

KEYWORDS: trait affectivity, organization-based self-esteem, organizational citizenship behavior

INTRODUCTION

Management researchers have long studied issues related to understanding why individuals choose to participate in organizations, are motivated to achieve, and lend their efforts to the greater organizational good (Sekiguchi, Burton, & Sablynksi, 2008). A primary goal of this research is to explore the role of two general mood dispositions (i.e., trait positive and negative affect) in organizational studies. Specifically, this research attempts to link affect with the propensity to enhance (or diminish) individuals senses of self-worth at work, and then to measure its effect on their choices to exhibit giving behaviors within the organization.

Heretofore, the field has dedicated significant attention to all of these constructs. For example, Staw, Sutton, and Pelled (1994) found that individuals' positive feelings about themselves and others enhanced the likelihood that they would demonstrate helping behaviors (operationalized in this study as organizational citizenship behaviors- OCB). Conversely, those whose feelings about themselves and others tend to be negative consistently behaved in a distant and lethargic fashion (Watson, Clark, & Tellegen, 1988), and were, thus, largely unwilling to give more to the organization. However, the nomological networks to which prior investigations belong have not yet been expanded to consider the intervening potential of feelings of self-worth on the relationship of trait affect and extra-role behaviors.

Carson, Carson, Lanford, and Roe (1997) noted that feelings of self-worth predicted lower employee turnover intentions, better service both to clients and peers, higher levels of commitment, and promoted more time spent both on a job and in a given career field (a facet of OCB). Nevertheless, to this point there has been no systematic attempt to link the giving tendencies noted by Staw et al. (1994) with findings like those from Carson and colleagues (1997). Essentially, the field has not sequentially analyzed if individuals' predispositions toward affect (either positive or negative) necessarily promote feelings of self-worth which then, in turn, lead to acts of good organizational citizenship.

This document will move forward by reviewing relevant contemporary research, developing hypotheses, describing the samples used for empirical study, and summarizing the results. After discussing the implications of paper's main findings, it concludes by addressing relevant strengths, limitations, directions for future research, and practical implications.

LITERATURE REVIEW

In this section of the paper, the author defines and positions all of the study variables. It begins by investigating the history and research on emotional affectivity. It then moves to a discussion of the psychological work related to self-esteem and the evolution of the mediating variable in the paper; organization-based self-esteem. The review then considers extant works related to acts of good organizational stewardship. Once these facets of organizational citizenship behaviors and its associated constructs have been delineated, the paper summarizes what researchers currently know of the relationships between these constructs and states its own hypotheses.

Emotional Affect

The affective constructs alluded to in introduction are component parts of the personality trait *neuroticism/emotional stability* which Costa and McCrea (1987) centrally defined as individual differences in the tendency to experience either positive or negative emotional states. Substantive research indicated that emotional experience is shaped by two broad but independent dimensions—negative affect (NA) and positive affect (PA). As such, it is important to examine both factors when studying how affect relates to various organizational phenomena including OBSE and OCB (Diener & Eammons, 1984; Watson, 1988).

Negative affect (NA) is a dimension of subjectively experienced strain. NA, as a construct, includes adverse mood states, such as anger, angst, guilt, disgust, pessimism, and depression. Affect can be measured either as a state (i.e., mood shifts) or as a trait (i.e., stable dispositional tendencies). The study variables in this research are consistent with what Tellegen (1982) defined as *negative affectivity* (or trait NA) and *positive affectivity* (or trait PA). These represent predispositions to experience either positive or negative feelings fairly *consistently over time* (Perrewe & Spector, 2002). Trait measures of affect are included in this research because they are more appropriate theoretical drivers of self-esteem. Self-esteem, whether organizationally based or otherwise, is more amendable to study by trait factors because the self concept, of which self-esteem is central, is created and sustained over time by experience and is, thus, relatively stable (Brief & Aldag, 1981).

Prior findings indicated that with respect to organizational interactions, those high in NA demonstrated a penchant for lethargy and a general disdain for interpersonal interaction (Watson et al., 1988). Furthermore, Castro, Douglas, Hochwarter, Ferris, and Frink (2003) noted that the positive communication style needed to be successful in dyadic relationships with supervisors is largely lacking for those high in NA. They attribute this to the fact that high NA individuals regularly behave in distant, hostile, or excessively fearful ways, thus, alienating others (Castro et al., 2003). Leader-member exchange theories would, thus, predict that the attendant negative quality of interaction then between such individuals and others, particularly supervisors, would generally result in "out-group" membership (Graen & Uhl-Bien, 1995). As such, few, if any growth and self-esteem building and/or affirming organizational activities are available to those high in NA.

Positive affect (PA) denotes an individual's level of excitement, enthusiasm, and optimism (Watson & Clark, 1984). Furthermore, Baron (1996) defined positive affect as follows: "the tendency to have an overall sense of well-being, to experience positive emotions and mood states, and to see oneself as pleasurably engaged in terms of both interpersonal relations and achievement" (p. 340). From that definition and related findings (e.g., Hochwarter, Perrewe, Ferris, & Brymer, 1999), researchers concluded those with high PA have enhanced interpersonal communication abilities that those high in NA do not, and thus find interaction more satisfactory. Conversely, those with low levels of PA, given their penchant for lethargy and a general lack of interpersonal enthusiasm (Watson, et al., 1988), do not likely possess the communication style needed to be successful in dyadic relationships.

Mobley (1977) argued that those high in PA would be more proactive in seeking satisfying situations, whereas individuals with low PA could be expected to be unresponsive and apathetic (see also Cropanzano, James, & Konovsky, 1993). Unsurprisingly, research indicated that individuals high in PA received better evaluations by interviewers, and tended to be liked more by colleagues as well (Fox & Spector, 2000). Researchers have also proposed that positive affect might generate support within organizations (Isen & Baron, 1991; Staw et al., 1994). Staw and colleagues (1994) argued that individuals with high positive affect are more attractive to others, and are perceived as possessing numerous desirable traits, and which lead to the development of positive relationships with coworkers.

Although much research has examined the relationships between dispositions and work attitudes – particularly job satisfaction (e.g., Organ, Podsakoff, & MacKenzie, 2006, Cropanzano et al., 1993; Judge, 1993; Weiss & Adler, 1984), far less has systematically studied the effects PA in terms of its nomological position (Duffy, Ganster, & Shaw, 1998). Indeed, Cropanzano et al. (1993) noted that further study of PA might offer valuable insight into the role of dispositional affectivity in organizational relationships. It is in this vein that the current study attempts to link PA with OBSE and OCB.

Organization-Based Self-Esteem

Pierce, Gardner, Cummings, and Dunham (1989) developed the concept of organization-based self-esteem (OBSE). Their research extends Coopersmith's (1967) contention that self-esteem reflects the extent to which individuals believe they are capable, significant, and worthy. Organization-based self-esteem therefore reflects individuals' feelings of personal adequacy and worthiness as employees. Thus, employees with high organization-based self-esteem believe that they are important, meaningful, and worthwhile. OBSE is one component of global self-esteem which, in turn, is a facet of self-identity.

OBSE, however, differs from global self-esteem and self-identity in that it is more context-specific and, thus, is more responsive to proximal factors at play in organizations (Pierce et al., 1989). For example, global self-esteem and self-identity are relatively stable individual differences, rooted more in the experiences of primary (e.g., family members) socialization (Coopersmith, 1967). On the other hand, OBSE evolves based on employees' cumulative experiences within specific organizations and thus changes when individuals move between employers.

Naturally, because OBSE is an organizational facet, its creation and expression are somewhat confined by the structure of the firm itself. For example, in organizations where procedures, control, formality, and hierarchy are emphasized, individuals might not have abundant opportunities to demonstrate and gain competence (Elloy, 2005). In this case, individuals might experience a lowering of organization-based self-esteem. In contrast when employees have the opportunity to exercise self-direction and self-control, they will have a greater opportunity to exercise competence and experience success (Pierce et al, 1989). Furthermore, in organizations that ostensibly trust their employees by providing them with increased autonomy and valid feedback, the opportunity to foster OBSE will be even higher (Elloy & Randolph, 1997).

According to Korman's (1970, 1976) self-consistency model of motivation, self-esteem is central to the explanation of employee motivation, attitudes, and behaviors. OBSE extends this reasoning by positing that experiences at work shape self-esteem beliefs, which in turn affect attitudes and behaviors. For example, individuals who perform well on a project will likely infer they are worthy and capable (Pierce et al., 1989). Similarly, when organizations acknowledge good performance (e.g., praise employees' work), it adds to individuals' organization-based self-esteem and increases the likelihood of further beneficial, self-directed efforts. In fact, successes enact a spiral of esteem building situations (Royle, Fox, & Hochwarter, 2009). These situations could be job performance related metrics or, to the degree to which both the individuals and organizations value giving, they could be acts of good citizenship.

Achieving high performance standards is one way in which individuals can maintain behavior that is consistent with their self-concept (Gardner, Van Dyne, & Pierce, 2004). When confronted with challenges, high self-esteem individuals value successful performance, exert effort, and engage in goal-directed behaviors. In addition, high self-esteem individuals are more likely to have higher self-efficacy than those with low self-esteem (Gardner & Pierce, 1998; Locke, McClear, & Knight, 1996). Self-efficacy, the belief in one's abilities to achieve, also contributes to higher performance levels under almost all role and extra-role (e.g., citizenship behaviors) conditions (Bandura 1977, 1989).

Self-enhancement theory (Dipboye, 1977; Korman, 2001) posits that individuals have a basic need to enhance their level of self-esteem. However, individuals with high and low self-esteem differ in their methods of enhancement. For example, individuals high in OBSE will activate self-enhancing motivation to perform better and might engage in OCBs, whereas those low in OBSE will activate self-protecting motivation or "damage control" to justify low performance (Korman, 2001). As both self-consistency and self-enhancement theories predict, individuals with high levels of OBSE are more likely than individuals with low OBSE to have positive attitudes about performance (Carson et al., 1997), have been shown to be more productive (Pierce et al., 1989; Van Dyne & Pierce, 2004), and are more likely to engage in OCBs (Van Dyne & Pierce, 2004).

The aim of this study is to further investigate the relationship between organization-based self-esteem and organizational citizenship behaviors. Prior research provides support for the idea that OBSE is an intervening mechanism between such antecedents as job satisfaction, affective commitment, procedural justice, distributive justice, leader-member exchange quality, and workplace complaining (Hech, Bedian, & Day, 2005). It is my contention, that good performance –both task specific and contextual (i.e., OCB) – when demonstrated, serves to reinforce and enhance individuals' feelings of self-esteem.

Organizational Citizenship Behaviors

Considerable attention has been paid to indentifying actions that help organizations but which are difficult to measure with respect to bottom line profitability (e.g., Katz & Kahn, 1978; Bateman & Organ, 1983; Bolino, 1999). Such behaviors represent the crux of what is also referred to in literature as contextual performance or organizational citizenship behaviors (Borman & Motowidlo, 1993). Different authors have attempted to clarify the dimensionality of this construct. For example, Van Scotter and Motowidlo (1996) contended that contextual performance contained two dimensions: job dedication (i.e., self-directed efforts to work diligently) and interpersonal facilitation (i.e., interpersonal behaviors that help individuals accomplish organizational goals). They noted that most of these behaviors are desired or expected by employers, but are often missing in formal job descriptions and performance evaluations specifications, and are also generally not directly remunerable. Despite this apparent disconnect, extra-role behaviors are still critical for organizational effectiveness as well as successful individual job performance (Van Scotter & Motowido, 1996).

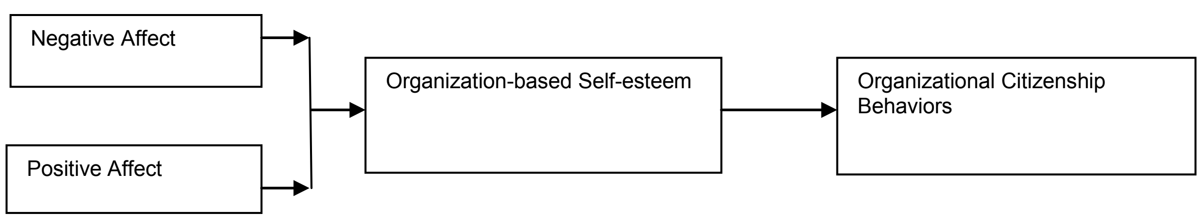
Organizational citizenship behaviors (OCB) require that individuals take the initiative not only to do "their duty" in terms of job performance, but also to help their colleagues, and act as diligent stewards with respect to organizational resources (Liang, Ling, & Hsieh, 2007). Organ's (1994) view of OCB is very prominent and well researched (Cheng, Hsieh, & Chou, 2002). This conceptualization incorporates collegiality, conscientiousness, respect for the law, sportsmanship, courtesy, and civic virtue (Cheng et al., 2002). Indeed, Bateman and Organ (1983) noted that several components of OCB involve behaviors that target others in the organization (e.g., altruism, compliance, loyalty, and participation). When employees demonstrate OCBs, their firms will not likely reward them financially, but will factor these behaviors into decisions related to pay and promotion at some future date (Lian et al., 2007).

As noted in previous sections of this research, trait affect and organization-based self-esteem are both theoretically and empirically related to OCB (e.g., Korman, 2001; Staw et al., 1994). These, as well as other authors have demonstrated that trait affect influences both self-identity (of which OBSE is a component) and giving behaviors (strongly related to OCB). Furthermore, high OBSE helps promote behaviors consistent with positive self-concepts and achieve high performance standards (Gardner et al., 2004). This research contends that individuals high in OBSE behave in a way that appears courteous, conscientious, supportive of others, and civically virtuous because it helps validate the positive feelings they have of themselves. It, furthermore, assumes that individuals are differentially inclined to feel good about themselves (i.e., NA/PA), but when they do, they give more to organizations because it reaffirms their identities. The study hypotheses are stated as follows and graphically depicted in Figure 1:

Hypothesis 1: Organization-based self-esteem mediates the relationship between negative affect and organizational citizenship behaviors such that NA diminishes OBSE and subsequently obviates OCB.

Hypothesis 2: Organization-based self-esteem mediates the relationship between negative affect and organizational citizenship behaviors such that PA promotes OBSE and subsequently fosters OCB.

Figure 1: The mediating effect of Organization-based Self-esteem on the trait affect (NA/PA) and Organizational Citizenship Behavior relationship.



This is the model of trait affect, OBSE, and OCB tested in this research. Hypothesis 1 states that negative affect adversely contributes to individuals' senses of organization-based self-esteem, which in turn discourages their exhibition of pro-social, giving, behaviors at work. Hypothesis 2 states that positive affect promotes individuals' senses of organization-based self-esteem, which in turn encourages them to proactively engage in giving behaviors.

METHOD

In order to be more certain about the study's findings, this research consists of data collected in two different studies analyzing the mediating effects of OBSE on the trait affect - organizational citizenship behavior relationship. Conducting multiple studies is desirable for two important reasons (see Lykken, 1968). First, it helps ensure that the findings were not particular to any particular work setting. Second, contributions to theory would be amplified if significant effects emerged in multiple, yet unique, studies. This research is comprised of two different samples: an amalgam sample and an organizational sample.

Participants and Procedures- Amalgam Sample

The amalgam sample consisted of self-reports from working adults around the world. Students involved in an extra credit assignment gave an employee survey only to individuals they knew to be employed full time in various organizations. A group of 75 students were allowed to distribute up to 5 surveys per person for class extra credit. As such, a maximum of 375 surveys was available to students. Ultimately, a total of 185 usable employee surveys were returned. This constitutes a response rate of 49%. Students either brought completed surveys back to class with them or told their contacted respondents to mail it back either in hard copy or electronic form. Contact information was collected, but not disseminated, on all respondents in order to ensure the legitimacy of their survey responses.

Respondent occupations in the amalgam sample included accountants, human resources administrators, sales professionals, marketing directors, and food service personnel. The average age of respondents was about 37 years old and the average organizational tenure was 7 years. The sample included 98 females (55%).

Participants and Procedures- Organizational Sample

Data for the organizational sample came from a recreation facility in a large university in the Southeast United States. The employees in this facility were mostly younger people, including many students. They were employed in various clerical, consulting, and custodial positions.

The organizational sample data came from a dyadic research design in which employees responded to questionnaires coded to match supervisor evaluations. Two surveys were distributed. The supervisor survey paired OCB data for each employee who completed the employee questionnaire. In fact, supervisors at this organization completed a survey for each of their employees regardless of whether that individual also submitted one. Supervisors and employees completed their surveys either at home or at work during break times.

The supervisors distributed surveys to employees in sealed envelopes. The employee could either return the survey in the mail (free of charge to employees) or, as was most often the case, could place it in a collection box in a sealed return envelope which was then collected in person. The supervisors maintained files that contained all the completed surveys for their subordinates. I collected these in person. Each of the four participating supervisors completed an average of 26 surveys for employees, all of whom they had known for at least three months.

Supervisors distributed 125 surveys, one for each supervised employee. Of the 125 surveys only 20 were not returned, thus, rendering a useable sample of 105. This constitutes a response rate of 84%. The average age of respondents was 21 and the average organizational tenure was 1.3 years. The sample included 54 females (51%).

Measures

Prior to using any measures, regardless of their prevalence in extant literature, the scales underwent confirmatory factor analysis (CFA) to test their dimensionality using principal component analysis with an orthogonal (Varimax) rotation. Applying Kaiser's Rule (retaining factors with eigenvalues over one), I examined the amount of variance extracted in the construct by the first factor relative to others (Pallant, 2004; Kaiser, 1974). The expected factor structures emerged, thus, no items were deleted in any scales in the analyses. Noted below, along with the variable descriptions and example questions, are the scales' calculated coefficient alpha values, the eigenvalues of the first extracted factor, and the proportion of cumulative variance in the construct described by that factor. Table 1 consolidates and presents all of this information as well noting the original authors of the measures selected. Furthermore, listed in Appendix 1 are all of the items in the survey instrument used in this paper.

The questionnaire given to supervisors only taps the performance dimensions of their subordinates, although some additional demographic information was also collected. As such, the supervisor measure of OCB is the same as the one noted above with only the wording changed to reflect "the employee" as opposed to oneself. Four different supervisors evaluated the employees. These supervisors manage between 20 and 30 employees each. Spurious effects are possible if controls are not added. Age, gender, and organizational tenure are, thus, included as control variables given their previously demonstrated influence (Sheridan & Vredenburgh, 1978).

Table 1: Scales, Sources, Reliabilities, and Factor Analyses

Sample	Variable Name	Scale Author	Coefficient α	Eigenvalue of the 1st factor	Variance explained by 1st factor
Amalgam	Positive Affect	Watson et al., (1988)	.88	5.00	.50
	Negative Affect		.89	4.18	.42
	Organization-based Self-esteem	Pierce et al., (1989)	.94	5.85	.59
	Organizational Citizenship Behavior	Podsakoff et al., (1990)	.83	2.59	.43
Organizational	Positive Affect		.92	5.86	.59
	Negative Affect		.86	4.63	.46
	Organization-based Self-esteem		.92	6.04	.60
	Organizational Citizenship Behavior		.78	2.97	.49

This table contains information about the study's variables and the creators of the scales used to measure them. In addition, it reports the coefficient alpha values of each scale in both samples as well as the Eigenvalue of the first extracted factor and the amount of variance that it accounts for. All scales were measured with a five-point Likert-type response format anchored by "strongly disagree" and "strongly agree" except PANAS which asked respondents to match the feelings they associate with a word to a number (1 = very slightly/not at all) to (5=extremely). Note: Scales used in both samples are exactly the same except in the organizational sample supervisors answered items about subordinate organizational citizenship behaviors.

Data Analysis and Results- Amalgam Sample

To determine if mediation existed in this data set, this research used Baron and Kenny's (1986) three-step procedure. In order to test for mediation, the following conditions must be met: First, the independent variable should be significantly related to the mediator variable (i.e., OBSE regressed on NA/PA, and control variables). Second, the independent variable should be related to the dependent variable (i.e., OCB regressed on NA/PA). Finally, in the third step, the mediating variable should be related to the dependent variable with the independent variable included in the equation (i.e., OBSE added into the regression equation). If the first three conditions hold, at least partial mediation is present. If the independent variable has a non-significant standardized beta weight in the third step and the mediator remains significant, then full mediation is present. If the independent variable has a significant but a reduced standardized beta weight (especially if associated significance levels drop) in the third step and the mediator remains significant as well, then a case of partial mediation exists.

Table 2 provides the means, standard deviations, and intercorrelations among study variables. The single largest correlation between variables in the amalgam sample is unsurprisingly between two controls- age and organization tenure ($r = .56$, $p < .01$). The correlations do not strongly indicate problems of multicollinearity because none exceeds the .60 benchmark noted by Cohen et al. (2003). To test this sample's hypotheses, the researcher performed the three-step procedure as recommended by Baron and Kenny (1986) to test for mediation. In each of the three steps, the control variables (i.e., age, organizational tenure, and gender) were included due to their potential impact on organizational citizenship behaviors and to provide a more stringent test of the relationships. Overall, gender was the only control variable to be significantly related to OCB. However, consistent with theory, OBSE was significantly related to citizenship at the $p < .01$ level.

Table 2: Means, Standard Deviations, and Intercorrelations among Study Variables

Variable	M1	SD1	M2	SD2	1	2	3	4	5	6	7
1. Age	36.51	13.42	20.97	1.71	---	-.20	.36*	.05	.05	-.10	-.13
2. Gender	---	---	---	---	-.08	---	-.16	.03	-.15	-.03	-.06
3. Org. Tenure	7.37	8.02	1.28	.76	.57*	-.10	---	.013	.03	-.06	-.03
4. OCB	3.49	.53	3.73	.56	.14	.19*	.05	---	.20*	.02	.14
5. OBSE	4.20	.54	4.02	.55	.26*	.01	.13	.48*	---	-.04	.52*
6. Negative affect	1.69	.62	1.77	.67	-.24*	-.04	-.04	-.15*	-.19*	---	-.22*
7. Positive affect	3.84	.72	3.71	.82	.11	.01	.00	.36*	.48*	-.27*	---

**indicates significance levels of p < .05 or higher. †M1 and SD1 come from the amalgam sample, M2 and SD2 from the organization. Correlations below the diagonal are from the amalgam sample, correlations above it are from the organization.*

The first step in Table 3 provides the results for the first step indicating that the mediating variable, OBSE, was significantly negatively related to NA ($b = -.16$, $p < .05$). As such, it is legitimate to proceed to the second step. The second panel provides the results for this step and shows that NA is significantly, negatively, related to the dependent variable (OCB) ($b = -.12$, $p < .10$). Trait negative affect explained 5% of the variance in OCB.

In the third step of Baron and Kenny's (1986) procedure, the mediating variable (i.e., OBSE) should be related to the dependent variable (OCB) with the independent variables included in the equation. The third step in Table 3 provides the results of the final step. As can be seen, OBSE was a strong predictor ($b = .46$, $p < .001$) of OCB, but NA failed to show significance ($b = -.06$, $p <$ n/s). This sudden lack of significance, according to Baron and Kenny (1986), indicates that organization-based self-esteem fully mediated the relationship between negative affect and organizational citizenship behaviors.

Table 3: Mediation Results for NA in the Amalgam Sample

Variable	**F**	**df**	**Adjusted R^2**	**β (standard)**
Step 1: Mediator Variable Regressed on the Independent Variable				
Mediator: OBSE	4.10**	4	.06	
NA				-.16*
Step 2: Dependent Variable Regressed on Independent Variable				
Dep. Var.: OCB	11.36***	4	.05	
NA				-.12†
Step 3: Dependent Variable Regressed on Mediator (OBSE) with the Independent Variable Included				
Dep. Var.: OCB	11.31***	5	.25	
OBSE				.46***
NA				-.06N/S

*Significance levels are indicated as follows: †p<.10, *p < .05, **p < .01, ***p < .001. All results include age, gender, and organizational tenure as control variables. The panels of this table show the mediation steps suggested by Baron and Kenny (1986). The results suggest that if the relationship weakens substantially in the presence of OBSE, partial mediation occurs. N=187*

The first step in Table 4 provides the results for the study's second test hypothesis. It indicated that the mediating variable, OBSE, is significantly positively related to PA ($b = .46$, $p < .001$). Thus, further calculations are in order. The table's second step provides these results and shows that PA is significantly, positively, related to the dependent variable (OCB) ($b = .34$, $p < .001$). Trait positive affect explained between 16% of the variance in OCB.

In the third step of Baron and Kenny's (1986) procedure, the mediating variable (i.e., OBSE) should be related to the dependent variable (OCB) with the independent variables included in the equation. The third step of Table 4 notes these results. As can be seen, OBSE was a strong predictor (b = .39, p < .001) of OCB, but PA still proved a significant antecedent to OCB (b = -.16, p < .05) with OBSE entered in the equation. Baron and Kenny (1986) noted that if between the second and third steps the IV's standardized beta weight drops and/or the significance level drops, the relationship is partially mediated. Such is the case here. In this sample, OBSE partially mediated the relationship between PA and OCB.

Table 4: Mediation Results for PA in the Amalgam Sample

Variable	F	df	Adjusted R^2	β (standard)
Step 1: Mediator Variable Regressed on the Independent Variable				
Mediator: OBSE	17.29***	4	.26	
PA				.46***
Step 2: Dependent Variable Regressed on Independent Variable				
Dep. Var.: OCB	9.52***	4	.16	
PA				.34***
Step 3: Dependent Variable Regressed on Mediator (OBSE) with the Independent Variable Included				
Dep. Var.: OCB	14.34***	5	.26	
OBSE				.39***
PA				.16*

*Significance levels are indicated as follows: †p<.10, *p < .05, **p < .01, ***p < .001. All results include age, gender, and organizational tenure as control variables. The panels of this table show the mediation steps suggested by Baron and Kenny (1986). The results suggest that if the relationship weakens substantially in the presence of OBSE, partial mediation occurs. N=187*

Data Analysis and Results- Organizational Sample

Again, Table 2 provides the means, standard deviations, and intercorrelations among study variables. The single largest correlation between variables in the organizational sample is between OBSE and PA (r = .52, p < .01). Based on the theoretical drivers mentioned above (e.g., Cropanzano et al., 1993) this correlation is to be expected. The other correlations do not strongly indicate problems of multicollinearity in that none exceeds the established .60 benchmark for concern (Cohen et al., 2003).

Data analyses in this sample used the same Baron and Kenny (1986) three-step procedure noted above to test for mediation. In each of the three steps, the control variables (i.e., age, organizational tenure, and gender) were included due to their potential impact on organizational citizenship behaviors and to provide a more stringent test of the relationships. Overall, of the controls only gender was significantly related to OCB. However, consistent with theory, OBSE was significantly related to citizenship behaviors at the p < .01 level.

The first step in Table 5 provides the results of this procedure. Unlike the amalgam sample, in the organizational sample NA did not significantly predict OBSE. In the absence of significance in step one, neither steps two or three are possible. As such, with respect to NA, OBSE and OCB, no concrete case can be made for mediation in the organizational sample.

Table 5: Mediation Results for NA in the Organizational Sample

Variable	F	df	Adjusted R^2	β (standard)
Step1: Mediator Variable Regressed on the Independent Variable				
Mediator: OBSE	N/S	4	-.01	
NA				N/S

*Significance levels are indicated as follows: †p<.10, *p* < .05, ***p* < .01, ****p* < .001. *All results include age, gender, and organizational tenure as control variables. The panels of this table show the mediation steps suggested by Baron and Kenny (1986). The results suggest that if the relationship weakens substantially in the presence of OBSE, partial mediation occurs. N=105*

The first step in Table 6 provides the results for the study's second test hypothesis. It notes that the mediating variable, OBSE, is significantly, positively, related to PA (b = .53, p < .001). Thus, a researcher is allowed to proceed to the second step. The table's step provides these results and shows that PA is significantly, positively, related to the dependent variable (OCB) (b = .29, p < .01). Trait positive affect explained 9% of the variance in OCB.

In the third step of Baron and Kenny's (1986) procedure, the mediating variable (i.e., OBSE) should be related to the dependent variable (OCB) with the independent variables included in the equation. The third step of Table 6 provides the results of the final calculation. As can be seen, OBSE was a strong predictor (b = .41, p < .001) of OCB, but PA failed to show significance (b = -.06, p < n/s). The lack of significance, according to Baron and Kenny (1986), indicates that organization-based self-esteem fully mediates the relationship between trait positive affect and organizational citizenship behaviors. Stated somewhat differently, these results suggested that the variance in OCB caused by PA was being channeled through OBSE.

Table 6: Mediation Results for PA the Organizational Sample

Variable	F	df	Adjusted R^2	β (standard)
Step 1: Mediator Variable Regressed on the Independent Variable				
Mediator: OBSE	10.50***	4	.27	
PA				.53***
Step 2: Dependent Variable Regressed on Independent Variable				
Dep. Var.: OCB	2.44*	4	.09	
PA				.29**
Step3: Dependent Variable Regressed on Mediator (OBSE) with the Independent Variable Included				
Dep. Var.: OCB	5.17***	5	.17	
OBSE				.41***
PA				.07 N/S

*Significance levels are indicated as follows: †p<.10, *p < .05, **p < .01, ***p < .001. All results include age, gender, and organizational tenure as control variables. The panels of this table show the mediation steps suggested by Baron and Kenny (1986). The results suggest that if the relationship weakens substantially in the presence of OBSE, partial mediation occurs. N=105*

DISCUSSION

The data in this study suggest a mediated relationship among trait affect, organization-based self-esteem and organizational citizenship behaviors exists. These data corroborate others' findings (e.g., Pierce et al., 1989: Graen & Uhl-Bien, 1995), with respect to the direct relationships between trait affect and OBSE as well as OCB. This research also helps validate and augment other relevant of bodies of literature as well. For example, finding that NA and PA predicted OBSE but that it, in turn, promoted contextual performance enhances both the study of organizational citizenship as well as personality research.

Heretofore, research has not sequentially examined the extent to which individuals' differential tendencies to view the world as either hostile or inviting, impacted the extent to which they build their senses of self-worth at work. Consequently, personality research is extended with the awareness that OBSE can serve as a linking mechanism in the creation of feelings self-worth in organizations and the willingness to give of oneself beyond what is expected by a job description. By examining the influence of individual factors (i.e., affect – both positive and negative) concomitantly, and across samples, t confident that dimensions relevant to OBSE and OCB are tapped in the current study.

Contributions to Theory and Practice

Mossholder, Bedeian, and Armenakis (1981) contended that self-esteem predicted abilities in many organizational contexts. This research seeks to demonstrate that one such ability (or the lack thereof) is that which allows individuals to behave proactively on the behalf of the organization and others (i.e., engage in OCB). Mossholder et al. (1981) demonstrated that those low in self-esteem sought the aid of others more than high self-esteem individuals. Unfortunately, those too dependent on their colleagues might find it difficult to make the specific individual level contributions that OCB requires (e.g., to come in early to work, be proactive, and mentor). The data in the amalgam sample helped validate that claim by demonstrating that NA negatively predicted both OBSE and subsequently OCB.

This study's findings are also in keeping with Mobley's (1977), contentions that those high in PA would be more proactive in seeking satisfying situations. This research indicated that PA promoted OBSE due to its ego-affirming nature – a quintessentially satisfying situation (Pierce et al., 1989), and individuals' subsequent tendencies to activate self-enhancing motivations to contextually perform better (Korman, 2001). Specifically, results from both the organizational and amalgam samples indicated that PA promoted individuals' tendencies to feel worthwhile at work and to subsequently give more at work.

A logical implication from this study for practitioners is to test applicant affective dispositions. Naturally, if organizations were to do so, it is clear that they would wish to hire applicants who are high in PA and/or low in NA. However, caution must be taken in this regard. To this point, personality predictors of job related outcomes like job performance and OCB have not consistently generated significant results and operational confounds persist (Organ et al., 2006; Barsade & Gibson, 2007). This variability underscores criticisms of personality testing for selection purposes (e.g., Guion & Gottier, 1965). However, in the context of this research, personality testing might still be useful given the mediated nature of the trait affect, OBSE, OCB relationship because NA /PA most proximally influences organization-based self-esteem. As Graen and Uhl-Bien (1995) noted, affect predicted LMX outcomes and the quality of these interactions constitute the self-evaluative reflections that help create organization-based self-esteem (Rosenberg, 1979; Pierce et al., 1989). In this respect then, testing applicants' trait affect might still prove beneficial.

There are implications for groups as well. Most contemporary organizations implement some sort of group based work (e.g., Devine, Clayton, Philips, Dunford, & Milner, 1999; Stewart, Manz, & Sims, 1999). As such, this research could prove helpful to managers when they consider how to deploy their employees in group situations. The present findings suggest that those most likely to demonstrate desired acts of good citizenship (e.g., helping others, volunteering, and being courteous) do so because they believe their organizations promote their senses of self-worth and they are generally positive individuals. Managers would do well to track the frequency of pro-social acts, the individuals performing them, and then place those employees together on teams. By doing so, managers could be more certain that they are creating a higher mean level of positive affect and discouraging the creation of unwanted affective diversity. This would likely lead the group to experience higher levels of cohesion, provide better customer service, reduce absenteeism, foster better cooperation amongst members, and ultimately lead to better firm performance (George, 1995; Barsade, Ward, Turner, & Sonnenfeld, 2000).

This research also adds to the body of literature on the ameliorative influences of NA on desirable work outcomes. Practitioners would be well advised to consider the effects of NA on OBSE, OCB, and the cost structure of the firm. Research (i.e., Simon, Von Korff, Ludman, Katon, Rutter, Unutzer, Lin, Bush, & Walker, 2002) suggested that negative affect promotes depressive episodes which, subsequently, adversely affect profitability. HR managers would likely find it difficult, if not ethically questionable, to try to eliminate applicants based on trait NA (Mount, Barrick, & Strauss, 1994). This task would be arduous, if not impossible, due to differential applicant abilities to self-monitor (Snyder, 1987). A person's ability to adjust behaviors based on environmental factors (e.g., the need to appear positive during an interview to make a "good impression" and get hired) might make it difficult to identify NA at the outset. Assuming then that both high NA and PA employees exist in organizations, it would be desirable, although admittedly reactive, to make counseling available for all members of the organization. Making depression prevention specialists available to employees modestly increases depression-free days for individuals high in NA and is a prudent investment with respect to health care costs (Simon et al., 2002). These authors suggested that the incremental cost effectiveness of treatment was $24 per depression free day whereas the costs of maintaining the program were only about $14 per day. Ultimately, such opportunities enhance the probability that individuals will find esteem building opportunities in their organizations and demonstrate pro-social behaviors.

Strengths and Limitations

A fundamental strength of this research involves its two-study design. The desirability of the two-study design is rooted in the constructive replication of findings across studies. Furthermore, multiple samples allow researchers more rigorous external generalizations, especially if their conclusions differ from previous research on potential moderating conditions (Schwab, 1999). Taken together, the findings in the organizational and amalgam samples increase validity. The veracity of the claims made in this research is also strengthened by the use of paired dyads in the organizational sample. The use of supervisor ratings of citizenship behaviors helps eliminate the threat that individuals will evaluate themselves too favorably and spuriously influence findings. Additionally, according to Organ et al., 2006, the fact that measures of OCB were collected from supervisors while employees completed information on the other study variables helps reduce the threat of common method variance (i.e., not all information coming from the same source and apparatus).

Another positive aspect of this research relates to its response rates. Generally, one would expect a response rate of 30% (Dillman, 2000). However, in the organizational sample the response rate was nearly 85%. This is advantageous because it helps alleviate concerns about the existence of significant differences between individuals who responded and those who did not. In this case, non-response bias (e.g., the potential that respondents differ in motivation and ability from non-respondents) can largely be ruled out (Schwab, 1999). Considering that the organizational data contain the responses of the vast majority of the employees, as opposed to only the anticipated one third of them (Dillman, 2000), study data do likely represent the attitudes of those in the organization.

Ideally, this research would have employed peer reviews of OCB as well as those of the supervisors. Although, as noted above, the use of supervisor/subordinate dyads is very useful for helping to eliminate the tendency individuals to evaluate themselves too positively, a substantive issues must still be addressed. Specifically, there is the possibility that supervisors show bias when they note subordinate punctuality, compliance, and observation of the rules and deem them "good employees". They then infer that such employees are helpful to coworkers and take initiative to solve problems (Williams & Anderson, 1991). Therefore, including peer evaluations of subordinate OCB could clarify if helping behaviors are actually taking place. It is, after all, usually peers who would be given that aid (or not).

Another possible limitation to this research involves the choice of organizations. The organization used in the current study represents a departure from many organizational samples. Specifically, this organization operates on a large university campus. As such, most of the employees were young relative to the general population. This could affect the nature and time frame of the job, and, thus, spuriously impact the evolution of OBSE (Somers, 1995). Additionally, the ratio of employees to supervisors was not ideal. On average, each supervisor evaluated 26 employees. Generally, it is desirable if supervisors evaluate a small number of employees in order to avoid the possibility of obtaining biased results. Nevertheless, this organization only had four supervisors.

In addition to the unfavorable ratio of employees to managers, the organizational study is also limited by its total sample size. Although the study enjoys a very favorable response rate (84%), only 105 surveys were collected, thus, the power and effect size in the organizational sample lie slightly below the a priori standards advocated by Cohen (1992) and Green (1991).

This research also suffers from another limitation in that it was a cross-sectional study. A frequent lament on the part of organizational researchers is the lack of longitudinal research design in field studies. Cross-sectional studies diminish researchers' abilities to make more definitive statements of causality. It might be said that cross-sectional research is like trying to understand a movie by looking only at one still shot.

Directions for Future Research

A fundamental step in future research relates to a longitudinal examination of the relationship between OBSE and OCB. Longitudinal designs would help clarify whether or not the influences of OBSE remain constant over time with respect to predicting OCB.

Another issue that future researchers might explore involves the inclusion of possible moderators to this basic model. One such boundary condition might be the effects of structural elements in the organization. For example, scholars might look at the structural distance between employees and supervisors as potential moderators of the existing linkages. Korman (2001) noted those low in self-esteem tend to engage in "damage control" to diminish unfavorable scrutiny from others in the organization. Structural distance has been shown to be negatively related to altruism and civic virtue (Podsakoff, MacKenzie, & Bommer, 1996). Given these findings, researchers might consider the potential that great structural distance augments the tendencies that those low in OBSE would have to perform poorly and withhold citizenship behaviors (Carson et al., 1997; Van Dyne & Pierce, 2004) because their supervisors are not close enough to notice it. This lack of engagement in OCBs might also be augmented if low OBSE individuals face substantial organizational constraints like insufficient time or training (Jex, Adams, Bachrach, & Sorenson, 2003).

Assuming that those in flatter organizations "wear more hats" and are, thus, more proximally linked to others (Cascio, 1995; Kirkman & Shapiro, 1997), researchers might also find it fruitful to examine the potential moderating effect of low structural distance (see Podsakoff et al., 1996) on those high in OBSE. In this case it might be that higher performance levels (including increased demonstration of citizenship behaviors) usually experienced by those high in self-esteem (Bandura 1977, 1989) would be exacerbated by the "closeness"- in terms of the proximity and quality of the functional relationship- of their supervisors (Organ et al., 2006; Napier & Ferris, 1993). Similarly, as Elloy (2005) suggested, this flat structure might also moderate the relationship between PA and OBSE, such that OBSE might increase under less-bureaucratic conditions because positive, outgoing, individuals would have more opportunities to engage in behaviors that build self-esteem.

Cultural distinctions also warrant consideration when discussing potential moderators. For example, two of Hofstede's (1984) dimensions of culture bear directly on the expression of OCB- *individualism/collectivism* and *power distance.* Individualistic countries (e.g., the United States) typically promote the expression of personal values and interests, whereas collectivist countries (e.g., China) emphasize the demonstration of behaviors that support the values of larger groups such as family, tribes, or countrymen. Fahr, Zhong, and Organ (2004) noted that collectivism created, in Chinese employees, a more comprehensive, unbounded, and diffuse sense of helping (e.g., beliefs that employees should go so far as to help others in their organizations repair their homes after water damage). As such, it reasonable to postulate that with the expanded domain of interaction that collectivism promotes, the tendency of employees high in OBSE to engage in OCBs might be augmented. Future scholarship might seek to validate that claim.

Power distance describes a society's recognition of, and comfort with, institutionalized, hierarchical, differences between individuals based on class, status, and income (Hofstede, 1984). Latin American cultures generally have a strong awareness of power distance (Hofstede, 1984; Organ et al., 2006). Van Dyne, Graham, and Dienesch (1994) noted that "voice"- the opportunities employees take to speak out against behaviors that discredit or damage the organization, is an important act of citizenship. Organ and colleagues (2006), however, noted that power distance distinctions among Mexican employees constrained the tendency of subordinates to question the behaviors and/or decisions of their superiors.

Future research might determine if high power distance could act as a suppressor variable. Per Roserberg's (1979) discussion, researchers might test, if high power distance –the test factor, is positively related to OBSE (especially among managers) - the independent variable, but negatively related to OCB- the dependent variable. It is plausible that even employees, who feel valued in the organizational context, might withhold citizenships behaviors (i.e., exercise "voice") because they are culturally conditioned to believe that it is not their place.

CONCLUSION

Trait affect is a fundamental personality dimension that influences employee behavior (e.g., Castro et al., 2003; Graen & Uhl-Bien, 1995). Indeed, its effects are felt by nearly everyone in both private and organizational life. However, researchers are still investigating the extent to which it impacts individuals, their social interactions, intentions to give, and feelings of self-worth. To date, research has not sequentially connected trait affect with organization-based self-esteem and organizational citizenship behaviors. This research, though preliminary, indicates that personality (i.e., trait affect) does impact employees' feelings of self-worth in organizations which in turn differentially predicts beneficial, pro-social, behaviors.

Appendix 1: Survey items

This scale consists of a number of words and phrases that describe different feelings and emotions. Read each item and then mark the appropriate answer in the space next to that word. Indicate to what extent you have felt this way during the past few weeks. Use the following scale to record your answers:

1 = very slightly, or not at all
2 = a little
3 = moderately
4 = quite a bit
5 = extremely

__________ afraid	__________ active	__________ alert
__________ scared	__________ strong	__________ proud
__________ nervous	__________ attentive	__________ upset
__________ jittery	__________ determined	__________ guilty
__________ irritable	__________ enthusiastic	__________interested
__________ hostile	__________ excited	__________distressed
__________ ashamed	__________ inspired	

Note: In addition to the items listed above, control variables (i.e., standard demographic variables) and information on respondent organizational tenure were collected and used in data analyses.

***Panel A: Organizational Citizenship Behavior* (Podsakoff ,MacKenzie, Moorman, & Fetter, 1990)**					
I often help others who have been absent at work.	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
I often volunteer for things that are not required at work.	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
I often orient people although it is not required at work.	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
I often help others when they have a heavy workload.	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
I often assist my supervisor with his or her work.	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
I often make suggestions to improve my department.	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
***Panel B: Organization-based Self-esteem* (Pierce, Gardner, Cummings, & Dunham, 1989)**					
I count in this organization.	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
I am taken seriously at work.	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
I am an important member of this organization.	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
Other organizational members trust me.	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
There is faith in me at work.	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
I can make a difference at work.	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
I am a valuable member of this organization.	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
I am helpful to others at work.	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
I am an efficient worker.	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
I am a cooperative member of this organization.	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree

PANAS (Watson, Clark, & Tellegen, 1988)

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SUSTAINING COMPETITIVENESS IN A GLOBAL ECONOMY: INSIGHTS OFFERED BY TOTAL FACTOR PRODUCTIVITY INDICATORS FOR THE U.S.

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ABSTRACT

Determination and implementation of effective policies that enhance and sustain U.S. competitiveness internationally requires a clear understanding of the concept of competitiveness as it relates to a nation. This paper addresses the ambiguity that surrounds the notion of nations competing, and presents a Total Factor Productivity (TFP) based model that more adequately measures the state of U.S. ability to compete in the international marketplace. TFP growth and total output are estimated using data from key sectors of the U.S. economy during 1986-1997. Results indicate that the U.S. remained competitive over this period, even though other popularly used indicators discussed in the paper appeared to suggest otherwise. The paper discusses appropriate policy measures and potential for future research in light of the findings.

JEL: D2; F1; M2; O4

KEYWORDS: Productivity growth, competitiveness, efficiency

INTRODUCTION

The concept of international competitiveness is hardly new. Rather, a dynamic phenomenon that has evolved with time. Traditionally, a nation's international competitiveness has been implied by international trade theories that have originated since the works of Adam Smith. In the context of globalization, however, today's global economy has become more complicated. Therefore, earlier attempts to explain competitiveness, no longer offer adequate explanations on how nations compete today. For example, critics of international trade theories argue that nations do not compete in a similar manner as firms do. Especially, international trade theory implies that nations are only winners and cannot be losers in international trade; otherwise they would not engage in trade (Lachmann, 2001). In today's competitive world, however, the reality is that some nations succeed and others fail in international competition.

The concept of competitiveness has gained importance in recent decades from perspectives of growth and development, and has become one of the central preoccupations of government and industry in every nation (Porter, 1990). It is a particularly fundamental subject for the United States considering its leadership role in the global economy. Given that the ability to compete in the international market is increasingly becoming an indicator of economic health, ultimately, living standards in the U.S. will be impacted by the competitiveness of its firms in the international market.

This study, among other things, seeks to explain how nations compete, and to offer more adequate criteria of measuring the ability of U.S. firms to compete in the international market. Primary findings indicate that using trade performance indicators alone to measure the ability to compete internationally, may in fact be a misconception; the U.S. sustained its productivity increases amidst a period of growing trade deficits. This paper proceeds with a brief literature review, followed by an explanation of methodology used, the empirical analysis, results of the analysis, policy analysis and conclusions.

LITERATURE REVIEW

The Meaning of International Competitiveness

Some theories that exemplify earlier attempts at explaining international competitiveness include David Ricardo's factor productivity theory, Eli Heckscher and Bertil Ohlin's factor abundance theory, Joseph Schumpeter's dynamic change and theory of economic development, and Robert Solow's technological progress model. Ezeala-Harrison (1998) offers a contemporary definition of international competitiveness as the relative ability of a country's firms to produce and market products of standard or superior quality at lower prices relative to rivals in the international market. This ability determines the country's relative performance in international trade. That is, where international trade may be an "engine" that drives economic growth of nations, international competitiveness represents the "fuel" that empowers that engine (Ezeala-Harrison, 1999).

The notion of a competitive nation is not as clear as that of a competitive firm. Ultimately, competitiveness is determined at the industry level. Most research in international competitiveness examines firms and industries to determine what gives some countries advantages in certain industries. Thus, Porter's (1990) contributions prove to be crucial in that he suggests an approach that focuses on resources and their productivity, both of which are firm level parameters of competitiveness. The definition that relates competitiveness to productivity necessarily measures the efficiency of the production process in terms of output obtained for units of input used. The challenge with this approach is that of obtaining productivity measures without leaving out the contributions of any inputs used in the production process.

It would be misleading to attribute changes in productivity to changes in the use of a single factor of production because factors are used in combination with other factors in the production process. While any list of measurements of productivity can cover a substantial number of factors, no list can be exhaustive. In this study, a framework that uses total factor productivity (TFP) measurements as indicators of international competitiveness is presented. TFP measures the relationship between output and its total factor inputs. It is a residual measure of changes in total output not accounted for by total factor input changes, after the output of the weighted sum of all inputs has been determined. This approach is suited to overcome the problem of attributing changes in productivity to changes in the use of a single factor of production. Also, TFP measurement is not subject to diminishing returns, unlike increments of capital and labor (assuming a combination with a fixed factor). These qualities enhance TFP's suitability as a tool for analyzing international competitiveness.

Given the definition of competitiveness offered in this study, a country's state of competitiveness is shown to be a dynamic phenomenon due to changes in either or both micro and macro level packages of parameters. Sustainability of competitiveness will endure if the sources of a firm's cost advantage are difficult for competitors to replicate or imitate. Therefore, TFP can be thought of as the level of technological advancement.

TFP is calculated as a Solow residual from real income after accounting for the contribution of various factor inputs of production. It is well established that most of the difference in income between countries is attributed to TFP (Porter, 1990; Ezeala-Harrison, 1995; Krugman, 1996; Klenow and Rodriguez-Clare, 1997; Hall and Jones, 1999; Aiyar and Feyrer, 2000). To this end, a methodology to calculate Solow residuals values for the U.S. economy is formulated.

METHODOLOGY

Following Ezeala-Harrison (1995, 1996, and 1999) in the study of Canada's international competitiveness, a TFP analysis derived from the application of a Solow residual approach to be applied to the U.S. case is presented. It is assumed that the aggregate production function is of an implicit form:

$$Y_i = Y_i (L_i, K_i, R_i) \quad (1)$$

where: Y = quantity of output (GDP),
L = labor input,
K = capital input,
R = amount of natural resources,
and subscript i denotes the i^{th} sector.

The growth rate of output in each sector of the economy is made up of the sum of the products of each input's marginal productivity and the rate of expansion the input. This can be shown from differentiating equation (1) with respect to time, t, as follows:

$$dY_i/dt = (\partial Y_i/\partial L_i \,.\, dL_i/dt) + (\partial Y_i/\partial K_i \,.\, dK_i/dt) + (\partial Y_i/\partial R_i \,.\, dR_i/dt) \quad (2)$$

Assume that each sector is characterized by a Cobb-Douglass production function of the type:

$$Y = \lambda L^{\alpha} K^{\beta} R^{\gamma}$$

where λ = TFP index
α = factor share of labor
β = factor share of capital
γ = factor share of material resources

Therefore, the growth rate of output can be shown as:

$$dY/dt = (\partial Y/\partial \lambda \,.\, d\lambda/dt) + (\partial Y/\partial L \,.\, dL/dt) + (\partial Y/\partial K \,.\, dK/dt) + (\partial Y/\partial R \,.\, dR/dt)$$

That is,

$$dY/dt = d\lambda/dt + \alpha \,.\, dL_i/dt + \beta \,.dK/dt + \gamma \,.\, dR/dt \quad (3)$$

Changes in λ (TFP growth) over time for the i^{th} sector of the economy are given as:

$$d\lambda_i/dt = dY_i/dt - (\alpha_i\, dL_i/dt + \beta_i dK_i/dt + \gamma_i dR_i/dt) \quad (4)$$

Substituting (3) into (4) we obtain:

$$d\lambda_i/dt = (\partial Y_i/\partial L_i . dL_i/dt) + (\partial Y_i/\partial K_i . dK_i/dt) + (\partial Y_i/\partial R_i . dR_i/dt) - (\alpha_i dL_i/dt + \beta_i dK_i/dt + \gamma_i dR_i/dt)$$

That is,

$$d\lambda_i/dt = dL_i/dt\, (\partial Y_i/\partial L_i - \alpha_i) + dK_i/dt\, (\partial Y_i/\partial K_i - \beta_i) + dR_i/dt\, (\partial Y_i/\partial R_i - \gamma_i)$$

Since α_i, β_i, and γ_i are factor shares, then:

$$\alpha_i = \frac{(\partial Y_i/\partial L_i)}{(Y_i/L_i)}, \qquad \beta i = \frac{(\partial Y_i/\partial K_i)}{(Y_i/K_i)}, \qquad \gamma_i = \frac{(\partial Y_i/\partial R_i)}{(Y_i/R_i)}$$

Therefore:

$$d\lambda_i/dt = dL_i/dt\ (\alpha_i Y_i/L_i - \alpha_i) + dK_i/dt\ (\beta_i Y_i/K_i - \beta_i) + dR_i/dt\ (\gamma_i Y_i/R_i - \gamma_i)$$

alternatively:

$$d\lambda_i/dt = \alpha_i \,.\, dL_i/dt(Y_i/L_i - 1) + \beta_i \,.\, dK_i/dt(Y_i/K_i - 1) + \gamma_i \,.\, dR_i/dt(Y_i/R_i - 1_i) \qquad (5)$$

This gives the measure of TFP growth for any given sector of the economy. Therefore, the aggregate TFP change for the n sectors of the economy, where i = 1,2,3,….n is given as:

$$\lambda^* = d\lambda_i/dt = \Sigma_1^n \{\alpha_i \,.\, dL_i/dt(Y_i/L_i - 1) + \beta_i \,.\, dK_i/dt\ (Y_i/K_i - 1) + \gamma_i \,.\, dR_i/dt\ (Y_i/R_i - 1_i)\} \qquad (6)$$

This obtains the national measure of TFP growth, posited as a more appropriate index for measuring competitiveness. Competitiveness is thus presumed to be the relative effective utilization of resources (the components of the production function) in the most efficient manner. Equation (5) can be used to show that the growth in any particular factor's productivity depends on the growth in the TFP. For example, for labor productivity:

$$dL_i/dt\ (Y_i/L_i - \alpha) = d\lambda_i/dt - \{\beta_i \,.\, dK_i/dt(Y_i/K_i - 1) + \gamma_i \,.\, dR_i/dt(Y_i/R_i - 1)\}$$

Capital productivity:

$$dK_i/dt(Y_i/K_i - \beta) = d\lambda_i/dt - \{\alpha_i \,.\, dL_i/dt(Y_i/L_i - 1) + \gamma_i \,.\, dR_i/dt(Y_i/R_i - 1)\}$$

Resource productivity:

$$dR_i/dt(Y_i/R_i - \gamma) = d\lambda_i/dt - \{\beta_i \,.\, dK_i/dt(Y_i/K_i - 1) + \alpha_i \,.\, dL_i/dt(Y_i/R_i - 1)\}$$

Appropriate data for the U.S. is employed to compute the trend values of:

(i) sectoral TFPs (λ_i) using equation (5). This way, comparisons can be obtained for intersectoral TFP performance, thereby obtaining a picture of relative competitiveness of the various sectors of the economy.

(ii) aggregate TFP growth over time, $\lambda^{*,}$ using equation (6). Besides indicating whether, and at what particular points in time the economy might (or might not) be losing the ability to sustain its relative competitiveness, this operation also gives an indication of the potential competitiveness profile of the U.S.

The Empirical Analysis and Data

The empirical analysis of this study provides insights and possible conclusions about the state of U.S. competitiveness. Further, when compared to U.S. trade performance in recent decades, the analysis allows us to ascertain the extent to which the growing trade deficits experienced by the U.S. economy during the 1980s and 1990s are (are not) a sign of a loss of its competitiveness, given what constitutes competitiveness, as presented here. Conclusions that emerge from the empirical analysis enable us to offer policy recommendations and propositions for future research.

The data employed in the analysis covers the years 1986-1997, and is adapted to the U.S. standard industrial code (SIC) format. Where variables in the model are not directly measurable, proxies are employed to make estimates. For each sector, the factor share inputs (α,β,γ) are proxied by the size of the respective input expenditures of each of these factors for the given sector in proportion to total input expenditures for that particular factor across all sectors. The relevant data is readily obtained from the U.S. Bureau of Economic Analysis (BEA). While data on all input variables is complete and readily available for the particular period specified, the level of accuracy in the tertiary (service-related) sector estimations cannot be verified with reasonable confidence. This is because, admittedly, output measurement for the service sector proves to be challenging, and there is little consensus on how it can be done.

In equation (7), factor shares of inputs (α,β,γ), are proxied by the size of expenditures on each of these factors. For example, labor share of the total input is proxied by worker compensation costs-output ratios. The relevant data are available with the U.S. Bureau of Labor Statistics (BLS). Capital share of total input is proxied by capital expenditure for structures and equipment-output ratios. The relevant data are available with the U.S. Bureau of Economic Analysis (BEA). While data for capital and labor inputs is mostly available, or otherwise relatively easy to proxy, the service sector presents a challenge. This is simply because different firms in the service sector produce services that differ.

Therefore, what constitutes raw material for each firm is likely to be unique across the industry. In the analysis, the raw material component is estimated be the remaining portion of the cost of production after subtracting costs incurred by labor, and investment in capital equipment. This idea is based on the assumed production function for the economy as expressed in equation (1). While it is possible to identify actual costs that account for the proxies selected to represent raw material costs for the service producing sectors, the process is hampered by unavailability of detailed production costs data necessary for such an approach. Also, compared to the proposed procedure, this (item proxy) approach does not guarantee the level of data uniformity that is necessary for reliable analysis. Output (Y) data is proxied by real GDP values, and is readily available from the BEA.

The dependent varibale, international competitiveness, is proxied by TFP index obtained from the U.S. Bureau of Labor Statistics (BLS). Other sources found useful for the data collection include the U.S. Bureau of Census and the National Bureau of Economic Research (NBER). The data used in the analysis is a combination of time series range of the years 1986-1987, and cross-section across a sample of 12 major industries that represent the three broad sectors of the U.S. economy namely: primary, secondary and tertiary, for a combined set of 120 panel observations.

The regression analysis is conducted as follows: the dependent variable is the index for international competitiveness, and is proxied by the BLS TFP index for the U.S. The independent variables are: the product of rate of human resource development and productivity of labor; the product of rate of investment growth and productivity of capital; and the product of rate of raw materials discovery and productivity of raw materials. The regression is run using equation (6), the linear form of which is written as:

$$IC = \omega_0 + \omega_1 L^* + \omega_2 K^* + \omega_3 R^* + e_i \quad (7)$$

Where,

ωs = parameter estimates
L* = product of labor input share growth rate and its average productivity
K* = product of capital input share growth rate and its average productivity
R* = product of raw material factor input share growth rate and its average productivity, and e_i = error term

The data was screened using standard econometric screening procedures to ensure that it met the necessary requirements before conclusions can be drawn. The model was tested for violations of multiple regression assumptions. Following successful data screening and violation tests, we ran regressions on equation (7) for each of the sectors previously described. Table 1 shows the results obtained.

Results of the Analysis

The results for the primary sector show that all variables are statistically significant at 95% confidence level, except for R*. The F-statistic seems to indicate that the overall fit of the model is significant. The R^2 value is also significantly high for the primary sector. The relationship between the independent variables and the dependent is positive as is expected. The coefficient for L* seems to indicate that competitiveness for the U.S primary sector is largely driven by labor productivity and expansion rate.
The secondary sector results returned a significantly high R^2 value. Similar to the primary sector, all variables are statistically significant at 95% confidence level, except R*. All explanatory variables show a positive relationship with the dependent variable as is expected. K* had the highest co-efficient in the secondary sector, which seems to indicate that competitiveness in the secondary sector is largely influenced by K*. This result supports the idea that innovation is crucial to sustaining competitiveness (productivity increases) for the secondary sector. The F-statistics seem to indicate that the overall fit for the model is significant at 95% confidence level.

Generally, the tertiary sector results show a departure between theory and practice. Also, the results obtained from the tertiary sector seem to offer little insights than anticipated. It was expected that an analysis of the tertiary sector, which is dominated by service industries, would offer meaningful insights into the state of U.S. competitiveness, given that more than 70% of the U.S. output is accounted for by the service-oriented sector. A positive relationship is observed between international competitiveness and the explanatory variables except for R*. Suspicion is that this unexpected result may be explained by either one of two factors: inadequacy in data and measurement procedures for the tertiary sector as previously mentioned, or a possible misspecification of the model.

According to the results in Table 1, the F value for the tertiary sector was relatively low, even though the F-tests indicate an overall model fit at 95% level of confidence. The results seem to show a relatively strong influence of L* on competitiveness as indicated by the coefficient values. However, the results for the tertiary sector analysis must be taken with caution for the reasons explained. It is also important to note that the dependent variable, which is proxied by the U.S. TFP index obtained from the BLS, does not factor the contributions of most of the tertiary sector industries. This may help in explaining the diluted nature of results obtained for the tertiary sector.

Table 1: Regression Results of Equation (7) with TFP Index as the Dependent Variable

Variable	Coeff.		Std. Error	t-Statistic	P-value
(constant)	-0.00165		0.0010	-2.6660	0.0370
Primary L*	0.10200		0.0200	5.1350	0.0020
Primary K*	0.04665		0.0120	4.0180	0.0070
Primary R*	0.00729		0.0110	0.6460	**0.542
R-squared	0.89300	Mean dep. var.	0.00026		
Adj. R-square	0.84000	S.D. dep. Var.	0.00250		
S.E. of regression	0.00100	F-Statistic	16.77100		
Sum of squared resid.	0.00000	P-value	0.00300		
Durbin-Watson Stat.	1.94300				

Variable	Coeff.		Std. Error	t-Statistic	P-value
(constant)	0.00253		0.00100	3.55000	0.01200
Secondary L*	0.04128		0.02400	1.72000	0.05400
Secondary K*	0.06106		0.02200	2.75600	0.03300
Secondary R*	0.23500		0.13000	1.81100	**0.120
R-squared	0.742000	Mean dep. var.	0.002456		
Adj. R-square	0.614000	S.D. dep. Var.	0.001255		
S.E. of regression	0.000780	F-Statistic	5.764000		
Sum of squared resid.	0.000000	P-value	0.034000		
Durbin-Watson Stat.	1.937000				

Variable	Coeff.		Std. Error	t-Statistic	P-value
(constant)	0.007721		3.707000	0.008000	
Tertiary L*	0.049080		0.043000	1.139000	0.029000
Tertiary K*	0.001030		0.015000	0.089000	0.053000
Tertiary R*	-0.094800		0.044000	-2.150000	**0.069
R-squared	0.6030	Mean dep. var.	0.000701		
Adj. R-square	0.4330	S.D. dep. Var.	0.002078		
S.E. of regression	0.0016	F-Statistic	3.544000		
Sum of squared resid.	9971381	P-value	0.056000		
Durbin-Watson stat.	2.0230				

The Dependent variable was TFP Index; the Method was Least Squares. Sample (adjusted was 1988-1997. It Included 10 observations, the number of cross sections was 12 and total panel observations (balanced) was 120.

*** The P-value results for all sectors, which seem to indicate insignificance of the R* variable, may be explained by the fact that the TFP index value computed for the U.S. by the Bureau of Labor Statistics does not take into consideration the contributions of material inputs. It focuses mainly on labor and capital contributions.*

Table 2: Summary Statistics of Total Factor Productivity Variables

	L*	K*	R*
Primary Sector:			
Mean	0.0229989	-0.01128255	0.0150486
Median	0.0186567	-0.0177065	0.0058909
Max.	0.0563268	0.041018	0.1000291
Min.	-0.0000992	-0.044203	0.0005964
Std. dev.	0.01169804	0.0295994	3.0231334
Skewness	0.671452599	0.7854754	1.0207845
Kurtosis	0.291417687	-0.63300589	3.332028
Secondary Sector:			
Mean	0.00864428	0.03201947	-0.0039472
Median	0.00806235	0.02835395	-0.0043145
Max.	0.0143637	0.0578634	0.002095
Min.	0.0014219	-0.00814	-0.00814
Std. dev.	0.003863999	0.01482376	0.002596
Skewness	-0.1931027	0.6420197	1.119162
Kurtosis	0.0555255	-0.426825	3.526985
Tertiary Sector:			
Mean	0.03250662	0.0436615	0.0282925
Median	0.03234775	0.0459909	0.02818615
Max.	0.0434275	0.0786566	0.0448499
Min.	0.0218121 `	0.0032025	0.0061315
Std. dev.	0.007141686	0.0283643	0.00981
Skewness	-0.02672639	0.181576	-0.905601
Kurtosis	-0.07838493	-1.3711346	3.183503
Observations	10	10	10
Cross sections	12	12	12

This table is a summary statistics of variables used in the model presented. In general, the kurtosis and skewness values for our variables are not significantly far from zero, indicating that the data set was obtained from a fairly normally distributed population. However, we observe slight variations for R kurtosis values. This may be an indication that the data sets for R* are not relatively normally distributed. This may be explained by variations in the type of data collected by the BLS for materials input. Some data sets are inclusive of energy inputs while some exclusively consist of material inputs. The highest mean values obtained were those for K* and L* variables in the secondary and tertiary sectors. Generally, the secondary and tertiary sectors are most active in the U.S. economy, and it is therefore expected that these sectors would show a relatively strong productivity performance.*

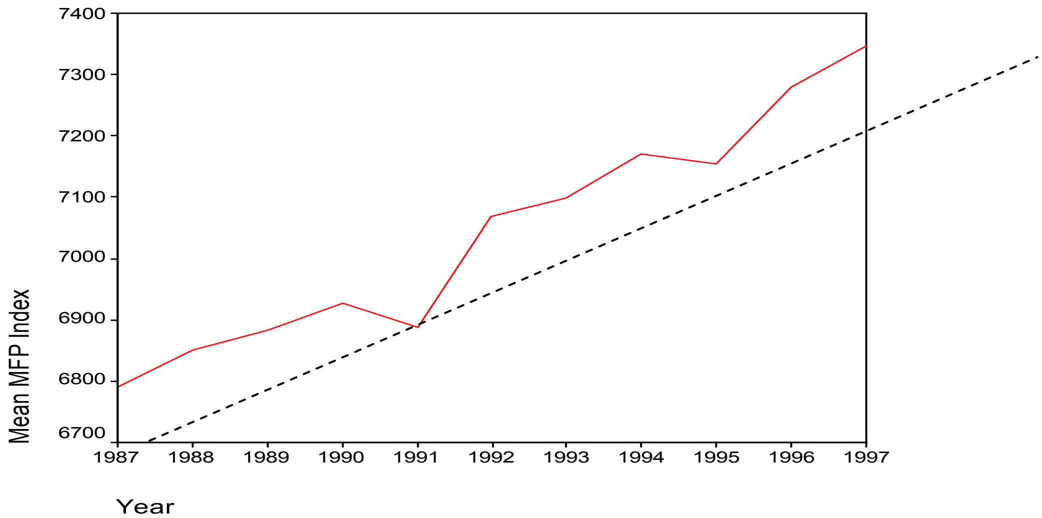
Graphical Analysis

Figure 1 depicts the aggregate TFP growth trends for the U.S. over the years 1987-1997. The figure indicates an upward trend in economy wide TFP. During this period, the U.S. continued to experience large trade deficits, which were widely interpreted as a symptom of loss of competitiveness. The trends seem to support the study's argument that trade performance alone must not be taken as an indicator of competitiveness.

POLICY ANALYSIS AND CONCLUSIONS

The results obtained show that in general, productivity increases in each of the sectors analyzed is directly related to competitiveness of the U.S. The secondary sector, which is dominated by manufacturing industries, was found to be the dominant when it comes to impacting competitiveness, as indicated by its relatively high mean value for the competitiveness index.

Figure 1: U.S. National Aggregate TFP Trends



The implication is that improvements in TFP growth for the secondary sector are likely to improve the U.S. competitive position abroad relatively more than improvements in the other sectors. In particular, manufacturing is an integral part of the U.S. and global economy. It is has proven to be a part of the network of inter-industry relations that create a stronger economy and the conditions for growth. According to the U.S. Bureau of Economic Analysis (BEA) and Bureau of Labor Statistics (BLS), the sector currently accounts for about 14% of the GDP and employs some 14 million workers. An International Monetary Fund report (IMF) ranks U.S. manufacturing sector as the world's largest. In fact, according to the IMF, the U.S. manufacturing alone would be the world's 7th largest economy, nearly equal to China's economy. In international trade, manufactures account for about 60% of all U.S. exports in goods and services. Therefore, appropriate policies must be aimed at productivity increases in the secondary sector, particularly manufacturing. More specific, TFP growth, which is driven by innovation technologies and technology-based entrepreneurship, should top the agenda of policies aimed at building and sustaining U.S. international competitiveness.

Limitations and Future Research

Previously failed policies such as trade protectionism should be avoided. Useful frameworks such as those used by this study to understand the dynamics of competitiveness, obtain that it makes sense to talk about competitiveness at the industry level, and points us to micro-level parameters as a point of focus in improving the competitive position of the U.S. A TFP criterion seems to be a better indicator of the U.S. firms' ability to compete internationally. Focusing on international trade performance alone as the sole indicator of the ability to compete internationally presents problems that render it a misconception.

The study was limited in the analysis of the tertiary sector, which is increasingly dominant in the changing structure of the U.S. economy. There does not seem to be a consensus as to how exactly productivity in services can be measured, without which it is difficult to determine competitiveness from the perspective of TFP. There is a need to determine a solid framework of measuring productivity in the service industry. In addition, the exclusion of material inputs in computation in TFP index for the U.S. limited the ability to fully analyze TFP measurements of international competitiveness. A comprehensive TFP index that incorporates materials inputs would help strengthen future studies on competitiveness.

Given the controversy around recent trends in the outsourcing of operations by U.S. firms, a study to ascertain the exact impact of outsourcing on U.S. competitiveness would help address these controversies. It is also not clear if a country has any choice of selecting industry(ies) to be globally competitive in a world that is increasingly moving towards free market policies. Further research on this aspect may shed light on the degree of "market freedom" allowable before countries can shape their industries for competitiveness. While the study is telling on the state of U.S. international competitiveness, it neither predicts it nor ranks it globally. Research that would allow for a reasonable prediction of future state of competitiveness, and rank the present state internationally would be gainful.

APPENDIX

Appendix A: Causality between Trade Performance and Competitiveness

To further investigate the idea that international competitiveness is the "fuel" that drives the "engine" of trade performance, a supplementary analysis was conducted to examine the precedence relationship between international competitiveness as measured by total factor productivity, and trade performance as measured by the trade performance index. A detailed explanation of methodology and data employed for the trade performance indicators (TPI) may be found in (Mutsune, 2008). Ezeala-Harrison (1999) seems to suggest that changes in TFP precede changes in trade performance. Berhanu and Kibre (2002), Driffield and Taylor (2001), and Salvatore (2001) seem to suggest that changes in certain aspects of trade performance preceded changes in TFP. The Granger causality test was used to analyze for the precedence relationship implied in this paper. The procedure involves estimating equations (1A) and (2A) as shown below:

$$TP_t = \Sigma^n{}_{i=1}\, ə_i TFP_{t-i} + \Sigma^n{}_{j=1}\, Ώ_j TP_{t-j} + u_{1t}, \qquad (1A)$$

$$TFP_t = \Sigma^n{}_{i=1}\, \lambda_i TFP_{t-i} + \Sigma^n{}_{j=1}\, \delta_j TP_{t-j} + u_{2t} \qquad (2A)$$

Where, ə, Ώ, λ and δ are constants, and t = time, u = disturbance term, n = sectors represented

The data used in the causality analysis covers the period 1980-2004 for both TPI, and TFP. The analysis is conducted in two formats: the first uses changes in TFP index versus changes in TPI, and the second uses changes in TFP raw values versus changes in TPI. In both cases, the analysis includes one, two, and three period lags and a 95% confidence interval. E-views was the software of choice for the analysis. The results are shown in Table 1A:

Table 1A: Granger-Precedence Analysis Results

Test: Pairwise Granger Precedence Test			
Sample (balanced): 1980-2004			
Null Hypothesis:	Obs.	F-Stat.	P-value
Lags: 1			
TFP index does not Granger-precede precede TPI change	23	6.86626	0.01639
TFP value does not Granger-precede TPI change	23	6.83722	0.01659
*Decision: We reject both the null hypotheses at 95% confidence level			
Lags: 2			
TFP index does not granger-precede TPI change	22	5.98839	0.01075
TFP value does not Granger-precede TPI change	22	6.02152	0.01054
*Decision: We reject both the null hypotheses at 95% confidence level			
Lags: 3			
TFP index does not Granger-precede TPI change	21	3.74612	0.03637
TFP value does not Granger-precede TPI change	21	3.79801	0.03494
*Decision: We reject both the null hypotheses at 95% confidence level			

This table provides a summary of the results in the analysis of causation between trade performance and competitiveness. Tests beyond 3 period lags were not found to be statistically significant.

The results obtained indicate that in fact changes in TFP may precede changes in TPI. These results seem to support Ezeala-Harrison's (1999) argument that, international competitiveness (TFP) is the 'fuel that runs' the trade performance 'engine' and therefore its applicability for the U.S. economy. This finding is important for practical purpose in policy decisions.

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MEASURING SERVICE QUALITY AND CUSTOMER SATISFACTION: AN EMPIRICAL STUDY IN THE SENIOR-CARE ORGANIZATIONS IN RURAL AREAS OF CENTRAL TAIWAN

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ABSTRACT

With rapid aging of the Taiwan population, the senior-care market has been growing in rural areas of Taiwan. Competition among senior care market players also soared in the past decade and consumers have been demanding better quality performances. This has forced the Senior Care Organizations (SCOs) to fine-tune their employee training programs to meet specific customer needs. The authors examined the relationship between service quality and customer satisfaction of the SCOs residents in rural areas of central Taiwan based on the ten dimensions: access, communication, competence, courtesy, credibility, reliability, responsiveness, security, tangibles, and employee's understanding their customer. The 143 effective data were collected from 3,008 senior residents living in the 94 private SCOs in rural areas of central Taiwan, where a random sample was selected to participate the survey through drop-off and face to face interview. T-test, one-way analysis of variance (ANOVA) and multiple regression analysis were used to test the relationship. The statistical results showed that courtesy and security were significantly and positively related to customer satisfaction. The results also show that demographic factors of age and health conditions have highly significant impact on customer satisfaction when living in the senior-care organizations. This finding, among others, suggests that senior-care operators in rural areas of central Taiwan might have overlooked the above mentioned major dimensions as factors leading to customer satisfaction and, ultimately, to a sustainable competitive edge. To pinpoint what the senior residents really need, the SCOs in central Taiwan should keep communicating with them, to identify the priority dimensions towards customer satisfaction.

JEL: M12; M31; M37; M38

KEYWORDS: customer satisfaction, service quality, consumer behavior, senior care, central Taiwan.

INTRODUCTION

Between 2011, when the first baby boomers turn 65, and 2030, when the entire cohort reaches that age, the population of the seniors in Taiwan is projected to increase dramatically (Ministry of Interior Taiwan Department of Social Affairs, 2007). Due to rapid progresses in health and technology, the life expectancy of Taiwan residents has extended. Council for Economic Development and Planning, a government agency affiliated to Administration Yuan estimates that the old-age population in Taiwan will continue to increase until 2020 (Chiu, 2002). As the older population becomes more diverse in terms of ethnicity, independence, health, economic status and education, services targeting older adults will need to be more flexible (Lee, 2002). There has been an apparent need for care, especially among the seniors living in rural Taiwan, where the young generations tend to leave homes. Currently, the Senior Care Organizations (SCOs) have been one of the best choices available to elderly living in rural areas of central Taiwan (Lee, 2007).

The objective of this present study was to identify the focus of company business strategy at SCOs through assessing the senior customers' perceptions of the satisfaction with the service provided in rural areas of central Taiwan. The SCOs, in order to achieve a sustainable competitive advantage, might need to invest more effort on certain priority dimensions of customer satisfaction. This advantage, in turn, will allow the

SCOs to either maintain or advance their standings in the market. It is an advantage that enables a senior-care provider to survive against its competitors over a long period of time. For this paper consists of six sections: literature review, research design, results and discussion, conclusion and recommendations, scholarly contributions, and limitations.

LITERATURE REVIEW

According to Taiwan's Ministry of Interior of Social Affairs (2007), senior welfare organizations (SWOs) can be divided into five categories: long-term care organizations, senior-care organizations (SCOs), retirement home organizations, senior culture organizations, and services organizations.

Senior-Care Organizations in Rural Taiwan

Ministry of Interior of Social Affairs (2007) estimated the number of senior citizens in Taiwan, as of October 2007, at 3,085,275, about 10.2% of the total population. The same agency reveals that, as of October 2007, there were about 1,015 SWOs providing long term care, senior care and home care to the seniors, with a capacity of around 62,000 beds while only 46,000 seniors actually lived in those facilities. The occupancy rate was 74.19%. On an extended time line, though, among the five types of SWOs, the occupancy rate in the SCOs reportedly increased from 1.04% in 1993 to 2.26% in 2005 (Ministry of Interior Department of Statistics, 2008).

According to Tsai (2004), most scholars believe that there exists an "urban bias" in Taiwan. Lipton (2005) explains, "Urban Bias Thesis (UBT) proposes that urban classes in poorer countries use their social power to bias (distort) a range of public policies against members of the rural classes." Lipton maintains that this bias involves (a) an allocation, to persons or organizations located in towns or (b) a disposition among the powerful urban classes to allocate resources in this way. Urban bias, so defined, is currently being witnessed in Taiwan's senior-care industry. The latest investigation indicates that the number of SCOs in Taiwan stands at 948 (Ministry of Interior of Social Affairs, 2007). SCOs are mostly established in big cities of Taiwan. For example, there are about 172 SCOs in Taipei County and 190 in Taipei City (Ministry of Interior of Social Affairs, 2007). Options are relatively limited for the rural seniors. More and more seniors living in rural areas, however, are asking for a greater supply of senior-care facilities (Tsai, 2004).

Moreover, senior welfare organizations' statistics (Ministry of Interior of Social Affairs, 2007) shows that the supply is falling short of the demand in rural Taiwan. Take Taichung County as an example, while about 3,562 people have requested SWOs, the available facilities could accommodate only 1,945 people. The authors of the present study conducted an interview with H. Chang, Dean of the E.L.F.C.T. Senior Care Organization in Tungshih Township, Taichung County, said that this problem of short supply is clearly felt in his nonprofit senior care organization (Personal communication, October 4, 2007). This shortage, on the other hand, suggests business potential in rural areas in Taiwan. More and more seniors, in rural Taiwan are looking for professional care through SCOs. Research indicates that the number of retirement homes and SCOs went from 765 in 2002 to 983 in 2007 (Ministry of Interior of Social Affairs, 2007). Currently, Taiwan's central government has encouraged local authorities and civil unions to actively build SCOs (Ministry of Interior of Social Affairs, 2007).

In the future, more and more SCOs will jump into this rural market in Taiwan. To enhance the competitive advantage of SCOs in rural Taiwan, it is important to focus on rural senior customers' satisfaction dimensions in their evaluations of the SCOs. Studies (e.g., Jun and Cai, 2001; Jun et al., 2004; Nwankwo, 2007; Petrochuk, 1999; Lee, 2002) have showed that companies have to know and understand the dimensions of their customers' satisfaction in order to sustain their competitiveness in the marketplace.

Definition of Customer Satisfaction

Customer satisfaction has attracted a great deal of attention in the literature because of its potential influence on consumer behavioral intentions and customer retention (Cronin et al., 2000). The authors of the present study used the theory by Parasuraman, et al. (1985, p.6-7), who developed a general list of ten dimensions on customer satisfaction (see the detail definition of each dimension on Table 1). Service quality is measured by calculating the difference in scores between the customer's expected level of service and level of service delivered. Several studies have shown that a high level of customer service quality can exert a positive influence on customer satisfaction (Parasuraman et al., 1988; Cronin and Taylor, 1992; Zeithaml et al., 1996; Ramsaran-Fowdar, 2006).

Table 1: Parasuraman et al's ten dimensions of service quality

Ten Dimensions	Definition
Access	Ease of contacting service firm by telephone
Communication	Explaining service to customers in language they can understand
Competence	Knowledge and skill of customer-contact personnel
Courtesy	Friendliness of customer-contact personnel
Credibility	Trustworthiness of customer-contact personnel
Reliability	Performing dependable service
Responsiveness	Willingness and ability to provide prompt service
Security	Confidentiality of transactions
Tangibles	Appearance of physical facilities and personnel
Understanding the Customers	Effort to ascertain a customer's specific requirements

RESEARCH DESIGN

Based on the above-mentioned research findings, a quantitative analysis using survey and statistical methods was conducted to identify possible answers to the research questions (listed below).

Instrument Development

The survey instrument was based on the combined designs by Nwankwo (2007) drawing on Parasuraman et al's (1985) ten service quality dimensions (i.e., access, communication, competence, courtesy, credibility, reliability, responsiveness, security, tangibles, and employee's understanding of their customers). The second part of the survey was to collect demographic information and was based on the studies by Petrochuk (1999) and Kleinsorge and Koening (1991). The authors developed a questionnaire that asked the sample to evaluate SCOs' service quality as well as their customer satisfaction in rural areas of central Taiwan (see the detail survey instrument from Appendix A). The questionnaire consisted of 21 Likert-scale items. Nearly half of the items are phrased positively, and half negatively. A positively worded statement is one for which a very satisfied participant would select strongly agree. A negatively worded statement is one for which a very satisfied participant would elect strongly disagree. (Stamps, 1997).

Creswell (2002) states that for a quantitative correlational study the results should apply to as many people as possible; therefore, a sample was chosen that was representatives of the population. The sample is a subset of the population that meets the study criteria. A larger sample more closely reflects the characteristic of a larger population (Colling, 2003). The authors hired Focus Survey Research Company to conduct the questionnaire survey and collect the data. The target population was the 3,008 senior residents living in the 94 private SCOs in rural areas of central Taiwan, where a random sample was selected to participate the survey through drop-off and face to face interview. In order to obtain a reliable output, substantial consideration must be given to the sample size (n) and the number of predictors (K). A recommended ratio is identified by Tabachnick and Fidell (1996), who put the simple rule of thumb as $n \geqq 50+8K$. Therefore the sample size is 130 (K=10).

Research Questions and Hypotheses

Research Question #1: is there a significant relationship between the senior customers' satisfaction and the ten dimensions of SCOs' service quality (i.e., access, communication, competence, courtesy, credibility, reliability, responsiveness, security, tangibles, and employee's understanding of their customers) in rural areas of central Taiwan?

Research Question #2: Do the demographic factors (i.e., gender, age, education level, the length of residence, health condition, marital status, percentage of care paid by self or family, and monthly income) have significant impacts upon customer satisfaction?

Hypothesis #1: The senior customer satisfaction is highly correlated with the ten dimensions (i.e., access, communication, competence, courtesy, credibility, reliability, responsiveness, security, tangibles, and employee's understanding of their customers) in rural areas of central Taiwan's senior- care industry.

Hypothesis #2: The demographic factors (i.e., gender, age, education level, length of residence, health condition, marital status, percentage of care paid by self or family, and monthly income) will have significant impact upon customer satisfaction.

The dependant variable of this study is customer satisfaction. The independent valuables of this study are the ten dimensions and eight demographic factors. The authors used a correlational statistical approach to study the relationships. Therefore, a quantitative correlational design can be considered an effective method for analyzing data and understanding relationships. Data analyses included independent samples t-test, one-way analysis of variance (ANOVA) and multiple regression analysis were conducted to test these relationships.

RESULTS AND DISCUSSION

Responses to the Survey

In this study, data were gathered during the period of June to July 2008 from a total effective 143 SCOs respondents in central Taiwan by the Focus Research Company. The data collection for this research study was hired by the professional survey company Focus Research Company which operated under the authors' directions. Each participant was provided the following: (a) letter of introduction, (b) informed consent form, (c) survey questionnaires. 143 out of the 220 people had responded to the inquiry during this drop-off collection phase, with the response rate being around 65%. On the basis of the data set obtained during the initial collection phase, some modifications on the questionnaire design were made to reduce the response time and, thus, to increase the response rate.

An evaluation of missing data and outliers (i.e., extreme values) led to the elimination of 48 cases, reducing the number of responses to 95 for further statistical analyses. The test of data normality, linearity, and homoscedasticity were also conducted in order to satisfy the general assumptions in multivariate statistical testing. Mertler and Vannatta (2005) suggested that "when the assumptions of linearity, normality, and homoscedasticity are met, residuals will create an approximate rectangular distribution with a concentration of scores along the center" (p.55). The scatterplots revealed that the residual plot created a rectangle shape with scores concentrated in the center, suggesting that the collected data set had satisfied the general assumptions of normality, linearity, and homoscedasticity in multivariate statistical testing.

Statistical Results and Discussions

Result 1: Table 2 and 3 represented the primary outputs of multiple regression. A review of the tolerance statistics presented in Table 3 indicated that all IVs were tolerated in the model (with the tolerance statistics exceeding 0.1). Mertler and Vannata (2005) explain, "…if the tolerance value for a given IV is less than 0.1, multicollinearity is a distinct problem" (p. 169). Thus, collinearity is not a serious problem for the current data. The model summary (see Table 2) indicated that the overall model of the ten IVs is significantly related to the customer satisfaction [Adjusted R^2 = .451, F (10, 83) = 8.650, p<.05]. Therefore, the results supported the hypothesis that the 10 dimensions are significantly correlated with the senior customer satisfaction in the SCOs. In addition, the statistical results also showed that courtesy and security are particularly significantly and positively related to customer satisfaction. The statistical results led to the development of a multiple regression function using beta weight on Table 3.

Table 2: Model Summary

Model	R	R Square	Adjusted R Square	Change Statistics				
				R Square Change	F Change	Df1	Df2	Sig. F Change
1	.714(a)	.510	.451	.510	8.650	10	83	.000

* Dependent variable: customer satisfaction. Independent variable: access, communication, competence, courtesy, credibility, reliability, responsiveness, security, tangibles, and understanding the customer.

Table 3: Coefficients

	Model	Standardized Coefficients Beta	Collinearity Statistics Tolerance	VIF	T	Sig.
1	(Constant)				-1.278	.205
	Access	.050	.533	1.875	.474	.637
	Communication	.048	.383	2.611	.389	.698
	Competence	.006	.431	2.318	.050	.960
	Courtesy	.370	.440	2.274	3.198	**.002***
	Credibility	-.092	.459	2.180	-.813	.418
	Reliability	-.074	.497	2.012	-.677	.500
	Responsiveness	.021	.502	1.992	.195	.846
	Security	.224	.482	2.074	2.026	**.046***
	Tangibles	.231	.360	2.781	1.807	.074
	Understanding the Customer	.098	.533	1.877	.932	.354

* P < 0.05, Because the observed significance value is less than 0.05, it would safe to say that there were highly significant effects of courtesy and security on senior customers' satisfaction when living in senior-care organizations in rural areas of central Taiwan.

The general model of the hypothesis of the present study is specified as:

(1)

Y(Customer Satisfaction) = 0.050X (Access) + 0.048X (Communication) + 0.006X (Competence) + 0.370X (Courtesy) - 0.092X (Credibility) – 0.074X (Reliability) + 0.021X (Responsiveness) + 0.224X (Security) + 0.231X (Tangibles) + 0.098X (Understanding the Customer).

Result 2: Table 4 and 5 represented the primary outputs of one-way ANOVA and T-test for each demographic factor. Table 4 shows the statistic results of the 143 seniors' demographic factors (age, education level, length of residence, health condition, marital status, percentage of care paid by self or family and monthly income) significant impact upon customer satisfaction. The results show that age and health conditions have highly significant impact on customer satisfaction when living in the senior-care organizations. Field (2005) mention that "Social scientists use a cut-off point of 0.05 as their criterion for statically significance." Thus, because the observed significance value is less than 0.05, it would safe to say that there were significant effects of age and health conditions on senior customers' satisfaction when living in senior-care organizations in rural areas of central Taiwan. Table 5 shows that the gender was not statistically significant (P>0.05). Brace, Kemp and Snelgar (2006) maintain, "If Leven's p >.05, then there is equality of variance, use the top row of value for t. If Levene's p ≦.05, then there is not equality of variance, use the bottom row of values for t." Therefore, the result shows P > 0.05 for the Levene's test, makes it clear that there is equality of variance.

Table 4: One-Way ANOVA Results of Demographic Factors

	df	F	**Sig.**
Between Groups **(Age)**	2	5.678	**.001***
Within Groups	141		
Total	143		
Between Groups (Education)	4	1.274	.280
Within Groups	139		
Total	143		
Between Groups (Length of Residence)	4	.332	.856
Within Groups	139		
Total	143		
Between Groups **(Health)**	4	9.800	**.000***
Within Groups	139		
Total	143		
Between Groups (Marital Status)	4	.402	.807
Within Groups	139		
Total	143		
Between Groups (% of Care Payment)	5	.312	.906
Within Groups	138		
Total	143		
Between Groups (Monthly Income)	4	1.739	.141
Within Groups	139		
Total	143		

* $P < 0.05$. Dependent variable: customer satisfaction. Independent variable: education level, length of residence, health condition, marital status, percentage of care paid by self or family and monthly income. Because the observed significance value is less than 0.05, it would safe to say that there were highly significant effects of age and health conditions on senior customers' satisfaction when living in senior-care organizations in rural areas of central Taiwan.

Table 5: T-Test Result of Gender

	Levene's Test for Equality of Variances				95% Confidence Interval of the Difference	
	F	Sig.	t	Sig (2-tailed)	Lower	Upper
Equal variance assumed	0.236	0.627*	-1.358	0.175*	-0.362	0.066
Equal Variance not assumed			-1.357	0.176	-0.363	0.067

* For the results there is equality of variance, so $t = -1.358$, $p = 0.\ 175$; $P > 0.05$. **Dependent variable: customer satisfaction. Independent variable: gender.

CONCLUSION AND RECOMMENDATIONS

Competition in the SCOs for senior people has been upheld as a means of increasing efficiency, driving down prices and raising the quality. Choices are made available to meet user expectations of healthcare and to improve service provision. Optimizing the management and process of care transitions of senior peoples is important to senior-care providers. In a word, catching the senior customers' hearts is the key to winning the business in today's ever-competitive senior-care market. Senior-care organizations have to understand the level of customer satisfaction in order to improve its service quality (Parasuraman et al., 1985). Efforts to align marketing strategies with the goal of maximizing customer satisfaction have been embraced in earnest as a new marketing concept by product and service providers. A theoretical framework of customer satisfaction is a way of measuring the perceived quality of a service product.

For senior service providers, it is important to reduce the complexity and fragmentation of the care process system (Clarfield et al., 2001). It seems essential to encourage the SCOs either to provide a range of services across the care continuum or to develop partnerships with other providers whose services complement their own (Coleman, et al., 2004; Cheek et al., 2006). This needs senior-care organization to adopt its policies practicable. This strategy could also limit the number of agencies a senior resident customer has to deal with, thereby reducing the complexity of the care system.

Other regulatory and policy constraints, such as requirements for employees training, will also pose a block to future competition among senior-care providers (Knibb, 2006). Therefore, providing quality services to the seniors is a multidimensional activity; employees' qualities are the key to customer satisfaction of the service quality (Cheek et al., 2006). If SCOs did not expend money training their employees on new and improved methods of carrying out business simply lag behind. Companies that have an employee performance management system have developed an affordable way to keep staffs trained and educated on the best possible methods. Cheek (2004) suggests that senor health-care related education and training should focus on short term; curative, episodic care provides a limited basis for developing worker that can contribute to the provision of services prompting positive, long term outcomes for senior people. For the SCOs in rural areas of central Taiwan, education and training should emphasize courtesy and security, and how these factors may be employed to enhance the senior-customer satisfaction.

The SCOs managers often become so caught up in daily administration that they fail to recognize that the satisfaction of the ultimate customers goes unmeasured and in many instances is totally ignored. The present study is a pioneer in conducting empirical studies to develop a diagnostic instrument for senior-customer satisfaction. This instrument may be an effective tool of evaluating ultimate customer satisfaction in way of developing future employee training programs. The results of the present study suggest that the SCOs in the rural areas of central Taiwan should customize their employee training programs to focus on *courtesy and security*. On the other hand, these findings suggest that the SCOs service providers might have overlooked the above-mentioned two priority dimensions of customer satisfaction which may have helped them gain a sustainable competitive advantage in rural areas of central Taiwan. Moreover, the results of demographic variables show that the *age and the health* condition have a significant impact on customer satisfaction with living in senior-care organizations in rural areas of central Taiwan. The satisfaction results generated in the present study are of practical value to both the executives of senior-care industry and the business investors.

Some of the surveyed senior residents in SCOs were not in good health, and their responses could have been biased or misleading. In addition, the administrators at the surveyed SCOs sometimes interrupted the survey process and therefore may have lowered the accuracy of data. Furthermore, as the study sample was taken from rural areas of central Taiwan, the results of the present study may not be generalized to other regions of Taiwan.

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APPENDIX A: THE SURVEY OF THE STRUCTURE OF THE INSTRUMENT

Section I: **Senior Resident Satisfaction Survey**

Customer Satisfaction – Service Quality Dimensions Identified by Parasuraman et al. (1985) and modified by Nwankwo (2007)

Question 3 & 13 addressed **Access**

Question 5 & 14 addressed **Communication**

Question 12 & 16 addressed **Competence**

Question 1 & 17 addressed **Courtesy**

Question 7 & 18 addressed **Credibility**

Question 2 & 19 addressed **Reliability**

Question 4 & 11 addressed **Responsiveness**

Question 15 & 20 addressed **Security**

Question 8, 9 & 21 addressed **Tangibles**

Question 6 & 10 addressed **Understanding the Customers**

Customer Satisfaction –Service Quality Dimensions Identified by Besterfield et al. (1995) and Modified by Nwankwo (2007).

Question 27 addressed **Communication.**

Customer Satisfaction – Overall Customer Satisfaction (Nwankwo, 2007).

Question 28 addressed **Overall Satisfaction with the Service Quality at Senior-care organizations.**

Section II: **Demographic Information**

The Demographic Questionnaire is Based on Petrochuk (1999) and Kleinsorge and Koening (1991).

Question 1 addressed **Gender** (Petrochuk, 1999).

Question 2 addressed **Age** (Petrochuk, 1999).

Question 3 addressed **Education Level** (Petrochuk, 1999).

Question 4 addressed **Length of Residence** (Kleinsorge and Koening, 1991).

Question 5addressed **Health Condition** (Petrochuk, 1999).

Question 6 addressed **Marital Status** (Petrochuk, 1999).

Question 7 addressed **Percent of the Living Cost Provided by the Seniors and Their Families** (Kleinsorge and Koening, 1991).

Question 8 addressed **Monthly Income** (Petrochuk, 1999).

WOMEN LEADERSHIP AND GLOBAL POWER: EVIDENCE FROM THE UNITED STATES AND LATIN AMERICA

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ABSTRACT

This paper examines leadership theories along with the advancement of women within the United States as well as in Latin America. Data from an exploratory survey of 19 women executives in Latin America and 19 women executives in the United States suggest that globalization has transformed the way in which organizations perceive and carry out leadership today. Globalization has paved the way for a new type of leadership style that is more collaborative and less hierarchal, in which relationship building and teamwork are critical. Data also suggest that women have emerged as effective leaders carrying out this new leadership style and their success has led to higher company profitability. This paper concludes by exploring ways in which corporations can maintain a competitive advantage in the global marketplace and how we, as humans, can begin to transform societies to cope with the Flat World while creating a flexible labor force and successful leaders.

JEL: M14, M16

KEYWORDS: leadership, women executives, corporate power

INTRODUCTION

Recent studies have revealed that out of the 500 largest U.S. companies, those with the highest percentage of female directors are more profitable and efficient than those with the lowest proportion. (Graham, 2007) Furthermore, organizations which have a higher representation of women at the executive level had a higher return on equity (ROE) and a higher total return to shareholders (TRS) as compared to organizations with lower women executives. (Cormier, 2007) The importance of this paper is to examine what characterizes successful women managers, directors and leaders in flatter organizations today. Our interest in conducting the research is to focus on women, to understand their experiences in the business world and arrive at conclusions regarding leadership that may be applied to any person who is striving for a senior position in this global corporate environment regardless of their gender. The ultimate goal of this research is to propose ways to empower more women so they may take on leadership roles and contribute to the success of an organization and our society.

Much of the recent literature has shown that leadership theory is transforming at a fast pace to keep up with globalization as the world and organizations become "flatter." Recent studies have shown that the types of leaders in this new global economy must possess a specific set of qualities. In fact, the changing business environment favors women because many of the characteristics and behaviors needed for leadership today are those that come more naturally to women (Noble 2006). This paper explores the rapidly changing business environment, the characteristics of successful women executives and why these qualities are needed in order to be a successful leader in the global marketplace.

Set against this backdrop three interlinked questions are addressed in the empirical sections which follows. First, what characterizes a successful business leader in the global marketplace? Second, what challenges (internal and external) have women faced in their pursuit for leadership and corporate power and how to overcome these challenges? And third, what can be learned from strategies that multinational corporations have implemented to help advancement of women in the corporate environment.

This paper is organized as follows. The next section provides a literature review for the study and gives an overview of theoretical perspectives with regard to leadership. Next we describe the survey methodology and the main characteristics of the sample. We then examine the results of the survey. The paper concludes with a brief discussion of the implications of the survey results for strategies of successful leadership.

LITERATURE REVIEW

"Leadership is one of the most observed and least understood phenomena on earth." (Jogulu, 2006) Fortunately, much research has been conducted and studied over the past few decades to help us gain better insight with regards to the history of leadership theory and its impact on society. Historically, leadership was something that was inherited and achieving a leadership position was characterized by the ability to influence others toward attaining certain goals in which the leader controlled the behavior of the other members of the group. According to the "Great Man" theory, the unique traits attributed to a leader were "innate" qualities: self-confidence, the need for achievement, the drive to carry out an action, and self-monitoring. These characteristics referred to masculine traits, while women's inherent qualities were classified as "caring" and "nurturing" which were not qualities associated with corporate leadership roles. (Jogulu, 2006)

In the 1970s, a comprehensive theory was proposed to explain differences among leaders using two terms: transactional and transformational. This allowed for a new way to analyze gender differences in leadership styles. Transactional leaders generally are associated with masculine characteristics, similar to a more autocratic leadership style in which power, competitiveness; authority and control are rooted in its behavior. However, transformational leaders are associated more with feminine characteristics, such as cooperation, collaboration, less control and more problem solving that mirrors the democratic leadership style. This concept of democratic leadership was the first one that opened the door to view men *and* women as possible democratic leaders. In this style of leadership, the leader encourages followers to create their own strategies and policies, giving them independence and freedom as they complete tasks, and congratulating group members when they succeed. Although former theories define leadership as exhibiting control and influence over others, results from recent research revealed that leadership is not only characterized by the ability to influence others, but also the ability to "motivate, and enable others to contribute toward the effectiveness and success of the organization of which they are members." (Jogulo, 2006)

A recent empirical study of managers by Mandell and Pherwani (2003) confirmed that females score higher on the transformational leadership scale compared to their male counterparts and that women are extremely capable to serve as corporate leaders in this global economy. (Jogulu, 2006) Globalization has transformed the way organizations are structured with a less hierarchical structure. Globalization has created an environment where intellectual work and resources can be delivered from anywhere in the world. It creates a "flatter" playing field in which everyone is competing for global knowledge and fosters a new kind of freedom for everyone regarding the way we work. Obstacles to a free-flowing global market are inefficiencies and lost opportunities. Gender stereotypes can be categorized as inefficiencies because they have been ingrained in our thought process and create lost opportunity in the market. The great challenge is to absorb the social changes that globalization has brought to the forefront and evolve along with those changes. The more we grasp global ideas and transform them with our own traditions, the greater advantage we will have in a flat world. (Freidman, 2006)

Recent literature suggests that a dynamic work environment requires a leader who possesses qualities of a transformational leader because more teamwork and compromise is practiced in the workplace, as well as proactive problem solving. Leadership style in flat organizations needs to be built around caring, concern for others and nurturing characteristics. (Jacobs, 2007) As organizations are flattening, an effective leader must become the hub of connectivity and work with everyone, creating networks, identifying problems and quickly redesigning a system to fix problems for good, implementing a standard protocol to follow. This can only be done by establishing trust in business relationships and by adopting common standards among each supply-chain member, regardless of geographical location. An effective leader must be a good collaborator, adapter, explainer, synthesizer of the big picture, able to personalize and work well with others internally and globally. Successful leaders also bring curiosity, passion and creativity to their work, and most of all, they do something they enjoy. (Friedman, 2006) A successful leader must also have a vision and be able to inspire people. The person must have entrepreneurial skills and be willing to take risks and have a concern with how choices will impact everyone. (Bible, 2007)

SURVEY METHODOLOGY

In a preliminary effort to explore the leadership characteristics of women business executives, a cover letter and a self-administered questionnaire were e-mailed to 50 women executives with titles of Directors, CEO's, Presidents, and Vice Presidents employed in companies within the United States and throughout 11 countries in Latin America (Argentina, Aruba, Belize, Brazil, Chile, Colombia, Ecuador, Mexico, Panama, Peru, Puerto Rico). The 19 women participants from the United States range from ages 28-67. The 19 women participants from Latin America range from ages 21-65. The participants are employed in manufacturing, hotel and casino tourism, healthcare, banking/financial services, retail and education.

E-mail addresses were obtained from the database maintained at Graphic Controls in Buffalo, New York. Follow-up e-mails were sent during the first and second weeks after the initial e-mail invitation to non-respondents in order to achieve an acceptable response rate, with a final response rate of 76 percent. The participants were informed that there are no anticipated risks in participating in this research and no identifiable references will be made to any person or firm.

Our survey instrument included questions which were both quantitative and qualitative in nature. A quantitative measurement of the variables ranged from categorical (yes/no) to ordinal (5 point likert scale).The survey was divided into three sections. The first section solicited information on company type, employee size, location, current position, and number of years in current position. The second section asked about obstacles faced in achieving current position and difficulties faced by women, opinion and perception of men toward women in corporate leadership, and benefits and drawbacks of women in leadership positions. The third section asked about globalization and women executives, future of women in corporate leadership, the value of mentors, and overall career satisfaction.

RESULTS

Most of the respondents revealed that in order to move up the corporate ladder in a global organization a woman has to achieve it through sincere work ethics and recognized accomplishments. Prior work experience and an advanced degree are definitely valuable in acquiring knowledge of the specific field as well as building self-confidence. The participants were asked to describe the strategies they have exercised for implementing successful leadership abilities. These strategies are summarized in Tables 1-3 below and compared/contrasted by region.

Table 1: Strategies for Implementing Successful Leadership: Total (United States and Latin America)

Strategy	Response
Panel A: United States and Latin America	
Initiative in Achieving Goals	38%
Delegating Team Responsibilities	17%
Motivating & Empowering Employees	12%
Communication	12%
Leading by Example	6%
Earn Respect from Team Members	6%
Consistency & Honesty	3%
Networking	3%
Encouraging Continued Learning Daily	3%
Panel B: United States Only	
Delegating Team Responsibilities	22%
Motivating & Empowering Employees	22%
Initiative in Achieving Goals	16%
Communication	11%
Leading by Example	11%
Earn Respect from Team Members	6%
Consistency & Honesty	6%
Networking	6%
Panel C: Latin America Only	
Initiative in Achieving Goals	62%
Delegating Team Responsibilities	13%
Communication	13%
Earn Respect from Team Members	6%
Encouraging Continued Learning Daily	6%

This table shows the strategies that women in Latin America believe to be necessary for implementing successful leadership in the global corporate environment that women place most importance on initiatives in achieving goals. Panel A, B, and C show the results for combined United States and Latin America, United States only and Latin America only, respectively.

The results reveal that leaders should demonstrate initiative in achieving goals while delegating team responsibilities and motivating and empowering employees. Successful leaders learn their team members' strengths and weaknesses, as well as their own, and delegate responsibilities accordingly to meet common goals. They motivate and empower their team members, constantly keeping communication open and being honest with themselves and with their group members. Successful leaders also lead by example and earn respect from their team members. (Table 1) It is interesting to note that certain differences exist between women executives in the United States and Latin America. Women in the United States put more emphasis on delegating team responsibilities, motivating and empowering employees, and initiative in achieving goals while women in Latin America place most importance on initiative in achieving goals. (Table 1 Panels B&C) All of the strategies expressed by the participants are key factors required for successful leadership today. Interestingly, they also correspond to the transformational, collaborative style of leadership as described earlier.

The participants also revealed that the essential characteristics for a successful leader in an organization today include: self-confidence, positive attitude, adaptable and flexible to new situations, perseverant, risk-taker, team player, inspirational, creative, establishment of openness and trust, empathetic, respect and concern for others which reflect transformational and collaborative style of leadership. Although the women participants possess senior executive positions in their companies, they have encountered obstacles in the corporate environment.

Overall, approximately a third (39%) of the participants has not faced obstacles in moving up the corporate ladder. While the majority (72%) of women in the United States did not face any serious obstacles, the majority (65%) of Latin American women stated that they did face struggles. The obstacles participants have encountered include lack of credibility, lack of knowledge/experience, difficulty in creating a work-life balance, isolation, low self-confidence level, hard competition and not enough monetary compensation. (Table 2)

Table 2: Obstacles Faced in Achieving Current Position: Total (United States and Latin America)

None	39%
Lack of Credibility	19%
Lack of Knowledge/Experience	15%
Home & Work Balance	6%
Isolation	6%
Low Self-Confidence Level	6%
Hard Competition	6%
No Monetary Consideration Compared to Men	3%

This table shows the obstacles faced by the women executives in their career while reaching their current position. The primary obstacles women encountered include lack of credibility, knowledge/experience. and creating a work-life balance.

The participants provide recommendations for creating a work-life balance, which is crucial for anyone striving for success and satisfaction in their life. Each participant in this study creates this balance slightly differently, but many state that the key is to be an excellent multi-tasker, to plan carefully, to be extremely organized and flexible. The majority of the participants suggest complete dedication to work while at work and total dedication to your family while at home. Boundaries have to be created in which overtime at work is limited and does not invade personal life. Having a supportive spouse and supportive family to help share responsibilities is definitely a critical success factor. Furthermore, they advise to take some time for yourself to do other recreational activities to care for your physical and spiritual well-being. Of course if life gets out of balance, they recommend to simply taking a step back to realign your priorities.

Studies have revealed that women have faced discrimination in the workplace as well as inequalities in which women continue to receive lesser pay for the same work done by male counterparts. There is an unfairness regarding performance appraisal, promotion, and training offered (Bible and Hill, 2007). The survey participants were asked if they experienced discrimination in their workplace. There is a noticeable difference in discrimination between women in United States versus Latin America. Only 21 percent of the women executives in United States indicated that they have experienced discrimination in the workplace, as compared to 61 percent of the women executives in Latin America who have faced discrimination. An independent- samples t test was calculated comparing the mean score of subjects in United States and Latin America who experienced discrimination found a significant difference between the means of the two groups $t = 2.642$ with p less than .05 (.012). It is quite evident that the efforts for equality in United States over the last few decades have had an impact, while equality efforts in Latin American are still fairly new or have not been fully implemented.

Regarding inequality of pay, the research shows the responses equally divided with approximately half who expressed they have experienced inequality in pay and half who have not. This is true for both the United States and Latin America. Similarly, an independent- samples t test was calculated, comparing the mean scores of subjects in the United States and Latin America who identified or experienced inequality of pay to the means score of subjects who did not experience inequality of pay. No significant difference was found $t = 1.676$ with p greater than .05 (.102).

The women executives were asked to identify factors important for women aspiring for corporate leadership. They suggest that women should work hard, know the business, and perform. They must believe in themselves, exhibit confidence and be prepared to take on responsibilities out of their comfort zone. Furthermore, women should have a passion for what they do, be creative, and innovative. There is no need to not be feminine; instead, women should use their female qualities to lead. Women should set emotions aside and stay calm during decision-making. They should be realistic with their goals, give themselves reality checks, and find an excellent mentor to turn to for help.

Regarding the impact on multinational corporations, the participants were asked if there are any benefits that companies will gain or any drawbacks by having women executives. The results indicate that having women executives provides a different perspective and that it is important to have a mix of men and women because it allows for a diversity of experiences. They also stated that women executives increases the creativity in the organization, allows for stronger business relationships and overall a more positive attitude. The participants believe that women bring better process organization, more efficiency and better results to corporations. No major drawbacks in having women executives were cited by the participants.

The results further indicate that majority of the companies in this study have not implemented strategies for women advancement. Although multinational corporations may be implementing strategies for women advancement as discussed earlier, not all companies are taking the same approach. The majority of participants believe that quotas do not solve the problem and it is not the solution for women executive positions. They believe a position should be filled based on competence, accomplishments and experience, regardless of gender. Imposing quotas is a way of "auto-discrimination" and lowers standards for all.

The results also demonstrate that majority of women participants have had a mentor to encourage them in their advancement. However, there is quite a difference between the United States response (95% yes) and the Latin American response (only 65% yes). Of those that said yes, they described their mentors as parents, immediate supervisor, family members, spouse, professors, colleagues, and friends. The majority of the participants believe that having a mentor has been a major part of their success because a mentor leads by example, motivates and empowers, and helps network within the organization. Majority of the participants stated that it still is difficult for women to achieve executive positions within an organization. However, they view the future for women in corporate leadership as favorable.

Caution should be taken in generalizing the results of this study because this study is subject to several limitations: 1) time 2) cost and 3) resources. The first limitation concerns the short period of time given to collect the primary data used in this study. Furthermore, the data was collected utilizing a sub-sample instead of the total population because of the limited budget. Also note that because the research was carried out using the database from Graphic Controls, the industries in which the participants are employed strictly reflect the industrial, medical and gaming sectors. Therefore, the results of this study should be treated as suggestive only.

SUMMARY AND CONCLUSIONS

Globalization has led us to witness the emergence of a dynamic "Flat World" full of new social, political, and business models in which some of the most deeply-rooted values of our society are directly impacted. In order to cope with these societal changes, everyone must absorb these challenges, evolve along with these changes and maximize them to his/her benefit. Incorporating global ideas into traditional values will offer a great advantage in a flat world. To transform society, all humans must re-visit the gender stereotypes that have been ingrained into our way of thinking and perceiving the world, and we must revise our mindsets about business and leadership. Our views of the world are "social constructions which are socially learned, incomplete, and sometimes distorted, narrow, single-framed….The good news is that because they are learned social constructions, our mental models or mindsets are revisable both at the individual and organizational level." (Werhane 2007) We must re-condition ourselves and our children to recognize that there is a level playing field for everyone regardless of gender, race, and ethnicity. We, the people, are the only ones capable of transforming society and it must start in the home and be reinforced in schools and corporate organizations. In order to transform societies to cope with the Flat World and create a flexible labor force, societies must be able to do three basic things: develop the infrastructure to connect with the flat-world platform, educate more of their people to be more innovative and to tap into the platform, and possess leaders with the ability to manage and reap the benefits of the global platform.

As this research demonstrates, the kind of leadership necessary in a global economy is exemplified by women, and it should be recognized that much can be learned from their style in the workplace. The most effective global leaders will not only have a vision, but also be able to work collaboratively with a diverse population and possess a global mindset. From our study we can state that leadership is an interactive, dynamic and mutually interrelated process where each participant (male and female) contributes to the progress of the organization. Transformational leaders see leadership as an ongoing process, envisioning themselves as team leaders, as inspirational rather than directive, as participative rather than hierarchical, working to coordinate and balance their interest and those of their employees, and transforming these into shared corporate goals. (Werhane 2007)

Businesses in both the United States and Latin America need to re-examine how they are supporting women's employment and make necessary changes. Businesses should not object to and resist change; instead they should view it as an opportunity to compete in the global environment. They need to create a corporate culture that embraces women leaders and new ways of managing and leading together. Companies must design incentives and corporate structure to attract and retain staff, such as facilitating the interface between work and family and practicing a true work-life balance. Team members should be cross-trained effectively before a woman employee goes on maternity leave, so that the company does not suffer during her absence. Being proactive and planning carefully will greatly alleviate matters.

To further equip women for leadership positions, corporations should identify women and train them in the new leadership skill sets. Companies should encourage continued learning and offer training programs to women by encouraging them to attend seminars related to their position so they can acquire the necessary skills and create networking opportunities. Team-building activities, mentoring programs, professional coaching, and negotiation courses are recommended tools for creating behavioral change.

The globalized Flat World has changed the dynamics of business and the new world requires behavioral and social modifications in managerial leadership. To maintain a competitive advantage and address the global challenges, the executives have to adapt the transformational leadership style. As diversity prevails, leaders who carry out a transformational leadership style and a global mindset will undoubtedly see an increase in their own success as well as an increase in profitability of their corporations allowing them to maintain a competitive advantage in the global marketplace. It is also important to note that a successful leader in this Flat, fast-paced society will not only consider the recommendations given in this study, but will also be flexible and continue to evolve with the rapidly changing environment, keeping up to speed and up to date on new ways to continue to improve and reflect on their leadership approach.

APPENDIX

WOMEN LEADERSHIP STUDY
QUESTIONNAIRE

Confidentiality Statement: There are no anticipated risks to participating in this research. Your survey results will be held in strict confidence. No identifiable reference will be made to any person or firm, and only combined results will be reported in this research project.

1. Company Name: ____
2. Headquarter Location: ____
3. Primary Industry of Your Company: _________________________________
4. What is your current position/title: _________________________________
5. How long have you been in this current position?

_____ Less than 5 years _____ 5-10 years _____ more than 10 years

6 How many years did it take to achieve this position?

_____ Less than 5 years _____ 5-10 years _____ more than 10 years

7. What was the key factor to achieve this position? ___________________________

8a. Have you faced any obstacles in achieving an executive position? _____ Yes _____ No

8b. If "Yes" Indicate the three obstacles you faced in achieving this position:

1. ____
2. ____
3. ____

9a. Have you experienced any discrimination in your workplace? _____ Yes _____ No

9b. If "Yes" what type of discrimination? Please explain __________________________

10. Have you experienced inequality of pay in comparison to your male counterparts? _____ Yes _____ No

11. Do you feel quotas in the workplace is a solution for women executive positions? _____ Yes _____ No

12. Is it difficult for women to achieve an executive position within an organization? _____ Yes _____ No

13. How do you think others perceive you as a woman in a leadership role?

_____ Positively _____ Negatively _____ Neutral

14. How would you describe the reaction of men toward women in corporate leadership

_____ Positively _____ Negatively _____ Neutral

15. In your opinion what are the three most important characteristics required by women for having a leadership position in an organization today.

1. ____
2. ____
3. ____

16. Has your company implemented any strategies to help women advance to leadership roles? _____ Yes _____ No

17. How important is it for your company to have women in executive positions?

_____ Critically important _____ Minor importance
_____ Very important _____ Not important
_____ Moderate importance

18. What are some significant benefits your company has gained by having women executives? ________________

19. What are some major drawbacks your company has faced by having women executives? ___________________

20. Do you feel with globalization, your company will increase women executives?

_____ Definitely will increase
_____ Probably will increase
_____ Might or might not increase
_____ Probably will not increase
_____ Definitely will not increase

21. How favorable do you feel is the future for women in corporate leadership?

_____ Extremely favorable
_____ Very favorable
_____ Somewhat favorable
_____ Not very favorable
_____ Not at all favorable

22. Did you receive much guidance on choosing a career while you were growing up? _____ Yes _____ No

23. Have you had a mentor to encourage you in your advancement as a women executive? _____ Yes _____ No

24. If "Yes" who were your primary mentors?

_____ Parents
_____ Spouse
_____ Boss
_____ College faculty
_____ Friend
_____ Other: Specify: __________________________

25. Do you feel that having a mentor has been a major part of your success? _____ Yes _____ No

26. How would you rate your overall career satisfaction?

_____ Extremely satisfied
_____ Very satisfied
_____ Somewhat satisfied
_____ Not very satisfied
_____ Not at all satisfied

27. How would you rate your overall life satisfaction?

_____ Extremely satisfied
_____ Very satisfied
_____ Somewhat satisfied
_____ Not very satisfied
_____ Not at all satisfied

28. Please check your age category:

_____ 21 – 35 years
_____ 36 – 45 years
_____ 46 – 55 years
_____ 56 – 65 years
_____ 66 years or over

29. Are you….

_____ Married
_____ Single
_____ Divorced/Separated

30. Do you have children currently living in your household? _____ Yes _____ No

Name: ____
Address: ____
Phone #: ____
E-mail: ____

THANK YOU VERY MUCH FOR YOUR TIME AND COOPERATION

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BIOGRAPHY

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UNIVERSITY RANKINGS BY COST OF LIVING ADJUSTED FACULTY COMPENSATION

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ABSTRACT

In this paper we rank 574 universities based on compensation paid to their faculty. The analysis examines universities both on a raw basis and on a cost of living adjusted basis. Rankings based on salary data and benefit data are presented. In addition rankings based on total compensation are presented. Separate rankings are provided for universities offering different degrees. The results indicate that rankings of universities based on raw and cost of living adjusted data are markedly different. The results suggest that faculty seeking employment opportunities should carefully consider cost of living issues. Administrators should design salary packages that reflect the cost of living conditions in their area in order to attract quality faculty.

JEL: J31, J44

KEYWORDS: cost of living, ranking, faculty compensation, higher education salaries, State ranking.

INTRODUCTION

Faculty in the academic job market are well aware that institutions offer different salary packages. They should also be aware that institutions sometimes have dramatically different benefit packages. Moreover, states, cities and localities sometimes vary substantially in their cost of living. The job applicant must aggregate data regarding each of these issues and others to identify the best offer of employment.

Of interest to administrators is the extent to which paying higher salaries contributes to the quality of professor hired. Indeed if there is no relationship between salaries and quality of professor, lower salary strategies would be optimal. Figlio (2002) however found a positive relationship between salary levels and the quality of teachers hired at U.S. public schools. The evidence suggests that universities experience benefits by paying higher salaries. As a result, administrators and legislators must develop compensation plans that optimally balance compensation with desirable quality faculty.

The impact of differential costs of living (COL) on the value of salaries has been the subject of studies dating at least back to a 1933 book authored by Viva Boothe (Boothe, 1933) and an article by Winakor (1943). More recent researchers have adjusted professor salaries within a locality or university to reflect cost of living differences (See Stoops 2007, and Foster 2002, and Guilkey, Mroz, Rhode and Salemi, 2009). Other studies examine cost of living adjusted salaries and a few rank small subsets of universities based on cost of living adjusted (COLA) salaries. No known study in the past twenty years, however, has provided a comprehensive ranking of cost of living adjusted university salaries.

This paper extends the literature on several fronts. First, the research here provides the most comprehensive ranking known to exist of universities based on both raw and COLA salaries and benefits paid. Indeed this study ranks more than five times as many universities as have been ranked in previous studies. Moreover, it is the only known study to have computed any such ranking of universities in recent years. This study also extends the literature by ranking universities not only in the aggregate, but also based on the specific degrees that they offer. Previous research has generally been limited to doctorate granting institutions. The results indicate that cost of living adjusted salaries differ widely from raw salary figures. Universities rank dramatically different on a raw basis than on a cost of living adjusted basis. Statistical tests verify that these ranking differences are significant. The findings contained in this article indicate that faculty should consider COLA salaries when evaluating employment offers. Ideally, administrators should design compensation packages that reflect COL characteristics of their community.

This paper is one in a series of three papers. Jalbert, Jalbert and Hayashi (2009) examined aggregated salaries by state for doctorate, master and bachelor degree granting universities. Jalbert, Jalbert and Hayashi (2010) examine data for community colleges. This paper examines university level data for doctorate, master and bachelor degree granting institutions. The remainder of the paper is organized as follows. In the next section literature on the relative salaries of faculty are presented. In the following section, we provide a discussion of the data and methodology utilized in the study. Rankings and analysis are provided in the results section. Some statistical analysis is presented in the test results section. The paper closes with some concluding comments and suggestions for future research.

LITERATURE REVIEW

A significant literature exists on faculty compensation. Fournier and Rasmussen (1986) estimated cost of living differences among states. They found that state rankings of salaries in public education differ substantially when salaries are adjusted for differences in purchasing power. They note that states should be aware of purchasing power differentials when designing compensation packages.

Ong and Mitchel (2000) examined cost of living adjusted salaries at institutions throughout the world using the Big Mac cost index and purchasing power parity to adjust faculty salaries. The Big Mac index compares the cost of a Big Mac at various locations throughout the world. The results show widely varying cost of living adjusted salaries across countries. Hong Kong and Singapore pay the highest cost of living adjusted salaries with the United States ranking in the middle of the countries considered.

Fogg (2006) examined COLA salaries at eleven top research universities. He found that on a COLA basis, the University of Chicago offers the highest pay. Five of eleven schools changed ranks by 3 or more places when raw rankings were compared to COLA rankings. While NYU ranked 6th on a raw basis, it ranked 11th on a COLA basis. Interestingly on a raw basis, the range of salaries was $40,300. However, on a COLA basis, the range was $52,096. The larger variation in COLA salaries again indicates the importance of evaluating job offers on a COLA basis.

Browne and Trieschmann (1991) examined COLA salaries at major research institutions. They ranked 106 universities based on real and nominal salaries earned in 1988. They found that in nominal terms, Harvard University paid the highest salaries, however, in real terms, Harvard ranked 51st. In real terms Notre Dame paid the highest salary. COLA data was not available for eleven schools. From those with available real salary data, Northeastern University paid the least. In general, the authors noted that real salaries differ substantially from nominal salaries in some instances. Moreover, they argue that nominal salaries are a misleading indicator of the competitiveness of a universities compensation practices. The marginal state income tax rate and the union status of the faculty were found not to impact the level of employee benefits. Variations in taxes and cost of living, however, do affect the competitiveness of salaries across universities.

Zeglen and Tesfagiorgis (1993) examined full professor salaries. Their sample consists of one doctoral granting institution from each of the United States. They use annual data from the 1991-1992 American Association of University Professors annual survey. Salaries were adjusted for geographic differences, cost of living differences and tax burdens. They found that rankings of faculty salaries among institutions differ substantially when adjustments are made for both cost of living and tax differences. Rankings were more affected by cost of living differences than by tax differences.

Stoddard (2005) examined cost of living adjusted salaries of high school and elementary school teachers. She argues that many studies that examine COLA salaries do not account for area amenities and opportunities. She argues that amenity and opportunity adjusted salaries produces more accurate salary comparisons. Her regressions control for a number of variables such as race, marital status, and children. She also examined the relationship between student test scores, dropout rates and salaries. She found that adjusting salaries for cost of living differences versus amenity and opportunity adjusted salaries produce significantly different state rankings.

Alexander (2001) examined data from the American Association of University Professors covering the time period from 1979-1998. He examined raw salaries, unadjusted for cost of living differences, to identify differences between compensation at public and private universities. He compared data for 139 public universities to that of 75 private universities, both at the research and doctorate granting levels. He found that both salaries and benefit levels are higher at private institutions than at public institutions. He writes that competitiveness of public institutions for both salary and benefits has declined over time. Many other authors have also documented the declining competitiveness of public universities including Bell, 2000, Hamermesh, 2002, Zogni 2003, and Ehrenberg, 2003.

There is also a significant body of literature that examines salary compression. Barbezat and Donihue (1998) examined the relationship between job seniority and faculty salaries using 1988 data from the National Survey of Postsecondary Faculty and National Center for Education Statistics. They found a negative relationship between seniority and salary. However, for untenured faculty, a positive relationship was found between seniority and salary. A number of other authors document a negative relationship between seniority and salary including Siow, 1994 and Hoffman, 1976.

Twigg, Velentine and Elias (2002) also examined salary compression at five year intervals at a public university and the predictions of four different models of faculty salaries. They found that compression does exist, and further that the different models indicate different degrees of compression. Others have found that the salary compression phenomenon is not limited to higher education, but is also present in the corporate world (see Jalbert, Rao and Jalbert, 2002 and Jalbert, Jalbert and Perrina, 2004). This research provides additional insights on salary compression by examining cost of living adjusted salaries.

Related to faculty compensation is the extent to which faculty supplement their compensation with consulting and other external activities. To the extent that professors earn supplemental income, and there is variation in these earnings across universities, direct salary comparisons, or even COLA salary comparisons may be problematic. Marsh and Dillon (1980) found that on average faculty supplement their income with external activities by about 15 percent. They note that some of this income is earned during the summer by faculty who are on nine month appointments.

A significant body of literature examines gender equity in higher education salaries. Strathman (2000) examines the effect of rank on salary models specifically with regard to models intended to detect gender discrimination. He utilizes data from Portland State University during the 1994-1995 academic years. He argues that rank needs to be treated as an endogenous variable in the models to avoid estimation bias. He found no confounding effects when rank is treated as an exogenous variable.

DATA AND METHODOLOGY

Data on the salaries of faculty at U.S. institutions were obtained from the 2008 special salary issue of *NEA Higher Education Advocate*. The data includes salary information by academic rank. The data is categorized by the highest level of degree offered by the institution. Schools are classified as associate degree, bachelor degree, master degree and doctorate degree granting respectively. To limit the study to a manageable size, universities listed as offering associate degrees were eliminated from the current study. These institutions will be examined separately in a later study. The data includes five hundred ninety one schools that offer a bachelor, master or doctorate level degree. Although listed in the NEA dataset, seventeen institutions were deleted from the dataset because no salary information was reported. These non-reporting institutions were primarily medical centers. The final dataset includes 574 useable observations. Sixty-nine schools were classified as bachelor conferring, 240 were classified as master conferring and 265 were classified as conferring doctorate degrees.

The NEA data reports salaries for instructors, assistant, associate and full professors. In addition, a weighted average of salaries paid by the university are reported. The average dollars spent on benefits per faculty member are reported separately. To manage the study size, the reported rankings in this study are limited to average salary and benefit information. An examination of salaries by rank will be reported in other papers in this series. It is important to point out that the dataset is not exhaustive as many notable universities do not report salary information. While it is not possible to identify every non-reporting school, a pattern does emerge; private institutions are notably absent from the NEA dataset.

In order to determine the relevant cost of living index for each university, the city where the university is located was identified. The identification was made based on information provided on the University's website. Each city was searched against the Yahoo.com real estate website, neighborhood information section. This section reports, among other things, a cost of living index for U.S. cities.

To complete the analysis, the average COLA salary paid by each university was computed. Consider a university that is located in a city with cost of living index, *COLindex*. The university reports a nominal average salary for its faculty, *Salary*. Then the COLA salary, *COLSal,* is computed as follows:

$$COLSal = \frac{Salary}{COLindex(\frac{1}{100})} \tag{1}$$

For example, consider a University that reports an average nominal salary of $100,000 per year. The city is located in a city with a cost of living index of 125. The COLA salary is computed as:

$$COLSal = \frac{\$100{,}000}{125\left(\frac{1}{100}\right)} = \$80{,}000$$

The interpretation is that a salary of $100,000 in this city is comparable to a salary of $80,000 in a city with COL Index equal to 100. In a similar fashion, we compute COLA salaries, benefits and total compensation. COLA total compensation is the sum of COLA salary and benefits.

Next, we rank the universities on several criteria. We rank universities on their nominal salaries as well as COLA salaries, benefits and total compensation. Finally, we use the Wilcoxon paired sample test and Kendall Tau correlation test on the rankings to determine if the COLA rankings differ from nominal data rankings (Wilcoxon, 1945 and Kendall, 1938).

RANKING RESULTS

Summary statistics of the data are reported in Table 1. Table 1 shows the number of reporting universities within each state. The total number of reporting universities is identified in the column titled

ALL. Pennsylvania had the largest number of reporting institutions at 41. Wyoming and the District of Columbia each had a single reporting institution. The remaining columns break the data down by the types of degrees offered.

Table 1: Summary Statistics

STATE	ALL	DOCTORATE	MASTER	BACHELOR	STATE	ALL	DOCTORATE	MASTER	BACHELOR
AL	14	7	6	1	MT	7	3	3	1
AK	3	1	2	0	NE	7	3	4	0
AZ	6	6	0	0	NV	4	2	1	1
AR	10	4	5	1	NH	4	1	2	1
CA	32	16	15	1	NJ	13	7	6	0
CO	12	6	3	3	NM	6	3	3	0
CT	6	4	1	1	NY	38	6	24	8
DE	2	2	0	0	NC	16	10	6	0
DC	1	0	1	0	ND	6	2	2	2
FL	11	9	1	1	OH	24	11	11	2
GA	21	8	11	2	OK	14	3	8	3
HI	3	2	0	1	OR	8	4	4	0
ID	4	3	0	1	PA	41	7	13	21
IL	12	9	3	0	RI	2	2	0	0
IN	14	5	9	0	SC	12	3	8	1
IA	3	3	0	0	SD	6	4	2	0
KS	7	4	3	0	TN	9	7	2	0
KY	8	3	5	0	TX	35	26	9	0
LA	13	8	5	0	UT	6	2	2	2
ME	7	2	1	4	VT	5	1	3	1
MD	14	9	4	1	VA	15	10	3	2
MA	13	4	9	0	WA	8	3	5	0
MI	15	10	5	0	WV	11	2	5	4
MN	11	5	4	2	WI	13	2	11	0
MS	8	5	3	0	WY	1	1	0	0
MO	13	5	7	1	**Total**	**574**	**265**	**240**	**69**

This table shows the number of observations used in the analysis of each state. The column labeled ALL indicate the number of observations in the full sample without regard to type of degree offered. The columns labeled D, BA+ and BA, indicate the number of observations in each state that were Doctorate , Master and BA granting institutions respectively.

Next, we rank universities as a single group based on their nominal salaries, cost of living adjusted salaries, cost of living adjusted benefits and combined cost of living adjusted salaries and benefits. The results are presented in Exhibit 1. The results are ordered based on the state in which the universities are located. The first data column indicates the highest level of degree offered by the University. D, BA+ and BA indicate that the school offers at least one doctorate, masters, or bachelor level degree respectively. The second column indicates the state where the university is located. The third column indicates the cost of living index for the city in which the university is located. The column labeled Raw Sal is the nominal salary figure reported by NEA, unadjusted for COL. The next column labeled Raw Sal Rank provides a ranking of the nominal salaries.

Examining the raw salary rankings reveals that the University of Maryland Baltimore pays the highest average salaries in the country at $116,200. The University of California Davis ranks second at $114,500. On the other end of the spectrum, The University of Maryland University College ranks last paying an average of $36,100. Oklahoma Panhandle ranks second to last at $37,800.

In the next two columns, the cost of living adjusted salaries are examined. In the column labeled COL Sal, COLA salaries as computed using equation 1 are reported. In the column labeled, COL SAL RANK, the COLA salaries are ranked across all reporting universities. The results show SUNY Buffalo is the highest paying university on a COLA basis at $113,200. The University of Maryland Baltimore ranks second with a COLA pay of $112,800. On the other end of the spectrum, CUNY Purchase ranks lowest with a COLA salary of only $18,600. CUNY NY City Technology ranks second to last at $18,700. These two colleges are located in areas with substantially higher cost of living indexes than schools in the rest of the country.

The evidence indicates that the leading universities on a raw basis also perform well on a COLA basis. The University of Maryland Baltimore ranked first on a nominal basis and second on a COLA basis. The University of California Davis ranked second on a nominal basis and third on a COLA basis. The same does not hold at the bottom end of the scale where some significant ranking differences exist. The University of Maryland University College improves to 569th from 574. Oklahoma Panhandle State University improves from 574 to 553.

To further examine the differences in rankings, we compute the change in ranking for each university in the sample. Defining the raw ranking for university i as $RRNK_i$ and the COLA ranking to be $COLRNK_i$, then the rank difference is computed by:

$$RDIF = COLRNK - RRNK \tag{2}$$

To conserve space we do not report the individual rank changes. The average rank change for all universities in the sample is 121.28 places out of 574 data observations. This change in ranks is significant. Ramapo College of New Jersey declined by 509 ranks from 54th place to 563rd place. The University of South Carolina Aiken ranked 456th on both a nominal and COLA basis. The evidence is clear that an individual who examines only nominal salaries could rank a job offer substantially in error.

The COLA benefits for each faculty are reported in the column titled COL BEN. The corresponding ranking is reported in the column titled COL BEN RANK. Western Michigan University sports the highest COLA benefit package averaging $42,000 per faculty member. Second place goes to Michigan Tech at $35,900. On the other end of the spectrum, University of Maryland University College pays only $2,600 per faculty member in COLA benefits. Southern University of New Orleans ranks second to last, providing $4,700 in benefits.

Finally, we examine the combined salaries and benefits on a cost of living adjusted bases. The combined, COLA, salaries and benefits along with their corresponding rankings are presented in the final two columns of Exhibit 1. The highest paying university is SUNY Buffalo at $146,800. In second place is University of Maryland Baltimore at $138,700. CUNY NY City College of Technology ranks lowest at $24,700 and SUNY Purchase ranks second lowest at $24,800. At the lower end of the spectrum, the results are driven by an exceptionally high cost of living in these areas.

The evidence presented in Exhibit 1 depicts a limited picture because it ranks all universities together regardless of degrees offered. Schools that offer different degree programs hire different classificaitons of faculty and typically pay them differently. For example, a top tier university that offers doctorate degrees will hire the highest qualified faculty available and expect these faculty to publish in top tier journals. To attract highly qualified faculty the university pays top-dollar. On the other hand a university that limits itself to bachelor degree offerings can typically hire faculty with lower research expectations, sometimes hiring faculty without Ph.D.'s. In this case the university can expect to pay lower wages.

To control for university level, we group the data by highest degree offered, doctorate degrees, master degrees and bachelor degrees. We then rank the universities within each of these groups. The results for doctorate granting institutions are presented in Exhibit 2. The rankings are presented with the same column headings as in Exhibit 1. On a COLA basis, SUNY Buffalo and University of Maryland Baltimore are the highest paying schools at $146,800 and $138,700 respectively. The more interesting results are at the bottom end of the spectrum. Not surprisingly, given the previous results, University of Maryland University College receives the lowest ranking at $35,700. The University of Hawaii at Manoa ranks second to last at $57,000. The other doctoral granting school in Hawaii, The University of Hawaii at Hilo also ranks near the bottom at 257th out of 265. Unfortunately, these findings cannot be compared to the findings of Browne and Trieschmann (1991) because they specifically note that they were unable to evaluate the University of Hawaii on a COLA basis.

Next, we examine the master's degree granting universities. The rankings of master degree universities are provided in Exhibit 3. On a COLA basis, California Polytechnic Panoma is the best paying school at $136,100. Rutgers University Camden takes the second ranking at $128,200. On the bottom end SUNY Purchase and CUNY Brooklyn pay $24,800 and $27,200 respectively. An interesting finding is that SUNY places schools both at the top and the bottom of the rankings. SUNY Buffalo ranks eighth while SUNY Purchase ranks last, indicating significant disparity within the SUNY system. Hawaii did not report a master degree school.

Finally we examine the Bachelor degree granting universities. The rankings are provided in Exhibit 4. Pennsylvania College of Technology and Athens State rank at the top with COLA salaries of $107,300 and $106,200 respectively. CUNY NY City College of Technology and CUNY Medgar Evers rank at the bottom COLA salaries of $24,700 and $25,800 respectively. The University of Hawaii West Oahu ranks third to last with a COLA salary of $54,600. Similar to the doctorate level, Hawaii ranks among the worst paying schools in the nation.

TEST RESULTS

Next, we wish to determine the extent to which the COLA rankings differ from nominal rankings. If the ordering of the COLA salaries is the same as the nominal salaries, the problems associated with comparing raw salaries are substantially reduced. If universities rank in the same order, salaries would be different by a scale factor only. On the other hand, if rankings of nominal and COLA salaries are significantly different, an individual could make a serious error by comparing raw salaries. To determine the significance of the salary differences, we conduct two tests of rank association.

The first test of association is the Wilcoxon paired sample test on the rankings (Wilcoxon, 1945). The results are presented in Table 2. Panel A, B, C and D present the results for the full data set, doctorate granting schools, master degree granting schools and bachelor degree granting schools respectively. The rows within each panel present the results for different compensation components, combined salary and benefits, salary alone and benefits alone. Benefits are only reported on an average basis as data on the benefits by rank are not available. The columns indicate the academic rank of the individual as well as an average across ranks. The first figure in each cell is the number of observations. The second figure is the average change in rank between nominal rankings and COLA rankings. The third figure in each cell is the maximum rank change for any university. The final figure in each cell is the test statistic.

In Panel A of Table 2, the combined analysis of all schools are presented. The results indicate that the COLA rankings differ significantly from the nominal rankings. For full professors, the average rank change for combined salary and benefits is 115.31 places across 566 observations. The maximum rank change for any one school is 499 places for the University of California Santa Barbara ranking 40th on a raw basis and 539th on a COLA basis. The rankings are different at a one percent level of significance. Panel B presents the results of the doctoral granting institutions. Significant differences are found at the full professor, instructor and average levels, but not at the associate and assistant levels. In addition, significant ranking differences are identified for average benefits. Similar results are noted at the master's degree level. Another significant difference is found for associate level salaries. When salary and benefits are combined there is no significant difference for associate professors.

Table 2: Wilcoxon Pairwise Tests for Differences in Rankings

Panel A: All Schools					
	Full	**Associate**	**Assistant**	**Instructor**	**Average**
Sal and Benefits	566	569	569	558	573
	115.31	139.39	142.72	135.14	126.43
	499	532	513	511	525
	3.429***	2.962***	2.83***	2.875***	3.243***
Salary	566	569	569	557	574
	106.35	132.81	144.12	126.54	121.28
	487	516	520	508	509
	3.603***	3.04***	2.5**	2.747***	3.123***
Benefits					573
					93.65
					496
					3.589***
Panel B: Doctorate Degree Granting					
	Full	**Associate**	**Assistant**	**Instructor**	**Average**
Sal and Benefits	262	265	265	262	265
	52.43	67.91	68.79	60.04	54.08
	221	233	229	221	231
	2.141**	1.62	1.525	1.932*	2.198**
Salary	262	265	265	262	265
	49.94	70.08	72.37	58.65	53.90
	229	234	234	239	239
	2.075**	1.422	1.358	1.81*	1.948*
Benefits					265
					38.35
					203
					2.394**
Panel C: Master Degree Granting					
	Full	**Associate**	**Assistant**	**Instructor**	**Average**
Sal and Benefits	236	236	236	227	240
	64.96	69.78	70.65	60.61	68.78
	225	226	223	202	228
	1.749*	1.578	1.50	1.705*	1.594
Salary	236	236	236	227	240
	61.06	66.37	69.04	55.59	67.74
	224	223	229	196	226
	1.910*	1.670*	1.495	1.776*	1.408
Benefits					240
					45.90
					212
					2.921***
Panel D: Bachelor Degree Granting					
	Full	**Associate**	**Assistant**	**Instructor**	**Average**
Sal and Benefits	68	68	68	68	69
	13.31	12.93	14.59	14.74	15.93
	63	64	64	64	64
	1.073	1.311	1.207	1.192	1.187
Salary	68	68	68	68	69
	12.01	11.60	13.49	13.46	15.38
	60	63	60	62	65
	1.165	1.318	0.837	0.856	1.094
Benefits					68
					13.88
					59
					1.724*

*This table tests shows the results of the Wilcoxon Paired Sample Test. The reported test statistic is for a two tailed test. The four panels indicate the types of schools included in the sample. The first figure in each cell is the number of observations. The second figure is the average change in rank between raw rankings and cost of living adjusted rankings. The third figure in each cell is the maximum rank change for any university. The final figure in each cell is the test statistic from the Wilcoxon Paired Sample test. ***, ** and * indicate significance at the 1, 5 and 10 percent levels respectively.*

The bachelor degree results, presented in Panel D, show no significant differences with the exception of average benefits. This finding is surprising when one realizes that the individual's schools change in ranking by as many as 64 out of a possible 68 places. This suggests that the lack of significance may be driven by a small number of observations, as opposed to differences in the underlying distributions. Overall, the results suggest a significant difference in raw rankings versus COLA rankings.

The second test of association between the ranks is based on Kendall's Tau (Kendall, 1938). Kendall's Tau is a test of rank correlation. Kendell's Tau tests the extent of agreement between two rankings. To the extent that the raw rankings and COLA rankings are highly correlated, there is little reason to examine cost of living adjusted salaries. In the case of perfect correlation, any differences would be by a scale factor only and would not change the ranking of the individual states. On the other hand if the two rankings are not highly correlated, the two rankings are said to be significantly different.

The results are presented in Table 3. The results indicate rank correlations that range from a minimum of 0.141 to a maximum of 0.607. The minimum correlation occurred for assistant professor total compensation at master degree granting institutions. The maximum correlation was for average benefits at doctorate institutions. In each instance the correlations were significant indicating that the two rankings are not independent. The correlations on average are relatively low, however, indicating that there are substantial differences between raw salary rankings and COLA salary rankings. In sum the results clearly indicate that professors should carefully consider cost of living issues when evaluating a job offer. Administrators should design their compensation packages with COL differences in mind.

CONCLUDING COMMENTS

Equitable faculty compensation has long been an issue in higher education. In this paper we rank 574 universities based on the salaries and benefits paid to faculty. This is the most comprehensive ranking of cost of living adjusted (COLA) university salaries known to exist in the literature. It is also the first such ranking to appear in the literature in more than twenty years. Separate rankings are made based on nominal and COLA data. A comprehensive analysis across all schools as well as separate analysis based on the levels of degrees offered by the institution.

The analysis indicates that comparing salary and compensation data on a cost of living adjusted basis produces substantially different rankings than comparing raw salary figures. The average difference between the raw salary rankings and the COLA rankings was 121 places in a ranking of 574 schools. The ranking differences are found to be significantly different using a Wilcoxon paired ranking test.

The analysis here indicates that faculty should take significant care in examining compensation packages on a cost of living adjusted basis. Faculty should compare combined salary and benefit data to make their employment decisions. Administrators should consider the rankings presented in this article to position their institutions in highly competitive faculty markets. It is unlikely that low ranked universities will be able to attract the highest quality faculty. In other instances administrators of highly ranked universities might reduce salaries yet still attract the highest quality faculty, particularly during economic downturns.

The analysis is limited in several ways. First, some U.S. universities are not included in the sample. Private universities are notably absent from the sample. A second limitation is that different academic fields have different academic salary levels. For example, business professors are consistently high paid in contrast to faculty in the humanities discipline. While humanities professors are generally paid less. To the extent that different schools have different program mixes, it should not be surprising that salaries differ across universities. We also are not able to account for supplemental earnings of faculty members. The extent to which supplemental earnings differ across universities is unknown. These and other areas remain a fertile area for additional research.

Table 3: Kendall's Tau Test for Rank Correlation

Panel A: All Schools					
	Full	**Associate**	**Assistant**	**Instructor**	**Average**
Sal and Benefits	0.430	0.306	0.291	0.315	0.382
	0.001***	0.001***	0.001***	0.001***	0.001***
	0.185	0.094	0.084	0.099	0.146
Salary	0.46	0.341	0.267	0.351	0.405
	0.001***	0.001***	0.001***	0.001***	0.001***
	0.226	0.116	0.071	0.124	0.164
Benefits					0.540
					0.001***
					0.292
Panel B: Doctorate Degree Granting					
	Full	**Associate**	**Assistant**	**Instructor**	**Average**
Sal and Benefits	0.431	0.268	0.258	0.344	0.422
	0.001***	0.001***	0.001***	0.001***	0.001
	0.185	0.072	0.067	0.118	0.178
Salary	0.458	0.244	0.216	0.361	0.422
	0.001***	0.001***	0.001***	0.001***	0.001***
	0.210	0.059	0.047	0.130	0.178
Benefits					0.607
					0.001***
					0.369
Panel C: Master Degree Granting					
	Full	**Associate**	**Assistant**	**Instructor**	**Average**
Sal and Benefits	0.216	0.149	0.141	0.237	0.180
	0.001***	0.000	0.001***	0.001***	0.001***
	0.047	0.022	0.020	0.056	0.033
Salary	0.266	0.186	0.156	0.296	0.196
	0.001***	0.001***	0.000***	0.001	0.001***
	0.071	0.035	0.024	0.087	0.038
Benefits					0.471
					0.001***
					0.221
Panel D: Bachelor Degree Granting					
	Full	**Associate**	**Assistant**	**Instructor**	**Average**
Sal and Benefits	0.445	0.435	0.387	0.391	0.332
	0.001***	0.001***	0.001	0.001***	0.001***
	0.198	0.190	0.150	0.153	0.110
Salary	0.509	0.447	0.445	0.431	0.349
	0.001	0.001***	0.001***	0.001***	0.001***
	0.259	0.227	0.198	0.186	0.122
Benefits					0.434
					0.001***
					0.188

*This table shows the results of the Kendall's Tau test for rank correlation. The first figure in each cell is the correlation. The second figure in each cell is the significance. The third figure in each cell is the coefficient of determination. ***, **, and * indicate significance at the 1, 5 and 10 percent levels respectively. The number of observations in each sample is the same as indicated in Table 2.*

Exhibit 1: Rankings of All Universities by Average Faculty Compensation

UNIVERSITY	DEG	ST	COLA INDX	RAW SAL	RAW SAL RANK	COLA SAL	COLA SAL RANK	COLA BEN	COLA BEN RANK	COLA S+B	COLA S+B RANK
ATHENS ST	BA	AL	85	67	217	78.8	119	27.4	32	106.2	75
AUBURN U MONTG.	BA+	AL	83	63.5	283	76.5	141	20.4	251	96.9	156
JACKSONVILLE ST	BA+	AL	84	56.9	418	67.7	306	27.3	37	95.0	183
TROY	BA+	AL	82	55.3	456	67.4	311	20.9	216	88.3	287
UOF MONTEVALLO	BA+	AL	85	57.4	405	67.5	310	12.8	533	80.4	416
U OF NORTH ALABAMA	BA+	AL	81	62.9	294	77.7	131	22.0	171	99.6	134
U OF WEST ALABAMA	BA+	AL	82	52.8	509	64.4	381	21.2	198	85.6	327
ALABAMA A&M	D	AL	76	54.4	474	71.6	216	18.8	334	90.4	248
ALABAMA ST	D	AL	83	61.2	333	73.7	181	18.9	328	92.7	210
AUBURN U MAIN	D	AL	90	78.2	89	86.9	51	22.9	134	109.8	55
THE U OF ALABAMA	D	AL	88	81.7	70	92.8	26	32.4	5	125.2	14
U OF AL BIRMINGHAM	D	AL	90	70.3	177	78.1	125	30.1	11	108.2	65
U OF AL HUNTSVILLE	D	AL	87	73.6	138	84.6	68	23.2	128	107.8	68
U OF SOUTH ALABAMA	D	AL	87	63.5	283	73.0	194	18.7	339	91.7	226
U OF ANCHORAGE	BA+	AK	117	64.2	267	54.9	512	25.6	57	80.5	413
ALASKA SOUTHEAST	BA+	AK	126	57.8	397	45.9	558	21.4	192	67.3	537
ALASKA FAIRBANKS	D	AK	116	64.9	254	55.9	501	25.3	62	81.2	399
ARIZONA ST DT PX	D	AZ	98	68.3	203	69.7	257	20.8	219	90.5	245
ARIZONA ST POLY	D	AZ	97	70.7	170	72.9	196	22.6	147	95.5	174
ARIZONA ST U TEMPE	D	AZ	100	86.6	45	86.6	53	24.8	78	111.4	44
ARIZONA ST U WEST	D	AZ	98	67.7	208	69.1	271	20.3	254	89.4	269
NORTHERN ARIZONA	D	AZ	119	66.4	228	55.8	502	18.6	346	74.4	494
U OF ARIZONA	D	AZ	96	86	47	89.6	33	24.2	99	113.8	36
U OF AR FORT SMITH	BA	AR	82	54	484	65.9	354	19.4	300	85.2	332
ARKANSAS TECH	BA+	AR	83	49.9	549	60.1	455	16.0	466	76.1	479
HENDERSON ST	BA+	AR	81	55.4	451	68.4	284	18.0	377	86.4	317
SOUTHERN ARKANSAS	BA+	AR	78	51.2	530	65.6	358	20.0	265	85.6	326
U OF ARKANSAS MONT	BA+	AR	81	47.4	564	58.5	471	15.8	474	74.3	495
U OF ARKANSAS PB	BA+	AR	78	45.1	569	57.8	481	15.3	490	73.1	507
ARKANSAS ST U MAIN	D	AR	74	53.4	498	72.2	207	18.6	343	90.8	238
U OF ARKANSAS MAIN	D	AR	89	73.5	139	82.6	82	19.6	289	102.1	110
U OF ARKANSAS LR	D	AR	91	64	272	70.3	235	16.5	448	86.8	309
CENTRAL ARKANSAS	D	AR	87	53.8	487	61.8	421	14.7	501	76.6	474
CA MARITIME ACAD	BA	CA	108	58.7	371	54.4	517	19.9	270	74.3	496
CA POLY SLO	BA+	CA	132	62.7	295	47.5	552	17.3	413	64.8	543
CA POLY PANOMA	BA+	CA	77	81.4	71	105.7	5	30.4	8	136.1	4
CA ST BAKERSFIELD	BA+	CA	93	71.5	163	76.9	139	23.3	124	100.2	127
CA ST CHANNEL ISL	BA+	CA	155	76	109	49.0	548	14.5	505	63.5	547
CA ST CHICO	BA+	CA	108	75.5	113	69.9	249	20.7	225	90.6	242
CA ST DH	BA+	CA	118	77.8	92	65.9	351	19.3	304	85.3	330
CA ST EAST BAY	BA+	CA	123	77.7	93	63.2	399	18.5	349	81.7	389
CA ST MONTEY BAY	BA+	CA	151	69.8	183	46.2	557	14.2	511	60.4	557
CA ST NORTHRIDGE	BA+	CA	183	75.1	116	41.0	566	12.2	544	53.2	565
CA ST SAN BERN	BA+	CA	129	74.3	126	57.6	484	17.2	415	74.8	490
CA ST SAN MARCOS	BA+	CA	124	76.6	106	61.8	422	18.2	367	80.0	422
CA ST STANISLAUS	BA+	CA	102	71.6	160	70.2	239	20.6	236	90.8	239
HUMBOLDT ST	BA+	CA	113	75	118	66.4	342	19.7	281	86.1	321
SAN JOSE ST	BA+	CA	141	80.3	81	57.0	491	16.5	452	73.4	502
SANOMA ST	BA+	CA	118	74	133	62.7	406	18.7	340	81.4	394
CA ST U - FRESNO	D	CA	99	72.1	156	72.8	199	22.3	157	95.2	181
CA ST: U-FULLERTON	D	CA	128	74.6	121	58.3	474	17.0	429	75.3	486
CA ST: U-LONG BEACH	D	CA	121	76	109	62.8	403	18.3	361	81.2	401
CA ST: U-LOS ANGELES	D	CA	131	79	87	60.3	453	17.2	419	77.5	457
CA ST: U-SACRAMENTO	D	CA	102	74.3	126	72.8	198	22.5	148	95.4	175
SAN DIEGO ST	D	CA	129	79.6	84	61.7	423	17.2	415	78.9	438

UNIVERSITY	DEG	ST	COLA INDX	RAW SAL	RAW SAL RANK	COLA SAL	COLA SAL RANK	COLA BEN	COLA BEN RANK	COLA S+B	COLA S+B RANK
SAN FRANCISCO ST	D	CA	166	79.9	82	48.1	550	13.9	520	62.0	552
U OF CA BERKELEY	D	CA	147	113.7	3	77.3	137	15.7	479	93.1	201
U OF CA SANTA BARB.	D	CA	179	96	19	53.6	526	9.3	563	63.0	548
U OF CA MERCED	D	CA	96	96.4	17	100.4	9	16.6	445	117.0	28
U OF CA-DAVIS	D	CA	102	114.5	2	112.3	3	15.6	482	127.8	8
U OF CA-IRVINE	D	CA	153	72	159	47.1	554	10.9	557	58.0	559
U OF CA-SAN DIEGO	D	CA	129	88.5	38	68.6	281	11.1	556	79.7	424
U OF CA-LOS ANGELES	D	CA	131	100.2	11	76.5	142	11.8	550	88.2	288
U OF CA-SANTA CRUZ	D	CA	150	100.7	9	67.1	323	10.7	558	77.9	453
U OF CA-RIVERSIDE	D	CA	106	90.2	28	85.1	63	15.2	492	100.3	125
FORT LEWIS C	BA	CO	117	52.1	523	44.5	561	10.2	561	54.7	563
METRO ST C OF DEN	BA	CO	101	56.8	420	56.2	497	9.5	562	65.7	540
WESTERN ST C OF CO	BA	CO	104	52.3	520	50.3	542	12.2	543	62.5	550
ADAMS ST C	BA+	CO	89	50.7	539	57.0	490	11.5	552	68.4	533
CORADO ST PUEBLO	BA+	CO	81	54.6	470	67.4	314	13.2	528	80.6	411
MESA SATE C	BA+	CO	98	48.8	557	49.8	545	12.3	541	62.1	551
CORADO SCHL OF MINES	D	CO	118	80.6	77	68.3	287	18.6	348	86.9	307
CORADO ST	D	CO	99	76.6	106	77.4	136	17.7	396	95.1	182
U OF CORADO BOULDER	D	CO	130	86.4	46	66.5	339	15.9	469	82.4	377
U OF CORADO CO SPRGS	D	CO	90	62.2	309	69.1	270	14.1	515	83.2	367
U OF CO DEN & HLTH SCI	D	CO	101	66.5	226	65.8	355	14.5	506	80.3	417
U OF NORTHERN CORADO	D	CO	88	58.5	381	66.5	338	13.1	529	79.5	428
US COAST GUARD ACAD	BA	CT	108	99.3	12	91.9	27			91.9	
EASTERN CONNECTICUT	BA+	CT	112	69.8	183	62.3	415	24.7	81	87.1	302
CENTRAL CONNECTICUT	D	CT	108	73.8	137	68.3	286	21.6	183	89.9	257
SOUTHERN CONNECTICUT	D	CT	111	73.9	136	66.6	336	20.4	252	86.9	304
U OF CONNECTICUT	D	CT	114	96.5	16	84.6	67	25.3	61	109.9	52
WESTERN CONNECTICUT	D	CT	129	76.8	103	59.5	460	21.2	201	80.7	406
DELAWARE ST U	D	DE	100	65	251	65.0	372	21.2	199	86.2	320
U OF DELAWARE	D	DE	106	90.2	28	85.1	63	27.0	41	112.1	38
U OF THE DC	BA+	DC	129	73.3	142	56.8	492	8.9	564	65.7	541
NEW C OF FLORIDA	BA	FL	108	64.2	267	59.4	462	17.7	395	77.1	464
FLORIDA GULF COAST	BA+	FL	101	62.2	309	61.6	428	17.0	430	78.6	443
FLORIDA A&M	D	FL	97	65.8	235	67.8	302	13.6	525	81.4	393
FLORIDA ATLANTIC	D	FL	136	68.5	201	50.4	541	12.4	539	62.7	549
FLORIDA INTERNATIONAL	D	FL	115	77.5	96	67.4	316	20.3	255	87.7	296
FLORIDA ST	D	FL	97	77.6	94	80.0	106	21.1	203	101.1	118
U OF CENTRAL FLORIDA	D	FL	102	69.5	188	68.1	291	19.5	294	87.6	297
U OF FLORIDA	D	FL	93	82.5	64	88.7	37	23.5	117	112.3	37
U OF NORTH FLORIDA	D	FL	93	61	337	65.6	359	17.6	397	83.2	366
U OF SOUTH FLORIDA	D	FL	98	74	133	75.5	153	18.5	355	94.0	192
U OF WEST FLORIDA	D	FL	90	63	292	70.0	244	18.9	329	88.9	273
DALTON ST	BA	GA	84	51.1	534	60.8	444	22.1	164	83.0	371
MACON ST	BA	GA	84	51.2	530	61.0	441	17.0	431	78.0	450
ALBANY ST	BA+	GA	82	52.6	516	64.1	387	18.5	350	82.7	376
ARMSTRONG ATLANTIC	BA+	GA	92	54.5	472	59.2	465	16.5	446	75.8	482
AUGUSTA ST	BA+	GA	80	56.7	422	70.9	229	15.6	480	86.5	313
CLAYTON ST	BA+	GA	86	55.4	451	64.4	379	18.5	353	82.9	374
CUMBUS ST	BA+	GA	85	54.6	470	64.2	385	16.6	444	80.8	404
FORT VALLEY ST	BA+	GA	82	50.2	545	61.2	435	17.6	402	78.8	439
GEORGIA	BA+	GA	88	53.1	504	60.3	452	16.5	449	76.8	471
GEORGIA SW ST	BA+	GA	82	53.4	498	65.1	369	19.4	300	84.5	345
NORTH GEORGIA	BA+	GA	91	54.4	474	59.8	458	14.4	507	74.2	497
SAVANNAH ST	BA+	GA	92	56.4	429	61.3	433	19.9	273	81.2	400
SOUTHERN POLY ST	BA+	GA	99	58.7	371	59.3	464	13.8	521	73.1	506
GEORGIA INST OF TECH	D	GA	104	96.7	15	93.0	25	21.9	173	114.9	33

UNIVERSITY	DEG	ST	COLA INDX	RAW SAL	RAW SAL RANK	COLA SAL	COLA SAL RANK	COLA BEN	COLA BEN RANK	COLA S+B	COLA S+B RANK
GEORGIA SOUTHERN	D	GA	85	58.9	365	69.3	262	18.7	342	88.0	289
GEORGIA ST	D	GA	104	70.5	172	67.8	304	16.7	439	84.5	344
KENNESAW ST	D	GA	95	58.6	378	61.7	424	11.5	551	73.2	505
MEDICAL C OF GEORGIA	D	GA	80	66.9	221	83.6	72	19.1	322	102.8	107
U OF GEORGIA	D	GA	96	83.5	57	87.0	50	22.0	170	109.0	59
U OF WEST GEORGIA	D	GA	91	55.5	447	61.0	439	16.6	443	77.6	456
VALDOSTA ST	D	GA	86	55.8	440	64.9	375	17.9	385	82.8	375
U OF HAWAII WEST OAHU	BA	HI	155	64.1	269	41.4	565	13.2	527	54.6	564
U OF HAWAII HILO	D	HI	128	64.8	257	50.6	540	16.1	464	66.7	539
U OF HAWAII MANOA	D	HI	188	83	61	44.1	562	12.9	531	57.0	560
LEWIS-CLARK ST	BA	ID	85	47.6	561	56.0	500	16.5	450	72.5	510
BOISE ST	D	ID	95	58.2	388	61.3	434	20.0	265	81.3	396
IDAHO ST	D	ID	83	54.2	478	65.3	365	21.6	184	86.9	306
U OF IDAHO	D	ID	88	66.6	225	75.7	152	23.9	110	99.5	135
EASTERN ILLINOIS	BA+	IL	84	60.3	351	71.8	212	17.9	387	89.6	261
NORTHEASTERN ILLINOIS	BA+	IL	114	55.3	456	48.5	549	12.3	542	60.8	555
SOUTHERN IL U EDWARD	BA+	IL	92	55.8	440	60.7	449	19.6	288	80.2	419
CHICAGO ST	D	IL	114	58.9	365	51.7	538	12.1	546	63.8	546
GOVERNORS ST	D	IL	96	77.5	96	80.7	100	20.7	227	101.5	116
ILLINOIS ST	D	IL	92	63	292	68.5	283	19.1	320	87.6	298
NOTHERN ILLINOIS	D	IL	94	65.1	247	69.3	265	20.2	258	89.5	267
SOUTHERN ILLINOIS CARB	D	IL	85	61.3	331	72.1	208	20.8	218	92.9	203
U OF ILLINOIS CHICAGO	D	IL	114	82.2	66	72.1	209	17.0	432	89.1	272
U OF IL SPRINGFIELD	D	IL	82	61.1	335	74.5	171	20.7	226	95.2	178
U OF ILLINOIS UC	D	IL	88	92.6	26	105.2	6	23.4	121	128.6	6
WESTERN ILLINOIS	D	IL	85	61.7	319	72.6	204	18.2	365	90.8	237
INDIANA U EAST	BA+	IN	78	53.6	492	68.7	279	19.6	286	88.3	285
INDIANA U KOKOMO	BA+	IN	80	55.4	451	69.3	266	20.3	256	89.5	266
INDIANA U NORTHWEST	BA+	IN	80	56.1	437	70.1	240	22.3	162	92.4	217
INDIANA U-PURDUE U FW	BA+	IN	80	58.1	392	72.6	203	27.5	29	100.1	128
INDIANA U SOUTH BEND	BA+	IN	80	53	506	66.3	345	20.4	249	86.6	311
INDIANA U SOUTHEAST	BA+	IN	83	61.5	324	74.1	178	23.4	122	97.5	153
PURDUE U CALUMET	BA+	IN	80	59.1	362	73.9	180	26.3	47	100.1	128
PURDUE U NORTH CNTRL	BA+	IN	91	53.8	487	59.1	468	22.1	165	81.2	398
U OF SOUTHERN INDIANA	BA+	IN	79	55.3	456	70.0	244	23.7	113	93.7	196
BALL ST	D	IN	81	57.7	400	71.2	225	27.9	24	99.1	141
INDIANA ST	D	IN	80	58.7	371	73.4	188	21.9	174	95.3	177
INDIANA ST BLOOM.	D	IN	85	85.2	50	100.2	10	25.5	59	125.8	11
INDIANA U-PURDUE U-IND	D	IN	82	67.2	214	82.0	86	22.4	153	104.4	89
PURDUE U-MAIN	D	IN	94	83.2	60	88.5	39	28.1	23	116.6	29
IOWA ST	D	IA	87	77	102	88.5	40	26.8	42	115.3	31
U OF IOWA	D	IA	92	88.1	40	95.8	18	25.9	55	121.6	20
U OF NORTHERN IOWA	D	IA	85	64.4	265	75.8	148	25.5	59	101.3	117
FORT HAYS ST	BA+	KS	78	52.8	509	67.7	308	18.6	345	86.3	319
PITTSBURG ST	BA+	KS	85	56.8	420	66.8	330	19.2	315	86.0	323
WASHBURN	BA+	KS	81	65.9	234	81.4	93	20.9	215	102.2	108
EMPORIA ST	D	KS	78	54.4	474	69.7	255	20.0	265	89.7	259
KANSAS ST	D	KS	83	67.3	213	81.1	95	18.2	369	99.3	139
U OF KANSAS	D	KS	86	83.9	55	97.6	15	23.3	126	120.8	21
WICHITA ST	D	KS	82	66.9	221	81.6	90	21.5	190	103.0	100
EASTERN KENTUCKY	BA+	KY	85	59.9	353	70.5	234	19.9	277	90.4	249
KENTUCKY ST	BA+	KY	86	52.4	518	60.9	443	14.9	497	75.8	481
MOREHEAD ST	BA+	KY	73	54.2	478	74.2	177	24.2	93	98.5	148
MURRAY ST	BA+	KY	83	60.5	347	72.9	195	19.5	291	92.4	215
NORTHERN KENTUCKY	BA+	KY	84	61.4	326	73.1	192	18.6	346	91.7	227
U OF KENTUCKY	D	KY	90	78.1	90	86.8	52	21.1	204	107.9	67

UNIVERSITY	DEG	ST	COLA INDX	RAW SAL	RAW SAL RANK	COLA SAL	COLA SAL RANK	COLA BEN	COLA BEN RANK	COLA S+B	COLA S+B RANK
U OF LOUISVILLE	D	KY	85	74.9	120	88.1	42	23.9	109	112.0	39
WESTERN KENTUCKY	D	KY	86	58.1	392	67.6	309	21.2	201	88.7	279
LOUISIANA SHREVEPORT	BA+	LA	83	56.9	418	68.6	282	17.3	409	85.9	324
MCNEESE ST	BA+	LA	84	57.8	397	68.8	274	18.5	356	87.3	301
NICHOLLS ST	BA+	LA	85	52.4	518	61.6	426	17.4	407	79.1	436
NW ST U OF LOUISIANA	BA+	LA	86	54.1	482	62.9	401	15.6	483	78.5	447
SOUTHERN U NEW ORL.	BA+	LA	95	49.3	553	51.9	536	4.7	572	56.6	562
GRAMBLING ST	D	LA	83	56.3	432	67.8	303	24.0	105	91.8	224
LOUSIANA ST U & A&M	D	LA	87	75.8	111	87.1	47	22.1	166	109.2	57
LOUISIANA TECH	D	LA	84	58.2	388	69.3	263	23.2	129	92.5	212
SOUTHEASTERN LA	D	LA	85	54.2	478	63.8	392	16.7	441	80.5	415
SOUTHERN U AND A&M	D	LA	87	55.6	445	63.9	390	14.0	518	77.9	452
U OF LA LAFAYETTE	D	LA	88	68.3	203	77.6	132	19.2	312	96.8	157
U OF LOUISIANA MONROE	D	LA	81	53.8	487	66.4	340	18.1	373	84.6	342
U OF NEW ORLEANS	D	LA	95	64.7	259	68.1	292	14.8	498	82.9	372
U OF MAINE FARMINGTON	BA	ME	94	54.7	468	58.2	476	19.6	287	77.8	454
U OF MAINE FORT KENT	BA	ME	90	52.2	521	58.0	479	19.4	298	77.4	459
U OF MAINE MACHIAS	BA	ME	92	50.3	544	54.7	515	17.3	412	72.0	515
U OF MAINE PRESQUE ISLE	BA	ME	90	54.7	468	60.8	445	20.8	222	81.6	390
U OF MAINE AUGUSTA	BA+	ME	91	56.7	422	62.3	416	19.5	297	81.8	385
U OF MAINE	D	ME	95	74.5	122	78.4	123	23.1	132	101.5	115
U OF SOUTHERN MAINE	D	ME	104	70.9	167	68.2	290	20.7	229	88.8	275
US NAVAL ACAD	BA	MD	128	113.1	4	88.4	41	15.1	493	103.4	96
COPPIN ST	BA+	MD	103	61.4	326	59.6	459	15.7	478	75.3	485
FROSTBURG ST	BA+	MD	93	65.6	238	70.5	230	20.2	257	90.8	240
SALISBURY	BA+	MD	99	63.6	280	64.2	384	24.2	94	88.5	281
ST MARY'S C MD	BA+	MD	103	63.5	283	61.7	425	17.1	425	78.7	440
BOWIE ST	D	MD	118	62.5	302	53.0	530	11.1	555	64.1	545
MORGAN ST	D	MD	103	61	337	59.2	467	19.3	305	78.5	445
TOWSON	D	MD	120	62.4	303	52.0	535	15.8	476	67.8	534
U OF BALTIMORE	D	MD	103	93.8	23	91.1	31	27.3	36	118.3	24
U OF MD EASTERN SHORE	D	MD	95	59.4	359	62.5	408	18.8	332	81.4	395
U OF MD BALTIMORE	D	MD	103	116.2	1	112.8	2	25.9	54	138.7	2
U OF MD BALTIMORE CTY	D	MD	103	75.6	112	73.4	187	19.5	293	92.9	204
U OF MD C PARK	D	MD	111	92.7	25	83.5	74	21.8	177	105.3	80
U OF MD U C	D	MD	109	36.1	574	33.1	569	2.6	573	35.7	569
BRIDGEWATER ST	BA+	MA	124	64.9	254	52.3	534	20.9	212	73.2	504
FITCHBURG ST	BA+	MA	99	64.1	269	64.7	376	11.9	548	76.7	472
FRAMINGHAM ST	BA+	MA	119	63.1	291	53.0	529	20.9	209	73.9	499
MASS C OF ART & DESIGN	BA+	MA	127	68	206	53.5	527	15.5	485	69.1	530
MASS C OF LIBERAL ARTS	BA+	MA	99	67.7	208	68.4	285	25.3	63	93.6	197
MASS MARITIME ACAD	BA+	MA	121	69.5	188	57.4	486	24.6	85	82.1	380
SALEM ST	BA+	MA	120	64.9	254	54.1	520	14.8	499	68.9	531
WESTFILED ST	BA+	MA	105	62.2	309	59.2	466	23.1	131	82.4	378
WORCHESTER ST	BA+	MA	102	66.2	231	64.9	374	24.9	75	89.8	258
U OF MASS AMHERST	D	MA	128	88.4	39	69.1	272	14.5	504	83.6	360
U OF MASS BOSTON	D	MA	127	82.7	62	65.1	370	12.8	532	78.0	451
U OF MASS DARTMOUTH	D	MA	134	81	74	60.4	451	24.6	89	85.0	337
U OF MASS LOWELL	D	MA	116	94.3	22	81.3	94	23.6	114	104.9	81
FERRIS ST	BA+	MI	83	63.9	276	77.0	138	27.5	31	104.5	88
LAKE SUPERIOR ST	BA+	MI	79	55.1	464	69.7	254	30.8	7	100.5	124
NORTHERN MICHIGAN	BA+	MI	87	62	316	71.3	224	28.9	18	100.1	130
SANGINAW VALLEY ST	BA+	MI	83	61.9	317	74.6	169	26.1	51	100.7	121
U OF MI DEARBORN	BA+	MI	85	73.1	145	86.0	54	25.2	65	111.2	45
CENTRAL MICHIGAN	D	MI	85	67.5	211	79.4	116	30.2	10	109.6	56
EASTERN MICHIGAN	D	MI	92	69.4	191	75.4	155	27.4	33	102.8	105

UNIVERSITY	DEG	ST	COLA INDX	RAW SAL	RAW SAL RANK	COLA SAL	COLA SAL RANK	COLA BEN	COLA BEN RANK	COLA S+B	COLA S+B RANK
GRAND VALLEY ST	D	MI	84	59	364	70.2	236	25.6	58	95.8	171
MICHIGAN ST	D	MI	90	88.8	35	98.7	13	33.7	4	132.3	5
MICHIGHAN TECH	D	MI	83	71.2	166	85.8	57	35.9	2	121.7	18
OAKLAND U	D	MI	96	69.8	183	72.7	201	21.5	191	94.2	191
U OF MI ANN ARBOR	D	MI	98	100.8	8	102.9	7	24.8	79	127.7	9
U OF MICHIGAN FLINT	D	MI	76	60.4	349	79.5	113	24.2	96	103.7	94
WAYNE ST U	D	MI	78	79.5	85	101.9	8	23.5	119	125.4	13
WESTERN MICHIGAN	D	MI	86	73.3	142	85.2	61	42.0	1	127.2	10
U OF MN CROOKSTON	BA	MN	89	54	484	60.7	447	24.6	86	85.3	329
U OF MN MORRIS	BA	MN	88	58.7	371	66.7	334	26.3	47	93.0	202
BEMIDJI ST	BA+	MN	89	62.4	303	70.1	243	20.4	242	90.6	243
METROPOLITAN ST	BA+	MN	101	63.2	288	62.6	407	18.0	379	80.6	412
SOUTHWEST MINNESSOTA	BA+	MN	90	62.3	307	69.2	268	20.8	222	90.0	255
U OF MN DULUTH	BA+	MN	91	63.6	280	69.9	250	25.1	68	94.9	184
MINNESOTA ST MANKATO	D	MN	92	64.1	269	69.7	258	20.4	245	90.1	253
MINNESOTA ST MRHEAD	D	MN	84	60.4	349	71.9	210	21.3	194	93.2	199
SAINT CLOUD ST	D	MN	90	64.7	259	71.9	211	20.4	244	92.3	218
U OF MN TWIN CITIES	D	MN	102	92.9	24	91.1	30	26.8	43	117.8	25
WINONA SATE	D	MN	89	62.1	315	69.8	253	19.8	280	89.6	264
ALCORN ST	BA+	MS	78	53.2	503	68.2	288	18.7	341	86.9	305
MISSISSIPPI FOR WOMEN	BA+	MS	81	47.7	559	58.9	469	17.5	404	76.4	476
MISSISSIPPI VALLEY ST	BA+	MS	79	49.6	552	62.8	404	20.4	248	83.2	368
DELTA ST	D	MS	83	51.1	534	61.6	431	15.3	488	76.9	469
JACKSON ST	D	MS	82	54.4	474	66.3	343	12.9	530	79.3	432
MISSISSIPPI ST	D	MS	80	64	272	80.0	106	12.5	536	92.5	212
U OF MISSISSIPPI	D	MS	87	68.7	199	79.0	118	17.8	388	96.8	158
U OF SO MISSISSIPPI	D	MS	85	60.9	340	71.6	214	19.6	282	91.3	231
HARRIS STOWE ST	BA	MO	88	47.5	562	54.0	521	16.1	463	70.1	524
LINCN U	BA+	MO	81	50.6	541	62.5	410	18.4	360	80.9	403
MISSOURI SOUTHERN ST	BA+	MO	73	58.7	371	80.4	103	22.6	145	103.0	101
MISSOURI WESTERN ST	BA+	MO	81	54.9	466	67.8	305	20.6	232	88.4	284
NORTHWEST MISSOURI ST	BA+	MO	81	55.1	464	68.0	296	18.8	335	86.8	310
SOUTHEAST MISSOURI ST	BA+	MO	83	56.5	427	68.1	294	19.3	308	87.3	300
TRUMAN ST	BA+	MO	78	58.2	388	74.6	167	21.8	178	96.4	162
U OF CENTRAL MISSOURI	BA+	MO	83	58.5	381	70.5	233	17.2	414	87.7	294
MISSOURI ST	D	MO	83	57.6	401	69.4	261	20.1	260	89.5	265
U OF MISSOURI CUMBIA	D	MO	85	74.2	129	87.3	46	22.7	139	110.0	51
U OF MISSOURI KANSAS C.	D	MO	88	73.5	139	83.5	73	21.8	175	105.3	79
U OF MISSOURI ROLLA	D	MO	82	81	74	98.8	12	26.7	44	125.5	12
U OF MISSOURI ST LOUIS	D	MO	88	64	272	72.7	200	19.3	306	92.0	221
U OF MONTANA WESTERN	BA	MT	98	44.2	570	45.1	560	14.6	503	59.7	558
MONTANA ST U BILLINGS	BA+	MT	94	51	537	54.3	518	14.9	496	69.1	528
MONTANA ST NORTHERN	BA+	MT	87	45.9	567	52.8	531	15.9	470	68.6	532
MONTANA TECH U	BA+	MT	89	51.3	529	57.6	482	16.5	447	74.2	498
MONTANA ST U BILLINGS	D	MT	94	51.8	526	55.1	508	16.2	462	71.3	520
MONTANA ST NORTHERN	D	MT	87	46.7	565	53.7	525	15.7	477	69.4	527
MONTANA TECH	D	MT	89	57.5	403	64.6	377	19.3	303	83.9	356
CHADRON ST	BA+	NE	76	50.9	538	67.0	327	18.4	358	85.4	328
PERU ST	BA+	NE	73	55.3	456	75.8	150	22.3	156	98.1	150
U OF NEBRASKA KEARNEY	BA+	NE	85	58.7	371	69.1	273	19.5	290	88.6	280
WAYNE ST	BA+	NE	80	55.4	451	69.3	266	20.9	213	90.1	251
U OF NEBRASKA MED CTR	D	NE	84	52	525	61.9	420	12.6	534	74.5	491
U OF NEBRASKA OMAHA	D	NE	84	66.4	228	79.0	117	20.4	253	99.4	138
U OF NEBRASKA LINCN	D	NE	81	80.4	79	99.3	11	24.2	97	123.5	17
NEVADA ST	BA	NV	103	66.5	226	64.6	378	7.6	565	72.1	513
GREAT BASIN	BA+	NV	98	61.2	333	62.4	411	13.3	526	75.7	483

UNIVERSITY	DEG	ST	COLA INDX	RAW SAL	RAW SAL RANK	COLA SAL	COLA SAL RANK	COLA BEN	COLA BEN RANK	COLA S+B	COLA S+B RANK
U OF NEVADA LAS VEGAS	D	NV	97	82.7	62	85.3	59	17.6	398	102.9	104
U OF NEBRASKA RENO	D	NV	109	84.7	51	77.7	130	15.0	494	92.8	208
U OF NH MAN.	BA	NH	108	69.5	188	64.4	383	17.1	421	81.5	391
KEENE ST	BA+	NH	104	68.5	201	65.9	353	17.7	393	83.6	361
PLYMOUTH ST	BA+	NH	103	67	217	65.0	371	18.1	376	83.1	370
U OF NEW HAMPSHIRE	D	NH	110	81.1	73	73.7	182	20.5	241	94.2	190
KEAN	BA+	NJ	126	85.5	49	67.9	300	22.2	163	90.1	254
NEW JERSEY CITY	BA+	NJ	126	84.6	52	67.1	322	5.0	571	72.1	512
RAMAPO C NJ	BA+	NJ	197	84	54	42.6	563	14.1	514	56.8	561
RUTGERS U CAMDEN	BA+	NJ	98	96.1	18	98.1	14	30.1	12	128.2	7
THE C OF NEW JERSEY	BA+	NJ	108	80.6	77	74.6	166	25.2	64	99.8	133
WILLIAM PATTERSON NJ	BA+	NJ	136	89.1	34	65.5	361	16.4	455	81.9	382
MONTCLAIR ST	D	NJ	140	87	42	62.1	419	14.1	513	76.3	477
NEW JERSEY TECH	D	NJ	122	101.3	7	83.0	78	22.5	149	105.6	78
ROWAN	D	NJ	107	81	74	75.7	151	25.0	72	100.7	122
RUTGERS NEW BRUN.	D	NJ	119	98.2	13	82.5	83	25.0	69	107.6	71
RUTGERS NEWARK	D	NJ	122	95	21	77.9	127	24.1	101	102.0	112
RICHARD STOCKTON NJ	D	NJ	117	80.4	79	68.7	278	22.6	140	91.4	229
U OF MED AND DENT NJ	D	NJ	122	60.9	340	49.9	544	20.5	240	70.4	523
EASTERN NEW MEXICO	BA+	NM	93	52.2	521	56.1	498	15.8	473	71.9	516
NEW MEXICO HIGHLANDS	BA+	NM	88	49.1	554	55.8	503	15.6	484	71.4	519
WESTERN NEW MEXICO	BA+	NM	93	50.1	546	53.9	523	17.2	417	71.1	521
NEW MEXICO INST M&T	D	NM	85	65.3	244	76.8	140	19.6	282	96.5	161
NEW MEXICO ST	D	NM	91	65.1	247	71.5	219	17.9	383	89.5	268
U OF NEW MEXICO	D	NM	93	74.4	124	80.0	106	18.5	352	98.5	147
CUNY MEDGAR EVERS	BA	NY	377	74.3	126	19.7	572	6.1	569	25.8	572
CUNY NY CITY C OF TECH	BA	NY	377	70.6	171	18.7	573	6.0	570	24.7	574
FARMINGDALE ST	BA	NY	131	72.1	156	55.0	510	18.0	380	73.1	508
MORRISVILLE ST	BA	NY	93	52.8	509	56.8	494	19.2	310	76.0	480
SUNY A&T COBLESKILL	BA	NY	103	57.4	405	55.7	504	19.1	321	74.9	489
SUNY TECH ALFRED	BA	NY	99	52.8	509	53.3	528	19.2	314	72.5	509
SUNY TECH CANTON	BA	NY	96	55.3	456	57.6	483	18.6	344	76.3	478
SUNY TECH DELHI	BA	NY	104	52.1	523	50.1	543	19.0	326	69.1	529
CUNY BERNARD BARUCH	BA+	NY	135	90	30	66.7	335	17.7	391	84.4	347
CUNY BROOKLYN	BA+	NY	377	79.3	86	21.0	570	6.2	567	27.2	571
CUNY CITY	BA+	NY	135	85.7	48	63.5	395	17.6	403	81.0	402
CUNY C OF STN ISLAND	BA+	NY	160	74.4	124	46.5	556	14.4	508	60.9	554
CUNY HUNTER	BA+	NY	135	81.9	68	60.7	448	17.4	408	78.1	449
CUNY JOHN JAY C CRM JST	BA+	NY	135	76.7	104	56.8	493	17.1	424	73.9	500
CUNY LEHMAN	BA+	NY	166	77.6	94	46.7	555	14.0	519	60.7	556
CUNY QUEENS	BA+	NY	204	77.1	99	37.8	567	11.3	553	49.1	568
CUNY YORK	BA+	NY	135	74.2	129	55.0	511	17.0	428	72.0	514
FASHION INST OF TEC	BA+	NY	135	77.1	99	57.1	488	20.6	235	77.7	455
SUNY C BROKPORT	BA+	NY	96	64.7	259	67.4	315	20.4	247	87.8	293
SUNY C BUFFALO	BA+	NY	79	64	272	81.0	96	25.9	53	107.0	73
SUNY C CORTLAND	BA+	NY	100	57.1	413	57.1	489	19.5	295	76.6	473
SUNY C NEW PALITZ	BA+	NY	114	61.3	331	53.8	524	18.0	382	71.8	518
SUNY C OLD WESTBURY	BA+	NY	332	69.1	196	20.8	571	6.4	566	27.3	570
SUNY C ONEONTA	BA+	NY	98	58.3	384	59.5	461	20.6	233	80.1	420
SUNY C OSWEGO	BA+	NY	88	60.5	347	68.8	276	22.4	154	91.1	234
SUNY CLGE PLATTS.	BA+	NY	100	61	337	61.0	438	20.9	211	81.9	383
SUNY CLGE PURCHASE	BA+	NY	349	65	251	18.6	574	6.1	568	24.8	573
SUNY INST OF TECH UR	BA+	NY	95	72.5	151	76.3	143	24.7	80	101.1	119
SUNY MARITIME	BA+	NY	166	62.2	309	37.5	568	12.2	545	49.6	567
SUNY FREDONIA	BA+	NY	94	59.7	355	63.5	394	21.3	197	84.8	339
SUNY GENESEO	BA+	NY	82	63.8	278	77.8	128	24.4	92	102.2	109

UNIVERSITY	DEG	ST	COLA INDX	RAW SAL	RAW SAL RANK	COLA SAL	COLA SAL RANK	COLA BEN	COLA BEN RANK	COLA S+B	COLA S+B RANK
SUNY-POTSDAM	BA+	NY	95	56.4	429	59.4	463	19.9	272	79.3	433
CUNY GRAD SCHL & U CTR	D	NY	135	109.1	5	80.8	98	18.2	368	99.0	142
SUNY C OF ENV SCI & FOR	D	NY	90	69.7	186	77.4	134	25.7	56	103.1	99
SUNY ALBANY	D	NY	105	83.4	58	79.4	115	24.1	102	103.5	95
SUNY BINGHAMTON	D	NY	95	81.4	71	85.7	58	26.2	50	111.9	41
SUNY BUFFALO	D	NY	79	89.4	32	113.2	1	33.7	3	146.8	1
STONY BROOK	D	NY	147	89.6	31	61.0	442	18.2	366	79.2	435
ELIZABETH CITY ST	BA+	NC	91	65.7	237	72.2	206	17.9	383	90.1	252
NORTH CAROLINA CNTRL	BA+	NC	90	70.8	168	78.7	122	20.0	265	98.7	145
NC SCHL OF THE ARTS	BA+	NC	87	58.3	384	67.0	326	18.2	372	85.2	334
U OF NC ASHEVILLE	BA+	NC	97	65.4	243	67.4	312	16.4	456	83.8	357
U OF NC PEMBROKE	BA+	NC	85	59.5	358	70.0	244	18.8	333	88.8	276
WINSTON-SALEM ST	BA+	NC	87	69.2	193	79.5	110	18.5	351	98.0	151
APPALACHIAN ST	D	NC	99	69	197	69.7	256	18.2	370	87.9	291
EAST CAROLINA	D	NC	89	67.9	207	76.3	145	19.9	276	96.2	166
FAYETTEVILLE ST	D	NC	91	62.6	297	68.8	275	17.7	392	86.5	314
NORTH CAROLINA A&T	D	NC	89	72.6	149	81.6	91	20.6	237	102.1	111
NC ST U RALEIGH	D	NC	103	84.2	53	81.7	89	20.1	262	101.8	113
U OF NC CHAPEL HILL	D	NC	115	102	6	88.7	38	20.4	245	109.1	58
U OF NC CHARLOTTE	D	NC	96	72.3	153	75.3	157	19.5	296	94.8	187
U OF NC GREENSBORO	D	NC	89	70.1	181	78.8	120	20.4	242	99.2	140
U OF NC- WILMINGTON	D	NC	102	68.2	205	66.9	328	17.5	405	84.3	349
WESTERN CAROLINA	D	NC	97	65.1	247	67.1	324	17.6	398	84.7	340
DICKINSON ST	BA	ND	84	49	555	58.3	473	19.0	325	77.4	460
MAYVILLE ST	BA	ND	81	40.2	572	49.6	547	17.9	386	67.5	536
MINOT ST	BA+	ND	85	50	548	58.8	470	19.9	277	78.7	442
VALLEY CITY ST	BA+	ND	80	44.2	570	55.3	507	21.6	182	76.9	467
NORTH DAKOTA ST	D	ND	84	62.6	297	74.5	170	20.8	217	95.4	176
U OF NORTH DAKOTA	D	ND	85	63.2	288	74.4	174	21.5	187	95.9	169
MIAMI U HAMILTON	BA	OH	85	59.7	355	70.2	237	26.1	52	96.4	163
MIAMI U MIDDLETOWN	BA	OH	85	57.1	413	67.2	321	24.9	74	92.1	219
CENTRAL ST	BA+	OH	89	54.8	467	61.6	430	22.8	136	84.4	346
OHIO ST U LIMA	BA+	OH	88	65.8	235	74.8	164	21.8	175	96.6	160
OHIO ST U MANSFIELD	BA+	OH	81	62.7	295	77.4	135	23.5	120	100.9	120
OHIO ST U MARION	BA+	OH	82	65.2	245	79.5	112	23.3	125	102.8	106
OHIO ST U NEWARK	BA+	OH	87	64.8	257	74.5	173	21.5	189	96.0	168
OHIO U CHILLICOTHE	BA+	OH	85	57.8	397	68.0	297	22.5	152	90.5	247
OHIO U EASTERN	BA+	OH	84	58.2	388	69.3	263	24.6	83	93.9	193
OHIO U LANCASTER	BA+	OH	87	62.4	303	71.7	213	23.8	112	95.5	173
OHIO U SOUTHERN	BA+	OH	82	53.3	502	65.0	372	11.8	549	76.8	470
OHIO U ZANESVILLE	BA+	OH	83	55.4	451	66.7	333	24.0	105	90.7	241
SHAWNEE ST	BA+	OH	78	55.5	447	71.2	226	32.2	6	103.3	98
BOWLING GREEN ST	D	OH	88	61.7	319	70.1	242	18.8	336	88.9	274
CLEVELAND ST	D	OH	84	71.6	160	85.2	60	25.1	67	110.4	50
KENT ST U KENT	D	OH	89	67	217	75.3	158	24.2	100	99.4	137
MIAMI U OXFORD	D	OH	90	72.6	149	80.7	101	30.0	13	110.7	48
OHIO ST	D	OH	88	96.8	14	110.0	4	27.5	29	137.5	3
OHIO	D	OH	85	70.4	175	82.8	81	23.2	130	106.0	76
U OF AKRON MAIN	D	OH	85	67.6	210	79.5	111	22.0	169	101.5	114
U OF CINCINNATI MAIN	D	OH	85	75.5	113	88.8	36	28.2	20	117.1	27
U OF TOLEDO MAIN	D	OH	81	65.1	247	80.4	104	28.1	22	108.5	62
WRIGHT ST U MAIN	D	OH	84	68.8	198	81.9	87	21.1	205	103.0	102
YOUNGSTOWN ST	D	OH	79	66.2	231	83.8	71	27.3	34	111.1	46
OKLAHOMA PANHANDLE	BA	OK	80	37.8	573	47.3	553	14.4	508	61.6	553
ROGERS ST	BA	OK	87	50.5	543	58.0	477	22.6	141	80.7	407
U OF SCI AND ARTS OF OK	BA	OK	74	46.2	566	62.4	412	20.8	220	83.2	365

UNIVERSITY	DEG	ST	COLA INDX	RAW SAL	RAW SAL RANK	COLA SAL	COLA SAL RANK	COLA BEN	COLA BEN RANK	COLA S+B	COLA S+B RANK
CAMERON	BA+	OK	79	50.6	541	64.1	389	22.8	137	86.8	308
EAST CENTRAL	BA+	OK	80	53.8	487	67.3	320	24.5	90	91.8	225
LANGSTON	BA+	OK	78	55.3	456	70.9	228	13.7	522	84.6	341
NORTHEASTERN ST	BA+	OK	84	52.9	507	63.0	400	21.3	194	84.3	350
NORTHWESTERN OK ST	BA+	OK	76	47.7	559	62.8	405	16.7	440	79.5	429
SOUTHEASTERN OK ST	BA+	OK	85	53.9	486	63.4	396	16.4	457	79.8	423
SOUTHWESTERN OK ST	BA+	OK	82	50.1	546	61.1	437	22.3	158	83.4	363
U OF CENTRAL OK	BA+	OK	89	61.6	323	69.2	269	15.8	471	85.1	336
OKLAHOMA ST	D	OK	85	71.6	160	84.2	70	26.7	45	110.9	47
U OF OK HLTH SCI CTR	D	OK	79	51.8	526	65.6	360	18.1	375	83.7	358
U OF OK NORMAN	D	OK	86	75.1	116	87.3	45	27.7	26	115.0	32
EASTERN OREGON	BA+	OR	93	49	555	52.7	532	26.2	49	78.9	437
OREGON INST OF TECH	BA+	OR	95	53.5	494	56.3	496	27.1	39	83.4	364
SOUTHERN OREGON	BA+	OR	115	52.5	517	45.7	559	22.0	168	67.7	535
WESTERN OREGON	BA+	OR	98	52.8	509	53.9	522	24.7	82	78.6	444
OREGON HLTH & SCI	D	OR	111	70.3	177	63.3	397	14.1	512	77.5	458
OREGON ST	D	OR	102	67.4	212	66.1	347	27.6	27	93.7	195
PORTLAND ST	D	OR	111	61.7	319	55.6	505	24.0	107	79.5	427
U OF OREGON	D	OR	99	70.3	177	71.0	227	28.9	17	99.9	132
PENN C OF TECH	BA	PA	84	66.1	233	78.7	121	28.6	19	107.3	72
PENN ST DELAWARE CTY	BA	PA	114	65.6	238	57.5	485	16.9	435	74.4	493
PENN ST ABINGTON	BA	PA	112	61.4	326	54.8	513	16.1	465	70.9	522
PENN ST ALTOONA	BA	PA	79	59.6	357	75.4	154	20.6	231	96.1	167
PENN ST BEAVER	BA	PA	83	62.2	309	74.9	163	19.5	291	94.5	189
PENN ST BERKS	BA	PA	89	61.8	318	69.4	260	18.9	331	88.3	286
PENN ST DUBOIS	BA	PA	82	63.6	280	77.6	133	22.0	172	99.5	136
PENN ST EBERLY	BA	PA	85	60.6	344	71.3	222	19.6	282	90.9	236
PENN ST GREATER ALLEG.	BA	PA	78	64.7	259	82.9	80	20.8	224	103.7	93
PENN ST HAZELTON	BA	PA	83	60.9	340	73.4	190	19.2	318	92.5	211
PENN ST LEHIGH VALLEY	BA	PA	118	65.5	241	55.5	506	14.1	516	69.6	526
PENN ST MONT ALTO	BA	PA	91	57.2	410	62.9	402	16.7	442	79.6	426
PENN ST NEW KENS.	BA	PA	80	65.5	241	81.9	88	21.5	188	103.4	97
PENN ST SCHUYLKILL	BA	PA	85	64.4	265	75.8	148	19.1	324	94.8	186
PENN ST SHENANGO	BA	PA	78	65	251	83.3	77	21.3	196	104.6	85
PENN ST WILKES-BARRE	BA	PA	85	64.6	263	76.0	147	21.1	206	97.1	154
PENN ST WS	BA	PA	86	63.9	276	74.3	176	18.5	353	92.8	207
PENN ST YORK	BA	PA	90	62.6	297	69.6	259	18.4	357	88.0	289
U OF PITT BRADFORD	BA	PA	81	53.8	487	66.4	340	21.0	207	87.4	299
U OF PITT GREENSBURG	BA	PA	86	52.8	509	61.4	432	17.8	390	79.2	434
U OF PITT JOHNSTOWN	BA	PA	78	53.6	492	68.7	279	20.5	239	89.2	271
CA U OF PENN	BA+	PA	84	73.1	145	87.0	49	21.7	181	108.7	61
CHEYNEY U OF PENN	BA+	PA	159	67.1	215	42.2	564	10.3	560	52.5	566
CLARION U OF PENN	BA+	PA	87	76.2	108	87.6	44	22.3	159	109.9	53
EAST STROUD. U OF PENN	BA+	PA	97	71.5	163	73.7	183	19.2	316	92.9	205
EDINBORO U OF PENN	BA+	PA	88	72.5	151	82.4	85	21.7	180	104.1	90
KUTZTOWN U OF PENN	BA+	PA	94	67	217	71.3	223	19.3	309	90.5	244
LINCN U OF PENN	BA+	PA	94	64.6	263	68.7	277	20.0	263	88.7	278
LOCK HAVEN U OF PENN	BA+	PA	88	68.7	199	78.1	126	20.9	210	99.0	143
MANSFIELD U OF PENN	BA+	PA	87	74.1	132	85.2	62	22.5	150	107.7	69
MILLERSVILLE U OF PENN	BA+	PA	100	74.5	122	74.5	172	20.1	261	94.6	188
PENN ST ERIE BEHREND	BA+	PA	84	70	182	83.3	76	21.5	185	104.9	82
SHIPPENSBURG U OF PENN	BA+	PA	92	73.2	144	79.6	109	20.7	230	100.2	126
WEST CHEST. U OF PENN	BA+	PA	111	70.5	172	63.5	393	17.1	423	80.6	410
BLOOMSBURG U OF PENN	D	PA	78	73.4	141	94.1	21	25.0	70	119.1	23
INDIANA U OF PENN	D	PA	82	74.2	129	90.5	32	24.0	104	114.5	34
PENN ST U MAIN	D	PA	103	86.8	43	84.3	69	19.8	279	104.1	91

UNIVERSITY	DEG	ST	COLA INDX	RAW SAL	RAW SAL RANK	COLA SAL	COLA SAL RANK	COLA BEN	COLA BEN RANK	COLA S+B	COLA S+B RANK
PENN ST HARRISBURG	D	PA	91	75	118	82.4	84	20.5	238	103.0	103
SLIPPERY RCK U OF PENN	D	PA	87	74	133	85.1	65	22.5	150	107.6	70
TEMPLE U	D	PA	101	86.7	44	85.8	56	22.3	161	108.1	66
U OF PITTSBURGH PITT	D	PA	85	82.1	67	96.6	17	27.5	28	124.1	16
RHODE ISLAND C	D	RI	109	60	352	55.0	509	22.0	167	77.1	465
U OR RHODE ISLAND	D	RI	128	76.7	104	59.9	457	21.3	193	81.3	397
U OF SC BEAUFORT	BA	SC	102	51.7	528	50.7	539	14.8	500	65.5	542
CITADEL MILITARY SC	BA+	SC	103	67.1	215	65.1	368	19.2	311	84.4	348
COSTAL CAROLINA	BA+	SC	90	59.1	362	65.7	357	19.3	302	85.0	337
C OF CHARLESTON	BA+	SC	103	62.3	307	60.5	450	20.2	259	80.7	408
FRANCIS MARION	BA+	SC	88	58.8	368	66.8	331	19.2	312	86.0	322
LANDER UINIVERSITY	BA+	SC	85	49.7	550	58.5	472	18.0	381	76.5	475
U OF SC AIKEN	BA+	SC	92	55.3	456	60.1	456	17.2	420	77.3	461
U OF SC UPST	BA+	SC	86	53.5	494	62.2	418	18.0	378	80.2	418
WINTHROP	BA+	SC	90	61.1	335	67.9	299	19.1	323	87.0	303
CLEMSON	D	SC	93	77.2	98	83.0	79	22.6	146	105.6	77
SOUTH CAROLINA ST	D	SC	84	58.8	368	70.0	244	16.4	453	86.4	315
U OF SC CUMBIA	D	SC	91	77.1	99	84.7	66	21.8	179	106.5	74
BLACK HILLS ST	BA+	SD	92	53.4	498	58.0	478	14.2	510	72.3	511
NORTHERN ST	BA+	SD	84	54.1	482	64.4	380	15.6	481	80.0	421
DAKOTA ST	D	SD	80	58.7	371	73.4	188	17.1	422	90.5	246
SOUTH DAKOTA M&T	D	SD	90	71.5	163	79.4	114	17.4	406	96.9	155
SOUTH DAKOTA ST	D	SD	86	57.2	410	66.5	337	15.8	472	82.3	379
U OF SOUTH DAKOTA	D	SD	84	58.9	365	70.1	241	16.3	459	86.4	315
AUSTIN PEAY ST	BA+	TN	83	55.9	438	67.3	317	22.3	160	89.6	262
U OF TENNESSEE MARTIN	BA+	TN	79	56.6	424	71.6	215	23.5	118	95.2	179
EAST TENNESSEE ST	D	TN	83	56.2	436	67.7	307	23.4	122	91.1	235
MIDDLE TENNESSEE ST	D	TN	87	63.2	288	72.6	202	23.6	116	96.2	165
TENNESSEE ST	D	TN	81	57.1	413	70.5	232	18.9	329	89.4	270
TENNESSEE TECH	D	TN	83	62.6	297	75.4	156	29.3	15	104.7	84
U OF TENNESSEE MARTIN	D	TN	79	75.4	115	95.4	20	29.2	16	124.7	15
U OF TN CHATTANOOGA	D	TN	83	61.7	319	74.3	175	23.3	127	97.6	152
U OF MEMPHIS	D	TN	81	69.6	187	85.9	55	30.4	9	116.3	30
ANGELO ST	BA+	TX	80	55.9	438	69.9	252	15.3	491	85.1	335
MIDWESTERN ST	BA+	TX	83	59.4	359	71.6	217	16.9	437	88.4	283
SUL ROSS ST	BA+	TX	81	53.4	498	65.9	352	18.1	373	84.1	353
TEXAS A&M GALVESTON	BA+	TX	89	60.6	344	68.1	293	16.2	461	84.3	351
TEXAS A&M TEXARKANA	BA+	TX	80	62.6	297	78.3	124	17.6	400	95.9	170
THE U OF TEXAS TYLER	BA+	TX	88	57.6	401	65.5	362	18.8	336	84.2	352
U OF TX PERMIAN BASIN	BA+	TX	80	58.3	384	72.9	197	12.4	538	85.3	331
U OF HOUSTON DT	BA+	TX	91	58.3	384	64.1	388	15.3	489	79.3	431
U OF HOUSTON VICTORIA	BA+	TX	80	70.4	175	88.0	43	20.4	249	108.4	63
LAMAR	D	TX	81	60.9	340	75.2	159	12.5	537	87.7	295
PRAIRIE VIEW A&M	D	TX	88	58.8	368	66.8	331	14.7	502	81.5	392
SAM HOUSTON ST	D	TX	85	63.4	286	74.6	168	17.1	427	91.6	228
STEPHEN F AUSTIN ST	D	TX	84	57	417	67.9	300	10.6	559	78.5	448
TARLETON ST	D	TX	82	55.8	440	68.0	295	16.0	467	84.0	354
TEXAS A&M INTL.	D	TX	83	58.1	392	70.0	244	15.8	475	85.8	325
TEXAS A&M	D	TX	88	82.4	65	93.6	23	18.3	363	111.9	40
TEXAS A&M COMMERCE	D	TX	85	57.2	410	67.3	318	12.4	539	79.6	425
TEXAS A&M COR. CHR.	D	TX	82	66.3	230	80.9	97	19.1	319	100.0	131
TEXAS A&M KINGSVILLE	D	TX	78	56.5	427	72.4	205	17.2	418	89.6	263
TEXAS SOUTHERN	D	TX	91	59.8	354	65.7	356	17.8	389	83.5	362
TEXAS ST U SAN MARCOS	D	TX	93	61.4	326	66.0	350	11.2	554	77.2	463
TEXAS TECH	D	TX	79	70.5	172	89.2	34	19.6	285	108.9	60
TEXAS WOMAN'S	D	TX	70	62.2	309	88.9	35	19.4	299	108.3	64

UNIVERSITY	DEG	ST	COLA INDX	RAW SAL	RAW SAL RANK	COLA SAL	COLA SAL RANK	COLA BEN	COLA BEN RANK	COLA S+B	COLA S+B RANK
U OF TX HLTH SC CTR SA	D	TX	84	53.1	504	63.2	398	14.0	517	77.3	462
U OF TEXAS ARLINGTON	D	TX	85	69.2	193	81.4	92	22.4	155	103.8	92
U OF TEXAS AUSTIN	D	TX	101	92.3	27	91.4	29	18.4	359	109.8	54
U OF TEXAS BROWNS.	D	TX	77	56.3	432	73.1	191	16.9	436	90.0	255
U OF TEXAS DALLAS	D	TX	98	95.4	20	97.3	16	19.9	271	117.2	26
U OF TEXAS EL PASO	D	TX	83	63.3	287	76.3	146	20.0	263	96.3	164
U OF TEXAS SAN ANT.	D	TX	84	78.3	88	93.2	24	21.2	200	114.4	35
U OF TX PAN AMERICAN	D	TX	83	59.3	361	71.4	220	12.5	535	84.0	355
U OF HOUSTON	D	TX	91	83.3	59	91.5	28	19.9	274	111.4	43
U OF HOUSTON CLR LAKE	D	TX	91	66.8	223	73.4	186	16.8	438	90.2	250
U OF NORTH TEXAS	D	TX	90	72.1	156	80.1	105	13.7	523	93.8	194
WEST TEXAS A&M	D	TX	81	54.5	472	67.3	319	17.3	411	84.6	342
DIXIE ST C OF UTAH	BA	UT	100	56.6	424	56.6	495	23.9	108	80.5	414
UTAH VALLEY ST	BA	UT	92	56.3	432	61.2	436	27.3	35	88.5	282
SOTHERN UTAH	BA+	UT	88	54.2	478	61.6	427	25.0	70	86.6	312
WEBER ST	BA+	UT	88	58.1	392	66.0	349	26.4	46	92.4	216
U OF UTAH	D	UT	98	81.8	69	83.5	75	27.1	38	110.6	49
UTAH ST	D	UT	85	63.7	279	74.9	162	29.9	14	104.8	83
VERMONT TECHNICAL	BA	VT	107	51.1	534	47.8	551	19.2	317	66.9	538
CASLETON ST	BA+	VT	103	51.2	530	49.7	546	20.0	265	69.7	525
JOHNSON ST	BA+	VT	104	56.4	429	54.2	519	20.9	214	75.1	488
LYNDON ST	BA+	VT	99	51.2	530	51.7	537	22.7	138	74.4	492
U OF VERMONT	D	VT	113	72.2	155	63.9	391	19.0	327	82.9	373
U OF THE VIRGINIA'S WISE	BA	VA	83	56.6	424	68.2	289	27.0	40	95.2	180
VIRGINIA MILITARY INST	BA	VA	99	72.7	148	73.4	185	24.9	73	98.4	149
CHRISTOPHER NEWPORT	BA+	VA	97	69.2	193	71.3	221	20.7	228	92.1	220
LONGWOOD	BA+	VA	88	57.4	405	65.2	367	22.6	143	87.8	292
U OF MARY WASHINGTON	BA+	VA	112	65.2	245	58.2	475	18.8	338	77.0	466
C OF WILLIAM AND MARY	D	VA	109	88	41	80.7	99	23.9	111	104.6	86
GEORGE MASON	D	VA	134	88.6	37	66.1	346	17.0	433	83.1	369
JAMES MADISON	D	VA	95	66.7	224	70.2	238	24.6	84	94.8	185
NORFOLK ST	D	VA	97	60.6	344	62.5	409	19.3	307	81.8	386
OLD DOMINION	D	VA	97	69.4	191	71.5	218	21.5	186	93.1	200
RADFORD	D	VA	88	61.5	324	69.9	251	22.6	143	92.5	212
U OF VIRGINIA MAIN	D	VA	105	100.3	10	95.5	19	24.2	98	119.7	22
VIRGINIA COMMON.	D	VA	100	73	147	73.0	193	23.6	115	96.6	159
VA POLY INST AND ST	D	VA	96	83.6	56	87.1	48	24.6	88	111.7	42
VIRGINIA ST	D	VA	93	62.4	303	67.1	325	13.7	524	80.8	405
CENTRAL WASHINGTON	BA+	WA	95	58.5	381	61.6	429	16.9	434	78.5	446
THE EVERGREEN ST	BA+	WA	106	58.1	392	54.8	514	17.1	426	71.9	517
U OF WA BOTHELL	BA+	WA	121	79.9	82	66.0	348	16.0	468	82.0	381
U OF WA TACOMA	BA+	WA	104	78	91	75.0	161	17.7	393	92.7	209
WESTERN WASHINGTON	BA+	WA	106	61.4	326	57.9	480	15.4	487	73.3	503
EASTERN WASHINGTON	D	WA	91	55.3	456	60.8	446	19.9	274	80.7	409
U OF WA SEATTLE	D	WA	120	88.8	35	74.0	179	17.3	410	91.3	230
WASHINGTON ST	D	WA	94	70.2	180	74.7	165	21.0	208	95.6	172
BLUEFIELD ST	BA	WV	75	52.9	507	70.5	231	18.3	364	88.8	277
GLENVILLE ST	BA	WV	78	48.6	558	62.3	416	16.4	454	78.7	441
WEST LIBERTY ST	BA	WV	79	47.5	562	60.1	454	15.4	486	75.6	484
WEST VIRGINIA U PARK	BA	WV	80	45.8	568	57.3	487	16.3	460	73.5	501
CONCORD	BA+	WV	79	50.7	539	64.2	386	17.6	401	81.8	384
FAIRMONT ST	BA+	WV	82	53.5	494	65.2	366	16.5	451	81.7	388
SHEPHERD	BA+	WV	107	56.3	432	52.6	533	12.0	547	64.6	544
WEST VIRGINIA ST	BA+	WV	76	49.7	550	65.4	364	16.3	458	81.7	387
WEST VIRGINIA TECH	BA+	WV	82	52.8	509	64.4	381	15.0	495	79.4	430
MARSHALL	D	WV	78	58.6	378	75.1	160	18.3	362	93.5	198

UNIVERSITY	DEG	ST	COLA INDX	RAW SAL	RAW SAL RANK	COLA SAL	COLA SAL RANK	COLA BEN	COLA BEN RANK	COLA S+B	COLA S+B RANK
WEST VIRGINIA	D	WV	88	70.8	168	80.5	102	18.2	370	98.6	146
WISCONSIN EAU CLAIRE	BA+	WI	84	57.1	413	68.0	298	24.9	76	92.9	206
WISCONSIN GREEN BAY	BA+	WI	98	53.5	494	54.6	516	20.6	233	75.2	487
WISCONSIN LA CROSSE	BA+	WI	85	57.3	409	67.4	313	24.6	87	92.0	222
WISCONSIN OSHKOSH	BA+	WI	86	57.5	403	66.9	329	24.4	91	91.3	232
WISCONSIN PARKSIDE	BA+	WI	91	55.5	447	61.0	439	22.6	142	83.6	359
WISCONSIN PLATTEVILLE	BA+	WI	99	55.5	447	56.1	499	20.8	221	76.9	468
WISCONSIN RIVER FALLS	BA+	WI	94	58.6	378	62.3	414	24.0	103	86.4	318
WISCONSIN STVNS POINT	BA+	WI	85	55.6	445	65.4	363	24.2	95	89.6	260
WISCONSIN STOUT	BA+	WI	73	55.7	443	76.3	144	28.2	21	104.5	87
WISCONSIN SUPERIOR	BA+	WI	84	55.7	443	66.3	344	24.9	76	91.2	233
WISCONSIN WHITEWATER	BA+	WI	92	57.4	405	62.4	413	22.8	135	85.2	333
WISCONSIN MADISON	D	WI	95	89.2	33	93.9	22	27.8	25	121.7	19
WISCONSIN MILWAUKEE	D	WI	89	65.6	238	73.7	184	25.2	66	98.9	144
U OF WYOMING	D	WY	93	72.3	153	77.7	129	22.9	133	100.6	123

This table shows the rankings of U.S. Universities based on compensation paid to faculty. DEG is the highest level of degree offered by the university. ST is the state where the university is located. COLA is the cost of living index for the city in which the university is located. RAW SAL is the average salary paid to faculty unadjusted for cost of living differences. RAW SAL RANK is the ranking of each university based on its faculty salaries. COLA SAL is the salary adjusted for the cost of living in the city where the university is located. COLA SAN RANK is the ranking of the university based on COLA adjusted salaries. COLA BEN is the cost of living adjusted benefits in dollars paid on average to each faculty. COLA BEN RANK ranks the universities based on their COLA benefits. COLA S+B is the combined COLA average salaries and benefits. COLA S+B RANK is the ranking based on combined COLA adjusted salary and benefits.

Exhibit 2: Ranking of Doctorate Granting Institutions by Faculty Compensation

UNIVERSITY	DEG	ST	COLA INDX	RAW SAL	RAW SAL RANK	COLA SAL	COLA SAL RANK	COLA BEN	COLA BEN RANK	COLA S+B	COLA S+B RANK
SUNY BUFFALO	D	NY	79	89.4	28	113.2	1	33.7	3	146.8	1
U OF MD BALTIMORE	D	MD	103	116.2	1	112.8	2	25.9	33	138.7	2
OHIO ST	D	OH	88	96.8	12	110.0	4	27.5	22	137.5	3
MICHIGAN ST	D	MI	90	88.8	30	98.7	12	33.7	4	132.3	4
U OF ILLINOIS UC	D	IL	88	92.6	23	105.2	5	23.4	69	128.6	5
U OF CA-DAVIS	D	CA	102	114.5	2	112.3	3	15.6	227	127.8	6
U OF MI ANN ARBOR	D	MI	98	100.8	7	102.9	6	24.8	47	127.7	7
WESTERN MICHIGAN	D	MI	86	73.3	107	85.2	53	42.0	1	127.2	8
INDIANA ST BLMINGTON	D	IN	85	85.2	43	100.2	9	25.5	37	125.8	9
U OF MISSOURI ROLLA	D	MO	82	81	63	98.8	11	26.7	30	125.5	10
WAYNE ST U	D	MI	78	79.5	71	101.9	7	23.5	68	125.4	11
THE U OF ALABAMA	D	AL	88	81.7	60	92.8	24	32.4	5	125.2	12
U OF TENNESSEE MARTIN	D	TN	79	75.4	89	95.4	18	29.2	12	124.7	13
U OF PITTSBURGH PITT	D	PA	85	82.1	58	96.6	15	27.5	21	124.1	14
U OF NEBRASKA LINCN	D	NE	81	80.4	67	99.3	10	24.2	52	123.5	15
MICHIGHAN TECH	D	MI	83	71.2	120	85.8	49	35.9	2	121.7	16
WISCONSIN MADISON	D	WI	95	89.2	29	93.9	20	27.8	18	121.7	17
U OF IOWA	D	IA	92	88.1	35	95.8	16	25.9	34	121.6	18
U OF KANSAS	D	KS	86	83.9	46	97.6	13	23.3	71	120.8	19
U OF VIRGINIA MAIN	D	VA	105	100.3	9	95.5	17	24.2	53	119.7	20
BLOOMSBURG U OF PENN	D	PA	78	73.4	106	94.1	19	25.0	44	119.1	21
U OF BALTIMORE	D	MD	103	93.8	20	91.1	28	27.3	25	118.3	22
U OF MN TWIN CITIES	D	MN	102	92.9	21	91.1	27	26.8	29	117.8	23
U OF TEXAS DALLAS	D	TX	98	95.4	17	97.3	14	19.9	140	117.2	24
U OF CINCINNATI MAIN	D	OH	85	75.5	88	88.8	33	28.2	14	117.1	25
U OF CA MERCED	D	CA	96	96.4	15	100.4	8	16.6	214	117.0	26
PURDUE U-MAIN	D	IN	94	83.2	51	88.5	36	28.1	16	116.6	27
U OF MEMPHIS	D	TN	81	69.6	134	85.9	47	30.4	6	116.3	28
IOWA ST	D	IA	87	77	81	88.5	37	26.8	28	115.3	29

UNIVERSITY	DEG	ST	COLA INDX	RAW SAL	RAW SAL RANK	COLA SAL	COLA SAL RANK	COLA BEN	COLA BEN RANK	COLA S+B	COLA S+B RANK
U OF OK NORMAN	D	OK	86	75.1	90	87.3	39	27.7	19	115.0	30
GEORGIA INST OF TECH	D	GA	104	96.7	13	93.0	23	21.9	95	114.9	31
INDIANA U OF PENN	D	PA	82	74.2	97	90.5	29	24.0	58	114.5	32
U OF TEXAS SAN ANT.	D	TX	84	78.3	73	93.2	22	21.2	109	114.4	33
U OF ARIZONA	D	AZ	96	86	42	89.6	30	24.2	54	113.8	34
U OF FLORIDA	D	FL	93	82.5	55	88.7	34	23.5	67	112.3	35
U OF DELAWARE	D	DE	106	90.2	25	85.1	54	27.0	27	112.1	36
U OF LOUISVILLE	D	KY	85	74.9	92	88.1	38	23.9	61	112.0	37
TEXAS A&M	D	TX	88	82.4	56	93.6	21	18.3	179	111.9	38
SUNY BINGHAMTON	D	NY	95	81.4	61	85.7	50	26.2	32	111.9	39
VA POLY INST AND ST	D	VA	96	83.6	47	87.1	42	24.6	49	111.7	40
U OF HOUSTON	D	TX	91	83.3	50	91.5	25	19.9	141	111.4	41
ARIZONA ST U TEMPE	D	AZ	100	86.6	40	86.6	46	24.8	46	111.4	42
YOUNGSTOWN ST	D	OH	79	66.2	163	83.8	62	27.3	24	111.1	43
OKLAHOMA ST	D	OK	85	71.6	117	84.2	61	26.7	31	110.9	44
MIAMI U OXFORD	D	OH	90	72.6	109	80.7	85	30.0	9	110.7	45
U OF UTAH	D	UT	98	81.8	59	83.5	66	27.1	26	110.6	46
CLEVELAND ST	D	OH	84	71.6	117	85.2	52	25.1	42	110.4	47
U OF MISSOURI CUMBIA	D	MO	85	74.2	97	87.3	40	22.7	79	110.0	48
U OF CONNECTICUT	D	CT	114	96.5	14	84.6	58	25.3	39	109.9	49
U OF TEXAS AUSTIN	D	TX	101	92.3	24	91.4	26	18.4	176	109.8	50
AUBURN U MAIN	D	AL	90	78.2	74	86.9	44	22.9	78	109.8	51
CENTRAL MICHIGAN	D	MI	85	67.5	149	79.4	96	30.2	7	109.6	52
LOUSIANA ST U & A&M	D	LA	87	75.8	86	87.1	41	22.1	91	109.2	53
U OF NC CHAPEL HILL	D	NC	115	102	5	88.7	35	20.4	128	109.1	54
U OF GEORGIA	D	GA	96	83.5	48	87.0	43	22.0	94	109.0	55
TEXAS TECH	D	TX	79	70.5	124	89.2	31	19.6	148	108.9	56
U OF TOLEDO MAIN	D	OH	81	65.1	167	80.4	87	28.1	15	108.5	57
TEXAS WOMAN'S	D	TX	70	62.2	195	88.9	32	19.4	153	108.3	58
U OF AL BIRMINGHAM	D	AL	90	70.3	127	78.1	101	30.1	8	108.2	59
TEMPLE U	D	PA	101	86.7	39	85.8	48	22.3	90	108.1	60
U OF KENTUCKY	D	KY	90	78.1	75	86.8	45	21.1	113	107.9	61
U OF AL HUNTSVILLE	D	AL	87	73.6	103	84.6	59	23.2	73	107.8	62
SLIPPERY RCK U OF PENN	D	PA	87	74	99	85.1	56	22.5	86	107.6	63
RUTGERS NEW BRUN.	D	NJ	119	98.2	11	82.5	71	25.0	43	107.6	64
U OF SC CUMBIA	D	SC	91	77.1	80	84.7	57	21.8	99	106.5	65
OHIO	D	OH	85	70.4	126	82.8	69	23.2	75	106.0	66
CLEMSON	D	SC	93	77.2	79	83.0	68	22.6	82	105.6	67
NEW JERSEY INST OF TECH	D	NJ	122	101.3	6	83.0	67	22.5	85	105.6	68
U OF MISSOURI KANSAS C.	D	MO	88	73.5	104	83.5	64	21.8	97	105.3	69
U OF MD C PARK	D	MD	111	92.7	22	83.5	65	21.8	98	105.3	70
U OF MASS LOWELL	D	MA	116	94.3	19	81.3	79	23.6	64	104.9	71
UTAH ST	D	UT	85	63.7	181	74.9	123	29.9	10	104.8	72
TENNESSEE TECH	D	TN	83	62.6	189	75.4	118	29.3	11	104.7	73
C OF WILLIAM AND MARY	D	VA	109	88	36	80.7	83	23.9	63	104.6	74
INDIANA U-PURDUE U-IND	D	IN	82	67.2	152	82.0	73	22.4	87	104.4	75
PENN ST U MAIN	D	PA	103	86.8	38	84.3	60	19.8	144	104.1	76
U OF TEXAS ARLINGTON	D	TX	85	69.2	138	81.4	78	22.4	88	103.8	77
U OF MICHIGAN FLINT	D	MI	76	60.4	213	79.5	93	24.2	51	103.7	78
SUNY ALBANY	D	NY	105	83.4	49	79.4	95	24.1	57	103.5	79
SUNY C OF ENV SCI & FOR	D	NY	90	69.7	133	77.4	106	25.7	35	103.1	80
WICHITA ST	D	KS	82	66.9	154	81.6	76	21.5	104	103.0	81
WRIGHT ST U MAIN	D	OH	84	68.8	140	81.9	74	21.1	114	103.0	82
PENN ST HARRISBURG	D	PA	91	75	91	82.4	72	20.5	123	103.0	83
U OF NEVADA LAS VEGAS	D	NV	97	82.7	53	85.3	51	17.6	195	102.9	84
EASTERN MICHIGAN	D	MI	92	69.4	136	75.4	117	27.4	23	102.8	85

UNIVERSITY	DEG	ST	COLA INDX	RAW SAL	RAW SAL RANK	COLA SAL	COLA SAL RANK	COLA BEN	COLA BEN RANK	COLA S+B	COLA S+B RANK
MEDICAL C OF GEORGIA	D	GA	80	66.9	154	83.6	63	19.1	161	102.8	86
U OF ARKANSAS MAIN	D	AR	89	73.5	104	82.6	70	19.6	149	102.1	87
NORTH CAROLINA A&T	D	NC	89	72.6	109	81.6	77	20.6	122	102.1	88
RUTGERS NEWARK	D	NJ	122	95	18	77.9	102	24.1	56	102.0	89
NC ST U RALEIGH	D	NC	103	84.2	45	81.7	75	20.1	136	101.8	90
U OF AKRON MAIN	D	OH	85	67.6	148	79.5	92	22.0	93	101.5	91
U OF MAINE	D	ME	95	74.5	94	78.4	100	23.1	76	101.5	92
GOVERNORS ST	D	IL	96	77.5	77	80.7	84	20.7	120	101.5	93
U OF NORTHERN IOWA	D	IA	85	64.4	176	75.8	113	25.5	37	101.3	94
FLORIDA ST	D	FL	97	77.6	76	80.0	89	21.1	112	101.1	95
ROWAN	D	NJ	107	81	63	75.7	114	25.0	45	100.7	96
U OF WYOMING	D	WY	93	72.3	111	77.7	103	22.9	77	100.6	97
U OF CA-RIVERSIDE	D	CA	106	90.2	25	85.1	54	15.2	229	100.3	98
TEXAS A&M COR. CHR.	D	TX	82	66.3	162	80.9	81	19.1	159	100.0	99
U OF OREGON	D	OR	99	70.3	127	71.0	160	28.9	13	99.9	100
U OF IDAHO	D	ID	88	66.6	158	75.7	115	23.9	62	99.5	101
KENT ST U KENT	D	OH	89	67	153	75.3	120	24.2	55	99.4	102
U OF NEBRASKA OMAHA	D	NE	84	66.4	160	79.0	97	20.4	131	99.4	103
KANSAS ST	D	KS	83	67.3	151	81.1	80	18.2	183	99.3	104
U OF NC GREENSBORO	D	NC	89	70.1	131	78.8	99	20.4	126	99.2	105
BALL ST	D	IN	81	57.7	234	71.2	159	27.9	17	99.1	106
CUNY GRAD SCHL & U CTR	D	NY	135	109.1	4	80.8	82	18.2	182	99.0	107
WISCONSIN MILWAUKEE	D	WI	89	65.6	165	73.7	133	25.2	41	98.9	108
WEST VIRGINIA	D	WV	88	70.8	122	80.5	86	18.2	184	98.6	109
U OF NEW MEXICO	D	NM	93	74.4	95	80.0	89	18.5	174	98.5	110
U OF TN CHATTANOOGA	D	TN	83	61.7	198	74.3	129	23.3	72	97.6	111
SOUTH DAKOTA M&T	D	SD	90	71.5	119	79.4	94	17.4	198	96.9	112
U OF LA LAFAYETTE	D	LA	88	68.3	143	77.6	105	19.2	158	96.8	113
U OF MISSISSIPPI	D	MS	87	68.7	141	79.0	98	17.8	190	96.8	114
VIRGINIA COMMON.	D	VA	100	73	108	73.0	139	23.6	65	96.6	115
NEW MEXICO INST M&T	D	NM	85	65.3	166	76.8	109	19.6	146	96.5	116
U OF TEXAS EL PASO	D	TX	83	63.3	184	76.3	112	20.0	137	96.3	117
MIDDLE TENNESSEE ST	D	TN	87	63.2	185	72.6	146	23.6	66	96.2	118
EAST CAROLINA	D	NC	89	67.9	146	76.3	111	19.9	143	96.2	119
U OF NORTH DAKOTA	D	ND	85	63.2	185	74.4	128	21.5	103	95.9	120
GRAND VALLEY ST	D	MI	84	59	219	70.2	163	25.6	36	95.8	121
WASHINGTON ST	D	WA	94	70.2	130	74.7	124	21.0	115	95.6	122
ARIZONA ST POLY	D	AZ	97	70.7	123	72.9	141	22.6	83	95.5	123
CA ST: U-SACRAMENTO	D	CA	102	74.3	96	72.8	142	22.5	84	95.4	124
NORTH DAKOTA ST	D	ND	84	62.6	189	74.5	126	20.8	116	95.4	125
INDIANA ST	D	IN	80	58.7	225	73.4	136	21.9	96	95.3	126
U OF IL SPRINGFIELD	D	IL	82	61.1	206	74.5	127	20.7	119	95.2	127
CA ST U - FRESNO	D	CA	99	72.1	114	72.8	143	22.3	89	95.2	128
CORADO ST	D	CO	99	76.6	84	77.4	107	17.7	193	95.1	129
JAMES MADISON	D	VA	95	66.7	157	70.2	164	24.6	48	94.8	130
U OF NC CHARLOTTE	D	NC	96	72.3	111	75.3	119	19.5	152	94.8	131
U OF NEW HAMPSHIRE	D	NH	110	81.1	62	73.7	132	20.5	125	94.2	132
OAKLAND U	D	MI	96	69.8	132	72.7	145	21.5	105	94.2	133
U OF SOUTH FLORIDA	D	FL	98	74	99	75.5	116	18.5	175	94.0	134
U OF NORTH TEXAS	D	TX	90	72.1	114	80.1	88	13.7	242	93.8	135
OREGON ST	D	OR	102	67.4	150	66.1	214	27.6	20	93.7	136
MARSHALL	D	WV	78	58.6	227	75.1	122	18.3	178	93.5	137
MINNESOTA ST MRHEAD	D	MN	84	60.4	213	71.9	152	21.3	107	93.2	138
OLD DOMINION	D	VA	97	69.4	136	71.5	156	21.5	102	93.1	139
U OF CA BERKELEY	D	CA	147	113.7	3	77.3	108	15.7	226	93.1	140
SOUTHERN ILLINOIS CARB	D	IL	85	61.3	204	72.1	150	20.8	117	92.9	141

UNIVERSITY	DEG	ST	COLA INDX	RAW SAL	RAW SAL RANK	COLA SAL	COLA SAL RANK	COLA BEN	COLA BEN RANK	COLA S+B	COLA S+B RANK
U OF MD BALTIMORE CTY	D	MD	103	75.6	87	73.4	135	19.5	150	92.9	142
U OF NEBRASKA RENO	D	NV	109	84.7	44	77.7	104	15.0	230	92.8	143
ALABAMA ST	D	AL	83	61.2	205	73.7	131	18.9	163	92.7	144
LOUISIANA TECH	D	LA	84	58.2	230	69.3	178	23.2	74	92.5	145
MISSISSIPPI ST	D	MS	80	64	178	80.0	89	12.5	251	92.5	145
RADFORD	D	VA	88	61.5	202	69.9	170	22.6	81	92.5	145
SAINT CLOUD ST	D	MN	90	64.7	174	71.9	153	20.4	127	92.3	148
U OF MISSOURI ST LOUIS	D	MO	88	64	178	72.7	144	19.3	156	92.0	149
GRAMBLING ST	D	LA	83	56.3	242	67.8	195	24.0	59	91.8	150
U OF SOUTH ALABAMA	D	AL	87	63.5	182	73.0	140	18.7	169	91.7	151
SAM HOUSTON ST	D	TX	85	63.4	183	74.6	125	17.1	205	91.6	152
RICHARD STOCKTON NJ	D	NJ	117	80.4	67	68.7	184	22.6	80	91.4	153
U OF WA SEATTLE	D	WA	120	88.8	30	74.0	130	17.3	199	91.3	154
U OF SO MISSISSIPPI	D	MS	85	60.9	209	71.6	154	19.6	146	91.3	155
EAST TENNESSEE ST	D	TN	83	56.2	244	67.7	197	23.4	70	91.1	156
WESTERN ILLINOIS	D	IL	85	61.7	198	72.6	147	18.2	180	90.8	157
ARKANSAS ST U MAIN	D	AR	74	53.4	258	72.2	149	18.6	171	90.8	158
ARIZONA ST DT PX	D	AZ	98	68.3	143	69.7	174	20.8	118	90.5	159
DAKOTA ST	D	SD	80	58.7	225	73.4	136	17.1	204	90.5	160
ALABAMA A&M	D	AL	76	54.4	251	71.6	155	18.8	167	90.4	161
U OF HOUSTON CLR LAKE	D	TX	91	66.8	156	73.4	134	16.8	210	90.2	162
MINNESOTA ST MANKATO	D	MN	92	64.1	177	69.7	175	20.4	128	90.1	163
U OF TEXAS BROWNS.	D	TX	77	56.3	242	73.1	138	16.9	209	90.0	164
CENTRAL CONNECTICUT	D	CT	108	73.8	102	68.3	187	21.6	100	89.9	165
EMPORIA ST	D	KS	78	54.4	251	69.7	172	20.0	138	89.7	166
TEXAS A&M KINGSVILLE	D	TX	78	56.5	241	72.4	148	17.2	202	89.6	167
WINONA SATE	D	MN	89	62.1	197	69.8	171	19.8	145	89.6	168
MISSOURI ST	D	MO	83	57.6	235	69.4	176	20.1	135	89.5	169
NOTHERN ILLINOIS	D	IL	94	65.1	167	69.3	179	20.2	134	89.5	170
NEW MEXICO ST	D	NM	91	65.1	167	71.5	157	17.9	188	89.5	171
ARIZONA ST U WEST	D	AZ	98	67.7	147	69.1	181	20.3	132	89.4	172
TENNESSEE ST	D	TN	81	57.1	239	70.5	161	18.9	164	89.4	173
U OF ILLINOIS CHICAGO	D	IL	114	82.2	57	72.1	151	17.0	207	89.1	174
U OF WEST FLORIDA	D	FL	90	63	187	70.0	167	18.9	164	88.9	175
BOWLING GREEN ST	D	OH	88	61.7	198	70.1	166	18.8	168	88.9	176
U OF SOUTHERN MAINE	D	ME	104	70.9	121	68.2	189	20.7	121	88.8	177
WESTERN KENTUCKY	D	KY	86	58.1	232	67.6	198	21.2	110	88.7	178
U OF CA-LOS ANGELES	D	CA	131	100.2	10	76.5	110	11.8	256	88.2	179
GEORGIA SOUTHERN	D	GA	85	58.9	220	69.3	177	18.7	170	88.0	180
APPALACHIAN ST	D	NC	99	69	139	69.7	173	18.2	184	87.9	181
LAMAR	D	TX	81	60.9	209	75.2	121	12.5	252	87.7	182
FLORIDA INTERNATIONAL	D	FL	115	77.5	77	67.4	199	20.3	133	87.7	183
U OF CENTRAL FLORIDA	D	FL	102	69.5	135	68.1	190	19.5	151	87.6	184
ILLINOIS ST	D	IL	92	63	187	68.5	186	19.1	160	87.6	185
SOUTHERN CONNECTICUT	D	CT	111	73.9	101	66.6	207	20.4	130	86.9	186
IDAHO ST	D	ID	83	54.2	254	65.3	220	21.6	101	86.9	187
CORADO SCHL OF MINES	D	CO	118	80.6	66	68.3	188	18.6	173	86.9	188
U OF ARKANSAS LR	D	AR	91	64	178	70.3	162	16.5	215	86.8	189
FAYETTEVILLE ST	D	NC	91	62.6	189	68.8	183	17.7	192	86.5	190
SOUTH CAROLINA ST	D	SC	84	58.8	223	70.0	167	16.4	216	86.4	191
U OF SOUTH DAKOTA	D	SD	84	58.9	220	70.1	165	16.3	217	86.4	191
DELAWARE ST U	D	DE	100	65	171	65.0	222	21.2	108	86.2	193
TEXAS A&M INTL.	D	TX	83	58.1	232	70.0	167	15.8	223	85.8	194
U OF MASS DARTMOUTH	D	MA	134	81	63	60.4	243	24.6	50	85.0	195
WESTERN CAROLINA	D	NC	97	65.1	167	67.1	203	17.6	195	84.7	196
U OF LOUISIANA MONROE	D	LA	81	53.8	256	66.4	211	18.1	186	84.6	197

UNIVERSITY	DEG	ST	COLA INDX	RAW SAL	RAW SAL RANK	COLA SAL	COLA SAL RANK	COLA BEN	COLA BEN RANK	COLA S+B	COLA S+B RANK
WEST TEXAS A&M	D	TX	81	54.5	250	67.3	201	17.3	200	84.6	197
GEORGIA ST	D	GA	104	70.5	124	67.8	196	16.7	211	84.5	199
U OF NC- WILMINGTON	D	NC	102	68.2	145	66.9	205	17.5	197	84.3	200
TARLETON ST	D	TX	82	55.8	245	68.0	192	16.0	220	84.0	201
U OF TX PAN AMERICAN	D	TX	83	59.3	218	71.4	158	12.5	250	84.0	202
MONTANA TECH	D	MT	89	57.5	236	64.6	224	19.3	154	83.9	203
U OF OK HLTH SCI CTR	D	OK	79	51.8	261	65.6	219	18.1	187	83.7	204
U OF MASS AMHERST	D	MA	128	88.4	34	69.1	182	14.5	234	83.6	205
TEXAS SOUTHERN	D	TX	91	59.8	216	65.7	217	17.8	191	83.5	206
U OF NORTH FLORIDA	D	FL	93	61	207	65.6	218	17.6	194	83.2	207
U OF CORADO CO SPRGS	D	CO	90	62.2	195	69.1	180	14.1	238	83.2	208
GEORGE MASON	D	VA	134	88.6	32	66.1	213	17.0	208	83.1	209
U OF NEW ORLEANS	D	LA	95	64.7	174	68.1	191	14.8	231	82.9	210
U OF VERMONT	D	VT	113	72.2	113	63.9	226	19.0	162	82.9	211
VALDOSTA ST	D	GA	86	55.8	245	64.9	223	17.9	189	82.8	212
U OF CORADO BOULDER	D	CO	130	86.4	41	66.5	210	15.9	221	82.4	213
SOUTH DAKOTA ST	D	SD	86	57.2	237	66.5	208	15.8	222	82.3	214
NORFOLK ST	D	VA	97	60.6	212	62.5	232	19.3	157	81.8	215
PRAIRIE VIEW A&M	D	TX	88	58.8	223	66.8	206	14.7	233	81.5	216
FLORIDA A&M	D	FL	97	65.8	164	67.8	194	13.6	244	81.4	217
U OF MD EASTERN SHORE	D	MD	95	59.4	217	62.5	231	18.8	166	81.4	218
BOISE ST	D	ID	95	58.2	230	61.3	239	20.0	138	81.3	219
U OR RHODE ISLAND	D	RI	128	76.7	83	59.9	245	21.3	106	81.3	220
ALASKA FAIRBANKS	D	AK	116	64.9	172	55.9	249	25.3	40	81.2	221
CA ST: U-LONG BEACH	D	CA	121	76	85	62.8	230	18.3	177	81.2	222
VIRGINIA ST	D	VA	93	62.4	193	67.1	204	13.7	243	80.8	223
WESTERN CONNECTICUT	D	CT	129	76.8	82	59.5	246	21.2	110	80.7	224
EASTERN WASHINGTON	D	WA	91	55.3	249	60.8	242	19.9	141	80.7	225
SOUTHEASTERN LA	D	LA	85	54.2	254	63.8	227	16.7	212	80.5	226
U OF CO DEN & HLTH SCI	D	CO	101	66.5	159	65.8	216	14.5	235	80.3	227
U OF CA-SAN DIEGO	D	CA	129	88.5	33	68.6	185	11.1	260	79.7	228
TEXAS A&M COMMERCE	D	TX	85	57.2	237	67.3	200	12.4	253	79.6	229
PORTLAND ST	D	OR	111	61.7	198	55.6	251	24.0	60	79.5	230
U OF NORTHERN CORADO	D	CO	88	58.5	229	66.5	209	13.1	245	79.5	231
JACKSON ST	D	MS	82	54.4	251	66.3	212	12.9	246	79.3	232
STONY BROOK	D	NY	147	89.6	27	61.0	241	18.2	181	79.2	233
SAN DIEGO ST	D	CA	129	79.6	70	61.7	236	17.2	201	78.9	234
MORGAN ST	D	MD	103	61	207	59.2	247	19.3	155	78.5	235
STEPHEN F AUSTIN ST	D	TX	84	57	240	67.9	193	10.6	263	78.5	236
U OF MASS BOSTON	D	MA	127	82.7	53	65.1	221	12.8	248	78.0	237
SOUTHERN U AND A&M	D	LA	87	55.6	247	63.9	225	14.0	240	77.9	238
U OF CA-SANTA CRUZ	D	CA	150	100.7	8	67.1	202	10.7	262	77.9	239
U OF WEST GEORGIA	D	GA	91	55.5	248	61.0	240	16.6	213	77.6	240
CA ST: U-LOS ANGELES	D	CA	131	79	72	60.3	244	17.2	203	77.5	241
OREGON HLTH & SCI	D	OR	111	70.3	127	63.3	228	14.1	236	77.5	242
U OF TX HLTH SC CTR SA	D	TX	84	53.1	259	63.2	229	14.0	239	77.3	243
TEXAS ST U SAN MARCOS	D	TX	93	61.4	203	66.0	215	11.2	258	77.2	244
RHODE ISLAND C	D	RI	109	60	215	55.0	253	22.0	92	77.1	245
DELTA ST	D	MS	83	51.1	263	61.6	238	15.3	228	76.9	246
CENTRAL ARKANSAS	D	AR	87	53.8	256	61.8	235	14.7	232	76.6	247
MONTCLAIR ST	D	NJ	140	87	37	62.1	233	14.1	237	76.3	248
CA ST: U-FULLERTON	D	CA	128	74.6	93	58.3	248	17.0	206	75.3	249
U OF NEBRASKA MED CTR	D	NE	84	52	260	61.9	234	12.6	249	74.5	250
NORTHERN ARIZONA	D	AZ	119	66.4	160	55.8	250	18.6	172	74.4	251
KENNESAW ST	D	GA	95	58.6	227	61.7	237	11.5	257	73.2	252
MONTANA ST U BILLINGS	D	MT	94	51.8	261	55.1	252	16.2	218	71.3	253

UNIVERSITY	DEG	ST	COLA INDX	RAW SAL	RAW SAL RANK	COLA SAL	COLA SAL RANK	COLA BEN	COLA BEN RANK	COLA S+B	COLA S+B RANK
U OF MED AND DENT NJ	D	NJ	122	60.9	209	49.9	261	20.5	124	70.4	254
MONTANA ST NORTHERN	D	MT	87	46.7	264	53.7	254	15.7	225	69.4	255
TOWSON	D	MD	120	62.4	193	52.0	257	15.8	224	67.8	256
U OF HAWAII HILO	D	HI	128	64.8	173	50.6	259	16.1	219	66.7	257
BOWIE ST	D	MD	118	62.5	192	53.0	256	11.1	259	64.1	258
CHICAGO ST	D	IL	114	58.9	220	51.7	258	12.1	255	63.8	259
U OF CA SANTA BARB.	D	CA	179	96	16	53.6	255	9.3	264	63.0	260
FLORIDA ATLANTIC	D	FL	136	68.5	142	50.4	260	12.4	253	62.7	261
SAN FRANCISCO ST	D	CA	166	79.9	69	48.1	262	13.9	241	62.0	262
U OF CA-IRVINE	D	CA	153	72	116	47.1	263	10.9	261	58.0	263
U OF HAWAII MANOA	D	HI	188	83	52	44.1	264	12.9	247	57.0	264
U OF MD U C	D	MD	109	36.1	265	33.1	265	2.6	265	35.7	265

This table shows the rankings of U.S. doctorate degree granting universities based on compensation paid to faculty. DEG is the highest level of degree offered by the university. ST is the state where the university is located. COLA INDX is the cost of living index for the city in which the university is located. RAW SAL is the average salary paid to faculty unadjusted for cost of living differences. RAW SAL RANK is the ranking of each university based on its faculty salaries. COLA SAL is the salary adjusted for the cost of living in the city where the university is located. COLA SAN RANK is the ranking of the university based on COLA adjusted salaries. COLA BEN is the cost of living adjusted benefits in dollars paid on average to each faculty. COL BEN RANK ranks the universities based on their COLA benefits. COLA S+B is the combined COLA average salaries and benefits. COLA S+B RANK is the ranking based on combined COLA adjusted salary and benefits.

Exhibit 3: Rankings of Master Degree Granting Universities by Average Faculty Compensation

UNIVERSITY	DEG	ST	COLA INDX	RAW SAL	RAW SAL RANK	COLA SAL	COLA SAL RANK	COLA BEN	COLA BEN RANK	COLA S+B	COLA S+B RANK
CA POLY PANOMA	BA+	CA	77	81.4	9	105.7	1	30.4	3	136.1	1
RUTGERS U CAMDEN	BA+	NJ	98	96.1	1	98.1	2	30.1	4	128.2	2
U OF MI DEARBORN	BA+	MI	85	73.1	35	86.0	6	25.2	19	111.2	3
CLARION U OF PENN	BA+	PA	87	76.2	22	87.6	4	22.3	59	109.9	4
CA U OF PENN	BA+	PA	84	73.1	35	87.0	5	21.7	69	108.7	5
U OF HOUSTON VICTORIA	BA+	TX	80	70.4	44	88.0	3	20.4	98	108.4	6
MANSFIELD U OF PENN	BA+	PA	87	74.1	31	85.2	7	22.5	54	107.7	7
SUNY C BUFFALO	BA+	NY	79	64	76	81.0	11	25.9	15	107.0	8
PENN ST ERIE BEHREND	BA+	PA	84	70	45	83.3	8	21.5	71	104.9	9
WISCONSIN STOUT	BA+	WI	73	55.7	159	76.3	26	28.2	6	104.5	10
FERRIS ST	BA+	MI	83	63.9	77	77.0	22	27.5	8	104.5	11
EDINBORO U OF PENN	BA+	PA	88	72.5	37	82.4	9	21.7	68	104.1	12
SHAWNEE ST	BA+	OH	78	55.5	162	71.2	51	32.2	1	103.3	13
MISSOURI SOUTHERN ST	BA+	MO	73	58.7	118	80.4	12	22.6	53	103.0	14
OHIO ST U MARION	BA+	OH	82	65.2	66	79.5	15	23.3	45	102.8	15
WASHBURN	BA+	KS	81	65.9	61	81.4	10	20.9	83	102.2	16
SUNY GENESEO	BA+	NY	82	63.8	78	77.8	19	24.4	33	102.2	17
SUNY INST OF TECH UR	BA+	NY	95	72.5	37	76.3	25	24.7	25	101.1	18
OHIO ST U MANSFIELD	BA+	OH	81	62.7	86	77.4	21	23.5	42	100.9	19
SANGINAW VALLEY ST	BA+	MI	83	61.9	97	74.6	32	26.1	14	100.7	20
LAKE SUPERIOR ST	BA+	MI	79	55.1	176	69.7	65	30.8	2	100.5	21
SHIPPENSBURG U OF PENN	BA+	PA	92	73.2	34	79.6	13	20.7	89	100.2	22
CA ST BAKERSFIELD	BA+	CA	93	71.5	40	76.9	23	23.3	44	100.2	23
INDIANA U-PURDUE U FW	BA+	IN	80	58.1	130	72.6	42	27.5	7	100.1	24
PURDUE U CALUMET	BA+	IN	80	59.1	115	73.9	37	26.3	12	100.1	24
NORTHERN MICHIGAN	BA+	MI	87	62	96	71.3	50	28.9	5	100.1	26
THE C OF NEW JERSEY	BA+	NJ	108	80.6	10	74.6	30	25.2	18	99.8	27
U OF NORTH ALABAMA	BA+	AL	81	62.9	85	77.7	20	22.0	65	99.6	28
LOCK HAVEN U OF PENN	BA+	PA	88	68.7	52	78.1	18	20.9	78	99.0	29
NORTH CAROLINA CNTRL	BA+	NC	90	70.8	42	78.7	16	20.0	106	98.7	30
MOREHEAD ST	BA+	KY	73	54.2	184	74.2	35	24.2	34	98.5	31

UNIVERSITY	DEG	ST	COLA INDX	RAW SAL	RAW SAL RANK	COLA SAL	COLA SAL RANK	COLA BEN	COLA BEN RANK	COLA S+B	COLA S+B RANK
PERU ST	BA+	NE	73	55.3	170	75.8	27	22.3	57	98.1	32
WINSTON-SALEM ST	BA+	NC	87	69.2	49	79.5	14	18.5	140	98.0	33
INDIANA U SOUTHEAST	BA+	IN	83	61.5	99	74.1	36	23.4	43	97.5	34
AUBURN U MONTG.	BA+	AL	83	63.5	81	76.5	24	20.4	100	96.9	35
OHIO ST U LIMA	BA+	OH	88	65.8	62	74.8	29	21.8	66	96.6	36
TRUMAN ST	BA+	MO	78	58.2	128	74.6	31	21.8	67	96.4	37
OHIO ST U NEWARK	BA+	OH	87	64.8	71	74.5	34	21.5	72	96.0	38
TEXAS A&M TEXARKANA	BA+	TX	80	62.6	88	78.3	17	17.6	159	95.9	39
OHIO U LANCASTER	BA+	OH	87	62.4	89	71.7	45	23.8	39	95.5	40
U OF TENNESSEE MARTIN	BA+	TN	79	56.6	149	71.6	46	23.5	41	95.2	41
JACKSONVILLE ST	BA+	AL	84	56.9	144	67.7	88	27.3	9	95.0	42
U OF MN DULUTH	BA+	MN	91	63.6	79	69.9	63	25.1	20	94.9	43
MILLERSVILLE U OF PENN	BA+	PA	100	74.5	27	74.5	33	20.1	104	94.6	44
OHIO U EASTERN	BA+	OH	84	58.2	128	69.3	66	24.6	28	93.9	45
U OF SOUTHERN INDIANA	BA+	IN	79	55.3	170	70.0	60	23.7	40	93.7	46
MASS C OF LIBERAL ARTS	BA+	MA	99	67.7	55	68.4	78	25.3	17	93.6	47
EAST STROUD. U OF PENN	BA+	PA	97	71.5	40	73.7	38	19.2	128	92.9	48
WISCONSIN EAU CLAIRE	BA+	WI	84	57.1	142	68.0	84	24.9	23	92.9	49
U OF WA TACOMA	BA+	WA	104	78	14	75.0	28	17.7	157	92.7	50
MURRAY ST	BA+	KY	83	60.5	108	72.9	40	19.5	117	92.4	51
WEBER ST	BA+	UT	88	58.1	130	66.0	110	26.4	11	92.4	52
INDIANA U NORTHWEST	BA+	IN	80	56.1	155	70.1	58	22.3	61	92.4	53
CHRISTOPHER NEWPORT	BA+	VA	97	69.2	49	71.3	48	20.7	88	92.1	54
WISCONSIN LA CROSSE	BA+	WI	85	57.3	141	67.4	93	24.6	30	92.0	55
EAST CENTRAL	BA+	OK	80	53.8	189	67.3	97	24.5	31	91.8	56
NORTHERN KENTUCKY	BA+	KY	84	61.4	100	73.1	39	18.6	137	91.7	57
WISCONSIN OSHKOSH	BA+	WI	86	57.5	137	66.9	101	24.4	32	91.3	58
WISCONSIN SUPERIOR	BA+	WI	84	55.7	159	66.3	107	24.9	23	91.2	59
SUNY C OSWEGO	BA+	NY	88	60.5	108	68.8	73	22.4	56	91.1	60
CA ST STANISLAUS	BA+	CA	102	71.6	39	70.2	57	20.6	94	90.8	61
FROSTBURG ST	BA+	MD	93	65.6	64	70.5	54	20.2	102	90.8	62
OHIO U ZANESVILLE	BA+	OH	83	55.4	165	66.7	104	24.0	38	90.7	63
CA ST CHICO	BA+	CA	108	75.5	24	69.9	62	20.7	87	90.6	64
BEMIDJI ST	BA+	MN	89	62.4	89	70.1	59	20.4	95	90.6	65
KUTZTOWN U OF PENN	BA+	PA	94	67	58	71.3	49	19.3	124	90.5	66
OHIO U CHILLICOTHE	BA+	OH	85	57.8	133	68.0	83	22.5	55	90.5	67
EASTERN KENTUCKY	BA+	KY	85	59.9	111	70.5	56	19.9	111	90.4	68
WAYNE ST	BA+	NE	80	55.4	165	69.3	67	20.9	81	90.1	69
ELIZABETH CITY ST	BA+	NC	91	65.7	63	72.2	43	17.9	154	90.1	70
KEAN	BA+	NJ	126	85.5	5	67.9	86	22.2	62	90.1	71
SOUTHWEST MINNESSOTA	BA+	MN	90	62.3	91	69.2	69	20.8	86	90.0	72
WORCHESTER ST	BA+	MA	102	66.2	60	64.9	126	24.9	22	89.8	73
WISCONSIN STVNS POINT	BA+	WI	85	55.6	161	65.4	118	24.2	36	89.6	74
EASTERN ILLINOIS	BA+	IL	84	60.3	110	71.8	44	17.9	155	89.6	75
AUSTIN PEAY ST	BA+	TN	83	55.9	156	67.3	96	22.3	60	89.6	76
INDIANA U KOKOMO	BA+	IN	80	55.4	165	69.3	67	20.3	101	89.5	77
U OF NC PEMBROKE	BA+	NC	85	59.5	113	70.0	60	18.8	130	88.8	78
LINCN U OF PENN	BA+	PA	94	64.6	73	68.7	74	20.0	105	88.7	79
U OF NEBRASKA KEARNEY	BA+	NE	85	58.7	118	69.1	71	19.5	116	88.6	80
SALISBURY	BA+	MD	99	63.6	79	64.2	132	24.2	35	88.5	81
MIDWESTERN ST	BA+	TX	83	59.4	114	71.6	47	16.9	179	88.4	82
MISSOURI WESTERN ST	BA+	MO	81	54.9	178	67.8	87	20.6	90	88.4	83
INDIANA U EAST	BA+	IN	78	53.6	191	68.7	75	19.6	114	88.3	84
TROY	BA+	AL	82	55.3	170	67.4	91	20.9	84	88.3	85
LONGWOOD	BA+	VA	88	57.4	138	65.2	121	22.6	52	87.8	86
SUNY C BROKPORT	BA+	NY	96	64.7	72	67.4	95	20.4	96	87.8	87

UNIVERSITY	DEG	ST	COLA INDX	RAW SAL	RAW SAL RANK	COLA SAL	COLA SAL RANK	COLA BEN	COLA BEN RANK	COLA S+B	COLA S+B RANK
U OF CENTRAL MISSOURI	BA+	MO	83	58.5	122	70.5	55	17.2	168	87.7	88
SOUTHEAST MISSOURI ST	BA+	MO	83	56.5	150	68.1	81	19.3	123	87.3	89
MCNEESE ST	BA+	LA	84	57.8	133	68.8	72	18.5	142	87.3	90
EASTERN CONNECTICUT	BA+	CT	112	69.8	46	62.3	153	24.7	26	87.1	91
WINTHROP	BA+	SC	90	61.1	105	67.9	85	19.1	129	87.0	92
ALCORN ST	BA+	MS	78	53.2	200	68.2	79	18.7	135	86.9	93
CAMERON	BA+	OK	79	50.6	221	64.1	137	22.8	49	86.8	94
NORTHWEST MISSOURI ST	BA+	MO	81	55.1	176	68.0	82	18.8	131	86.8	95
INDIANA U SOUTH BEND	BA+	IN	80	53	202	66.3	108	20.4	98	86.6	96
SOTHERN UTAH	BA+	UT	88	54.2	184	61.6	159	25.0	21	86.6	97
AUGUSTA ST	BA+	GA	80	56.7	147	70.9	53	15.6	199	86.5	98
HENDERSON ST	BA+	AR	81	55.4	165	68.4	77	18.0	149	86.4	99
WISCONSIN RIVER FALLS	BA+	WI	94	58.6	121	62.3	152	24.0	37	86.4	100
FORT HAYS ST	BA+	KS	78	52.8	204	67.7	89	18.6	136	86.3	101
HUMBOLDT ST	BA+	CA	113	75	26	66.4	106	19.7	113	86.1	102
FRANCIS MARION	BA+	SC	88	58.8	117	66.8	103	19.2	126	86.0	103
PITTSBURG ST	BA+	KS	85	56.8	146	66.8	102	19.2	127	86.0	104
LOUISIANA SHREVEPORT	BA+	LA	83	56.9	144	68.6	76	17.3	166	85.9	105
SOUTHERN ARKANSAS	BA+	AR	78	51.2	214	65.6	115	20.0	106	85.6	106
U OF WEST ALABAMA	BA+	AL	82	52.8	204	64.4	130	21.2	76	85.6	107
CHADRON ST	BA+	NE	76	50.9	218	67.0	100	18.4	143	85.4	108
CA ST DH	BA+	CA	118	77.8	15	65.9	111	19.3	122	85.3	109
U OF TX PERMIAN BASIN	BA+	TX	80	58.3	124	72.9	41	12.4	224	85.3	110
WISCONSIN WHITEWATER	BA+	WI	92	57.4	138	62.4	151	22.8	47	85.2	111
NC SCHL OF THE ARTS	BA+	NC	87	58.3	124	67.0	99	18.2	146	85.2	112
ANGELO ST	BA+	TX	80	55.9	156	69.9	64	15.3	207	85.1	113
U OF CENTRAL OK	BA+	OK	89	61.6	98	69.2	70	15.8	195	85.1	114
COSTAL CAROLINA	BA+	SC	90	59.1	115	65.7	114	19.3	121	85.0	115
SUNY FREDONIA	BA+	NY	94	59.7	112	63.5	139	21.3	75	84.8	116
LANGSTON	BA+	OK	78	55.3	170	70.9	52	13.7	220	84.6	117
GEORGIA SW ST	BA+	GA	82	53.4	196	65.1	123	19.4	120	84.5	118
CENTRAL ST	BA+	OH	89	54.8	179	61.6	162	22.8	48	84.4	119
CUNY BERNARD BARUCH	BA+	NY	135	90	2	66.7	105	17.7	156	84.4	120
CITADEL MILITARY SC	BA+	SC	103	67.1	56	65.1	122	19.2	125	84.4	121
NORTHEASTERN ST	BA+	OK	84	52.9	203	63.0	143	21.3	74	84.3	122
TEXAS A&M GALVESTON	BA+	TX	89	60.6	107	68.1	80	16.2	191	84.3	123
THE U OF TEXAS TYLER	BA+	TX	88	57.6	136	65.5	117	18.8	132	84.2	124
SUL ROSS ST	BA+	TX	81	53.4	196	65.9	112	18.1	147	84.1	125
U OF NC ASHEVILLE	BA+	NC	97	65.4	65	67.4	92	16.4	188	83.8	126
WISCONSIN PARKSIDE	BA+	WI	91	55.5	162	61.0	167	22.6	51	83.6	127
KEENE ST	BA+	NH	104	68.5	53	65.9	113	17.7	157	83.6	128
SOUTHWESTERN OK ST	BA+	OK	82	50.1	224	61.1	165	22.3	58	83.4	129
OREGON INST OF TECH	BA+	OR	95	53.5	192	56.3	200	27.1	10	83.4	130
MISSISSIPPI VALLEY ST	BA+	MS	79	49.6	230	62.8	145	20.4	97	83.2	131
PLYMOUTH ST	BA+	NH	103	67	58	65.0	124	18.1	148	83.1	132
CLAYTON ST	BA+	GA	86	55.4	165	64.4	128	18.5	141	82.9	133
ALBANY ST	BA+	GA	82	52.6	208	64.1	135	18.5	139	82.7	134
WESTFILED ST	BA+	MA	105	62.2	93	59.2	181	23.1	46	82.4	135
MASS MARITIME ACAD	BA+	MA	121	69.5	48	57.4	193	24.6	29	82.1	136
U OF WA BOTHELL	BA+	WA	121	79.9	12	66.0	109	16.0	193	82.0	137
WILLIAM PATTERSON NJ	BA+	NJ	136	89.1	3	65.5	116	16.4	187	81.9	138
SUNY CELGE PLATTS.	BA+	NY	100	61	106	61.0	166	20.9	79	81.9	139
CONCORD	BA+	WV	79	50.7	219	64.2	134	17.6	160	81.8	140
U OF MAINE AUGUSTA	BA+	ME	91	56.7	147	62.3	154	19.5	119	81.8	141
WEST VIRGINIA ST	BA+	WV	76	49.7	228	65.4	119	16.3	190	81.7	142
FAIRMONT ST	BA+	WV	82	53.5	192	65.2	120	16.5	185	81.7	143

UNIVERSITY	DEG	ST	COLA INDX	RAW SAL	RAW SAL RANK	COLA SAL	COLA SAL RANK	COLA BEN	COLA BEN RANK	COLA S+B	COLA S+B RANK
CA ST EAST BAY	BA+	CA	123	77.7	16	63.2	142	18.5	138	81.7	144
SANOMA ST	BA+	CA	118	74	32	62.7	147	18.7	134	81.4	145
PURDUE U NORTH CNTRL	BA+	IN	91	53.8	189	59.1	182	22.1	63	81.2	146
SAVANNAH ST	BA+	GA	92	56.4	151	61.3	163	19.9	110	81.2	147
CUNY CITY	BA+	NY	135	85.7	4	63.5	140	17.6	162	81.0	148
LINCN U	BA+	MO	81	50.6	221	62.5	149	18.4	144	80.9	149
CUMBUS ST	BA+	GA	85	54.6	180	64.2	133	16.6	181	80.8	150
C OF CHARLESTON	BA+	SC	103	62.3	91	60.5	171	20.2	103	80.7	151
WEST CHEST. U OF PENN	BA+	PA	111	70.5	43	63.5	138	17.1	172	80.6	152
CORADO ST PUEBLO	BA+	CO	81	54.6	180	67.4	94	13.2	222	80.6	153
METROPOLITAN ST	BA+	MN	101	63.2	83	62.6	148	18.0	151	80.6	154
U OF ANCHORAGE	BA+	AK	117	64.2	74	54.9	206	25.6	16	80.5	155
UOF MONTEVALLO	BA+	AL	85	57.4	138	67.5	90	12.8	223	80.4	156
U OF SC UPST	BA+	SC	86	53.5	192	62.2	155	18.0	150	80.2	157
SOUTHERN IL U EDWARD	BA+	IL	92	55.8	158	60.7	170	19.6	115	80.2	158
SUNY C ONEONTA	BA+	NY	98	58.3	124	59.5	177	20.6	91	80.1	159
NORTHERN ST	BA+	SD	84	54.1	186	64.4	129	15.6	200	80.0	160
CA ST SAN MARCOS	BA+	CA	124	76.6	21	61.8	156	18.2	145	80.0	161
SOUTHEASTERN OK ST	BA+	OK	85	53.9	188	63.4	141	16.4	189	79.8	162
NORTHWESTERN OK ST	BA+	OK	76	47.7	235	62.8	146	16.7	180	79.5	163
WEST VIRGINIA TECH	BA+	WV	82	52.8	204	64.4	130	15.0	208	79.4	164
U OF HOUSTON DT	BA+	TX	91	58.3	124	64.1	136	15.3	205	79.3	165
SUNY-POTSDAM	BA+	NY	95	56.4	151	59.4	178	19.9	109	79.3	166
NICHOLLS ST	BA+	LA	85	52.4	210	61.6	158	17.4	164	79.1	167
EASTERN OREGON	BA+	OR	93	49	233	52.7	218	26.2	13	78.9	168
FORT VALLEY ST	BA+	GA	82	50.2	223	61.2	164	17.6	161	78.8	169
ST MARY'S C MD	BA+	MD	103	63.5	81	61.7	157	17.1	174	78.7	170
MINOT ST	BA+	ND	85	50	226	58.8	184	19.9	111	78.7	171
FLORIDA GULF COAST	BA+	FL	101	62.2	93	61.6	160	17.0	177	78.6	172
WESTERN OREGON	BA+	OR	98	52.8	204	53.9	212	24.7	27	78.6	173
CENTRAL WASHINGTON	BA+	WA	95	58.5	122	61.6	161	16.9	178	78.5	174
NW ST U OF LOUISIANA	BA+	LA	86	54.1	186	62.9	144	15.6	201	78.5	175
CUNY HUNTER	BA+	NY	135	81.9	8	60.7	169	17.4	165	78.1	176
FASHION INST OF TEC	BA+	NY	135	77.1	18	57.1	194	20.6	93	77.7	177
U OF SC AIKEN	BA+	SC	92	55.3	170	60.1	174	17.2	171	77.3	178
U OF MARY WASHINGTON	BA+	VA	112	65.2	66	58.2	187	18.8	133	77.0	179
VALLEY CITY ST	BA+	ND	80	44.2	240	55.3	204	21.6	70	76.9	180
WISCONSIN PLATTEVILLE	BA+	WI	99	55.5	162	56.1	202	20.8	85	76.9	181
OHIO U SOUTHERN	BA+	OH	82	53.3	199	65.0	125	11.8	231	76.8	182
GEORGIA	BA+	GA	88	53.1	201	60.3	172	16.5	184	76.8	183
FITCHBURG ST	BA+	MA	99	64.1	75	64.7	127	11.9	230	76.7	184
SUNY C CORTLAND	BA+	NY	100	57.1	142	57.1	195	19.5	118	76.6	185
LANDER UINIVERSITY	BA+	SC	85	49.7	228	58.5	186	18.0	152	76.5	186
MISSISSIPPI FOR WOMEN	BA+	MS	81	47.7	235	58.9	183	17.5	163	76.4	187
ARKANSAS TECH	BA+	AR	83	49.9	227	60.1	173	16.0	192	76.1	188
KENTUCKY ST	BA+	KY	86	52.4	210	60.9	168	14.9	210	75.8	189
ARMSTRONG ATLANTIC	BA+	GA	92	54.5	182	59.2	180	16.5	182	75.8	190
GREAT BASIN	BA+	NV	98	61.2	104	62.4	150	13.3	221	75.7	191
COPPIN ST	BA+	MD	103	61.4	100	59.6	176	15.7	198	75.3	192
WISCONSIN GREEN BAY	BA+	WI	98	53.5	192	54.6	208	20.6	91	75.2	193
JOHNSON ST	BA+	VT	104	56.4	151	54.2	210	20.9	82	75.1	194
CA ST SAN BERN	BA+	CA	129	74.3	29	57.6	192	17.2	169	74.8	195
LYNDON ST	BA+	VT	99	51.2	214	51.7	222	22.7	50	74.4	196
U OF ARKANSAS MONT	BA+	AR	81	47.4	237	58.5	185	15.8	197	74.3	197
NORTH GEORGIA	BA+	GA	91	54.4	183	59.8	175	14.4	213	74.2	198
MONTANA TECH U	BA+	MT	89	51.3	213	57.6	191	16.5	183	74.2	199

UNIVERSITY	DEG	ST	COLA INDX	RAW SAL	RAW SAL RANK	COLA SAL	COLA SAL RANK	COLA BEN	COLA BEN RANK	COLA S+B	COLA S+B RANK
FRAMINGHAM ST	BA+	MA	119	63.1	84	53.0	216	20.9	77	73.9	200
CUNY JOHN JAY C CRM JST	BA+	NY	135	76.7	20	56.8	199	17.1	173	73.9	201
SAN JOSE ST	BA+	CA	141	80.3	11	57.0	197	16.5	186	73.4	202
WESTERN WASHINGTON	BA+	WA	106	61.4	100	57.9	189	15.4	204	73.3	203
BRIDGEWATER ST	BA+	MA	124	64.9	69	52.3	220	20.9	80	73.2	204
SOUTHERN POLY ST	BA+	GA	99	58.7	118	59.3	179	13.8	219	73.1	205
U OF ARKANSAS PB	BA+	AR	78	45.1	239	57.8	190	15.3	206	73.1	206
BLACK HILLS ST	BA+	SD	92	53.4	196	58.0	188	14.2	215	72.3	207
NEW JERSEY CITY	BA+	NJ	126	84.6	6	67.1	98	5.0	239	72.1	208
CUNY YORK	BA+	NY	135	74.2	30	55.0	205	17.0	176	72.0	209
EASTERN NEW MEXICO	BA+	NM	93	52.2	212	56.1	201	15.8	196	71.9	210
THE EVERGREEN ST	BA+	WA	106	58.1	130	54.8	207	17.1	175	71.9	211
SUNY C NEW PALITZ	BA+	NY	114	61.3	103	53.8	214	18.0	153	71.8	212
NEW MEXICO HIGHLANDS	BA+	NM	88	49.1	232	55.8	203	15.6	202	71.4	213
WESTERN NEW MEXICO	BA+	NM	93	50.1	224	53.9	213	17.2	170	71.1	214
CASLETON ST	BA+	VT	103	51.2	214	49.7	224	20.0	106	69.7	215
MONTANA ST U BILLINGS	BA+	MT	94	51	217	54.3	209	14.9	209	69.1	216
MASS C OF ART & DESIGN	BA+	MA	127	68	54	53.5	215	15.5	203	69.1	217
SALEM ST	BA+	MA	120	64.9	69	54.1	211	14.8	211	68.9	218
MONTANA ST NORTHERN	BA+	MT	87	45.9	238	52.8	217	15.9	194	68.6	219
ADAMS ST C	BA+	CO	89	50.7	219	57.0	196	11.5	232	68.4	220
SOUTHERN OREGON	BA+	OR	115	52.5	209	45.7	232	22.0	64	67.7	221
ALASKA SOUTHEAST	BA+	AK	126	57.8	133	45.9	231	21.4	73	67.3	222
U OF THE DC	BA+	DC	129	73.3	33	56.8	198	8.9	235	65.7	223
CA POLY SLO	BA+	CA	132	62.7	86	47.5	227	17.3	167	64.8	224
SHEPHERD	BA+	WV	107	56.3	154	52.6	219	12.0	229	64.6	225
CA ST CHANNEL ISL	BA+	CA	155	76	23	49.0	225	14.5	212	63.5	226
MESA SATE C	BA+	CO	98	48.8	234	49.8	223	12.3	225	62.1	227
CUNY C OF STN ISLAND	BA+	NY	160	74.4	28	46.5	229	14.4	214	60.9	228
NORTHEASTERN ILLINOIS	BA+	IL	114	55.3	170	48.5	226	12.3	226	60.8	229
CUNY LEHMAN	BA+	NY	166	77.6	17	46.7	228	14.0	218	60.7	230
CA ST MONTEY BAY	BA+	CA	151	69.8	46	46.2	230	14.2	216	60.4	231
RAMAPO C NJ	BA+	NJ	197	84	7	42.6	233	14.1	217	56.8	232
SOUTHERN U NEW ORL.	BA+	LA	95	49.3	231	51.9	221	4.7	240	56.6	233
CA ST NORTHRIDGE	BA+	CA	183	75.1	25	41.0	235	12.2	227	53.2	234
CHEYNEY U OF PENN	BA+	PA	159	67.1	56	42.2	234	10.3	234	52.5	235
SUNY MARITIME	BA+	NY	166	62.2	93	37.5	237	12.2	228	49.6	236
CUNY QUEENS	BA+	NY	204	77.1	18	37.8	236	11.3	233	49.1	237
SUNY C OLD WESTBURY	BA+	NY	332	69.1	51	20.8	239	6.4	236	27.3	238
CUNY BROOKLYN	BA+	NY	377	79.3	13	21.0	238	6.2	237	27.2	239
SUNY CLEGA PURCHASE	BA+	NY	349	65	68	18.6	240	6.1	238	24.8	240

This table shows the rankings of U.S. master degree granting universities based on compensation paid to faculty. DEG is the highest level of degree offered by the university. ST is the state where the university is located. COLA INDX is the cost of living index for the city in which the university is located. RAW SAL is the average salary paid to faculty unadjusted for cost of living differences. RAW SAL RANK is the ranking of each university based on its faculty salaries. COLA SAL is the salary adjusted for the cost of living in the city where the university is located. COLA SAN RANK is the ranking of the university based on COLA adjusted salaries. COLA BEN is the cost of living adjusted benefits in dollars paid on average to each faculty. COL BEN RANK ranks the universities based on their COLA benefits. COLA S+B is the combined COLA average salaries and benefits. COLA S+B RANK is the ranking based on combined COLA adjusted salary and benefits.

Exhibit 4: Average Salaries for BA Institutions Only

UNIVERSITY	DEG	ST	COLA INDX	RAW SAL	RAW SAL RANK	COLA SAL	COLA SAL RANK	COLA BEN	COLA BEN RANK	COLA S+B	COLA S+B RANK
PENN C OF TECH	BA	PA	84	66.1	10	78.7	7	28.6	1	107.3	1
ATHENS ST	BA	AL	85	67	8	78.8	6	27.4	2	106.2	2
PENN ST SHENANGO	BA	PA	78	65	14	83.3	3	21.3	15	104.6	3
PENN ST GREATER ALLEG.	BA	PA	78	64.7	15	82.9	4	20.8	20	103.7	4
US NAVAL ACAD	BA	MD	128	113.1	1	88.4	2	15.1	57	103.4	5
PENN ST NEW KENS.	BA	PA	80	65.5	12	81.9	5	21.5	14	103.4	6
PENN ST DUBOIS	BA	PA	82	63.6	21	77.6	8	22.0	13	99.5	7
VIRGINIA MILITARY INST	BA	VA	99	72.7	4	73.4	14	24.9	7	98.4	8
PENN ST WILKES-BARRE	BA	PA	85	64.6	16	76.0	9	21.1	16	97.1	9
MIAMI U HAMILTON	BA	OH	85	59.7	28	70.2	18	26.1	6	96.4	10
PENN ST ALTOONA	BA	PA	79	59.6	29	75.4	11	20.6	21	96.1	11
U OF THE VIRGINIA'S WISE	BA	VA	83	56.6	36	68.2	22	27.0	4	95.2	12
PENN ST SCHUYLKILL	BA	PA	85	64.4	17	75.8	10	19.1	34	94.8	13
PENN ST BEAVER	BA	PA	83	62.2	23	74.9	12	19.5	26	94.5	14
U OF MN MORRIS	BA	MN	88	58.7	30	66.7	24	26.3	5	93.0	15
PENN ST WS	BA	PA	86	63.9	20	74.3	13	18.5	39	92.8	16
PENN ST HAZELTON	BA	PA	83	60.9	26	73.4	15	19.2	32	92.5	17
MIAMI U MIDDLETOWN	BA	OH	85	57.1	34	67.2	23	24.9	8	92.1	18
PENN ST EBERLY	BA	PA	85	60.6	27	71.3	16	19.6	24	90.9	20
U OF PITT JOHNSTOWN	BA	PA	78	53.6	45	68.7	21	20.5	22	89.2	21
BLUEFIELD ST	BA	WV	75	52.9	46	70.5	17	18.3	41	88.8	22
UTAH VALLEY ST	BA	UT	92	56.3	38	61.2	33	27.3	3	88.5	23
PENN ST BERKS	BA	PA	89	61.8	24	69.4	20	18.9	37	88.3	24
PENN ST YORK	BA	PA	90	62.6	22	69.6	19	18.4	40	88.0	25
U OF PITT BRADFORD	BA	PA	81	53.8	44	66.4	25	21.0	17	87.4	26
U OF MN CROOKSTON	BA	MN	89	54	42	60.7	37	24.6	9	85.3	27
U OF AR FORT SMITH	BA	AR	82	54	42	65.9	26	19.4	28	85.2	28
U OF SCI AND ARTS OF OK	BA	OK	74	46.2	65	62.4	30	20.8	18	83.2	29
DALTON ST	BA	GA	84	51.1	56	60.8	35	22.1	12	83.0	30
U OF MAINE PRESQUE ISLE	BA	ME	90	54.7	40	60.8	36	20.8	19	81.6	31
U OF NH MAN.	BA	NH	108	69.5	7	64.4	28	17.1	47	81.5	32
ROGERS ST	BA	OK	87	50.5	58	58.0	42	22.6	11	80.7	33
DIXIE ST C OF UTAH	BA	UT	100	56.6	36	56.6	48	23.9	10	80.5	34
PENN ST MONT ALTO	BA	PA	91	57.2	33	62.9	29	16.7	50	79.6	35
U OF PITT GREENSBURG	BA	PA	86	52.8	47	61.4	32	17.8	44	79.2	36
GLENVILLE ST	BA	WV	78	48.6	61	62.3	31	16.4	52	78.7	37
MACON ST	BA	GA	84	51.2	55	61.0	34	17.0	48	78.0	38
U OF MAINE FARMINGTON	BA	ME	94	54.7	40	58.2	41	19.6	25	77.8	39
U OF MAINE FORT KENT	BA	ME	90	52.2	51	58.0	43	19.4	27	77.4	40
DICKINSON ST	BA	ND	84	49	60	58.3	40	19.0	35	77.4	41
NEW C OF FLORIDA	BA	FL	108	64.2	18	59.4	39	17.7	45	77.1	42
SUNY TECH CANTON	BA	NY	96	55.3	39	57.6	44	18.6	38	76.3	43
MORRISVILLE ST	BA	NY	93	52.8	47	56.8	47	19.2	29	76.0	44
WEST LIBERTY ST	BA	WV	79	47.5	63	60.1	38	15.4	56	75.6	45
SUNY A&T COBLESKILL	BA	NY	103	57.4	32	55.7	51	19.1	33	74.9	46
PENN ST DELAWARE CTY	BA	PA	114	65.6	11	57.5	45	16.9	49	74.4	47
CA MARITIME ACAD	BA	CA	108	58.7	30	54.4	56	19.9	23	74.3	48
WEST VIRGINIA U PARK	BA	WV	80	45.8	66	57.3	46	16.3	53	73.5	49
FARMINGDALE ST	BA	NY	131	72.1	5	55.0	53	18.0	42	73.1	50
SUNY TECH ALFRED	BA	NY	99	52.8	47	53.3	58	19.2	30	72.5	51
LEWIS-CLARK ST	BA	ID	85	47.6	62	56.0	50	16.5	51	72.5	52
NEVADA ST	BA	NV	103	66.5	9	64.6	27	7.6	66	72.1	53
U OF MAINE MACHIAS	BA	ME	92	50.3	59	54.7	55	17.3	46	72.0	54
PENN ST ABINGTON	BA	PA	112	61.4	25	54.8	54	16.1	55	70.9	55

UNIVERSITY	DEG	ST	COLA INDX	RAW SAL	RAW SAL RANK	COLA SAL	COLA SAL RANK	COLA BEN	COLA BEN RANK	COLA S+B	COLA S+B RANK
HARRIS STOWE ST	BA	MO	88	47.5	63	54.0	57	16.1	54	70.1	56
PENN ST LEHIGH VALLEY	BA	PA	118	65.5	12	55.5	52	14.1	61	69.6	57
SUNY TECH DELHI	BA	NY	104	52.1	52	50.1	61	19.0	36	69.1	58
MAYVILLE ST	BA	ND	81	40.2	68	49.6	62	17.9	43	67.5	59
VERMONT TECHNICAL	BA	VT	107	51.1	56	47.8	63	19.2	31	66.9	60
METRO ST C OF DEN	BA	CO	101	56.8	35	56.2	49	9.5	65	65.7	61
U OF SC BEAUFORT	BA	SC	102	51.7	54	50.7	59	14.8	58	65.5	62
WESTERN ST C OF CO	BA	CO	104	52.3	50	50.3	60	12.2	63	62.5	63
OKLAHOMA PANHANDLE	BA	OK	80	37.8	69	47.3	64	14.4	60	61.6	64
U OF MONTANA WESTERN	BA	MT	98	44.2	67	45.1	65	14.6	59	59.7	65
FORT LEWIS C	BA	CO	117	52.1	52	44.5	66	10.2	64	54.7	66
U OF HAWAII WEST OAHU	BA	HI	155	64.1	19	41.4	67	13.2	62	54.6	67
CUNY MEDGAR EVERS	BA	NY	377	74.3	3	19.7	68	6.1	67	25.8	68
CUNY NY CITY C OF TECH	BA	NY	377	70.6	6	18.7	69	6.0	68	24.7	69

This table shows the rankings of U.S. bachelor degree granting universities based on compensation paid to faculty. DEG is the highest level of degree offered by the university. ST is the state where the university is located. COLA is the cost of living index for the city in which the university is located. RAW SAL is the average salary paid to faculty unadjusted for cost of living differences. RAW SAL RANK is the ranking of each university based on its faculty salaries. COLA SAL is the salary adjusted for the cost of living in the city where the university is located. COLA SAN RANK is the ranking of the university based on COLA adjusted salaries. COLA BEN is the cost of living adjusted benefits in dollars paid on average to each faculty. COL BEN RANK ranks the universities based on their COLA benefits. COLA S+B is the combined COLA average salaries and benefits. COLA S+B RANK is the ranking based on combined COLA adjusted salary and benefits.

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