January 2015

Two Essays Examining Organizational Performance

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by

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A dissertation submitted in partial fulfillment
of the requirements for the degree of
Doctor of Philosophy
Department of Economics
College of Arts and Sciences
University of South Florida

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Date of Approval:
June 30, 2015

Keywords: manager humility, employee voice, continual improvement, efficiency, malaria, Nigeria, mosquito bed nets, anti-malarial campaign

DEDICATION

With all the love and appreciation a person can feel, I dedicate this dissertation to my parents. No words can describe how thankful I am to have the most wonderful, loving and supportive mom and dad anyone could ever be blessed with. Without my mom reminding me that I have what it takes to finish it as long as I sit down to actually work, this would have taken four times longer. Her continued willingness to discuss my research over a period of 6 years or so will forever be appreciated, as I know it couldn't have been as exciting for her as it was for me (thanks mom)! Without my dad always telling me that I could accomplish anything in the world that I wanted, I never would have even started this adventure. His unwavering support and undeniable belief that I would eventually finish was always a reassuring confirmation that it was possible. Although they would have still been extremely proud had I simply stopped at my Master's degree, they knew I was determined to go all the way and so made sure I had everything I needed to make it possible. Their continued support and encouragement throughout my entire life (along with the many blessings of what I fondly call "the universe") not only gave me the courage to start this journey, but for sure allowed me to finish it.

ACKNOWLEDGMENTS

This dissertation wouldn't have become what it is without the amazing guidance and support of the committee members. Gabriel Picone has been such an influential mentor since the beginning of my program, and this experience wouldn't have been as educational and enjoyable without his involvement. Walt Nord I found randomly after stealing his classroom to host a review session for my students, and for that I will always be thankful. Without his expertise and guidance related to the management side of this research (which is of course a major component), I wouldn't have been able to address and consider all the things necessary to make this research as strong as possible. I am also thankful for his friendship and the fact that he was always willing to listen to me spout off various ideas and thoughts, no matter how much they seemed to be all over the place. I will also always be appreciative to Paul Spector (who as an I/O psychologist probably wondered why I asked him to be on my committee) for all of his expertise and feedback related to survey items and their analyses. Between his and Gabriel Picone's research methods expertise, I had all the guidance I needed. He was also always very thoughtful in his comments and provoked deeper thoughts as to how to address the various issues related to collecting and analyzing your own data. I am also extremely thankful for all the time Andrei Barbos was willing to spend with me to not only discuss all the facets of my research and things I needed to consider, but also for all the time he spent reminding me that finishing this degree would pay off (and to not go too slowly). He always had insightful comments and was always willing to re-read every version this paper went through to try to help make it better (and there were many). Josh Wilde was willing to jump on board seemingly at the last minute due to another member becoming unavailable. Even while working toward his

tenure, he was always willing to discuss with me things to think about and how to improve my research. I learned a lot from him, and from every member of my committee. Without them, this work wouldn’t be even close to what it is and I am forever grateful that they were willing to take off on this incredible (but sometimes seemingly impossible) journey with me.

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ABSTRACT

Social scientists from different disciplines have various approaches to explaining phenomena such as why people behave as they do and why some organizations outperform their competition. However, the complexity of human and even firm behavior is perhaps better understood by combining the work from multiple fields and perspectives. For example, economists can explain differences in productivity using capital and labor, but psychologists can explain how to get more productivity out of the same labor. Indeed, economic models often notice “residual effects” when modeling firm performance, but they simply call them “managerial quality” and leave them inside the error term (Bloom & Van Reenen, 2007). By incorporating psychology into economics, we have a chance to pull this additional “input” out of the error term so that our models can better explain why some firms are more productive or more profitable than their rivals.

Of course, other economists have also argued for the need to blend disciplines and take a multi-disciplinary approach to our usual problems. They argue that incorporating more realistic psychological findings and theories into the assumptions of economic models can be not only beneficial, but should be necessary to help us better predict the behaviors we observe in the real world. For example, feelings of reciprocity often lead to deviations from our models: people reciprocate unfairness (and altruism) in ways that may even lower their expected utility (see, for example, results of the “ultimatum game”). Along these same lines, Akerlof and Yellen (1990) looked at the relationships between firms and workers using the social exchange theory (which comes mainly from sociology or anthropology) and held that workers may reciprocate a higher wage with a higher effort. (This is different than the view of most economic theories, which hold that the effort or productivity comes first, and is rewarded with a wage equal to the worker’s

marginal contribution.) It can also be seen that psychology has aided our models from the work of Kahneman and Tversky (1979), who developed the ideas of reference-dependent preferences and loss aversion and improved standard models of risk behavior.

Rabin (1998) argues that in general, economists understand that the assumptions we make before beginning our analyses are often unrealistic. However, he argues that some of these assumptions could be aided by incorporating what psychology has found to be true about people's behaviors. As he puts it (pg 3):

As messy as complicating our familiar model of humans will be… it is not legitimate for economics to continue to ignore psychological research… Most importantly, we must abandon meta-arguments about whether it is "possible" that psychologists have identified economically relevant departures from rationality, self-interest, and other familiar assumptions. Of course it is possible, and in fact is true."

Thus, one goal of this research is to see whether the contributions of psychology to our models of individuals' behaviors can be mirrored by contributions to our models of firms. If so, the reader will hopefully be convinced that while specialization allows each of us to be experts in our own fields, it's the integration of fields that allows for the multi-lens perspectives that give us the best understanding of the highly complex realities of human and firm behavior.

Both essays of this dissertation take this approach, integrating psychology and management into economics to see if a greater understanding of differences in organizational performance and outcomes can be achieved. The first essay, Measuring the Effects of Management Humility and Employee Voice on Continual Improvement and Performance, focuses on what occurs inside the firm between managers and employees that may affect the firm's ability to continually improve. This ability can be especially necessary in highly competitive industries where firms aren't protected by barriers to entry and customers' preferences are

constantly changing. However, the internal exchanges between employees and managers are often not modeled or included in our standard economic theories, even though they may be an integral component to the development and implementation of new ideas that could improve efficiency and firm performance. Specifically, in this research I will investigate whether certain managers are more likely to experience more input from employees and whether these same types of managers are more likely to implement new ideas to continually improve the way things are done. Additionally, I test whether this willingness to implement new ideas is also associated with higher perceived levels of efficiency. If this chain of events can help us better understand differences in firm performance, then perhaps we can enhance our models by measuring and including these internal firm characteristics (rather than leaving them inside the error term as "unobservable").

In the second essay, I propose to test whether different organizations involved in heading anti-malaria campaigns (such as the World Bank, UNICEF, etc.) are having varying levels of success, defined by achieving levels of preventive behavior among their target populations. If some organizations are both more efficient and more effective than others, then perhaps those that underperform can learn from and imitate the higher performers, and funding can be directed toward those organizations that use the money efficiently. In this way, the second essay differs from the first. The first essay takes as given that performance differs among organizations and seeks to understand why, but the second investigates whether differences in "performance" among these non-profits or government institutions can even be found. However, both attempt to enhance the standard models used in most economic analyses by incorporating perspectives from other fields. If these integrated models shed greater light on issues that we have yet to fully understand, then perhaps future research should continue using this combination of multiple perspectives to enhance our knowledge of these somewhat complex but undoubtedly important issues.

REFERENCES CITED:

Akerlof, G. A., & Yellen, J. L. (1990). The fair wage-effort hypothesis and unemployment. Quarterly Journal of Economics, 105(2), 255-283.

Bloom, N., & Van Reenen, J. (2007). Measuring and Explaining Management Practices across Firms and Countries. The Quarterly Journal of Economics(4), 1351. doi: 10.2307/25098879

Kahneman, D., & Tversky, A. (1979). Prospect Theory: An Analysis of Decision under Risk. Econometrica(2), 263. doi: 10.2307/1914185

Rabin, M. (1998). Psychology and economics. Journal of economic literature, 36(1), 11-46.

ESSAY #1: EXAMINING THE EFFECTS OF LEADERSHIP HUMILITY AND EMPLOYEE VOICE ON CONTINUAL IMPROVEMENT AND FIRM PERFORMANCE

1. INTRODUCTION

In highly competitive industries where firms aren't protected by barriers to entry and consumers' preferences are constantly changing, the willingness and ability to adapt and continually improve operations may be critical for continued success. However, the internal exchanges between employees and managers that may be an integral part of the development and implementation of new ideas are often not modeled or included in our standard economic theories.

In this research I investigate whether a higher level of employee voice (or employee input) predicts higher levels of continual improvement, and whether this continual improvement predicts higher levels of firm performance. Additionally, I will study whether humble managers keep this process going by fostering an environment where employees feel free to provide input. If this chain of events can help us better understand differences in firm performance then perhaps we can enhance our models by measuring and including these internal firm characteristics instead of simply leaving them inside the error term and calling them "unobservable."

Results across three separate studies show that humble managers are more likely to be perceived as making continual improvements and higher levels of perceived continual improvement leads to both greater levels of employee voice and fewer perceived job obstacles. A pilot study involving two separate quick-food restaurant chains also lends support for the above ideas, but uses sales in dollars as the measure for performance. Additionally, holding the

employee constant in a fixed-effects analysis shows that the same employee is more likely to voice ideas to a manager he or she reports as continually improving the way things are done.

2. MOTIVATION

What makes a firm more profitable than its rivals, when they all exist within the same, highly competitive industry? Economists have often looked into explanations related to economies of scale or scope, patent protections, differentiated products, etc. but these are characteristics of industries that limit competition. What we need are explanations as to why firms within a highly competitive industry experience strikingly different levels of performance and profits, and most importantly, why above-average profits are not ultimately swept away as predicted by most standard economic models.

Fortunately, the work has already begun. Some leading economists are breaking the tradition and looking inside the firm for sources of performance heterogeneity. (See, for example, the many works of Bloom and Van Reenen.) Traditionally, economists treat all firms within an industry as exactly alike on the inside, assuming that they are all choosing the same approach to staying in business: maximizing profits. When all firms are solving the same equation, there's no reason to look inside, because those who don't optimize won't survive.

However, what this assumption fails to appreciate are the many other potential approaches a firm can take to stay in business. For example, they could maximize employee productivity by focusing on employee-centered policies that make for a happy or more productive workforce, reducing turnover and therefore potentially reducing costs. They could also try to maximize the flow of new ideas, continually improving the way things are done, thereby continually increasing efficiency and lowering costs of doing business. Both of these strategies may lead to higher profits, yet the standard approach of assuming the firm simply chooses the optimal combination of labor and capital remains. Then, when the effect of these inputs on profits and performance leaves much to be explained inside the error term, we often

label the unobserved as “managerial quality” (Bloom & Van Reenen, 2007) and ultimately leave it unmeasured and ignored. Although theoretically management could be handled just as any other input in a production function (such as capital or labor) (Nicholson & Snyder, 2008), most find it too cumbersome to measure and instead adopt an approach that “treats the firm as a single-decision making unit and sweeps away all the complicated behavioral issues” (pg. 359, Nicholson and Snyder (2008)). This view of the firm as a “black box” necessarily limits our understanding of important productivity and performance differences that are often observed across firms.

However, we can incorporate some of the measures of people and relationships from the fields of management and psychology into our theoretical models and see if we can further explain some of the variance in performance. Specifically, I propose to measure and test particular features of firms that I believe will add to our understanding of why some firms outperform and outlast their competition: the level of employee input that occurs and how responsive the management is to that employee input.

The goals of this research are to investigate whether these internal characteristics matter, and to what degree they are inter-related and connected. Specifically, do higher levels of employee voice (input) predict better performance? Are more humble managers more likely to be willing to use employee ideas, and does this impact the willingness of employees to voice their ideas?

These are the research questions I propose to test, combining what we know from economics, management and psychology to generate a model that incorporates the importance of internal characteristics in order to help explain firm performance heterogeneity that we often observe.

In the first study presented, survey data were collected from 251 employees working within various industries and firms and survey items were combined to create complex constructs. (Item analyses show reliability estimates that exceed 0.80). These constructs were

then analyzed using a recursive system of equations with three-stage least squares. Clearly this combines techniques and research methods from multiple fields, which can be a useful strategy when trying to analyze the impact of employees' and managers' behavioral characteristics on outcomes such as firm performance.

The second study uses a different sample of employees who each reported about two separate managers. This study uses fixed effects analysis to study whether it's the characteristics of the employee that determine whether he or she voices ideas (meaning some people simply will or will not voice ideas across many situations) or if the how he or she perceives the manager who would hear the idea makes a difference in determining the employee's willingness to provide helpful input.

The third study then uses observations from approximately 20 units across two separate quick-food restaurants to study whether the relationships found in Study #1 remain even while using actual sales in dollars as the performance measure.

Results across all three studies lend support to an alternatively specified model than the original. Specifically, humble leaders are more likely to be perceived as continually improving the way things are done and this continual improvement encourages even more ideas from the employees below. Additionally, it appears that this continual improvement is what leads to fewer job obstacles and higher sales, and that manager humility has no significant impact on performance once controlling for one consequence of manager humility: continual improvement.

The purpose of this research is to try to build a stronger understanding of which factors may be acting as some of the "unobservable" sources of differences in firm performance. Additionally, if this understanding allows us to pull these factors out of the error term and measure them and their effects directly, our models become slightly more enhanced and potentially better able to predict what causes the substantial and sustained firm heterogeneity that we often observe.

The essay is structured as follows: section 3 outlines the relevant literature on which the ideas presented are based. Section 4 covers the methodology, the sample, and the data for the first study and Section 5 contains the results. Section 6 details the alternative specification found to more accurately capture what is found in the data. Section 7 describes the second study and Section 8 discusses the third study. The essay concludes with a discussion of the limitations of this research, followed by ideas that can correct these limitations in the future.

3. LITERATURE REVIEW

3.1 Dynamic Capabilities and Firm Performance

This research problem focuses on a firm's desire and capability to adapt, or more specifically stated, *improve.* A firm can, of course, improve processes to increase efficiency or improve products and services to increase customer satisfaction. Either way, the desire (and ability) to continually improve may also improve both the overall performance and the likelihood of surviving the turbulent dynamic markets within which so many firms operate. This idea runs parallel to the 'dynamic capabilities' perspective introduced over 15 years ago.

The dynamic capabilities literature has been extensively developed in the strategic management field after first being introduced by Teece, Pisano, and Shuen (1997). They were extending the ideas of the 'resource-based view (RBV) of the firm' (introduced by Wernerfelt (1984) and later popularized by Barney (1991)) which held that firms need to own resources that are *valuable, rare, inimitable* and *nonsubstitutable* in order to achieve competitive advantage. Teece et al. (1997) argued that owning these types of resources wasn't enough; firms also needed the *internal capabilities* to deploy those resources (Wang & Ahmed, 2007). Specifically, since most markets are dynamic and constantly changing, in order to achieve a sustainable competitive advantage, firms must be able to "constantly… integrate, reconfigure, renew and recreate its resources and capabilities and, most importantly, upgrade and reconstruct its core

capabilities in response to the changing environment" (pg. 35). It is the emphasis on "upgrading" and "renewing" the resources that make this perspective especially relevant to this research.

There are three factors that Wang and Ahmed (2007) put forth that "explain firms' mechanisms of linking *internal resource advantage to external marketplace-based competitive advantage*" (emphasis added, pgs. 36-7): adaptive capabilities, absorptive capabilities and innovative capabilities. What will be argued here is that the *internal resource advantage* may come not only from patent protection or other barriers to entry, but also from having internal processes that cannot easily be imitated. Examples include specifically the constructs being studied here: namely, the amount of employee voice that occurs and the leadership style that encourages it. Managers who encourage ideas from all levels likely have the best possibility of developing these capabilities and additionally, will likely out-perform their counterparts whose adaptive or innovative capabilities are stifled by close-minded management.

Because a distinction is often made in the literature between innovative and adaptive capabilities, I will employ a more general concept of "*improvement* capabilities." This blends the two concepts and allows improvements to be caused by a need to adapt to changing market conditions (as in the adaptive capabilities literature), or simply by a desire to constantly improve (even when "unnecessary"). Additionally, the implemented idea may be completely new (or innovative) or it could be "borrowed" from competitors, the important thing only being that it improved productivity, efficiency or customer satisfaction for the firm that was not previously employing the idea. Using this term leaves sufficient room for various types of strategies and focuses on what I believe is the biggest determinant of remaining competitive: continual improvement.

Indeed, links have been found between adaptive capabilities and firm evolution, survival and success (Wang and Ahmed (2007); see also Alvarez and Merino (2003), Camuffo and Volpato (1996), and Forrant and Flynn (1999). Other studies have found these outcomes linked specifically to innovative capabilities (see, for example, Deeds, Decarolis, and Coombs (1999);

Delmas (1999); Lazonick and Prencipe (2005); Petroni (1998); Tripsas (1997)). I propose not only to combine these capabilities into one construct, but also hope to provide employee voice (and management styles that encourage it) as specific and clear antecedents that help build and sustain these capabilities.

3.2 Employee Voice

There has been a great deal of research done in organizational behavior which focuses on employees taking part in building a firm's competitive advantage. "Employee voice" in particular is one avenue through which employees can contribute to the success of the firm. This construct has been defined in various ways, but most researchers follow the definition put forth by Van Dyne (see, for example, Van Dyne and LePine (1998); Botero and Van Dyne (2009); Van Dyne, Ang, and Botero (2003), which specifies that employee voice occurs when an employee "makes innovative suggestions for change and recommends modifications to standard procedures," utilized not to criticize, but instead to "proactively express constructive suggestions" (Botero and Van Dyne (2009), pg 87). Employee voice, then, relates specifically to improvement ideas suggested by employees that may lead to a greater level of success for the organization. (To be clear, this means it does not include employee complaints or dissatisfactions that don't bring with them potential improvement solutions.)

Many researchers have attempted to discover what influences employee voice, what types of people are most likely to engage in it, and under what conditions it is most likely to occur. For example, studies have found that certain managerial characteristics such as openness and responsiveness (Saunders, 1992) or transformational leadership (Detert & Burris, 2007) encourage employees to express their ideas. In addition, employees are more likely to speak up if they perceive that speaking up is safe and/or will be effective and make a difference (Morrison, 2011), and if personal beliefs such as power distance orientation leads one to believe that authority in power should or can be challenged (Botero & Van Dyne, 2009). Additionally,

gender, experience in the field and tenure with the organization have been found to be individual-level characteristics that help predict employee voice (Morrison, 2011). Organizational characteristics such as the structure and bureaucracy can also either provide or withhold opportunities for ideas to be communicated and create an environment that either makes the ideas more likely to be implemented or more likely to be ignored. These factors can therefore impact how willing the employees will be to generate and communicate new ideas that may truly improve the organization and help it build a sustainable competitive advantage.

However, despite the growing focus on employee voice in the literature, most studies test only potential antecedents or causes of employee voice and only imply (usually somewhere in the introduction) that employee voice is likely good for the organization. Therefore, one contribution of this research is testing whether employee voice does, in fact, affect performance. Additionally, I show that when employees perceive their managers to be willing to continually improve the way things are done, they are more likely to report voicing ideas to them.

3.3 The Role of Management

The attitudes, beliefs and behaviors of managers can play a major role in whether employees first even make the effort to generate ideas that may benefit the organization, but then can also impact whether they take the time and potential risks associated with voicing those ideas upward. More specifically, managers may either openly encourage input from all levels or they may instead make most decisions on their own and prefer employees to listen and simply follow directions without offering their own ideas on how things should be done. Indeed, many managers believe subordinates are subordinates for a reason, and that they have nothing beneficial to add besides the completion of the tasks assigned to them. However, other managers think that good ideas can come from any level, and therefore their behaviors reflect an open and responsive environment where ideas flow freely from all directions. I propose that this latter type of leader will be found at those organizations experiencing the highest levels of

employee voice. This type of leader has been referred to by many names, but most of all, this leader can certainly be referred to as *humble.*

3.4 Humility

"Leader humility is still viewed as a rare personality trait that somewhat mysteriously produces favorable organizational outcomes" (Owens & Hekman, 2012). In contrast with the more conventional idea that leaders should portray themselves as superstars, there have been calls for leaders to "show their humanness by being open about their limitations in knowledge and experience" (Weick (2001), as quoted by Owens and Hekman (2012)), especially since the workplace is becoming increasingly more complex and adaptability is now essentially required for survival (Weick (2001), referenced by Owens and Hekman (2012)**).**

However, exactly what humility is or what humble leader behaviors look like is still unclear (Owens & Hekman, 2012). In a great summary of the previous literature, Owens and Hekman (2012) synthesize the various ways scholars and others have defined humility as involving "how leaders tend to view themselves more objectively, others more appreciatively and new information or ideas more openly" (pg 789). Put another way, those who are humble 1) acknowledge their limitations, 2) are open to others' ideas and 3) view others appreciatively without feeling threatened by their potential contributions (B. P. Owens, Rowatt, & Wilkins, 2011). These characteristics are likely to be some of the underlying attitudes and beliefs of managers that foster the kind of environment where employees feel comfortable and safe expressing ideas, as well as encouraged or appreciated for doing so. When a leader is able to acknowledge his or her limitations they are likely more willing to seek the ideas and opinions of others, including their subordinates. When they can "spotlight followers' strengths and contributions" (pg. 794) then these followers are likely more willing to spend the time and energy generating and communicating their ideas for improving company performance. If employee input is, in fact, found to affect the ultimate success of the firm through enriching ideas to

improve processes, products or services, and a manager's perceived level of humility positively impacts employee voice, then we can add these management and employee behaviors to our models to better explain how some companies so successfully out-perform their competition inside ever-evolving, dynamic markets.

3.5 Contributions to Existing Literature

Existing economic models focus mainly on inputs and outputs to describe a firm's profit-maximization problem, and describe differences in performance that we observe in data as *unobservable differences in efficiencies* among firms. I will argue that these "unobservable" characteristics occurring inside the firm can (and should) be modeled using techniques that have been employed by other fields for many years. An integrated model incorporating theories of management and psychology, for example, may shed better light on what determines performance heterogeneity across firms over a model using isolated theories from economics. Perhaps management and employees affect profits not only through productivity, but also through influencing the flow of ideas and continual improvement. If these things can be measured, I offer them as potential reasons some firms continually outlast and out-perform their rivals while others fail when market conditions change.

Contributions to the existing literature on employee voice come from showing that employees do perhaps need to feel that their ideas may be implemented, not just heard. (Perceived efficacy of voice may be important.) Additionally, the consequences of voice may not simply be assumed to be positive, as is usually done in introductions to voice research (Morrison, 2011). Instead, a moderating relationship may be more appropriate, where the outcomes of employee voice depend heavily on whether the manager is willing to implement ideas and try new things when suggested by the employees. Additionally, researchers studying humility are still trying to determine potential consequences of humility in management. I hope to add support to the idea that humble managers not only encourage employee ideas, but also

may be more likely to continually improve processes, products and services, thereby further impacting performance.

4. RESEARCH DESIGN AND METHODS- STUDY #1

4.1 Conceptual Framework

A visual representation of the full model based on the ideas presented above is provided below:

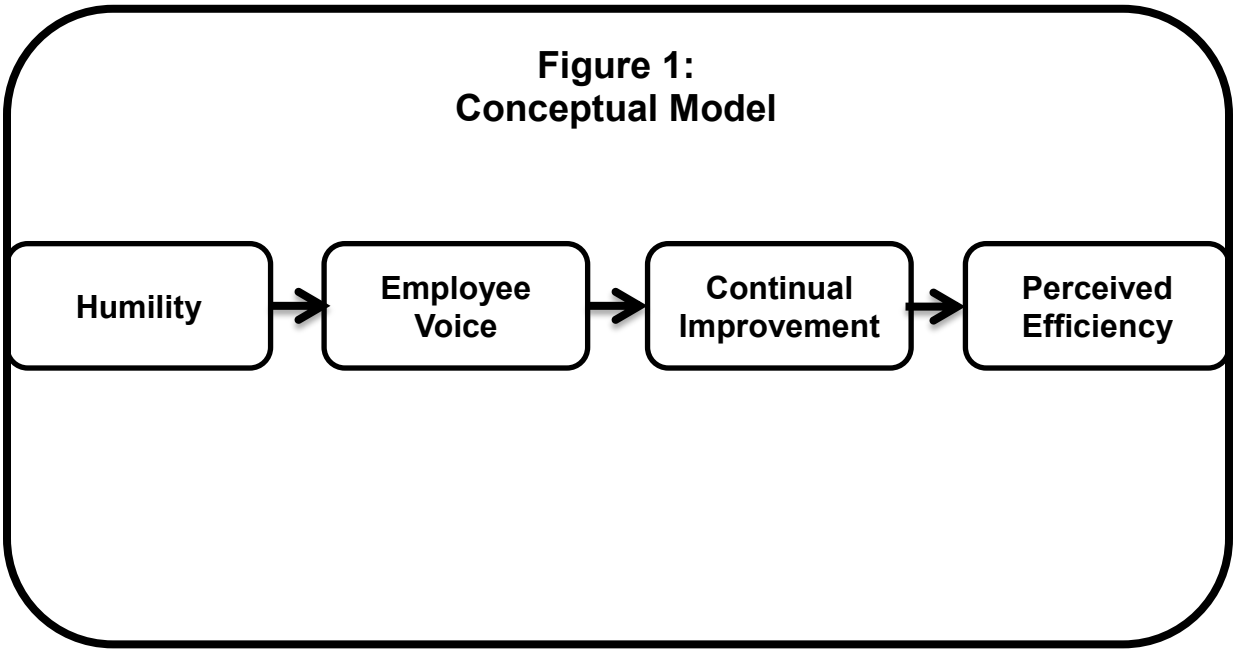

Figure 1: Visual Representation of Model

First, do humble managers inspire or encourage greater levels of employee voice? Second, when more ideas related to fixing inefficiencies are flowing around (greater levels of employee voice), do employees also perceive greater levels of continual improvement (i.e., more ideas actually being implemented)? Finally, are greater levels of continual improvement also associated with fewer perceived job obstacles within the firm?

Support for this model would show that these factors could be some of the missing pieces in our profit maximization equations, especially helping to predict which firms may be

more able and likely to adapt and survive constantly changing market conditions. If so, incorporating them into our standard economic models may help us better explain the firm heterogeneity that we often observe but cannot (or do not) measure.

4.2 Data

4.2.1 Data collection method

Survey data were collected from a convenience sample of employed university students, online from reddit.com internet users and from personal contacts. All were asked to respond electronically to the survey questions, and data were collected over a 12 month period. The final sample consists of 251 working adults from a wide range of industries. Unfortunately, data on participants' gender and ages are not available for this sample.

4.2.2 Survey instrument

The employees each responded to a survey that included questions related to their perceptions of their manager's humility, their own voice behaviors, and other measures related to their workplace and supervisor[1]. (A full discussion of items follows in the next section). Since respondents were from a variety of industries and firms, a subjective measure of efficiency in the workplace works well to create a somewhat universal measure (as opposed to performance being measured by number of goals hit, number of clients, etc.). This subjective performance measure relates to perceived job obstacles by the employees; specifically, if they feel as though things get in the way of them doing their job well. This can be measured across various work environments but maintain its meaning related to inefficiencies in the workplace.

A blending of data collection methods is helpful since this research involves complex constructs that aren't easily measured by one clear, objective variable. With complex constructs, it's best to collect data on several different aspects of the construct and blend them to create

[1] Respondents chose the manager about which to respond after being prompted in the following way: "Please answer the following questions about one of your supervisors/managers that you work with at your current location. Keep this manager in mind for the remainder of the survey."

one measure of the variable, similar to what economists do for “socio-economic status” or even the consumer price index. The combined items produce a measure of reliability (see α below next to each construct) that represents the individual items’ inter-relatedness. All of the survey items and constructs are detailed in the sections that follow and Table 1A displays the entire survey instrument used in this research. The responses range from one to five for every item, from “Strongly Disagree” to “Strongly Agree” or from “Never” to “Always”, whichever is more appropriate for the particular question. Table 2A shows the summary statistics for each variable obtained from the sample in Study #1.

4.2.3 Measures

Job obstacles (α=0.89): Perceived levels of efficiency are being used as a proxy for performance. Perceived levels of efficiency will be measured by the report of “organizational obstacles” that get in the way of the employee doing his or her job. In any industry, at any company, when things prohibit employees from doing their job well, performance is likely to suffer. As this measure is a general one of perceived obstacles inhibiting performance, it can be collected from employees working under different conditions within different organizations and still be used for comparisons and analyses. Specifically, the measures include “Things get in the way of me doing my job well”; “Things get in the way of me offering good service to my customers”; and “Things get in the way of our customers being easily satisfied.” It can then be tested whether higher levels of employee voice lead to fewer perceived job obstacles within the workplace. Additionally, the model will test whether more job obstacles are associated with lower job satisfaction, which can further impact performance through reduced turnover costs related to training, recruiting and learning-curve inefficiencies (Brown & Mitchell, 1993).

Employee voice (α=0.96): Several different instruments exist that measure employee voice behavior within an organization. The most widely used self-report instruments include those from Van Dyne and LePine (1998), and these will be modified slightly in order to address the specific issues of this research. For instance, “I develop and make recommendations to this

supervisor [that could improve work processes]" and "I develop and make recommendations to this supervisor [that could improve customer satisfaction]" should help capture whether employees are engaged in generating and communicating ideas for continual improvement that may affect the overall performance of their organization or workplace. Additionally, Detert and Burris (2007) employed the question "I give suggestions about how to make [our department and/or company] better", and this, too, will be included. These three items are combined to generate a score for each employee related to their self-reported "voice behaviors."

Humility (α=0.94): Humility or humble leader behaviors are measured using items from a scale developed by B. P. Owens, Johnson, and Mitchell (2013). Example items include "This supervisor admits it when they don't know how to do something", "This supervisor is willing to learn from others" and "This supervisor is open to the ideas of others." It may seem obvious how humility in leadership would likely lead to an increased willingness to hear and use employee ideas, but these links have yet to be empirically tested. The full list of items making up this construct (along with the full survey instrument) is provided in Table 1A.

Continual improvement (α=0.90): Continual improvement is a construct created specifically for this study. It attempts to measure whether the manager makes changes to improve customer satisfaction, makes changes to improve efficiency, and "continually improves the way things are done." From the definition of management humility, it would make sense that humble managers are not only willing to listen to the ideas of others, but may also be more willing to implement new ideas (of their own and those of others). Factor analysis confirms that although the two measures' descriptions may sound as though they are both capturing the same thing, they are, in fact, different constructs. (Two Eigen values over one; discriminatory factors confirmed by an oblique oblimin rotation with no cross-loadings over 0.08.) Additionally, because this construct is measured as whether the manager is perceived to implement new improvement ideas in general (not specifically employee ideas), it also has discriminant validity with the employee voice construct. Put another way, employees were asked if they voice

improvement ideas to their managers and whether their managers implement improvement ideas, not whether their managers implement *their* (the employee's) improvement ideas. This separation allows testing of whether managers who are perceived to continually try to improve the way things are done are more likely to experience employees trying to be a part of the process.

Supervisor is able to make changes (α=0.93): If constraints exist to making changes in the workplace, then even the most humble leader and the highest levels of employee voice likely won't have much of an impact. Therefore, a control variable for a manager's ability to make changes is included in the analysis. There are two items: "This supervisor is able to make changes to improve our customer satisfaction" and "This supervisor is able to make changes to improve the way we do things."

Job satisfaction: As noted briefly above, since job satisfaction can impact firm performance through turnover costs and employee productivity, it will be tested whether the constructs above also impact job satisfaction. If they do, then humble leadership, employee voice and continual improvement can have indirect influences on performance through these channels in addition to the direct influences being tested with the model outlined above. Job satisfaction is measured with a simple job satisfaction question: "All in all, I am satisfied with my job."

Power distance (α=0.79): As mentioned previously in the section detailing the literature on employee voice, power distance has been found to be negatively correlated with employee voice. Power distance captures whether the employee believes that authority should not be challenged, and is measured with the following three items taken from Botero and Van Dyne (2009): "It is better to not disagree with this supervisor's decisions", "When this supervisor makes a decision with which I disagree I prefer to accept the decision rather than question it" and "I believe that it is not right to disagree with this supervisor."

4.3 Econometric Strategy

The above model implies a particular order of the variables, which can be tested using simultaneous equation modeling (SEM) and three-stage-least-squares (3SLS). This method treats the equations as part of one system, and as such, allows the errors of the equations to be correlated. Essentially, this method is similar to 2-stage least squares (2SLS), except in a third stage the variance/covariance matrix is re-estimated from the presence of the system of equations and their errors. (A system of equations is likely to have errors that are correlated across the different equations and 3SLS accounts for this.) As long as the equations are correctly specified, then estimation using a system approach will give more efficient estimates then the alternative 2SLS estimation equation-by-equation, since allowing them to be simultaneously estimated means more information available for each estimate. Of course, when using a systems approach, consistent estimates are only recovered if the entire system is correctly specified (Wooldridge, 2002). For this reason, 2SLS can be employed as a robustness check since correct specification of all equations within the model is not required to obtain consistent estimation of any one given equation. Both methods will therefore be examined and compared since both produce consistent estimates (as long as identification is achieved through sufficient exclusions restrictions) and because one is more efficient and the other is more robust to misspecification.

Humility is the foundation and starting point of the ideas set forth in this research. The leadership's level of humility will likely impact whether an employee feels that ideas voiced for improvement will be welcomed and/or given serious thought. Therefore, the first equation in the system is:

$$V_i = \beta_{10} + \beta_{11} Mgr\_Hum_i + \beta_{12} PD_i + \beta_{13} Change\_ability_i + u_1 \quad (1)$$

where V_i is the measure of self-reported employee voice behavior by individual i. Hum_i is the measure of the perceived humility of the employee's manager as reported by the same employee i. It is, of course, the *perceived* level of management humility that should impact the employee's voice behavior, not the *actual* level (or self-report of the manager). For this reason, the single-source method is both appropriate and beneficial. PD_i is the power distance orientation of the employee. The first subscript on each of the parameters indicates that this is the first equation in the system. Here, the parameter of interest will be β_{11}, which estimates the relationship between perceptions of the manager's humility and the self-reported employee voice behavior related to ideas for improvement. If the conceptual model is supported, this parameter will be both positive and significant. β_{12} is expected to be negative since a higher level of power distance orientation should be negatively related to voice behaviors of subordinates. It is also thought that the manager's ability to make changes to the workplace will impact whether an employee feels it is worthwhile to communicate ideas for improvement, so this variable is included as well and its coefficient (β_{13})is expected to be positive.

The second equation in the system implies that employee voice affects the continual improvement of the firm:

$$CI_i = \beta_{20} + \beta_{21} Voice_i + \beta_{22} Change\_ability_i + u_2 \quad (2)$$

Here, CI_i measures whether employee i feels as though the supervisor continually improves the way things are done. Again, it's probably more important to find out if the *employee* feels that the work processes are continually being improved. Asking the manager if he or she continuously makes improvements can lead to bias in measurement for two reasons: 1) because it may be "socially desirable" for managers to continuously make improvements, and 2) because the manager may truly believe improvements are being made while the staff on the

ground (the ones dealing with the new “improvements” directly) may disagree. Additionally, since the questions are posed using language such as “continually improves” and “makes changes to improve…” it is hoped that what is captured is whether this occurs frequently and in general, not whether a recent change was made which may excite varied levels of support and acceptance.

The parameter of interest is of β_{21}, which is the effect of an individual’s report of employee voice behavior on the perception of the level of continual improvement implemented by the manager. If the model is supported, greater levels of employee ideas would be associated with higher levels of continual improvement by the managers. Additionally, the level of continual improvement reported depends on whether the manager has the ability to make changes. If so, β_{22} will be both positive and significant.

The third equation then relates continual improvement to the firm’s performance, measured by the level of perceived job obstacles within the firm:

$$Job\ Obstacles_i = \beta_{30} + \beta_{31} CI_i + \beta_{32} Change\_ability_i + u_3 \quad (3)$$

where $Job\ Obstacles_i$ are the perceived job obstacles at the firm reported by employee i and CI_i comes from the equation above. Here, perceived job obstacles are acting as a proxy for performance.

The final equation tests whether the preceding equation predicts job satisfaction, which, in addition to efficiency in work processes, may help keep costs down and performance up. The equation is as follows:

$$Job\_sat_i = \beta_{40} + \beta_{41} Job\ Obstacles_i + \beta_{42} Mgr\_Hum_i + u_4 \quad (4)$$

where $Job\ Obstacles_i$ is from equation (3) and perception of the manager's humility is thought to perhaps also influence job satisfaction beyond the effect of his or her humility on job obstacles.

5. RESULTS

The model's estimated standardized parameters are shown in Table 4A in the Appendix. In the first equation, perceived management humility is positively related to reported levels of employee voice. A one standard deviation increase in perceived humility is associated with an approximately 0.4 standard deviation increase in reported voice behaviors. Change ability also has a positive effect, and as predicted, power distance orientation has a negative effect. Equation (2) shows that the level of employee voice reported (instrumented by the exogenous variation in voice) is significantly related to continual improvement, even after controlling for change ability. Continual improvement is then negatively and significantly related to reported job obstacles, and job obstacles are negatively and significantly related to reported job satisfaction. Therefore, this estimation shows that the hypothesized model is supported: manager humility is associated with greater levels of employee voice, which are positively associated with continual improvement in the firm. Greater perceived levels of continual improvement are associated with fewer perceived job obstacles. Finally, more job obstacles are associated with less job satisfaction. (Perceived manager humility is also found to be positively associated with reported job satisfaction.)

However, in the above model, management humility is excluded from the continual improvement equation. Upon testing this exclusion, something very interesting occurs: employee voice goes insignificant. Table 5A shows what happens when management humility is included in equation (2). With employee voice no longer having its own effect on continual improvement additional to the perceived level of humility, it appears that the original model needs improvement. Perhaps management humility (being open to advice and ideas, modeling teachability, and giving credit where it's due) is the main reason employee voice was found to

affect continual improvement. In other words, the manager's humility leads to both being open to *listening* to ideas and to *implementing* them. If this is the case, employee voice (when instrumented with manager humility (among the other exogenous regressors)) would show up as significantly related to continual improvement. However, once manager humility is itself included, employee voice no longer has a significant impact. This makes sense: employee voice is only helpful when the management is open to trying new ideas (such as when the manager is humble). If the ideas always fall on deaf ears or the manager is not open to giving the improvement ideas a chance, then they likely won't positively impact continual improvement or reduce job obstacles within the firm. A discussion and re-specification of the model follows below.

6. DISCUSSION AND ALTERNATIVE MODELSPECIFICATIONS

One surprising result was the impact of management humility on many of these constructs. It appears that this trait may lead to great results for an organization in a variety of ways: influencing the number of improvement ideas that employees communicate upwards, directly impacting reported job satisfaction of the employees, and also impacting the level of continual improvement, potentially through these types of managers simply being willing to try new things. Therefore, the question may need to become: Are humble managers also more willing to try new things, in addition to being open to others ideas? Since a humble leader is one who understands the value in others' ideas and contributions, it makes sense that he or she may understand that every decision they make or process they implement isn't necessarily the "right" one and therefore may change it if necessary by trying something new. A leader who doesn't continually question the processes that he or she implements may be blind to any inefficiencies that remain in place, or even to those that are unintentionally created.

The link between continual improvement and perceived efficiency isn't as surprising of course, but signals an important phenomenon: in order to achieve greater levels of efficiency (at

least as they are perceived by the employees), managers can strive to continually improve the work processes and customer service standards in place. This seems obvious, but in reality there appear to be many managers that don't seem to get it. In fact, 50% of this sample gave their manager a score at or below a 3. In competitive markets, that score may not be enough to ensure survival of constantly changing consumer preferences and unpredictable market conditions.

Perhaps the most interesting finding was the fact that the effects of employee voice on continual improvement disappear when humble leadership is accounted for. Not only does leadership humility appear to greatly impact employee voice, but that same humility impacts continual improvement and makes employee voice by itself appear to have no additional impact. This could be very important to explore further and better understand, as it gives us added insight into the effects of employee voice. Essentially, it could be the case that it's not that employee ideas by themselves are helpful for an organization. Rather, it may be the environment created by humble management (which of course impacts the level of employee voice in the firm) that is truly impacting the level of continual improvement and perceived levels of efficiency within the company. If this is the case, then employee voice needs to be further investigated as simply one consequence of leadership humility, and this leadership humility ultimately deserves the brunt of the credit for impacting continual improvement.

Based on these revelations and findings, an alternative specification was explored: since we now know that humility may be directly connected to continual improvement, perhaps it's the observed continual improvement that the manager carries out that further leads to voice. Essentially, employees observe that their manager is able and willing to make changes to continually improve the way things are done, and that leads them to be more willing to communicate ideas upward to their manager. Therefore perhaps manager humility impacts voice only indirectly through its effect on increasing continual improvement (rather than the manager's humility directly impacting voice). This model was tested and the results are shown

in Table 6A, where equation 1 is now that which has continual improvement as the dependent variable.

We see that a manager's humility and his or her ability to make changes are both positively associated with continual improvement taking place within the firm. Additionally, manager humility is positively associated with voice. That is, until you include continual improvement. These results show that once continual improvement is controlled for, manager humility no longer significantly impacts an employee's willingness to voice ideas upward. This implies that it isn't simply a manager being willing to *listen* to ideas from employees that encourage greater levels of employee voice. Instead, it's whether the manager is perceived to *implement* ideas that improve the way things are done. The manager's humility and his or her ability to make changes both impact whether he or she is perceived to make changes, and when he or she does on a continual basis, it appears to encourage even more ideas from employees.

Looking at the results from equation (3), employee voice appears to be associated with fewer reported job obstacles. However, upon further examination and tests of exclusion restrictions, we see in the second model of Table 6A that employee voice is no longer directly related to job obstacles once continual improvement is included. Again, this makes perfect sense: the amount of employee voice has no bearing on performance if the ideas are not appreciated and/or explored by the decision-makers in power. Instead, it's the amount of continual improvement that occurs that reduces job obstacles. We also see the manager's humility rating has no effect on reported job obstacles once we include and control for the amount of continual improvement taking place within the firm. Both tables show that job obstacles continue to negatively affect job satisfaction. This final proposed model is represented below.

The importance of being perceived as being willing and able to make changes to improve the way things are done or improve customer satisfaction appears to be crucial.

However, it also appears that managers who display humility are more likely to be perceived in this way. In an environment with constantly changing market conditions and constantly emerging new competition, this leadership style could therefore become extremely important. Additionally, allowing managers to make changes as necessary (or even before they're necessary) may also be an essential piece of the profit-maximizing puzzle.

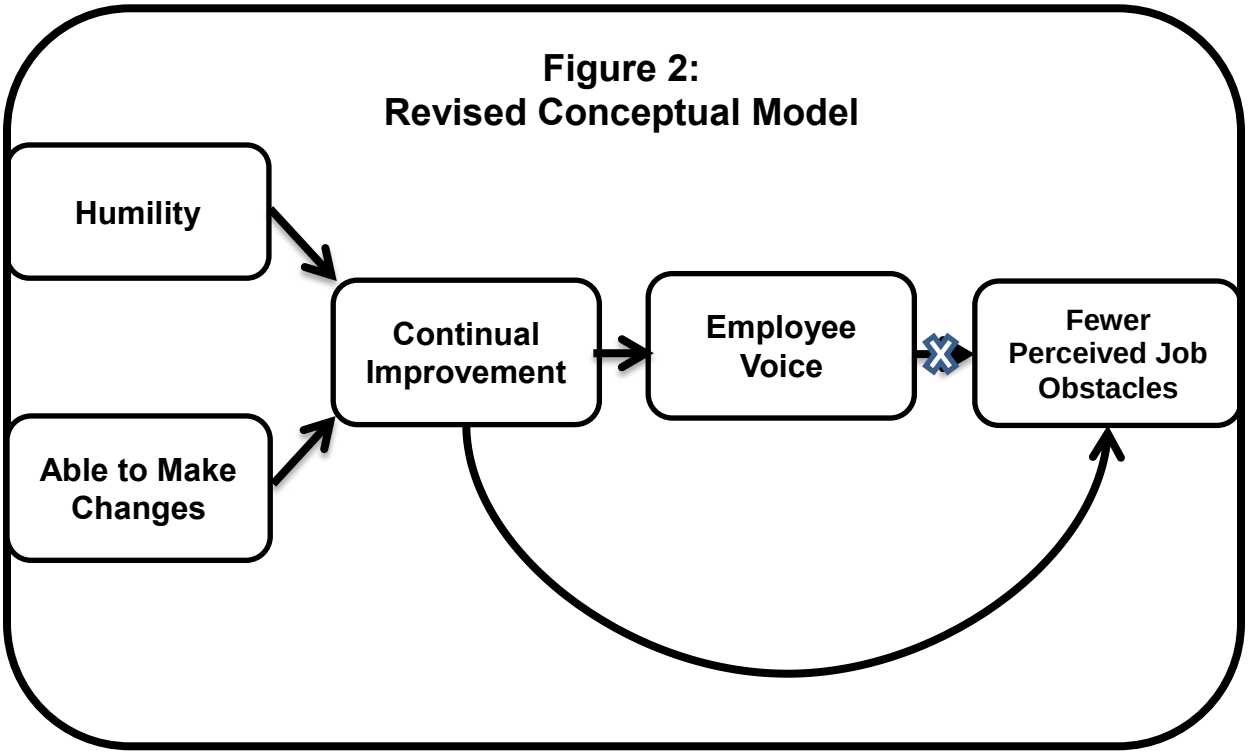

Figure 2: Revised conceptual model

7. STUDY #2- FIXED EFFECTS ANALYSES

The first study supported the idea that humble leadership is associated with greater levels of continual improvement, and that greater continual improvement was associated with both greater levels of employee voice and fewer job obstacles. The second study uses the same constructs, but a different estimation strategy to try to get toward more of a causal interpretation of the effect of a manager's style or behavior on employee voice. This study uses a different data set than that used in the first study, although obtained similarly from different students, reddit.com internet users and employees of two quick-service food restaurants.

In this study, employees were asked to respond about two different managers with whom they work directly, the highest level manager (here, called “top manager”) and any other manager they choose (here, called “other manager”). Using a fixed effects strategy, we can hold the employee constant to measure whether this same employee is more or less likely to voice ideas to their two different managers based on his or her ratings of the two different managers’ level of humility. The results are shown in Table 8A.

This fixed effects estimation strategy shows us that differences in the employee’s perceptions of their two different managers’ humility are associated with differences in that employee’s reported voice behaviors toward those managers, implying more of a causal link than was testable with the data used in Study #1. The rating of the manager’s humility influences the level of voice toward that manager- the higher the humility rating, the more likely the employee is to voice improvement ideas to that manager. This could lead to more ideas from all levels, which, if then implemented, could improve both efficiency within the workplace and customer satisfaction (since these are the types of ideas being voiced that “employee voice” is measuring). In this study, it is the manager’s humility associated with the level of employee voice and not the perceived level of continual improvement across the two managers. There are several explanations for this contradictory result. 1) In the first study with 3SLS, continual improvement was being instrumented by humility, meaning it could be that I was actually finding the effects of humility in managers working *through* continual improvement. It was the exogenous part of continual improvement (as predicted by the manager’s humility, ability to make changes and the employee’s power distance orientation) that was found to be associated with employee voice and a similar specification is difficult with fixed effects. 2) Additionally with fixed effects, the coefficient will be significant if *differences* in the two managers’ continual improvement are associated with differences in voice behaviors. Perhaps in this sample, the two managers chosen don’t vary enough on this dimension.

As was also done in Study #1, we can test whether differences in humility ratings are associated with differences in continual improvement ratings (using the same fixed effects strategy used above). The results are shown in Table 9A. We see similar results to the first study: it appears that voice is positively associated with continual improvement, but only until humility ratings are included. We see that humility ratings are positively associated with continual improvement ratings and that a one standard deviation in humility is associated with more than a half standard deviation increase in perceived continual improvement.

It's important to note that we cannot necessarily infer a causal link between humility and continual improvement using this data. The reason for this is that here we are still holding the employee constant, meaning the results can only be interpreted as whether differences in the employee's ratings of his or her two managers' humility are associated with differences in the same employee's ratings of those two managers' levels of continual improvement. Put another way, both ratings are about two different managers from the same employee, so what we see is that employees who perceive their manager as more humble also rate those managers higher on the continual improvement scale (similar to what we saw and estimated in Study #1). For the humility-voice relationship, the results can instead be interpreted as differences in the employee's ratings of his or her two managers' humility leading to differences in the same employee's willingness to voice ideas. Since we hold the person whose behavior we are measuring constant, it means that an employee isn't equally likely to voice ideas to their managers no matter how they perceive the managers. Instead, the perception of the manager's humility has an influence on the employee's voice behaviors.

Unfortunately the fixed effects approach doesn't allow us to test any of the relationships from the first study that used variables that don't vary across the managers (for instance job satisfaction) since these variables take the same value within each person. I am also unable to use fixed effects to test the impacts of humble leadership or continual improvement on job

obstacles, as job obstacles relate to the job (not the manager) so the value doesn't vary across the employee observation.

Nonetheless, this data set can help provide further support for the relationships found in the first study if we go back to using simple linear regressions. Each employee responded about his or her highest-level manager under which they work, as well as another, lower-level manager. We can therefore again test the relationship between manager humility ratings and employee voice (for each of the two managers) by running separate regressions for each of the manager types. The results for the two simple linear regressions are provided in Table 10A. We see that perceived humility still has the same positive effect on employee voice that was found in the first study, although again, the effect becomes insignificant once continual improvement is included (columns (2) and (4)). Continual improvement of the lower manager is significantly related to voice to that same manager at the 10% level and continual improvement of the top manager is also positively and significantly related to voice toward that same manager (at the 5% level).

An additional use of these data allows for a robustness check to further test the humility-voice link and continual improvement-voice link by testing whether the perceived humility (or continual improvement) of Manager B affects an employee's reported voice toward Manager A. (We shouldn't expect the humility rating of Manager A to influence my willingness to voice ideas to Manager B.) The results are shown in Table 11A. We see that voice toward the top manager is unaffected by the perceived humility of another (lower level) manager (which is what we would expect). The same is true about continual improvement. However, we also see an interesting result coming out of regressing voice toward a lower manager on the perceived humility and continual improvement of the top manager (column 2). It seems as though voice toward a lower manager may be affected by both the humility and the continual improvement of the top manager! However, it appears as though the more humble to top manager, the *less* likely an employee is to voice ideas to the manager at the lower level. This seems to describe a

situation in which employees will go to the top (and skip lower level) of management when those at the top are themselves willing to listen to ideas. However, we see a positive and significant effect of the top manager's continual improvement on voice toward the lower manager, suggesting that perhaps a top manager can create an environment or culture where improvement ideas tried and implemented, and this type of culture may lead to greater levels of employee voice toward any manager. Indeed, the effect of the top manager's continual improvement on voice toward the lower manager remains significant at below the 1% level even after including perceptions of the lower manager's willingness to continually improve. (And in fact, the top manager's continual improvement has almost *double* the impact of the lower manager's continual improvement on voice toward the lower manager. See the results in the final column of Table 11A.) This provides further support for the argument that the manager at the top can have effects on employee voice that permeate throughout the firm.

We can now also test the effects of continual improvement (from both managers) on the perceived level of job obstacles present in the workplace. (The results are provided in Table 12A.) Here we see results similar to those found in Study #1. Greater levels of employee voice are negatively related to reported job obstacles (although only at the 10% level and only for voice toward the lower manager), but not once continual improvement is included. Interestingly, it appears that it's actually the perceived continual improvement of the *lower* manager that has the impact on perceived job obstacles. This has a few implications- although the continual improvement of the top manager may lead to greater levels of voice to even lower managers, it's actually when the lower level manager is perceived to continually improve things that employees perceive few job obstacles. This may mean that top managers may benefit additionally from allowing the lower level managers to make changes when necessary (or even prior to being "necessary") to resolve inefficiencies or to adapt to changing conditions. If they do, employees may at the very least *perceive* a more efficiently running workplace.

Of course, job obstacles are still being reported by the same source that is rating manager humility and continual improvement, potentially leading to a single-source bias. (This is because it's possible that when the employee perceives the manager continually improving things he or she also perceives fewer obstacles in the workplace.) The only way to get around this problem is to use a more objective measure of performance from a separate source. This is the purpose of the third and final study.

8. STUDY #3- THE CASE OF TWO QUICK-FOOD RESTAURANTS

Data were collected from employees and managers of 2 quick-service restaurant chains in the South-eastern region of the United States. The humility and voice ratings were averaged across the employees within each unit to create a unit-level measure, since performance is measured using monthly sales in dollars at the unit level. "Brand 1" has 8 different units and "Brand 2" has 11. Using these data, we can test whether humble leadership and continual improvement impact a firm's sales performance. The same 3SLS model was estimated using this data and the results are shown in Table 15A.

Although the sample size is extremely small, it is worth noting that the results found in Study #1 (which captured responses from only one source) are replicated and we now see that continual improvement doesn't just affect perceived job obstacles but also actual sales in dollars! All the variables have been standardized so that the coefficients are interpreted as how many standard deviations the dependent variable changes when the independent variable changes by one standard deviation (holding all others in the equation constant).

The results show that manager humility is positively and significantly related to perceived continual improvement, and that this continual improvement is positively related to employee voice (although only at the 10% level) and to sales in dollars. A one standard deviation increase in continual improvement is associated with almost a ¾ standard deviation in sales. (This translates into approximately an extra $10,000 in monthly sales. Of course without panel data

it's unclear whether the effect of continual improvement would increase sales *each* month by $10,000 but we do see that stores with a one standard deviation higher rating of continual improvement are associated with approximately $10,000 in higher sales[2].)

Additionally, we still see that a one standard deviation increase in the average humility rating increases the average level of perceived continual improvement by 0.9 standard deviations. Also, as found in Study #1, better performance is associated with higher levels of job satisfaction. (Of course, in Study #1 performance was measured by perceived job obstacles where here it is measured by sales in dollars.)

Since the manager's average humility ratings by the employees may have embedded within them other factors that could potentially impact performance, another test using the manager's self-rating can be used to provide further (and possibly more robust) support for the idea that a willingness to take actions on ideas to improve the workplace actually has an impact on performance. Specifically, the managers were asked whether they use employee ideas to make changes and improve the way things are done. Using the manager's self-rating of using and implementing employee ideas gets away from the potential issues of using employee ratings of manager humility and continual improvement since the employee's ratings may also include other factors that could impact sales. The results from this regression are shown in Table 16A.

The results show that a manager's own rating is also positively associated with sales; a one standard deviation increase in the manager's own report of using employee ideas is associated with a 0.8 standard deviation increase in higher sales, even after controlling the employees' perceptions of continual improvement. This is also interesting because it shows that

[2] Note that brand is included as a control due the differences in the levels of sales for each brand. The coefficient on continual improvement can then be thought of as measuring the effect of continual improvement on changes in sales within each brand.

managers with higher sales are more likely to report that they use employee ideas to improve the way things are done, crediting the employees with part of the success.

Although this third study is only exploratory due to the current small sample size, all three studies lend support to the idea that humble managers are more likely to be perceived as implementing more improvement ideas. Additionally, those managers who are perceived to make these improvements seem to encourage greater levels of employee voice, and greater continual improvement seems to be positively associated with both fewer perceived job obstacles and higher sales in dollars. The triangulation of the three different studies allows for a more conclusive and robust argument for all of the relationships tested here, but more research needs to be done. The limitations and possible future work are outlined in the subsequent section.

9. DISCUSSION

First, I tried to establish that a relationship exists between employee voice and manager humility. I then tested it against holding constant all time-invariant (or personal trait) characteristics to show that it is in fact the perception of the manager's humility that affects a person's decision to voice ideas upward. I also showed that average voice ratings within a store are associated with average ratings of that store manager's humility.

However, upon further investigation, it appears that it's more important that employees perceive their managers as *implementing* ideas, not just listening to them. All three studies supported this new alternative specification. In Study #2, we also saw that continual improvement of the top manager is even associated with greater employee voice toward lower managers. Additionally, across all three studies we see that continual improvement is associated with fewer perceived job obstacles and higher sales.

In the first study, I had only a subjective measure of performance which I referred to as "job obstacles." The data showed that at the very least employees who perceive their managers

as continually improving the way things are done also perceive fewer job obstacles (which may be beneficial to an organization in itself). Study #3 supports this finding by showing that continual improvement (still as perceived by the employees) has an impact on monthly sales in dollars. Then we saw that a manager's own self-rating of using employee voice (to get even further away from a potential single-source bias) is positively and significantly related to sales.. Using two different sources of data (the objective sales measure and the manager's own self-rating) lends additional support to the notion that managers' openness to trying new ideas improves performance.

10. LIMITATIONS AND FUTURE RESEARCH

While the results may help us argue that managers can impact performance in ways that economic models don't generally measure, more research is needed to confirm the results. This research may raise more questions than it answers, creating a potentially long and healthy stream of future investigations. First, the next step would certainly be applying these ideas to a larger sample of a company with multiple units, each with its own manager and performance rating, or alternatively, to multiple companies within the same industry that have comparable performance data. We need additional evidence to see whether perceived efficiency and continual improvement relate to real, hard, objective performance data as was assumed here.

Second, we need to further investigate management humility, including whether it is a stable trait, or one that can be taught or influenced. If it is stable, companies must figure out how to find and recruit such managers. If it can be influenced, then they must figure out how to train various managers to become more humble leaders. Further investigations into the how and why of the effects of humility are also needed. Are they simply more open to taking risks, or do they fully appreciate the contribution of others so strongly that under this type of leadership, your ideas will be both appreciated and attempted? Or is it possibly a little bit of both? Humility is definitely an up-and-coming research area, and much still remains to be done.

Also, the construct created here called “continual improvement” needs further validation from inclusion in other research. While I found that this construct is distinct from the other constructs analyzed here (and reliability was above .9), further investigations into what other factors besides management humility lead to higher levels of perceived continual improvement would be beneficial. Additionally, testing the perceived levels against more objectively captured measures of the same thing would be a great next step.

Moreover, future research using other methods may be necessary to test more causal inferences. More data are needed for Study #3 to see if results remain with a larger sample, and more experimental data can help us better understand if humility can be learned, and if so, if it in fact leads to better performance. Other limitations of this research include the potential same-source bias caused by gathering all the data from the employees in Study #1 and #2. This could be rectified in future studies by attempting to gather additional data from multiple sources.

This paper may just be a piece of the very first steps trying to understand what humble leadership entails and whether or not it may positively impact performance through channels such as increasing job satisfaction and a willingness to implement new ideas. Although there is some support found here, it’s not entirely clear how or why. I posit that it is through the openness to others’ ideas and through trying new things to improve performance, but it’s also possible that humble leaders are more willing to empower their employees or even give them greater levels of autonomy, which could also positively affect performance. Future research should try to more fully investigate the mechanisms through which this type of leadership affects organizational outcomes like performance.

Future research should also test whether managers at different levels have varying impacts on performance. Apriori it may seem as though higher-level managers may have greater impacts on performance, but it also makes sense that lower-level managers closer to the employees’ processes and perhaps even closer to the customers could have a larger impact on some of the day-to-day things that impact performance and efficiency in the workplace.

Additionally, it was found here that employee voice may only be beneficial to an organization when those ideas are heard with open ears by someone willing to give them a try, which describes a humble leader who continually makes improvements. However, further studies could examine whether employee voice is helpful under circumstances of other types of leadership as well. Although these studies explore humble leadership and provide support for its beneficial consequences, it's only one piece of the first steps of this research; there is admittedly still much left to be done.

This research is by no means the end of an investigation. Rather, it is viewed as the very beginning. The potential directions and contributions of these ideas will hopefully generate inquisitive excitement and rewarding research for those interested in bridging the gaps between organizational theory and economic analysis. The ideas set forth here are not only important for firms that want to survive increasing competition and turbulent markets, but also for researchers who would like further empirical support for the notion that our standard economic models can be enhanced by the inclusion of employee and managerial behaviors. Indeed, a firm is a collection of people; therefore understanding firms necessarily means modeling the people within them.

REFERENCES CITED

Alvarez, V. S., & Merino, T. G. (2003). The history of organizational renewal: Evolutionary models of Spanish savings and loans institutions. *Organization Studies, 24*(9), 1437-1461.

Barney, J. (1991). Firm resources and sustainable competitive advantage (Vol. 170, pp. 99-120).

Botero, & Van Dyne. (2009). Employee voice behavior: Interactive effects of LMX and power distance in the United States and Colombia. *Management Communication Quarterly, 23*(1), 84-104. doi: 10.1177/0893318909335415

Brown, K. A., & Mitchell, T. R. (1993). Organizational Obstacles: Links with Financial Performance, Customer Satisfaction, and Job Satisfaction in a Service Environment. *Human Relations, 46*(6), 725-757. doi: 10.1177/001872679304600603

Camuffo, A., & Volpato, G. (1996). Dynamic Capabilities and Manufacturing Automation: Organizational Learning in the Italian Automobile Industry. *Industrial and Corporate Change, 5*(3), 813-838.

Deeds, D. L., Decarolis, D., & Coombs, J. (1999). Dynamic capabilities and new product development in high technology ventures. An empirical analysis of new biotechnology firms. [Article]. *Journal of Business Venturing, 15*, 211-229. doi: 10.1016/s0883-9026(98)00013-5

Delmas, M. A. (1999). Exposing Strategic Assets to Create New Competencies: The Case of Technological Acquisition in the Waste Management Industry in Europe and North America. *Industrial and Corporate Change, 8*(4), 635-671. doi: http://icc.oxfordjournals.org

Detert, J. R., & Burris, E. R. (2007). Leadership behavior and employee voice: is the door really open? *Academy of Management Journal, 50*(4), 869.

Forrant, R., & Flynn, E. (1999). Skills, shop-floor participation and the transformation of Brimfield Precision: lessons for the revitalization of the metal-working sector. *Industrial & Corporate Change, 8*(1), 22.

Lazonick, W., & Prencipe, A. (2005). Dynamic Capabilities and Sustained Innovation: Strategic Control and Financial Commitment at Rolls-Royce plc. *Industrial and Corporate Change, 14*(3), 501-542. doi: http://icc.oxfordjournals.org

Mackenzie, S. B., Podsakoff, P. M., & Podsakoff, N. P. (2011). Challenge-oriented organizational citizenship behaviors and organizational effectiveness: do challenge-oriented behaviors really have an impact on the organization's bottom line? [Article]. *Personnel Psychology, 64*(3), 559-592. doi: 10.1111/j.1744-6570.2011.01219.x

Morrison, E. (2011). Employee Voice Behavior: Integration and Directions for Future Research. *The Academy of Management Annals, 5*(1), 373.

Owens, & Hekman, D. R. (2012). Modeling how to grow: an inductive examination of humble leader behaviors, contingencies, and outcomes. [Article]. *Academy of Management Journal, 55*(4), 787-818. doi: 10.5465/amj.2010.0441

Owens, B. P., Johnson, M. D., & Mitchell, T. R. (2013). Expressed humility in organizations: Implications for performance, teams, and leadership. *Organization Science, 24*(5), 1517-1538.

Owens, B. P., Rowatt, W. C., & Wilkins, A. L. (2011). Exploring the relevance and implications of humility in organizations. *Handbook of positive organizational scholarship*, 260-272.

Petroni, A. (1998). The analysis of dynamic capabilities in a competence-oriented organization. *Technovation, 18*(3), 179-189.

Saunders, D. M. S., Blair H.; Knight, Virginia; Roth, Jonelle. (1992). Employee Voice to Supervisors. *Employee Responsibilities and Rights Journal, 5*(3), 241-259.

Teece, D. J., Pisano, G., & Shuen, A. (1997). Dynamic capabilities and strategic management. *Strategic Management Journal (1986-1998), 18*(7), 509.

Tripsas, M. (1997). Surviving Radical Technological Change through Dynamic Capability: Evidence from the Typesetter Industry. *Industrial and Corporate Change, 6*(2), 341-377. doi: http://icc.oxfordjournals.org

Van Dyne, L., Ang, S., & Botero, I. C. (2003). Conceptualizing employee silence and employee voice as multidimensional constructs. *Journal of Management Studies, 40*(6), 1359-1392. doi: 10.1111/1467-6486.00384

Van Dyne, L., & LePine, J. A. (1998). Helping and voice extra-role behaviors: evidence of construct and predictive validity. [Article]. *Academy of Management Journal, 41*(1), 108-119. doi: 10.2307/256902

Wang, C. L., & Ahmed, P. K. (2007). Dynamic capabilities: A review and research agenda. *International Journal of Management Reviews, 9*(1), 31-51.

Weick, K. E. (2001). Leadership as the legitimization of doubt. In W. Bennis, G. M. Spreitzer & T. G. Cummings (Eds.), *The future of leadership: Today's top leadership thinkers speak to tomorrow's leaders.* (pp. 91-102). San Francisco, CA US: Jossey-Bass.

Wernerfelt, B. (1984). A Resource-based View of the Firm. [Article]. *Strategic Management Journal, 5*(2), 171-180.

Wooldridge, J. M. (2002). *Econometric analysis of cross section and panel data / Jeffrey M. Wooldridge*: Cambridge, Mass. : MIT Press, c2002.

ESSAY #1 TABLES

Table 1A: Questionnaire

Humility* (α=.94)

1. This supervisor actively seeks feedback, even if it is critical
2. This supervisor admits it when they don't know how to do something
3. This supervisor acknowledges when others have more knowledge and skills than themselves
4. This supervisor takes notice of others' strengths
5. This supervisor often compliments others on their strengths
6. This supervisor shows appreciation for the unique contributions of others
7. This supervisor is willing to learn from others
8. This supervisor is open to the ideas of others
9. This supervisor open to the advice of others

Employee Voice** (α=.89)

1. I develop and make recommendations to this supervisor that could improve work processes
2. I develop and make recommendations to this supervisor that could improve customer satisfaction
3. I give suggestions about how to make this company better

Continual Improvement** (α=.90)

1. This supervisor continually improves the way things are done
2. This supervisor changes how we do things to improve efficiency
3. This supervisor changes how we do things to improve customer satisfaction

Job Obstacles** (α=.90)

1. Things get in the way of me offering good service to my customers
2. Things get in the way of our customers being easily satisfied
3. Things get in the way of me doing my job well

Job Satisfaction*

1. All in all, I am satisfied with my job

Change Ability** (α=.87)

1. This supervisor is able to make changes to improve the way we do things
2. This supervisor is able make changes to improve our customer satisfaction

Power Distance* (α=.76)

1. It is better not to disagree with management decisions
2. When this supervisor makes a decision with which I disagree I prefer to accept the decision rather than question it
3. I believe that it is not right to disagree with my boss

*Responses range 1-5 from "Strongly Disagree" to "Strongly Agree"

**Responses range 1-5 from "Never" to "Always"

Table 2A: Summary Statistics Study #1

Variable	Mean	Std. Dev.	Min.	Max.
Job Satisfaction	3.68	1.01	1	5
Job Obstacles	2.97	1.02	1	5
Humility	3.63	.951	1	5
Continual Improvement	3.15	.978	1	5
Change Ability (CA)	3.67	1.05	1	5
Employee Voice	3.25	1.02	1	5
Power Distance (PD)	2.68	.844	1	5

Table 3A: Correlation Matrix

		(1)	(2)	(3)	(4)	(5)	(6)	(7)
(1)	Employee Voice	1.00						
(2)	Manager Humility	0.38	1.00					
(3)	Mgr. Able to Make Changes	0.22	0.24	1.00				
(4)	Power Distance	-0.44	-0.30	-0.06	1.00			
(5)	Continual Improvement	0.34	0.55	0.51	-0.16	1.00		
(6)	Job Obstacles	-0.06	-0.27	-0.34	0.13	-0.40	1.00	
(7)	Job Satisfaction	0.27	0.41	0.34	-0.24	0.38	-0.48	1.00

Table 4A: 3SLS Estimated System of Equations: Original Model

Voice (Eq. 1)	
Mgr. Humility	0.379***
	(0.056)
Mgr. Able to Make Changes	0.115*
	(0.052)
Power Distance	-0.311***
	(0.057)
"R-squared"	0.273
Continual Improvement (Eq. 2)	
Voice	0.618***
	(0.114)
Mgr. Able to Make Changes	0.365***
	(0.060)
"R-squared"	0.175
Job Obstacles (Eq. 3)	
Continual Improvement	-0.488***
	(0.128)
Mgr. Able to Make Changes	-0.087
	(0.084)
"R-squared"	0.167
Job Satisfaction (Eq. 4)	
Job Obstacles	-0.944***
	(0.236)
Mgr. Humility	0.257*
	(0.101)
"R-squared"	0.091
Observations	253

Standard errors in parentheses
* p<0.05, ** p<0.01, *** p<0.001

Table 5A: Estimation Including Humility in Continual Improvement Equation

Voice (Eq. 1)	
Mgr. Humility	0.235***
	(0.062)
Mgr. Able to Make Changes	0.141**
	(0.052)
Power Distance	-0.412***
	(0.060)
"R-squared"	0.292
Continual Improvement (Eq. 2)	
Mgr. Humility	0.482***
	(0.069)
Voice	0.0347
	(0.124)
Mgr. Able to Make Changes	0.384***
	(0.049)
"R-squared"	0.463
Job Obstacles (Eq. 3)	
Continual Improvement	-0.454***
	(0.129)
Mgr. Able to Make Changes	-0.102
	(0.084)
"R-squared"	0.175
Job Satisfaction (Eq. 4)	
Job Obstacles	-1.004***
	(0.236)
Mgr. Humility	0.185
	(0.102)
"R-squared"	0.043
Observations	253

Standard errors in parentheses
* p<0.05, ** p<0.01, *** p<0.001

Table 6A: Re-specification

	(1)	(2)
Continual Improvement (Eq. 1)		
Mgr. Humility	0.504***	0.495***
	(0.0514)	(0.0517)
Mgr. Able to Make Changes	0.332***	0.389***
	(0.0450)	(0.0462)
"R-squared"	0.455	0.459
Voice (Eq. 2)		
Mgr. Humility	0.320***	0.0585
	(0.0554)	(0.102)
Power Distance	-0.337***	-0.406***
	(0.0573)	(0.0595)
Continual Improvement		0.361**
		(0.136)
"R-squared"	0.267	0.276
Job Obstacles (Eq. 3)		
Voice	-0.585***	-0.190
	(0.117)	(0.131)
Continual Improvement		-0.654***
		(0.159)
Mgr. Humility		0.167
		(0.118)
"R-squared"	-0.246	0.038
Job Satisfaction (Eq. 4)		
Job Obstacles	-1.449***	-0.992***
	(0.203)	(0.236)
Mgr. Humility	0.0844	0.188
	(0.0876)	(0.102)
"R-squared"	-0.504	0.053
Observations	253	253

Standard errors in parentheses
* p<0.05, ** p<0.01, *** p<0.001
Reported estimates are beta coefficients

Table 7A: Summary Statistics Study #2

Variable	Mean	Std. Dev.	Min	Max
Top Mgr. Humility	3.61	1.04	1	5
Lower Mgr. Humility	3.49	1.04	1	5
Voice toward Top Mgr.	3.17	1.06	1	5
Voice toward Lower Mgr.	3.20	1.05	1	5
Top Mgr. Continually Improves	3.41	1.01	1	5
Lower Mgr. Continually Improves	3.13	1.00	1	5
Satisfaction with Top Mgr.	3.93	1.21	1	5
Satisfaction with Lower Mgr.	3.63	1.27	1	5
Top Mgr. is Able to Make Changes	4.06	1.00	1.5	5
Lower Mgr. is Able to Make Changes	3.65	1.11	1	5
Job Satisfaction	3.62	1.13	1	5

Table 8A: Study #2- Fixed Effects Analyses

	(1) Voice
Mgr. Humility	0.357**
	(0.128)
Continual Improvement	0.0492
	(0.140)
Mgr. Able to Make Changes	-0.0570
	(0.0985)
Constant	0.0612
	(0.0464)
R-squared	0.141
Observations	204
Groups	102

Standard errors in parentheses
* p<0.05, ** p<0.01, *** p<0.001
Reported estimates are beta coefficients

Table 9A: Fixed Effects Analyses on Continual Improvement

	(1) Continual Improvement	(2) Continual Improvement
Voice	0.203**	0.0254
	(0.0729)	(0.0723)
Mgr. Able to Make Changes	0.454***	0.249***
	(0.101)	(0.0664)
Mgr. Humility		0.544***
		(0.0784)
Constant	0.0106*	0.0201
	(0.00446)	(0.0336)
R-squared	0.336	0.553
Observations	204	204
Groups	102	102

Clustered standard errors in parentheses
* p<0.05, ** p<0.01, *** p<0.001
Reported estimates are beta coefficients

Table 10A: Separate Analyses for Different Types of Managers

	"Other" Manager		"Top" Manager	
	(1) Voice	(2) Voice	(3) Voice	(4) Voice
Humility	0.375***	0.174	0.263*	0.068
	(0.085)	(0.129)	(0.121)	(0.150)
Mgr. Able to Make Changes	0.013	-0.099	-0.025	-0.184
	(0.080)	(0.098)	(0.095)	(0.112)
Power Distance	-0.072	-0.103	-0.341**	-0.330**
	(0.143)	(0.142)	(0.116)	(0.111)
Continual Improvement		0.359+		0.368*
		(0.194)		(0.153)
Constant	0.020	0.010	0.058	0.053
	(0.076)	(0.069)	(0.083)	(0.083)
R-squared	0.133	0.177	0.207	0.239
Observations	117	117	104	104

Standard errors in parentheses
+ p<0.10, * p<0.05, ** p<0.01, *** p<0.001
Reported estimates are beta coefficients

Table 11A: (Different) Manager's Humility and Continual Improvement on Voice toward ("Wrong") Manager

	(1) Voice Toward Top Manager	(2) Voice Toward Other Manager	(3) Voice Toward Other Manager
Other Mgr. Humility	-0.0857		
	(0.15)		
Other Manager Continually Improves	0.121		0.313*
	0.15)		(0.12)
Other Mgr. is Able to Make Changes	0.0748		
	(0.14)		
Power Distance with Other Manager	-0.0875		
	(0.11)		
Top Mgr. Humility		-0.262+	-0.242+
		(0.14)	(0.12)
Top Manager Continually Improves		0.681***	0.555**
		(0.16)	(0.16)
Top Mgr. is Able to Make Changes		-0.251+	-0.280*
		(0.13)	(0.14)
Power Distance with Top Manager		-0.0922	-0.0947
		(0.14)	(0.14)
Constant	0.0229	0.0474	0.0388
	(0.082)	(0.081)	(0.084)
R-squared	0.023	0.152	0.235
Observations	107	104	104

Clustered standard errors in parentheses
+ p<0.10, * p<0.05, ** p<0.01, *** p<0.001
Reported estimates are beta coefficients

Table 12A: Effects of Continual Improvement, Voice and Change-ability on Perceived Job Obstacles

	(1) Job Obstacles	(2) Job Obstacles
Voice Toward "Other" Mgr.	-0.157+	-0.013
	(0.081)	(0.067)
"Other" Mgr. Able to Make Changes	-0.301**	-0.015
	(0.094)	(0.094)
Voice Toward "Top" Mgr.	0.081	0.037
	(0.064)	(0.061)
"Top" Mgr. Able to Make Changes	-0.331***	-0.240*
	(0.079)	(0.110)
"Other" Mgr. Continually Improves		-0.528***
		(0.093)
"Top" Mgr. Continually Improves		-0.015
		(0.143)
Constant	-0.103	-0.095
	(0.090)	(0.077)
R-squared	0.345	0.481
Observations	104	104

Clustered standard errors in parentheses
+ p<0.10, * p<0.05, ** p<0.01, *** p<0.001
Reported estimates are beta coefficients

Table 13A: Summary Statistics- Study #3 Brand 1 (Brand=0)

Variable	N	Mean	Std. Dev.	Min	Max
Avg. Voice Rating	11	3.42	0.68	2.33	5.00
Avg. Humility Rating	11	4.00	0.55	2.50	4.72
Avg. Continual Improvement Rating	11	3.89	0.59	2.33	4.50
Mgr. Able to Make Changes	11	4.44	0.31	3.83	5.00
Power Distance	11	2.71	0.72	1.67	3.86
July 2014 Sales	11	$48,045	$14,617	$32,085	$84,192

Table 14A: Summary Statistics- Study #3 Brand 2 (Brand=1)

Variable	N	Mean	Std. Dev.	Min	Max
Avg. Voice Rating	8	2.98	0.39	2.33	3.42
Avg. Humility Rating	8	3.70	0.37	3.22	4.33
Avg. Continual Improvement Rating	8	3.45	0.41	2.97	4.11
Mgr. Able to Make Changes	8	3.89	0.54	3.30	5.00
Power Distance	8	2.93	0.30	2.44	3.33
July 2014 Sales	8	$70,233	$12,896	$56,104	$91,896

Table 15A: 3SLS Using Firm Data

Continual Improvement (Eq. 1)	
Humility	0.869***
	(0.14)
Mgr. is Able to Make Changes	0.245+
	(0.13)
Constant	-0.064
	(0.071)
"R-squared"	0.889
Voice (Eq. 2)	
Continual Improvement	0.961+
	(0.49)
Power Distance	-0.584**
	(0.21)
Mgr. is Able to Make Changes	-0.587
	(0.47)
Constant	-0.0725
	(0.20)
"R-squared"	0.385
July 2014 Sales (Eq. 3)	
Continual Improvement	0.724*
	(0.29)
Brand1	2.202**
	(0.71)
Constant	-0.956*
	(0.38)
"R-squared"	0.442
Job Satisfaction (Eq. 4)	
July 2014 Sales	0.714**
	(0.26)
Brand1	-1.701**
	(0.51)
Constant	0.774**
	(0.24)
"R-squared"	0.462
Observations	19

Standard errors in parentheses
+ p<0.10, * p<0.05, ** p<0.01, *** p<0.001
Reported estimates are beta coefficients

Table 16A: 3SLS Using Manager's Own Self-Rating of Using Employee Voice

Continual Improvement (Eq. 1)	
Humility	0.872***
	(0.16)
Mgr. is Able to Make Changes	0.247+
	(0.15)
"R-squared"	0.900
Voice (Eq. 2)	
Continual Improvement	1.074*
	(0.53)
Power Distance	-0.441
	(0.27)
Mgr. is Able to Make Changes	-0.725
	(0.50)
"R-squared"	0.341
July 2014 Sales (Eq. 3)	
Manager's Self-Rating of	0.807*
Using Employee Voice	(0.39)
Continual Improvement	0.547*
	(0.24)
Brand1	2.723**
	(0.91)
Constant	-3.963*
	(1.64)
"R-squared"	0.522
Job Satisfaction (Eq. 4)	
July 2014 Sales	0.442
	(0.30)
Brand1	-1.153*
	(0.48)
Constant	0.525*
	(0.24)
"R-squared"	0.449
Observations	15

Standard errors in parentheses
+ p<0.10, * p<0.05, ** p<0.01, *** p<0.001
Reported estimates are beta coefficients

ESSAY #2: EXAMINING THE IMPACTS OF DIFFERENT ANTI-MALARIA CAMPAIGNS: ARE SOME ORGANIZATIONS MORE EFFECTIVE THAN OTHERS? THE CASE IN NIGERIA

1. INTRODUCTION

In the year 2010, there were an estimated 655,000 deaths related to malaria, with approximately 86% of these deaths occurring in children under 5 years of age (WHO, 2011). However these deaths could be prevented with the proper implementation of recommended interventions (WHO, 2011). Since 1998 when Roll Back Malaria was founded, many countries have received assistance and funding from various organizations to help fight malaria prevalence, morbidity and mortality. However, countries are experiencing varying levels of success in terms of reducing mortality and encouraging preventive behaviors. The question then becomes: to what extent can the varying levels of success be explained by which organization is in charge of the anti-malaria campaign serving the area? For instance, is the World Bank Booster program more effective than UNICEF at carrying out the same mission? And is the World Bank more effective when they work alongside the National Malaria Control Programme or when they work with other NGOs?

Because malaria is transmitted through nocturnal mosquitos, one effective way to prevent and avoid the disease is by sleeping under a bed net (Sexton, 2011). Data from Nigeria are collected from various sources and analyzed using a distributed lag model to assess first whether having any campaign in your state impacts the probability that the household owns a bed net and then second, whether these impacts are long lasting or short lived. The same is then done using net usage as the dependent variable. Results show that various campaigns do in fact have varying degrees of success in increasing net usage and some have longer lasting effects than others. For example, children under five in states whose campaigns were covered

by organizations funded by the Global Fund within the past 12 months are 25 percentage points more likely to have been sleeping under a net the night preceding the survey. This achievement beats out the same type of children in states whose campaigns were covered by the World Bank working with the National Malaria Control Programme (NMCP) and those covered by other NGOs not funded by the Global Fund. Net usage is also somewhat sustained at higher levels in these states over the next 3-year period, but some of the other campaigns fail to maintain the increase in net usage over time. We also see no real differences in net ownership changes across the various campaigns, although all achieve an increase over those states that had no anti-malaria campaign prior to the most recent 2013 survey.

2. MOTIVATION

In the year 2010, there were an estimated 655,000 deaths related to malaria, with approximately 86% of these deaths occurring in children under 5 years of age (WHO, 2011). Additionally, these deaths are not distributed evenly across the globe. In fact, 85% of malaria-related deaths occur within Africa (RBM, 2005) and 16% of deaths occurring in children under 5 in this region (1 out of every 6) can be attributed to malaria (WHO, 2008a). The reality is, however, that these deaths can be prevented with the proper implementation of recommended interventions (WHO, 2011).

Because this burden is both large and avoidable, four international agencies (WHO, UNICEF, the World Bank and the United Nations Development Programme) came together in 1998 and started the Roll Back Malaria campaign. The primary focus of this campaign is on reducing malaria-related mortality and morbidity by providing the resources required to make a difference. Although malaria incidence has been declining over the last decade due to these efforts (WHO, 2011), it is estimated that over 3.3 billion people (close to half of the world's population) remain at risk (RBM, 2008), with an estimated 247 million cases in one year alone (WHO, 2008b).

Throughout the decade following the Roll Back Malaria's founding, many countries have received assistance and funding from various organizations. However, different countries and different anti-malaria campaigns are having different levels of success. In Nigeria for example, different organizations are operating across different states. These different states are experiencing varying levels of compliance with recommended preventive behaviors, and varying levels of access to particular preventative measures. Therefore, Nigeria offers a unique opportunity to examine whether the varying levels of success may be explained by who is in charge. For example, are NGOs such as the Society for Family and Health (SFH) more or less effective than the campaigns driven by the larger organizations such as the World Bank Boosters Program or UNICEF? In some cases, it may be argued that larger organizations have to deal with greater levels of bureaucracy and "red tape" and local organizations are more familiar with the lay of the land. On the other hand, economies of scale may give the larger organizations a comparative advantage. In this paper, I explore whether different organizations are achieving varying levels of success in terms of increasing both ownership and usage of mosquito nets. Because malaria is transmitted through nocturnal mosquitos, one effective way to prevent and avoid the disease is by sleeping under a bed net (Sexton, 2011). In fact, many campaigns now focus solely on the distribution of these nets. Using a distributed lag model, I am able to test whether the effects of these campaigns wear off over time and whether different campaigns see longer lasting impacts than others.

Data are combined from various sources such as the Demographic Health Surveys (DHS); Malaria Indicator Surveys (MIS); Multiple Indicator Cluster Surveys (MICS); and Nigeria's Yakubu Gowon Center and are analyzed using various econometric strategies in order to assess whether particular organizations are in fact achieving intended results, and whether some organizations are doing this better than others. We need a better understanding as to which organizations are the most successful at reducing malaria-related burdens so that we can ensure this enormous battle is fought both efficiently and effectively to prevent the hundreds of

thousands of unnecessary deaths that are occurring year after year. The paper is organized as follows: Section 3 gives a background on malaria, various anti-malaria campaigns and on the situation in Nigeria in particular. Section 4 details the research strategy, Section 5 discusses the results, and the paper concludes with a discussion on the limitations of this research and potential directions for future analyses.

3. BACKGROUND ON MALARIA

Malaria is caused by the bite of a mosquito carrying the parasite Plasmodium. When the parasites affect the red blood cells, malaria-related symptoms can occur for those lacking immunity or those with weak immune systems, and transmission through blood (to unborn children in pregnant women, for example) is also possible. Then, when an uninfected mosquito feeds off of the infected human, that mosquito contracts the parasites, and then passes it on to its next victim. This continuous cycle of malaria transmission can be controlled, but various and extant resources as well as country- or even continent-level commitments are required for successful reduction or eradication. Because of this, numerous multi-organization and multi-country campaigns have been created within the past 20 years, with a focus on reducing and eventually eliminating malaria-related burdens.

3.1 The Creation of Various Anti-Malaria Campaigns

In 1998, the Roll Back Malaria (RBM) campaign was created by four international organizations joining together with one primary focus: reducing and eventually eliminating malaria. Since then, the RBM Partnership has developed to include more than 500 partners, including malaria-endemic countries, their bilateral and multilateral development partners, the private sector, nongovernmental and community-based organizations, foundations, and research and academic institutions (RBM). In 2000, an African Summit on Roll Back Malaria was held in Abuja, Nigeria, where 44 of the 50 malaria-affected countries called for a commitment to implement RBM's strategies and halve Africa's malaria-related mortality by 2010

(RBM, 2004). This commitment, called the Abuja Declaration and Plan of action detailed the various strategies that were to be carried out by all participating countries and called on the international community to help provide the necessary resources required to overcome this overwhelming challenge.

In the year 2000, 189 nations across the globe put forth the Millennium Declaration outlining eight 'Millennium Development Goals.' These goals include a reduction in malaria, HIV/AIDS and other diseases, as well as a reduction in any-cause mortality for children under 5. In 2002, the Global Fund to Fight AIDS, Tuberculosis and Malaria (GFATM) was created to help accumulate the resources required for these goals and to direct them to those in need. The GFATM awards grants to countries who successfully apply for additional resources that will help increase activities found to combat these diseases. For example, grants have been awarded to increase access to and distribute bed nets and other preventative commodities across various countries, and provide education or mass-marketing campaigns to increase awareness of the causes and treatments of these diseases. In 2005, the World Bank got more heavily involved by establishing funds for various initiatives across Africa in what they called the World Bank Booster campaign. Also in 2005, the President's Malaria Initiative (PMI) was launched as a five-year, $1.2 billion expansion of U.S. Government resources to reduce malaria-related burdens and help relieve poverty across Africa (PMI, 2009). The Millennium Development Goals, together with the RBM partnership, the World Bank, the Global Fund and the PMI all show an increased world-wide commitment to strengthening developing countries and reducing the health-related burdens that affect these countries the most.

3.3 Anti-Malaria Campaigns In Nigeria

97% of Nigeria's population is at risk for malaria (United States Embassy in Nigeria, 2011) and transmission occurs year-round (National Population Commission (NPC) [Nigeria] and ICF International, 2014). In terms of relative prevalence, Nigeria accounted for32 percent of

the global estimate of 655,000 malaria deaths in 2010 (World Health Organization, 2012 as cited in DHS 2013). Malaria is also a leading cause of death of children under age five in Nigeria (National Bureau of Statistics (NBS), 2013). These statistics especially highlight the importance of studying Nigeria in particular when analyzing the effectiveness of anti-malarial campaigns.

The 2009-2013 National Malaria Control Strategic Plans (NMCSP) saw approximately 60 million long-lasting insecticide-treated nets (LLINs) distributed across Nigeria through the work of various organizations and a "massive influx of resources from donors" (National Population Commission (NPC) [Nigeria] and ICF International, 2014). Nigeria had previously implemented a 2006-2010 strategy targeting only the most at-risk populations (pregnant women and children under five) but in 2008 this strategic plan was revised (and set to cover 2009-2013) to instead reach all people living in malaria-endemic areas. Because of this, some states had previously seen bed net distribution campaigns. However, the massive scale-up between 2009 and 2013 will be the focus in this research, and net ownership and usage prior to this period will be controlled for in the analyses.

Between the years of 2009 and 2013, several "lead partners" were involved in bed net distribution across the various states of Nigeria. The World Bank Booster program, who had been a major partner in setting up for some of the earlier distributions, worked without the NMCP prior to 2011 (in campaigns across seven states) but then worked with them for most campaigns occurring in and after 2011 (in 17 states including those carried out after collection of the 2013 data). UNICEF was also a lead partner in five different states, NGOs funded by the Global Fund carried out campaigns in four of the states and finally NGOs funded by sources other than the Global Fund were active in the four remaining states. This research attempts to shed light on whether some lead partners were more effective than other at achieving bed net ownership and usage, controlling for general time trends affecting all states and also for state-level fixed effects.

3.4 Strategies of Anti-Malaria Campaigns

Because malaria is transmitted through nocturnal mosquitos, one effective way to prevent and avoid the disease is by sleeping under a bed net (Sexton, 2011). In fact, many campaigns now focus solely on the distribution of these nets. For example, between 2008 and 2010, 289 million long-lasting insecticide-treated nets (LLINs) were distributed, which was enough to cover almost 80% of the at-risk population in sub-Saharan Africa (RBM, 2011). While it is known that those most susceptible to death from malaria are children and pregnant women, the latest goals of the anti-malaria campaigns in Africa now include covering all at-risk populations (not just women and children), since spillover effects can be achieved with more extensive coverage (RBM, 2008). Additionally, some campaigns' goals include ensuring the availability of Artemisinin Combination Therapies (ACTs) and intermittent preventive treatment in pregnancies (IPTp), indoor-residual spraying, and demand creation for bed nets. Attempts are now being made across the globe to "scale up" these intervention programs in an attempt to achieve the Millennium Development Goal related to malaria by the year 2015.

Bed nets treated with an insecticide (ITNs) can be highly effective at reducing mortality (see, for example, Lengeler (2004)) since mosquitos are both unable to penetrate the net and die after coming into contact with one. A reduction in the number of mosquitos that can transmit malaria parasites from person to person can help aid in the reduction of malaria-related mortality and morbidity. Of course, if more people are protected by bed nets, it is less likely they will contract the disease in the first place, also reducing the chances that the surviving mosquitos don't pick it up to pass along to another person. Additionally, there are "long-lasting insecticide-treated nets" (LLINs), which last a full 3 years without needing re-treatment (CDC). Massive campaigns to distribute these LLINs across sub-Saharan Africa have shown great but varying levels of success.

The biggest problem leading to lack of bed net usage has always been both access and understanding, where those without access to bed nets certainly won't sleep under one, but

those without an understanding or appreciation of its life-saving benefits are also highly unlikely to use it. Therefore, in addition to increasing access through mass distribution, many campaigns have also focused on demand creation with mass-marketing campaigns teaching citizens that sleeping under bed nets can help save both children and pregnant women's lives.

There are not only various programs that exist to achieve these goals, but there are also various strategies being implemented by the organizations in charge to achieve their goals. What I propose to investigate is whether some organizations are experiencing better returns to their resources in terms of achieving higher levels of coverage of effective preventive behaviors. This is only the first step- if we observe that varying levels of success are occurring across the various organizations involved in the fight against malaria, then the next step is to try to figure out *why*. This call for future research underscores the need and urgency with which both local and international organizations must act. We need to discover which organizations are most capable of achieving these outcomes so that we can start to understand if their greater success is due to their strategies, their organizational structure or something else entirely. Once we know what works, we may be able to not only save more lives and give people a better chance at living longer, more productive lives, but we may also reduce the amount of wasted resources given to inferior organizations that seem to be unable to achieve the same goals.

4. RESEARCH STRATEGY

Although many countries within sub-Saharan Africa have implemented various anti-malaria campaigns, this research focuses solely on the situation in Nigeria. First, it's easier to see what factors might be leading to differences in the success rates of different campaigns when focusing on just one country. This allows you to exploit the variation within the country while holding constant for all states many of the country-level variables that could be having an effect. Second, Nigeria conveniently has data related to which state had which organization leading the anti-malaria campaign within it. For various reasons, the campaigns in some states

were led by the World Bank Boosters program (WB) working alongside the National Malaria Control Programme (NMCP) and in other states, the NMCP was absent and the World Bank worked with other NGOs. Still other states' campaigns were led by UNICEF, and the rest were headed by NGOs funded by the Global Fund. This country then provides a unique opportunity to assess whether different organizations are experiencing different levels of effectiveness in terms of mosquito net ownership and usage, and to see whether the differences can be attributed to the organizations in charge.

Once the question of whether different campaigns are experiencing different levels of success has been answered, more research will need to be conducted using additional countries within sub-Saharan Africa to see if the results generalize beyond Nigeria. If we can explain differences in impacts by differences in strategies or other organizational characteristics across many different countries, we may be able to fight the fight against malaria with fewer, yet more efficiently-utilized and effective resources. Since this is such a difficult fight with extremely significant consequences and resources are limited, this should be the goal of any research related to the anti-malaria campaigns that are trying to reduce infant and child mortality across the continent. Of course, the first step is to assess whether heterogeneity can in fact be seen in the data.

4.1 Data Description

Data on net ownership and usage are obtained from the Demographic and Health Surveys (DHS), Malaria Indicator Surveys (MIS) and Multiple Indicator Cluster Surveys (MICS). Specifically, I use DHS Nigeria 2003, DHS Nigeria 2008, MIS Nigeria 2010, MICS Nigeria 2011 and DHS Nigeria 2013. Because data are also collected on state of residence for each household, I am able to merge these separate data sets together to create state-level pooled cross-section data. In the analyses for net ownership, I use household level data since each household reported whether or not they own a bed net. For the net usage analyses, I "re-

shaped" the DHS and MIS women data set to create one line per child under the age of five. This allowed all relevant household and women variables to remain attached to each child observation. I then appended these data to the MICS data set, which was already one line per child under five. All control variables (whether the household had electricity, was in an urban area, the number of members and members under five, and the highest level of the mother's education) were also obtained from these same data sets. The list of available data sets is provided in

Table 17A, as well as information on the number of observations in each.

The Yakubu Gowon Center was also instrumental in providing data for this research. They put together a detailed report of which organization(s) led the campaigns in each state and the month and year that the campaign was carried out. This information was used to create the data related to which organization was in charge and the timing of each campaign. (See Table 18A for a description of when campaigns were involved in each state.)

4.2 Empirical Specification- Net Ownership

As stated above, the data span 10 years, and variables are measured at both the household and person level. Creating a pooled cross-section data set and using both time and state fixed effects, as well as a linear state-level time trend, we can assess first whether having any campaign increases the likelihood of your household owning a bed net, controlling for things such as whether your household is in an urban area, whether it has electricity, the highest level of education achieved by the mother in the household, and the number of members, women and children under 5 in the household. We can also see if the effect of having a campaign in your state wears off over time by using a distributed lag model. The first model is specified as follows:

$$OwnNet_{ist} = \delta_1 Campaign_{st} + \delta_2 Campaign_{s(t-1)} + \delta_3 Campaign_{s(t-2)} + \delta_4 Campaign_{s(t-3)} +$$

$$\beta \boldsymbol{X} + \mu_s + \mu_t + \theta_s \mu_{st} + u_{ist} \quad (1)$$

Where $OwnNet_{ist}$ takes the value one or zero for whether household i in state s owns any type of bed net at time t. δ_1 will measure whether having a campaign in the state 12 months or less prior to the survey (here, denoted as $Campaign_{st}$) increases the likelihood that the household owns a net, relative to those living in states that did not have a campaign between 2009 and the time of data collection in 2013. δ_2 will measure the effect of having a campaign 13-24 months prior to the survey (here, denoted as $Campaign_{s(t-1)}$) on bed net ownership (again, relative to the baseline group who had no campaign). $Campaign_{s(t-2)}$ represents that a campaign was in the state 25-36 months prior to the survey, and $Campaign_{s(t-3)}$ represents that the campaign was in the state more than 36 months prior to the survey[3]. $\boldsymbol{X_{ist}}$ contains the controls listed above (and a vector of ones to estimate an intercept), μ_s represents the state-level fixed effects, μ_t is a set of year dummies (t=2003, 2008, 2010, 2011, 2013) and θ_s will estimate a linear state-level time trend for each state s. Note also that the standard errors will be clustered at the year,

[3] To illustrate, Table 18A shows that Adamawa had a campaign headed by UNICEF in 2010. This campaign was carried out in August of that year (months of campaigns are not shown in order to keep the table brief). Nigeria had MIS survey data collected in December of 2010, and UNICEF collected MICS survey data in Feb of 2011. DHS survey data were collected again in April of 2013. Therefore households in Adamawa surveyed in 2010 will be given a value of 1 for $Campaign_t$. Additionally, households surveyed in Adamawa in 2011 will also be given a value of 1 for $Campaign_t$ since the campaign was fewer than 12 months prior to the 2011 survey. (Note that this is the case for many of the campaigns carried out in 2010, due to the fact that the 2010 and 2011 surveys were conducted within 6 months of each other.) $Campaign_t$ will have a value of 0 for 2003, 2008 and 2013 since a campaign was not conducted within 12 months prior to the survey in any of those years. Households surveyed in 2013 will take a value of 1 for $Campaign_{t-2}$ because April 2013 was 25-36 months after the campaign and $Campaign_{t-1}$ and $Campaign_{t-3}$ will take a value of zero for all years.

state and cluster level since the households residing in the same cluster and state in the same year are not independent of one another.

After assessing the effects over time on any campaign being conducted within the state, it's possible to split the different campaigns and estimate their effects separately. We can then test whether certain campaigns are producing better or worse results than others. Each of the various campaigns in Nigeria was carried out in states chosen specifically by the campaign. While the lack of random assignment makes it difficult to truly control for all potentially confounding factors, it is hoped that the state-level fixed effects can help test whether different campaigns are more or less effective than others, since this econometric strategy effectively controls for all state-level (time-invariant) variables that may cause omitted variable bias in the estimates. However, as mentioned above, there are not many state-level variables (either time-invariant or time-varying) thought to be correlated with both campaign activity and bed net ownership. This is especially true since universal coverage was the goal, with no regard to the population's levels of wealth, education or even risk level. The states' campaigns were categorized as follows: World Bank Boosters (WB) working with the National Malaria Control Programme (NMCP), the WB working without the NMCP (often alongside other NGOs), campaigns with UNICEF acting as the lead partner, campaigns led by NGOs funded by the Global Fund to Fight AIDS, Tuberculosis and Malaria (GFATM) and finally those campaigns headed by other NGOs. Note that this list is both mutually exclusive and exhaustive in that every state belongs either to one of the groups (and only one) or had no campaign prior to the collection of the 2013 data. Each campaign will also have the lagged values as in the model above. The specification is as follows:

$$OwnNet_{ist} = \delta_1 WB\ \&\ NMCP_t + \cdots + \delta_4 WB\ \&\ NMCP_{t-3} + \delta_5 WB\ without\ NMCP_t + \cdots$$
$$+ \delta_8 WB\ without\ NMCP_{t-3} + \delta_9 UNICEF_t + \cdots + \delta_{12} UNICEF_{t-3} + \delta_{13} GFATM_t + \cdots$$
$$+ \delta_{16} GFATM_{t-3} + \delta_{17} Other\ NGOs_t + \cdots + \delta_4 Other\ NGOs_{t-3} + \beta \boldsymbol{X} + \mu_s + \mu_t + \theta_s \mu_{st} + u_{ist} \qquad (2)$$

where $\boldsymbol{X}$ contains the same controls as in (1) and both fixed effects and the state-level time trends are included. This specification allows us to test not only whether the effects of individual campaigns are wearing off over time, but also whether some campaigns are having stronger impacts than others and whether some are having longer-lasting effects than others.

4.3 Empirical Specification- Net Usage

The above specifications use data at the household level to assess campaigns' effects on bed net ownership. The DHS, MIS and MICS data also allow us to test whether campaigns are impacting net *usage* in children under 5, one of the most at-risk populations for malaria-related mortality. The specifications are identical to those above, except the dependent variable is now net usage, and the standard errors are now clustered at the year, state, cluster and household level since multiple individual observations can come from within the same household. Net usage takes on the value 1 for those children under 5 who were reported to have slept under a mosquito net the night prior to the survey and a value of zero otherwise. The specifications are as follows:

$$NetUsage_{ist} = \delta_1 Campaign_t + \delta_2 Campaign_{t-1} + \delta_3 Campaign_{t-2} + \delta_4 Campaign_{t-3} + \beta \boldsymbol{X} + \mu_s + \mu_t + \theta_s \mu_{st} + u_{ist} \quad (3)$$

$$NetUsage_{ist} = \delta_1 WB\ \&\ NMCP_t + \cdots + \delta_4 WB\ \&\ NMCP_{t-3} + \delta_5 WB\ without\ NMCP_t + \cdots + \delta_8 WB\ without\ NMCP_{t-3} + \delta_9 UNICEF_t + \cdots + \delta_{12} UNICEF_{t-3} + \delta_{13} GFATM_t + \cdots + \delta_{16} GFATM_{t-3} + \delta_{17} Other\ NGOs_t + \cdots + \delta_4 Other\ NGOs_{t-3} + \beta \boldsymbol{X} + \mu_s + \mu_t + \theta_s \mu_{st} + u_{ist} \quad (4)$$

Like the one above, this specification will allow us to test both whether there are lagged effects of campaigns on net usage, but also whether different campaigns are having varying impacts. The results are described and discussed in the Section 5.

5. RESULTS

The appendix includes both tables and box plots of the estimated coefficients. The tables are included for those who prefer to see the estimates, but the box plots give a much better visualization of differences across the campaigns and whether the effects are long-lasting so they will be the topic of discussion in this results section.

Figure 3A shows the declining impact of campaigns over time on net ownership. The effect of having a campaign within the past 12 months preceding a survey is significantly different (at the 5% level) from the effect of having a campaign more than 12 months ago, and this effect is also different from the effects more than 2 years ago (although the effect of having a campaign 25-36 months ago is not statistically different from having one more than 36 months ago. We see the same general trend in Figure 4A, although some campaigns seem to have longer-lasting effects than others (as shown by the consistently high GFATM estimates up through 25-36 months ago). We can see from this figure that there aren't statistically different impacts of individual campaigns on net ownership when comparing campaigns that were conducted within the same time period preceding a survey. (One possible exception is the GFATM within the past 12 month's estimate, which appears to be statistically different from the estimate for "other NGOs" and slightly higher than the estimate for campaigns led by UNICEF. However, within the other time frames, all individual campaign estimates seem to overlap. This seems to suggest that net ownership is achieved somewhat equally and doesn't vary due to differences in campaign management. We will see somewhat different results when comparing estimates on net *usage*.

Figures 5A through 9A show the lagged impacts for each individual campaign. It's worth noting that campaigns led by NGOs funded by the Global Fund and NGOs funded in other ways (usually sets of international donors) both seem to have the longest-lasting impact on net ownership. The other three campaigns' effects at 25-36 months ago are statistically lower than the campaigns' effects within the first 12 months. It's also worth noting that only one campaign (the WB working without the NMCP) sees net ownership that is statistically different from zero even after 36 months or more have passed. All other campaigns' states see no better net ownership after 3 years than states that have had no campaign at all.

Table 20A then presents the estimates for net usage when any campaign has been in the state within the past. Again, the discussion will focus on the 95% confidence intervals presented in the figures. The effect of campaigns on net usage drops more dramatically than net ownership, suggesting that although people may retain ownership of their nets they reduce their usage. This could perhaps be due to the wear and tear of nets, since a net with tears fails to achieve its purpose. People may hold onto them and report owning one because they may plan on sewing the net or repairing it in the future but aren't continuing its use. Alternatively, it could be that the commitment to use the nets spikes right after the campaign because of the behavioral change communication the campaigns attempts, but then this wears off once the campaign has been gone for a while.

Figure 11A shows the same general trend although again we see the GF NGOs maintaining the longest-lasting impact. We also see differences among the campaigns in this , where the GF NGOs impact net usage statistically more than both NGOs funded by other means and the WB working with the NMCP. When looking at 13-24 months after a campaign, the GF NGOs outperform UNICEF and the WB with the NMCP. After 25 months, the GF NGOs outperform everyone, and the same is true for greater than 36 months except for NGOs funded by other means. (More on NGOs funded by donors other than the Global Fund below.)

Figures 12A through 16A show the lagged effects net usage for each individual campaign. As discussed above, states with campaigns led by NGOs funded by the Global Fund do a pretty great job at sustaining net usage. There are no statistical differences in net usage between time lags of 13-24 months, 25-36 and even greater than 36 months, although they do experience the highest increase in net usage within their first 12 months.

There were no states with the WB & NMCP having conducted campaigns more than 36 months ago, but you can see a great decline in net usage. In fact, once 2 years have passed, states that had this group leading the campaign have less net usage than states with no campaigns[4]. States where the WB worked with groups other than the NMCP also reduce their net usage dramatically after 2 years. States with UNICEF as the lead partner see a large decline in net usage after only the first year.

Figure 16A shows net usage in states whose campaigns were led by NGOs funded by donors other than the Global Fund. We see an odd result where it appears that the effect 36 months after the campaign is larger than the effect 2-3 years after. This is due somewhat to the fact that two states (Ekiti and Ogun) had their campaigns in 2010, so had a value of 1 for $other\ NGO_t$, $other\ NGO_{t-1}$, and $other\ NGO_{t-3}$. These two states maintain a somewhat higher level of net usage across all four years. However Zamfara, the only state with a value of 1 for $other\ NGO_{t-2}$, has a low level of net usage in 2013, the year for which this value is 1. However, one thing we do learn from this figure is that usage stays somewhat consistent in the three other states. A full discussion of these results, along with policy implications, is discussed in Section 6.

6. DISCUSSION AND POLICY IMPLICATIONS

This research casts light not only on the impact of anti-malaria campaigns on net ownership and net usage, but also on whether the effects of campaigns last even after the

[4] Of course, net ownership and usage was not zero for states with no campaigns prior to the 2013 survey.

campaigns are conducted. The general finding is that net ownership is heavily impacted by campaigns (as to be expected) and that ownership doesn't quite return to levels consistent with having no campaign even after the campaigns have been gone for several years. This means that campaigns *are* in fact having positive impact on mosquito net ownership and that although ownership does decline over time once the campaigns have left, those states covered by a campaign still see higher rates of ownership three years following the campaign than those states with no campaign at all. However, we see a somewhat different result when looking at net usage. This has several policy implications. First, behavioral change communication will need to stress the *continued care and usage* of mosquito nets. In fact, there is currently work being done to do just that by an organization called Networks, which is funded by USAID and the Johns Hopkins Bloomberg School of Public Health (http://www.networksmalaria.org/networks/nigeria). Additionally, the durability of nets is extremely important if funding doesn't allow for campaigns to re-visit states (or countries) every 2-3 years (estimated length of net durability is around 3 years).

Since net usage also spikes immediately after campaigns, this implies that malaria prevalence may in fact be able to be reduced by these campaigns. Since malaria is spread from a mosquito biting an infected human and then infecting another, if the usage of nets reduces the number of people initially catching malaria and even kills the mosquitos that come into contact with the nets, overall prevalence of malaria may be reduced even though net usage falls after the first year.

Additionally, since we do see somewhat different levels and longevity of impacts across campaigns headed by different organizations, it may be important for different organizations to increase their communication with other campaigns so that best methods and practices are learned and spread across both states and countries (and even continents). However, there is still work to be done in better understanding the different impacts and the results of this research. The limitations and ideas for future research are discussed in the section that follows.

7. LIMITATIONS AND FUTURE RESEARCH

As mentioned throughout the paper, if these results truly represent the differences in results achieved by various organizations, the next step is to find out how, or why. Could these differences be due to differences in strategies, organizational structures, leadership styles, or some other factor? More research could be helpful in assessing whether these particular organizations actually differ on these dimensions, or if it's simply a story of who manufactures the nets purchased by the campaigns for instance.

Additionally, further research is necessary to see if these results remain when looking into other countries. Opportunities exist to not only research into differences between anti-malaria campaigns, but also campaigns across the globe with any goal to achieve. The availability of extensive data from the Demographic and Health Surveys and the others mentioned here make it easier to do these types of analyses, and a better understanding of differences in results across various organizations can help us make sure funding is used most efficiently and awarded to the most effective organizations.

More research is also needed to assess whether levels of funding are similar across campaigns. Of course, the purpose of this research was simply to test whether differences could be found. If the results are reliable, future research needs to dig into the various strategies and funding levels of these campaigns to see if we can discover the mechanisms through which different campaigns achieve different results.

Additionally, the outcome variable used here allowed for a simple econometric strategy, but other (and perhaps more important) outcomes should also be studied. For example, are there reductions in reported cases of fever or lower probabilities of death among pregnant women and children under 5? These are all important questions, and future work can hopefully provide some answers.

8. CONCLUDING REMARKS

The fight against malaria has been going on for decades, with a major increase in attention over the last 15 years. Recent research has attempted to address topics such as which preventive behaviors are most effective at achieving desirable health outcomes, which policies are more likely to get people engaged in these key preventive behaviors, and even which preventative behaviors are the most cost effective. Nevertheless, in addition to the social, economic and medical perspectives looking into the fight, it's possible that this problem can be studied from an organizational performance perspective. Perhaps some non-profit organizations operate more efficiently and effectively than their counterparts, and are more likely to succeed in achieving the goals shared by the international community. If this is the case (as this research seems to suggest) other organizations should begin trying to replicate what it is that the most effective ones are doing. Perhaps then we could ultimately learn how to save more lives with fewer resources.

REFERENCES CITED

CDC. March 26, 2014. Insecticide-Treated Bed Nets Retrieved June 26th, 2015, from http://www.cdc.gov/malaria/malaria_worldwide/reduction/itn.html

Global Fund. (2007). Grant Performance Report: NGA-202-G04-M-00.

Lengeler, C. (2004). Insecticide-treated bed nets and curtains for preventing malaria. *Cochrane Database of Systematic Reviews*(2).

National Bureau of Statistics (NBS). (2013). Nigeria Multiple Indicator Cluster Survey 2011. Abuja, Nigeria.

National Population Commission (NPC) [Nigeria] and ICF International. (2014). Nigeria Demographic and Health Survey 2013. Abuja, Nigeria and Rockville, Maryland, USA: NPC and ICF International.

National Population Commission (NPC) [Nigeria], N. M. C. P. N. N., ICF International. (2012). Nigeria Malaria Indicator Survey 2010. Abuja, Nigeria: NCP, NMCP and ICF International.

PMI. (2009). About The President's Malaria Initiative Retrieved Feb. 6, 2013, from http://www.fightingmalaria.gov/about/index.html

RBM. RBM Mandate Retrieved Feb. 6, 2013, from http://www.rbm.who.int/rbmmandate.html

RBM. (2004). *Roll Back Malaria: Looking Forward*. Geneva.

RBM. (2005). *Rolling Back Malaria: The World Bank Global Strategy & Booster Program*.

RBM. (2008). *Global Malaria Action Plan*.

RBM. (2011). *Annual Report* Geneva.

Sexton, A. (2011). Best practices for an insecticide-treated bed net distribution programme in sub-Saharan eastern Africa. [Journal article]. *Malaria Journal*(1), 157.

United States Embassy in Nigeria. (2011). *Nigeria Malaria Fact Sheet*. Central Area Abuja, FCT, Nigeria.

Van Eijk, A. M., Hill, J., Alegana, V. A., Kirui, V., Gething, P. W., ter Kuile, F. O., & Snow, R. W. (2011). Coverage of malaria protection in pregnant women in sub-Saharan Africa: a synthesis and analysis of national survey data. *Lancet: Infectious Diseases, 11*, 190-207.

WHO. (2008a). *Global Burden of Disease: 2004 Update*. Geneva.

WHO. (2008b). *World Malaria Report*. Geneva.

WHO. (2011). *World Malaria Report*. Geneva.

World Bank. (2007). The World Bank Booster Program for Malaria Control in Africa: Scaling-Up for Impact (SUFI), A Two-Year Progress Report.

ESSAY #2 TABLES

Table 17A: Data Sources

Year	Source	Number of Households	Number of Children Under Five
2003	Demographic and Health Survey (DHS), Wave 4	5,292	14,475
2008	Demographic and Health Survey (DHS), Wave 5	24,272	70,089
2010	Malaria Indicator Survey (MIS), Wave 6	4,557	13,877
2011	Multiple Indicator Cluster Survey (MICS), Round 4	23,116	26,018
2013	Demographic and Health Survey (DHS), Wave 6	27,978	82,703

Table 18A: Campaigns by State and Year

	2009	2010	2011	2012	2013
Abia				WB & NMCP	
Adamawa		UNICEF			
Akwa Ibom		WB W/O NMCP			
Anambra	WB W/O NMCP				
Bauchi		WB W/O NMCP			
Bayelsa			WB & NMCP		
Benue			WB & NMCP		
Borno			WB & NMCP		
Cross river			Other NGOs		
Delta**					WB & NMCP*
Ebonyi			GF NGOs		
Edo				WB & NMCP	
Ekiti	Other NGOs				
Enugu			WB & NMCP		
FCT			WB & NMCP		
Gombe		WB W/O NMCP			
Imo				WB & NMCP	
Jigawa		WB W/O NMCP			
Kaduna		UNICEF			
Kano	WB W/O NMCP				
Katsina		GF NGOs			

Table 18A (continued): Campaigns by State and Year

	2009	2010	2011	2012	2013
Kebbi	**UNICEF**				
Kogi**					**WB & NMCP***
Kwara			**WB & NMCP**		
Lagos			**WB & NMCP**		
Nassarawa		**UNICEF**			
Niger	**GF NGOs**				
Ogun	**GF NGOs**				
Ondo				**WB & NMCP**	
Osun**					**WB & NMCP***
Oyo				**WB & NMCP**	
Oyo				**WB & NMCP**	**WB & NMCP***
Plateau		**GF NGOs**			
Rivers		**WB W/O NMCP**			
Sokoto	**UNICEF**				
Taraba			**WB & NMCP**		
Yobe			**WB & NMCP**		
Zamfara			**Other NGOs**		

***** These states' campaigns were carried out following data collection in 2013.

** These states create our baseline group.

Table 19A: Bed Net Ownership by State Over Time

State	2003	2008	2010	2011	2013
Abia	.03	.04	.13	.16	.58
Abuja	.03	.15	.22	.49	.39
Adamawa	.13	.13	.82	.82	.74
Akwa Ibom	.05	.17	.70	.72	.48
Anambra	.03	.15	.79	.76	.59
Bauchi	.19	.23	.76	.82	.71
Bayelsa	.54	.22	.22	.29	.54
Benue	.12	.15	.11	.18	.74
Borno	.38	.53	.55	.50	.57
Cross River	.31	.27	.55	.71	.69
Delta**	.06	.13	.25	.28	.40
Ebonyi	.19	.25	.36	.45	.62
Edo	.11	.15	.14	.17	.65
Ekiti	.01	.15	.83	.63	.48
Enugu	.11	.10	.23	.14	.67
Gombe	.07	.28	.90	.86	.76
Imo	0.0	.15	.23	.17	.80
Jigawa	.10	.32	.89	.80	.77
Kaduna	.02	.20	.78	.78	.36
Kano	.03	.12	.76	.61	.51
Katsina	.05	.05	.19	.77	.69
Kebbi	.43	.20	.75	.83	.64
Kogi**	.16	.15	.24	.30	.35
Kwara	.05	.15	.18	.29	.56

Table 19A (continued): Bed Net Ownership by State Over Time

State	2003	2008	2010	2011	2013
Lagos	.01	.15	.15	.18	.58
Nasarawa	.15	.25	.47	.67	.63
Niger	.17	.11	.78	.75	.49
Ogun	.02	.09	.58	.47	.38
Ondo	.01	.18	.19	.11	.67
Osun**	0.0	.04	.07	.15	.28
Oyo	0.0	.04	.09	.17	.44
Plateau	.05	.20	.42	.79	.61
Rivers	.05	.16	.67	.63	.32
Sokoto	.46	.62	.74	.70	.60
Taraba	.24	.2	.34	.23	.65
Yobe	.14	.17	.64	.42	.63
Zamfara	.14	.12	.32	.18	.85

** These states form our baseline group.

Table 20A: Bed Net Usage by State Over Time

State	2003	2008	2010	2011	2013
Abia	.03	.02	.03	.04	.15
Abuja	.03	.05	0.0	.21	.18
Adamawa	.05	.04	.42	.12	.09
Akwa Ibom	.01	.08	.25	.17	.14
Anambra	.01	.11	.32	.16	.11
Bauchi	.04	.08	.45	.12	.05
Bayelsa	.12	.12	.06	.08	.20
Benue	.04	.09	.04	.04	.20
Borno	.06	.18	.3	.05	.08
Cross River	.16	.14	.24	.25	.24
Delta**	.02	.07	.13	.09	.08
Ebonyi	.11	.13	.16	.05	.21
Edo	.11	.07	.04	.04	.16
Ekiti	0.0	.08	.13	.20	.13
Enugu	.05	.05	.06	.04	.20
Gombe	.02	.09	.51	.26	.09
Imo	0.0	.08	.06	.02	.18
Jigawa	.08	.13	.53	.25	.20
Kaduna	0.0	.08	.42	.25	.04
Kano	.01	.04	.36	.15	.05
Katsina	.01	.02	.06	.23	.16
Kebbi	.19	.08	.40	.08	.16
Kogi**	.07	.08	.10	.15	.10

Table 20A (continued): Bed Net Usage by State Over Time

State	2003	2008	2010	2011	2013
Kwara	.02	.06	.01	.10	.18
Lagos	0.0	.05	.07	.06	.16
Nasarawa	.03	.05	.06	.12	.12
Niger	.09	.01	.29	.09	.07
Ogun	0.0	.05	.17	.11	.14
Ondo	0.0	.08	.05	.03	.19
Osun**	0.0	.01	0.0	.06	.05
Oyo	0.0	.02	.02	.09	.13
Plateau	.01	.06	.17	.22	.15
Rivers	0.0	.09	.33	.16	.10
Sokoto	.03	.22	.43	.14	.10
Taraba	.06	.05	.14	.04	.09
Yobe	.01	.05	.40	.07	.13
Zamfara	.01	.04	.09	.03	.07

** These states form our baseline group.

Table 21A: OLS Estimates of Effects of Anti-malaria Campaigns on Net Ownership

	(1) HH Owns Mosquito Net	(2) HH Owns Mosquito Net	(3) HH Owns Mosquito Net
Campaign (past 12 months)	0.409*** [0.38,0.44]	0.409*** [0.38,0.44]	0.407*** [0.37,0.44]
Campaign (13-24 months ago)	0.320*** [0.29,0.35]	0.319*** [0.28,0.35]	0.315*** [0.27,0.36]
Campaign (25-36 months ago)	0.241*** [0.19,0.29]	0.240*** [0.19,0.29]	0.174*** [0.10,0.25]
Campaign (>36 months ago)	0.179*** [0.12,0.24]	0.179*** [0.12,0.23]	0.122** [0.034,0.21]
Urban		-0.0670*** [-0.082,-0.052]	-0.0679*** [-0.083,-0.053]
Has Electricity		0.0114** [0.0028,0.020]	0.0115** [0.0029,0.020]
No. of HH Members		0.00663*** [0.0049,0.0083]	0.00647*** [0.0048,0.0082]
No. of Women in HH		-0.0126*** [-0.018,-0.0073]	-0.0122*** [-0.017,-0.0069]
No. of Children U5		0.0244*** [0.021,0.028]	0.0241*** [0.021,0.028]
Mother's Edu. Level		0.0306*** [0.025,0.037]	0.0300*** [0.024,0.036]
State FE	Yes	Yes	Yes
Time FE	Yes	Yes	Yes
State Time Trend	No	No	Yes
R^2	0.237	0.245	0.254
Observations	85172	83627	83627

95% confidence intervals in brackets; * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table 22A: OLS Estimates of Effects of Anti-malaria Campaigns on Net Ownership

	HH Owns Mosquito Net
WB & NMCP	0.419***
(Within Past 12 Months)	[0.33,0.51]
WB & NMCP	0.293***
(13-24 Months Ago)	[0.21,0.38]
WB & NMCP	0.0922
(25-36 Months Ago)	[-0.088,0.27]
WB w/o NMCP	0.398***
(Within Past 12 Months)	[0.33,0.46]
WB w/o NMCP	0.339***
(13-24 Months Ago)	[0.27,0.41]
WB w/o NMCP	0.187**
(25-36 Months Ago)	[0.045,0.33]
WB w/o NMCP	0.131*
(>36 Months Ago)	[0.023,0.24]
UNICEF	0.350***
(Within Past 12 Months)	[0.27,0.43]
UNICEF	0.321***
(13-24 Months Ago)	[0.16,0.48]
UNICEF	0.0664
(25-36 Months Ago)	[-0.068,0.20]
UNICEF	0.182
(>36 Months Ago)	[-0.069,0.43]
GF NGOs	0.495***
(Within Past 12 Months)	[0.42,0.57]
GF NGOs	0.333***
(13-24 Months Ago)	[0.22,0.45]
GF NGOs	0.305***
(25-36 Months Ago)	[0.17,0.44]
GF NGOs	0.0331
(>36 Months Ago)	[-0.17,0.24]
Other NGOs	0.319***
(Within Past 12 Months)	[0.22,0.41]
Other NGOs	0.232***
(13-24 Months Ago)	[0.14,0.33]
Other NGOs	0.308***
(25-36 Months Ago)	[0.14,0.48]
Other NGOs	0.0168
(>36 Months Ago)	[-0.12,0.16]
Controls	Yes
State FE	Yes
Time FE	Yes
State Time Trend	Yes
R^2	0.255
Observations	83627

95% confidence intervals in brackets; * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

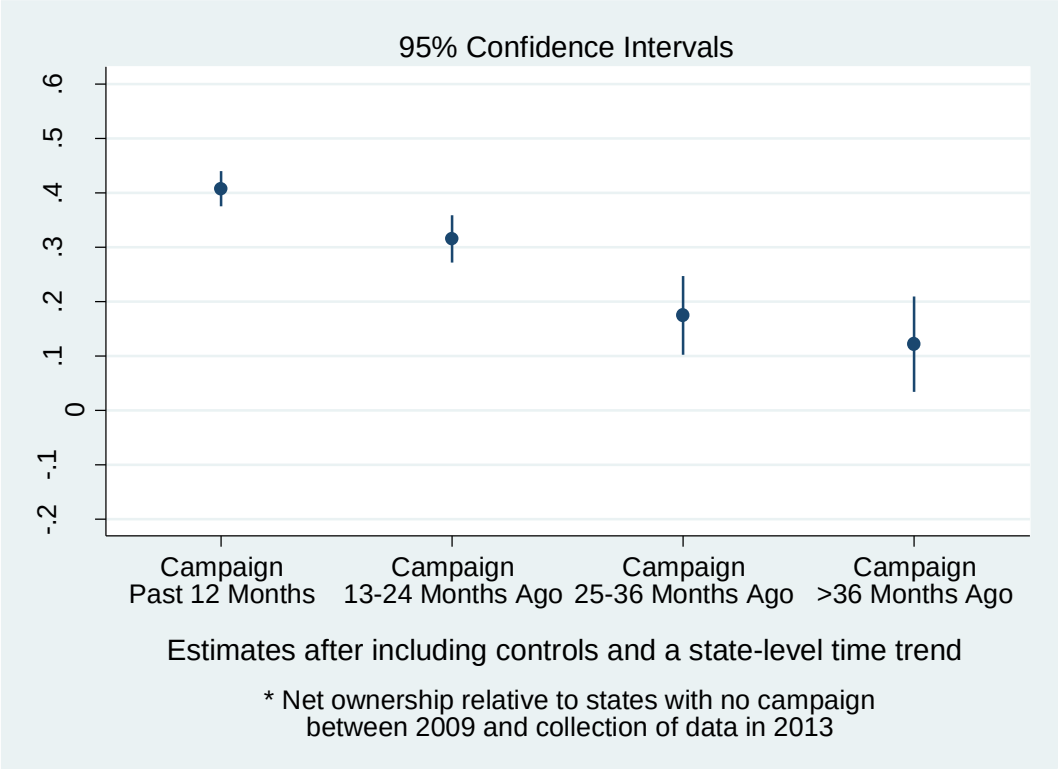

Figure 3A: Net Ownership by Time Elapsed Since Any Campaign

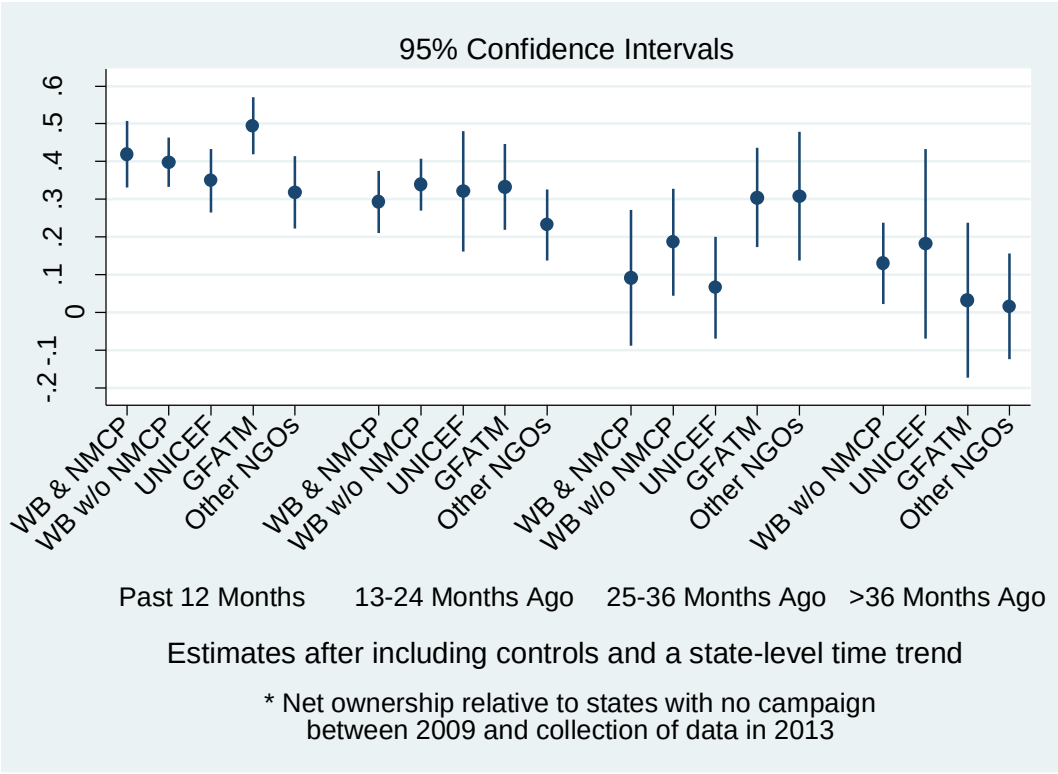

Figure 4A: Net Ownership by Campaign and Time Elapsed Since Campaign

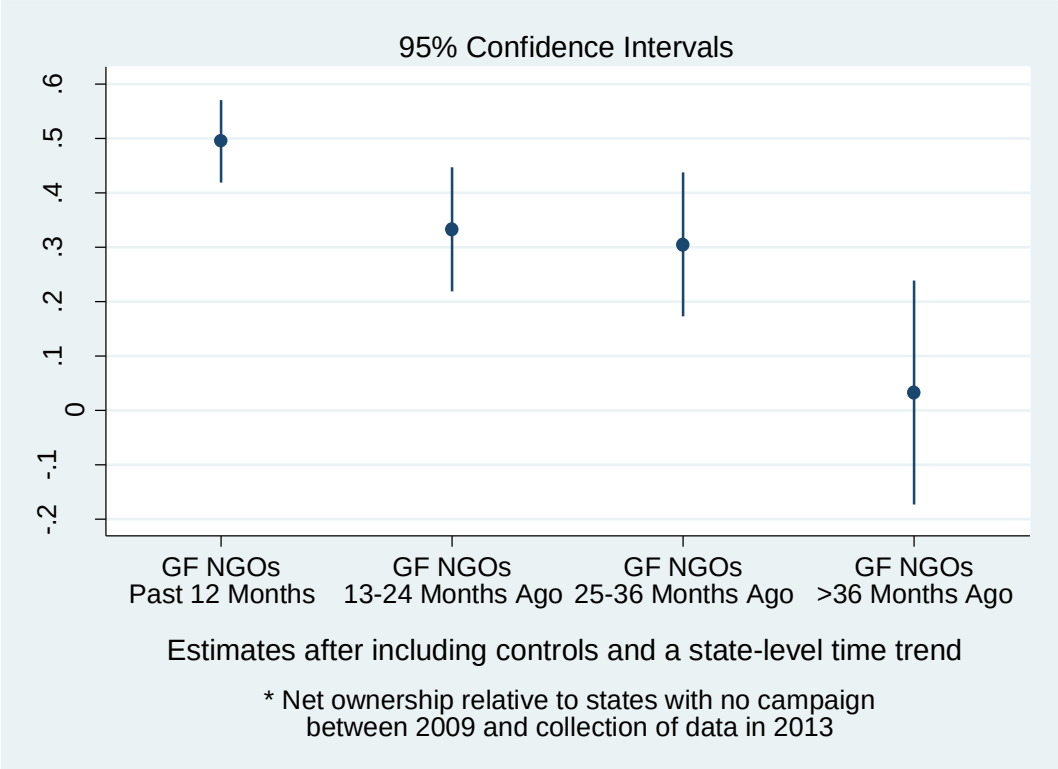

Figure 5A: Net Ownership by Time Elapsed Since Campaign- GF NGOs

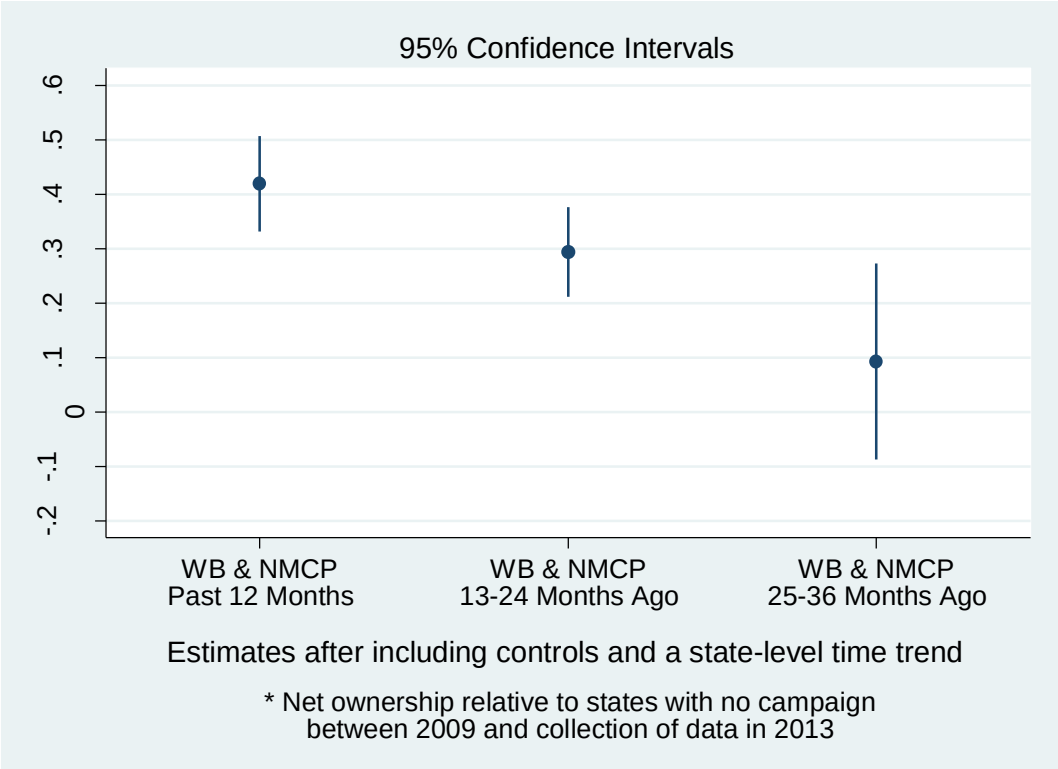

Figure 6A: Net Ownership by Time Elapsed Since Campaign- WB & NMCP

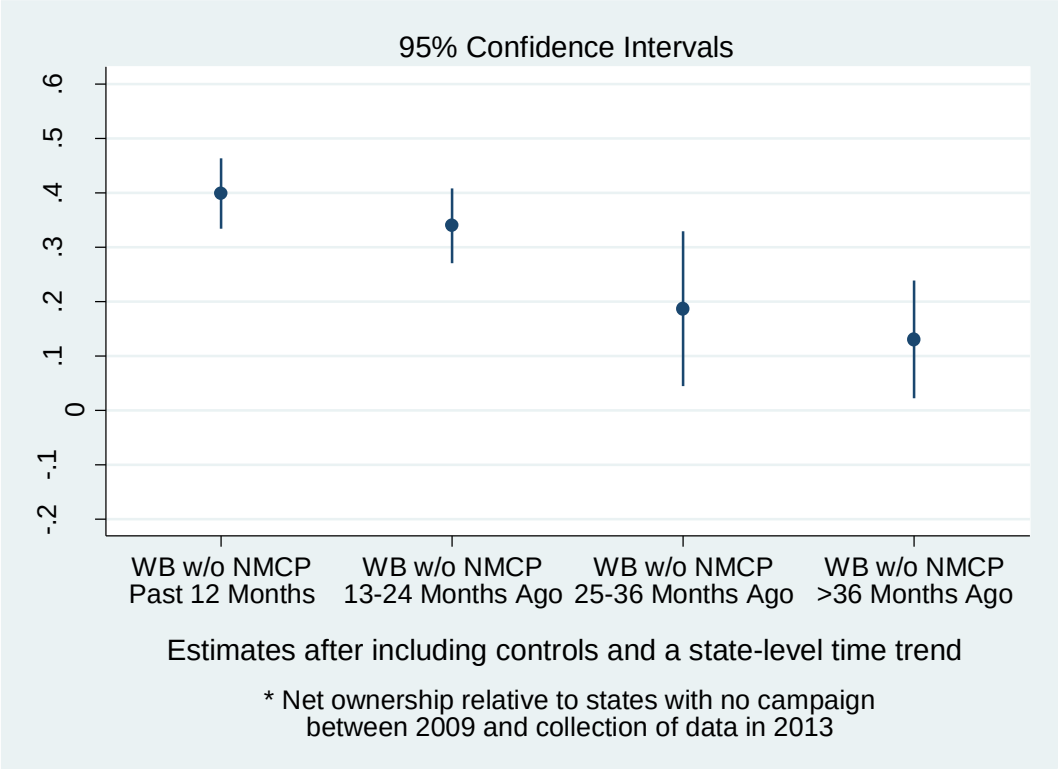

Figure 7A: Net Ownership by Time Elapsed Since Campaign- WB w/o NMCP

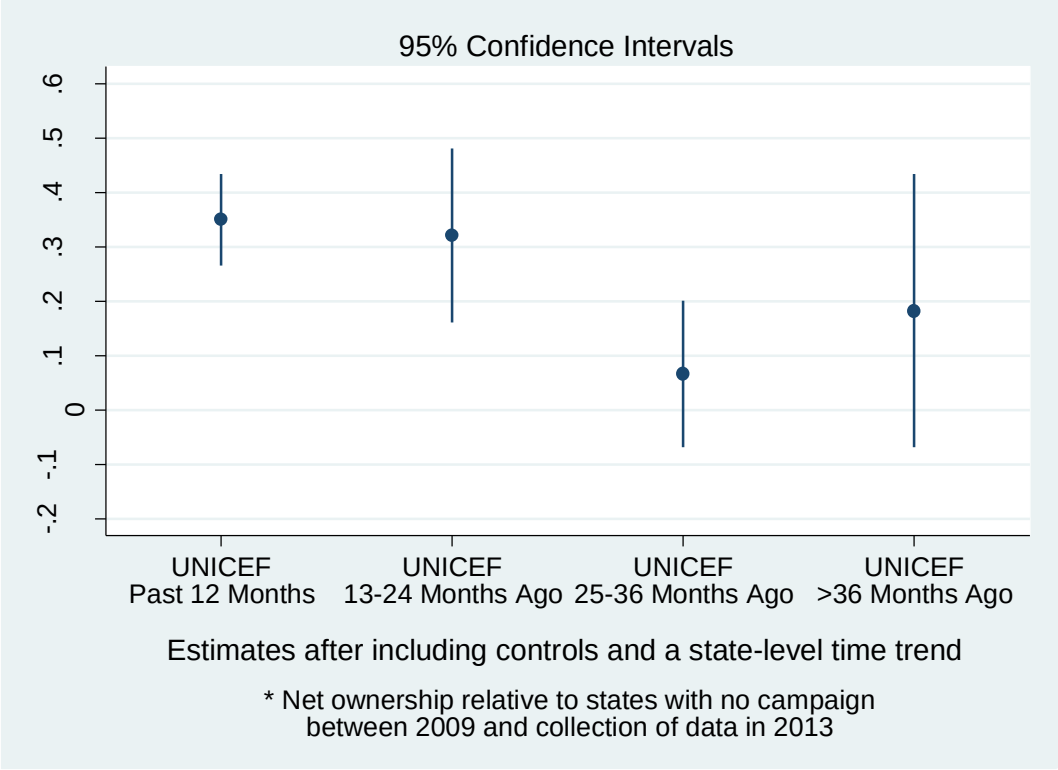

Figure 8A: Net Ownership by Time Elapsed Since Campaign- UNICEF

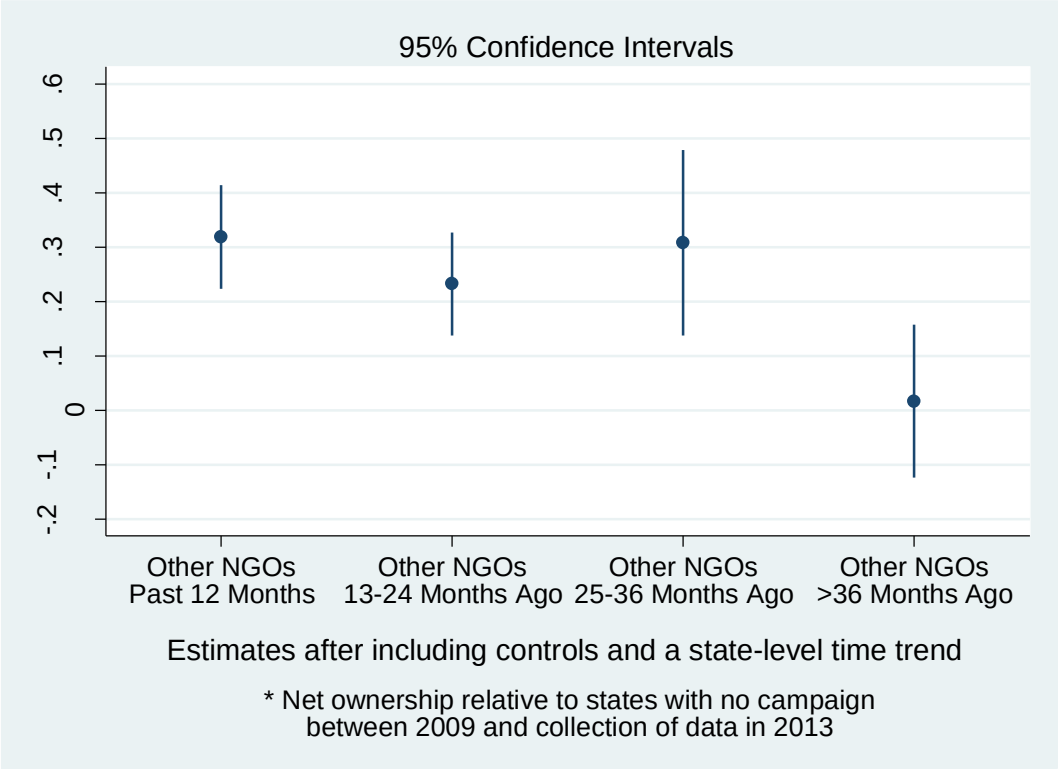

Figure 9A: Net Ownership by Time Elapsed Since Campaign- Other NGOs

Table 23A: OLS Estimates of Effects of Anti-malaria Campaigns on Net Usage for Children Under 5

	(1)	(2)
Campaign	0.140***	0.160***
(past 12 months)	[0.131,0.150]	[0.148,0.172]
Campaign	0.090***	0.096***
(13-24 months ago)	[0.080,0.101]	[0.081,0.111]
Campaign	0.005	-0.017
(25-36 months ago)	[-0.007,0.018]	[-0.037,0.003]
Campaign	0.021**	0.024
(>36 months ago)	[0.008,0.035]	[-0.002,0.050]
Urban	-0.005	-0.006*
	[-0.010,0.000]	[-0.012,-0.001]
Has Electricity	-0.006***	-0.006***
	[-0.009,-0.004]	[-0.009,-0.004]
No. of HH Members	-0.004***	-0.004***
	[-0.005,-0.003]	[-0.005,-0.003]
No. of Women in HH	-0.013***	-0.013***
	[-0.016,-0.010]	[-0.016,-0.010]
No. of Children U5 in HH	0.017***	0.017***
	[0.015,0.019]	[0.015,0.019]
Mother's Edu. level	0.018***	0.018***
	[0.015,0.020]	[0.015,0.020]
State FE	Yes	Yes
Time FE	Yes	Yes
State Time Trend	No	Yes
R^2	0.054	0.059
Observations	204945	204945

95% confidence intervals in brackets
* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

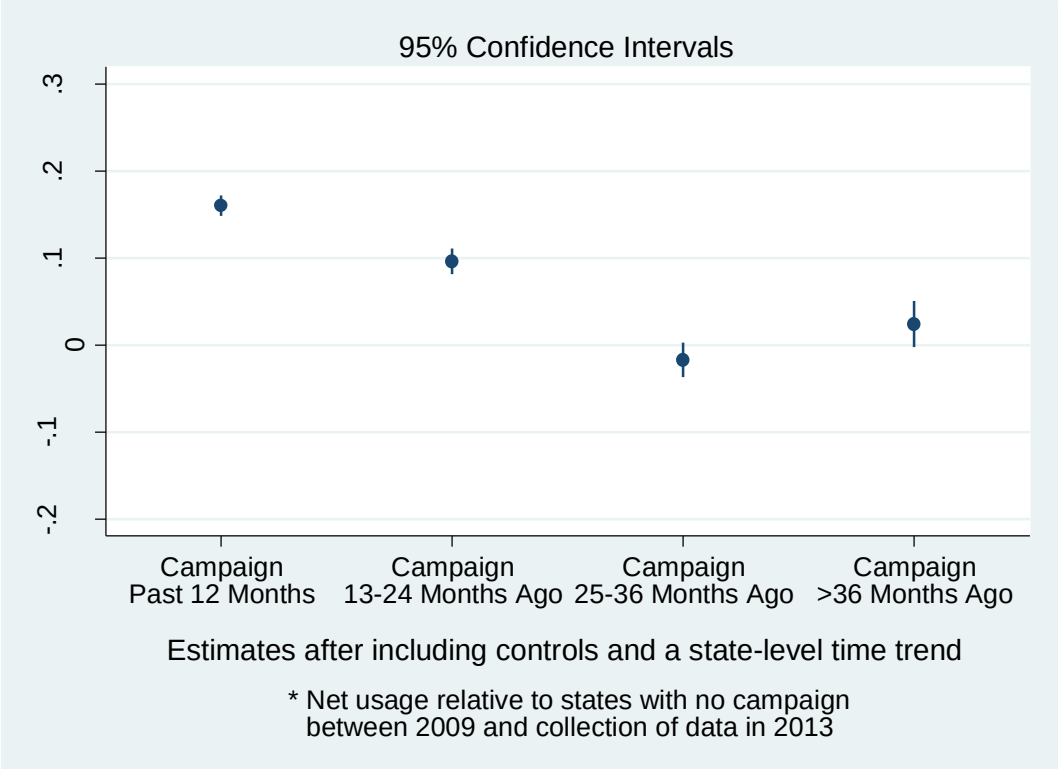

Figure 10A: Net Usage by Time Elapsed Since Campaign

Table 24A: Effects of Anti-malaria Campaigns on Net Usage for Children Under 5

	(1) Child Slept Under Net	(2) Child Slept Under Net
WB & NMCP	0.110***	0.147***
(Within Past 12 Months)	[0.092,0.129]	[0.119,0.175]
WB & NMCP	0.086***	0.096***
(13-24 Months Ago)	[0.070,0.102]	[0.070,0.121]
WB & NMCP	-0.081***	-0.085***
(25-36 Months Ago)	[-0.113,-0.049]	[-0.132,-0.038]
WB w/o NMCP	0.218***	0.210***
(Within Past 12 Months)	[0.196,0.241]	[0.184,0.237]
WB w/o NMCP	0.148***	0.152***
(13-24 Months Ago)	[0.128,0.168]	[0.127,0.176]
WB w/o NMCP	-0.005	-0.037
(25-36 Months Ago)	[-0.032,0.021]	[-0.087,0.013]
WB w/o NMCP	0.023**	0.043**
(>36 Months Ago)	[0.006,0.040]	[0.012,0.074]
UNICEF	0.200***	0.211***
(Within Past 12 Months)	[0.178,0.222]	[0.183,0.239]
UNICEF	-0.001	0.009
(13-24 Months Ago)	[-0.027,0.024]	[-0.033,0.051]
UNICEF	0.015	0.050**
(25-36 Months Ago)	[-0.004,0.033]	[0.013,0.087]
UNICEF	-0.018	0.012
(>36 Months Ago)	[-0.043,0.007]	[-0.048,0.072]
GF NGOs	0.220***	0.247***
(Within Past 12 Months)	[0.195,0.245]	[0.219,0.274]
GF NGOs	0.091***	0.165***
(13-24 Months Ago)	[0.069,0.114]	[0.135,0.196]
GF NGOs	0.114***	0.154***
(25-36 Months Ago)	[0.092,0.135]	[0.119,0.188]
GF NGOs	0.035**	0.169***
(>36 Months Ago)	[0.012,0.059]	[0.116,0.222]
Controls	Yes	Yes
State FE	Yes	Yes
Time FE	Yes	Yes
State Time Trend	No	Yes
R^2	0.061	0.063
Observations	204945	204945

95% confidence intervals in brackets
* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$
GF NGOs represents NGOs funded by the Global Fund to Fight AIDS, Tuberculosis and Malaria

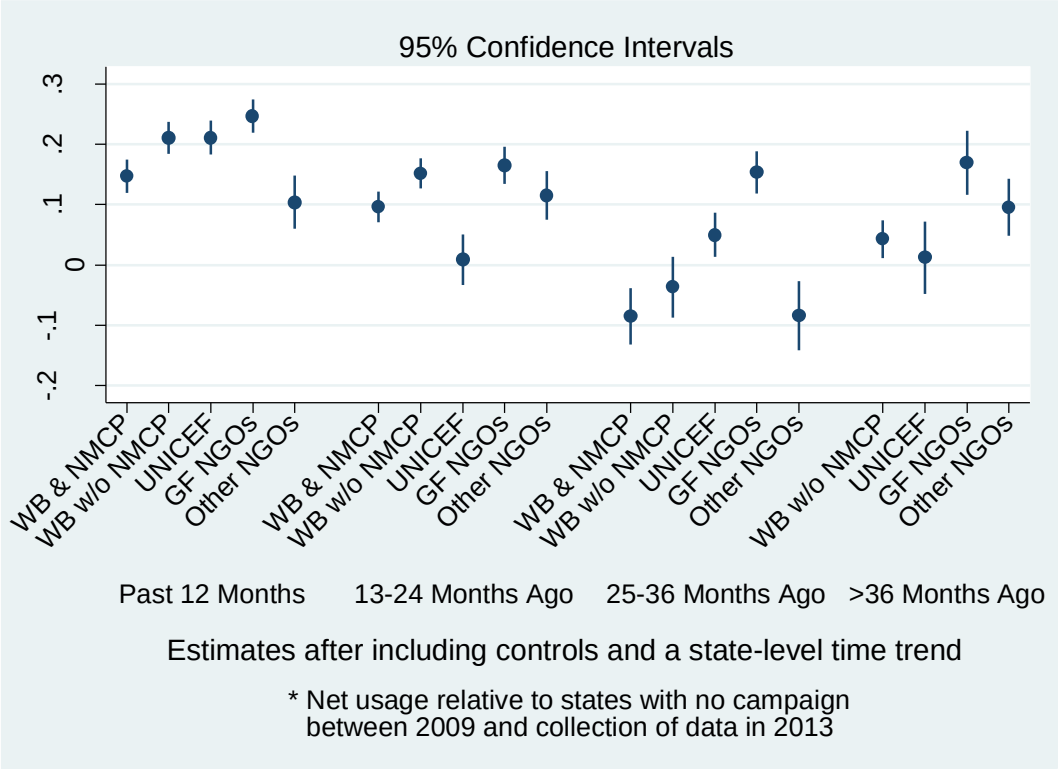

Figure 11A: Net Usage by Campaign and Time Elapsed Since Campaign

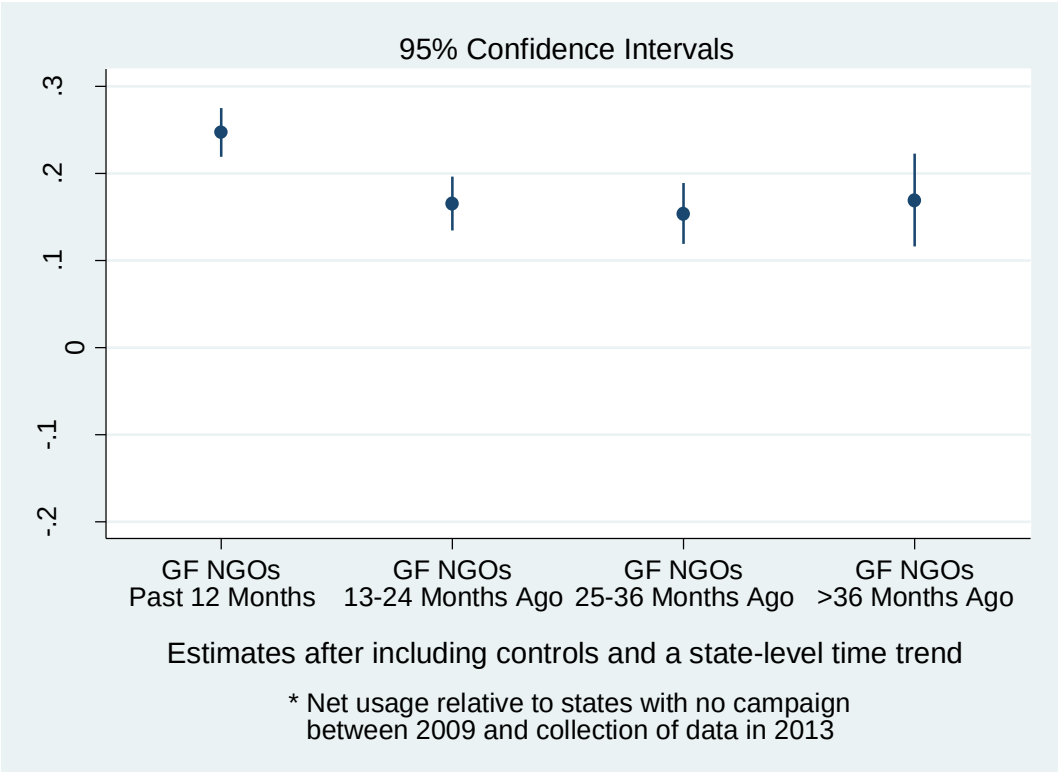

Figure 12A: Net Usage by Time Elapsed Since Campaign- GF NGOs

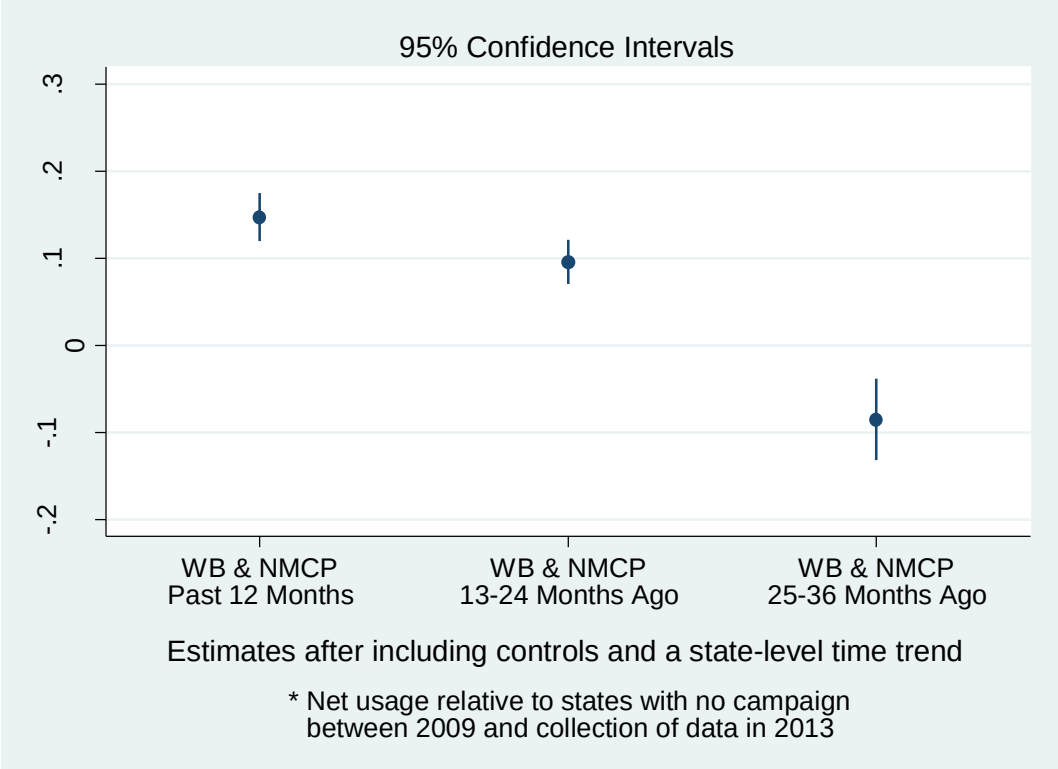

Figure 13A: Net Usage by Time Elapsed Since Campaign- WB & NMCP

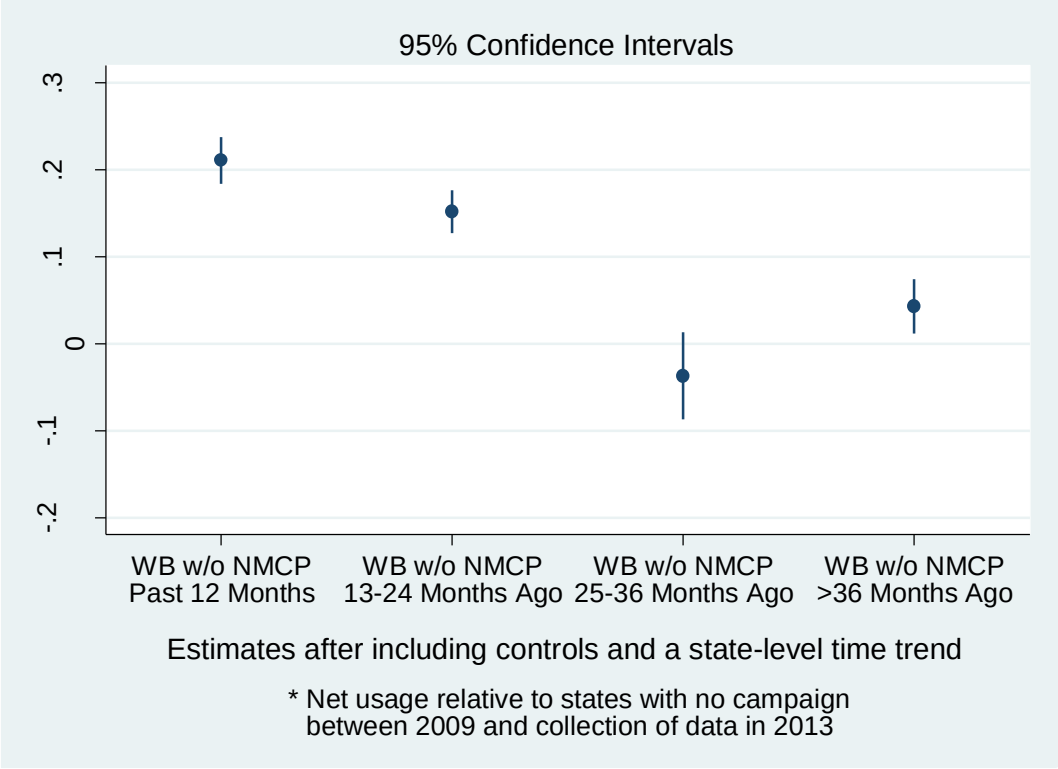

Figure 14A: Net Usage by Time Elapsed Since Campaign- WB w/o NMCP

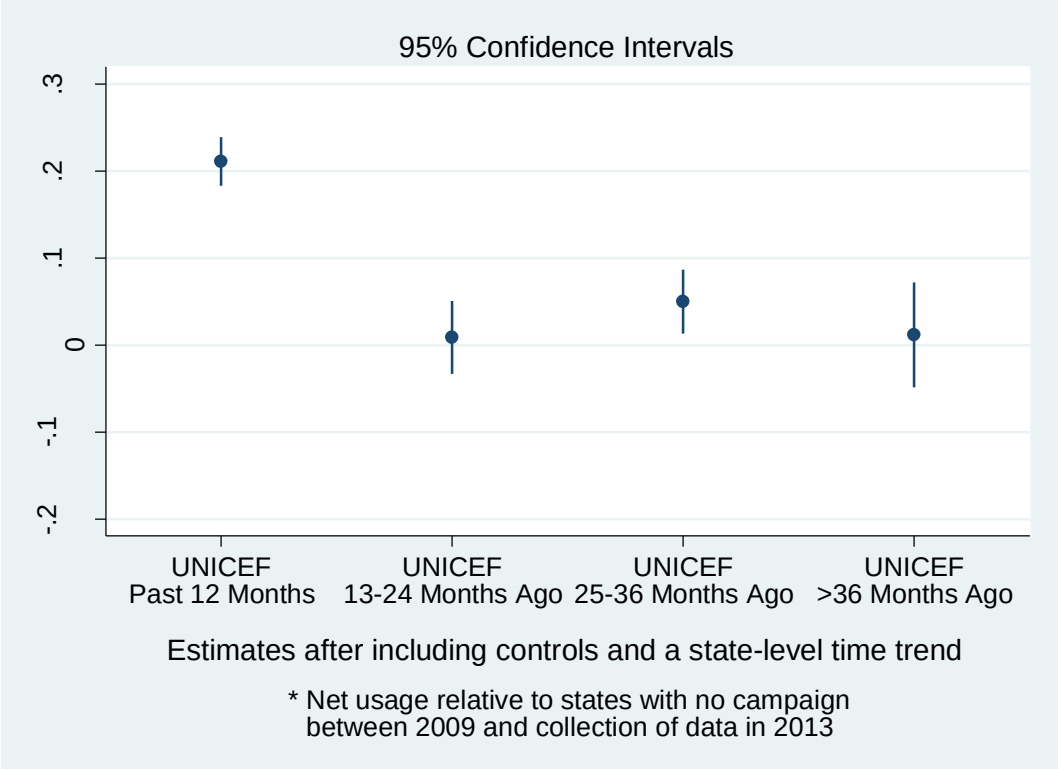

Figure 15A: Net Usage by Time Elapsed Since Campaign- UNICEF

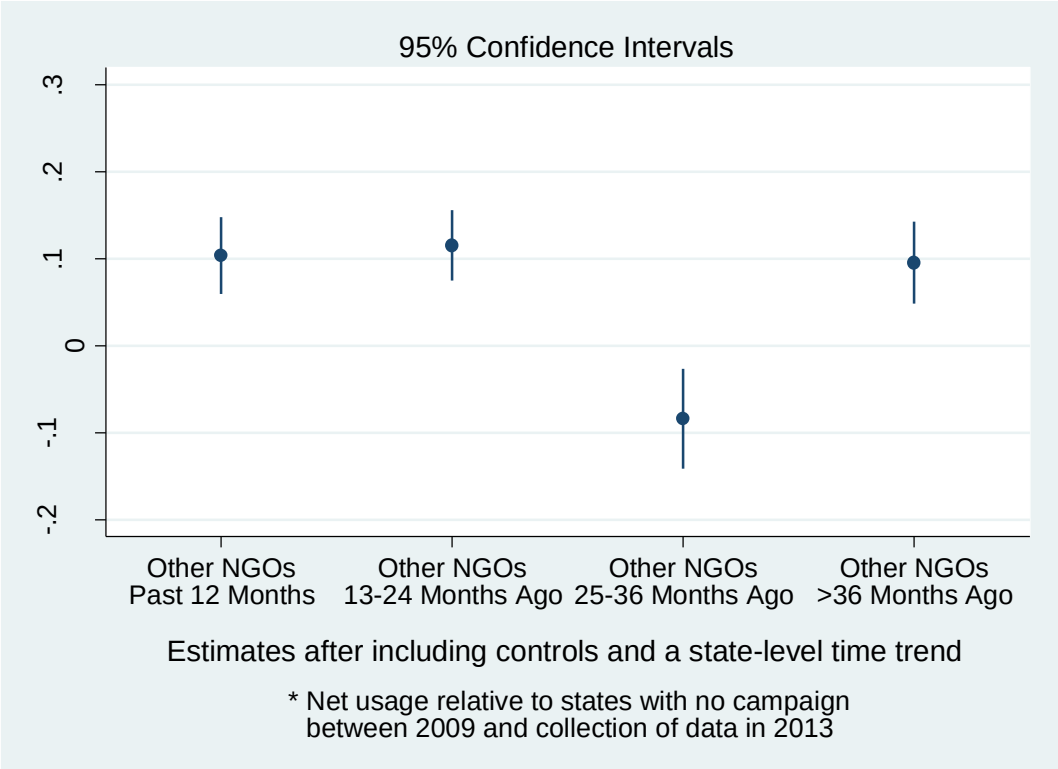

Figure 16A: Net Usage by Time Elapsed Since Campaign- Other NGOs

APPENDIX: IRB APPROVAL CERTIFICATIONS

USF
UNIVERSITY OF
SOUTH FLORIDA

RESEARCH INTEGRITY AND COMPLIANCE
Institutional Review Boards, FWA No. 00001669
12901 Bruce B. Downs Blvd., MDC035 • Tampa, FL 33612-4799
(813) 974-5638 • FAX (813) 974-7091

April 18, 2013

Stacey Gelsheimer
Economics
Tampa, FL 33612

RE: **Exempt Certification**
IRB#: Pro00007641
Title: Version #1 4/10/13: Examining the effects of leadership humility and employee voice on continual improvement and firm performance: Examples from the restaurant industry

Study Approval Period: 4/18/2013 to 4/18/2018

Dear Ms. Gelsheimer:

On 4/18/2013, the Institutional Review Board (IRB) determined that your research meets USF requirements and Federal Exemption criteria as outlined in the federal regulations at 45CFR46.101(b):

(2) Research involving the use of educational tests (cognitive, diagnostic, aptitude, achievement), survey procedures, interview procedures or observation of public behavior, unless:
(i) information obtained is recorded in such a manner that human subjects can be identified, directly or through identifiers linked to the subjects; and (ii) any disclosure of the human subjects' responses outside the research could reasonably place the subjects at risk of criminal or civil liability or be damaging to the subjects' financial standing, employability, or reputation.

(4) Research involving the collection or study of existing data, documents, records, pathological specimens, or diagnostic specimens, if these sources are publicly available or if the information is recorded by the investigator in such a manner that subjects cannot be identified, directly or through identifiers linked to the subjects.

Approved Documents:

IRB Protocol

Stage 1 Online Survey, Version #1, 4-11-13
Stage 1 Paper Survey, Version #1, 4-11-13

As the principal investigator for this study, it is your responsibility to ensure that this research is

conducted as outlined in your application and consistent with the ethical principles outlined in the Belmont Report and with USF IRB policies and procedures. Please note that changes to this protocol may disqualify it from exempt status. Please note that you are responsible for notifying the IRB prior to implementing any changes to the currently approved protocol.

The Institutional Review Board will maintain your exemption application for a period of five years from the date of this letter or for three years after a Final Progress Report is received, whichever is longer. If you wish to continue this protocol beyond five years, you will need to submit a new application at least 60 days prior to the end of your exemption approval period. Should you complete this study prior to the end of the five-year period, you must submit a request to close the study.

We appreciate your dedication to the ethical conduct of human subject research at the University of South Florida and your continued commitment to human research protections. If you have any questions regarding this matter, please call 813-974-5638.

Sincerely,

John A Schinka, Ph.D.

John Schinka, Ph.D., Chairperson
USF Institutional Review Board

USF
UNIVERSITY OF
SOUTH FLORIDA

DIVISION OF RESEARCH INTEGRITY AND COMPLIANCE
Institutional Review Boards, FWA No. 00001669
12901 Bruce B. Downs Blvd., MDC035 • Tampa, FL 336124799
(813) 974-5638 • FAX (813) 974-5618

7/26/2011

Gabriel Picone, Ph.D.
Economics
4202 E. Fowler Avenue, BSN 3403
Tampa, FL 33620

RE: **Exempt Certification** for IRB#: Pro00005200
Title: Social Interactions and Malaria Preventive Behaviors in Sub-Saharan Africa

Dear Dr.Picone:

On 7/26/2011 , the Institutional Review Board (IRB) determined that your research meets USF requirements and Federal Exemption criteria as outlined in the federal regulations at 45CFR46.101(b):

(4) Research involving the collection or study of existing data, documents, records, pathological specimens, or diagnostic specimens, if these sources are publicly available or if the information is recorded by the investigator in such a manner that subjects cannot be identified, directly or through identifiers linked to the subjects.

As the principal investigator for this study, it is your responsibility to ensure that this research is conducted as outlined in your application and consistent with the ethical principles outlined in the Belmont Report and with USF IRB policies and procedures. Please note that changes to this protocol may disqualify it from exempt status. Please note that you are responsible for notifying the IRB prior to implementing any changes to the currently approved protocol.

The Institutional Review Board will maintain your exemption application for a period of five years from the date of this letter or for three years after a Final Progress Report is received, whichever is longer. If you wish to continue this protocol beyond five years, you will need to submit a continuing review application at least 60 days prior to the exemption expiration date. Should you complete this study prior to the end of the five-year period, you must submit a request to close the study.

We appreciate your dedication to the ethical conduct of human subject research at the University of South Florida and your continued commitment to human research protections. If you have any questions regarding this matter, please call 813-974-5638.

Sincerely,

John A Schinka, Ph.D.

John Schinka, PhD, Chairperson
USF Institutional Review Board

Cc: Olivia Hart, USF IRB Professional Staff