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The Michigan Journal of Business intends to provide undergraduate students
worldwide with a platform for exceptional work in the field of business. The
Journal seeks to publish distinguished theses, empirical research, case studies,
and theories in issues relating to areas of Accounting, Economics, Finance,
Marketing, Management, Operations Management, Information Systems,
Business Law, Corporate Ethics, and Public Policy. The Journal is distributed
and cataloged in prestigious university libraries around the world, and is en-
listed in the Directories of Open Access Journals (DOAJ), a scholarly journal
database that enlists more than 3000 of the world’s leading publications. The
contemporary business environment is exceedingly complex. Analyzing this
real world phenomenon through traditional applications of theories often yield
a suboptimal understanding of the world. The Journal, accordingly, encour-
gages work that takes an interdisciplinary approach to understanding a topic and
emphasizes the importance of incorporating the knowledge of liberal arts into
an area of interest. By providing a venue to recognize high quality work, the
Journal gives an incentive for students to explore their area of interest, reward-
ing them with the experience to share the power of knowledge with others.
The Journal’s mission and philosophy parallels the mission of the University
of Michigan, the premier research university in the United States.
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The Journal only accepts works from undergraduate students or works completed during undergraduate study. Each manuscript submitted should include a short abstract, author information, and any acknowledgements. Papers will be evaluated based upon sound analysis, originality of argument, and novelty of research. For more information on submitting article for publication, please visit www.michiganjb.org.

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The organization is entirely student-run, with an editorial staff of about 20 of the top students at the Department of Economics and the Stephen M. Ross School of Business at the University of Michigan. Each semester, the Michigan Journal of Business calls for papers from undergraduate students around the world. Throughout the semester, the editorial board carefully reviews, selects, and edits exceptional work for publication. Faculty willing to advise the Journal is formed from each department to give minor oversight for the project. Throughout the process, a blind review process is implemented to ensure an impartial review of all submissions.

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</tbody>
</table>
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Submitted papers for this edition came from the following institutions:

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EDITORS NOTE

The Michigan Journal of Business began as a collaborative mission between students and faculty members at the Stephen M. Ross School of Business to publish outstanding papers in the field of business. Since then, the Journal has successfully published three editions, featuring business-focused articles written by undergraduate students around the world. Our editorial board is thankful to the students who have submitted articles and to all who have helped make our publication possible. The Michigan Journal of Business has been distributed to over 200 University libraries worldwide, and we are working diligently to catalog our publications both electronically and physically at every library that has received copies. Our publication has been accepted into the Directories of Open Access Journals (DOAJ) and is catalogued at world-renowned libraries such as the United States Library of Congress, the Kresge Library at the Ross School of Business, the Baker Library at Harvard Business School and the Main Library of Princeton University.

Given the recent financial crisis, advancement in business research is becoming increasingly important. As the premier undergraduate business journal, the Michigan Journal of Business will continue to serve as a platform for exceptional work. For our third edition, thirty-four submissions were received from students around the world, of which four were selected for publication. All four papers are readily applicable to the business world and address topics beyond traditional economics with a greater sense of practicality in mind. In the first article, “Cooperation and Friendship Choice Heuristics in Dynamic Local Interaction Networks,” the author uses an agent-based model to simulate economic interaction in a social network. The second article, “Perceptions of Female Managers in Male-Dominated Industries: Effects of Gender Rarity, Performance, and Diversity Justification,” focuses on gender dynamics in the workplace and discusses employee perceptions and behaviors towards female managers. In the third article, “Is CEO/Chair Duality Associated with Greater Likelihood of an International Acquisition?” the author investigates the likelihood that a firm with a combined CEO and chairman will pursue international acquisitions. Lastly, “Sarbanes-Oxley and the Outsourcing of Accounting” analyzes the outsourcing and offshoring of accounting-related services following the passage of the Sarbanes-Oxley Act in 2002.

We would like to thank Professor Tammy Feldman and Professor Scott Moore, along with our faculty sponsors at the Ross School of Business for their support and leadership. We would like to thank the entire editorial board, who played invaluable roles in helping us publish our third edition. Our seven new Associate Editors were instrumental in reviewing, editing and critiquing the many submissions we received. Furthermore, we would like to thank Ms.
Erika Busch for assisting our editorial board with the day-to-day operations of the Journal. Finally, we would like to thank Mr. Thomas C. Jones and the Alumni Association of the Ross School of Business for generously providing us with the financial means to make our publication feasible.

Charley Li
EDITOR-IN-CHIEF
Cooperation and Friendship Choice Heuristics
in Dynamic Local Interaction Networks

Trevor G. Dobson
University of Virginia

Abstract

I built an agent-based model that simulates economic interaction in a social network. In the model, agents dynamically break and create network links based on whether their neighbors cooperate in a repeated Prisoner’s Dilemma game. Agents use heuristics to predict which potential neighbors will yield the highest payouts and form links with those neighbors, but some heuristics which are individually beneficial have significant negative externalities. These heuristics can change the network’s structure, increasing its vulnerability to systemic defection cascades which reduce payouts for all agents.

1 Trevor Dobson is an alumnus of the University of Virginia, where he studied Economics, Biology and Computer Science. This research was completed as a senior thesis for the Economics Distinguished Majors Program. Trevor is currently employed as a Financial Analyst in the Algorithmic Trading department of Goldman Sachs. Comments are welcome at TrevorGDobson@gmail.com.
Simulation with 2000 agents playing the Locality strategy. Green agents are cooperating; red agents are defecting. Agents’ size is proportional to the number of neighbors they possess. Links between pairs of cooperators are white, links between pairs of defectors are blue, and links between cooperators and defectors are orange.
I. Introduction

The global economy is a complex, interconnected network of markets. Crises that begin as isolated, local events spread rapidly through the network in unpredictable ways. Loss of confidence in one market not only depresses asset prices locally, but spurs further loss of confidence in neighboring markets. Modern financial crises propagate in ways traditionally associated with epidemiology and infectious disease. Financial contagion spreads across nations, as in the Asian financial crisis of 1997 and 1998, and across asset classes, as in the current financial crisis, which began in sub-prime mortgages but expanded to the markets for commercial debt and equity.

I study this behavior by abstracting investment decisions and physical space. In my model, agents play a repeated Prisoner’s Dilemma game with their neighbors in a local interaction social network, which represents the repeated interaction that occurs in any economy. Agents use a simple imitation strategy to choose their behavior in each round—either cooperation or defection—and attempt to improve their payoffs by selectively breaking and creating links with other agents. In some situations, the network can fall apart as links are repeatedly broken and agents choose not to cooperate. This type of defection cascades across the network and is analogous to financial contagion.

Because agents break links rationally, they end relationships with partners who do not cooperate in the prisoner’s dilemma game in order to form relationships with potentially more cooperative agents. Given that agents observe their neighbors’ behavior, they have the information necessary for rational link destruction.

Rational link creation is more difficult. Because agents receive higher payouts from links with cooperative agents, they have an incentive to preferentially link with cooperating agents. I depart from standard equilibrium theory by assuming that agents lack complete knowledge of other agents’ behaviors, and only know the recent behavior of their immediate neighbors. Agents use limited information heuristics to approximate whether potential new neighbors would cooperate in the future.

In the short run, several of the heuristics increase agents’ average payouts but have a negative externality. This externality is caused by structural changes in the network when induced by certain heuristics used by a critical mass of agents. These structural changes can cause network-wide defection for specific periods of time, reducing the payoffs to all agents. It is this emergent phenomenon that I seek to explore with this simulation.
II. Literature Review

*The Prisoner’s Dilemma and Cooperation*

In the Prisoner’s Dilemma, actors choose to either cooperate or defect. Cooperation benefits both players while defection benefits only the defector at the expense of the cooperator. There are many examples of the Prisoner’s Dilemma in biology and economics, including the classic anecdote involving two criminals who are offered plea bargains by the police if they testify against their partner. In this example, the police have separately detained two suspects for a crime. Both suspects are given an offer: if they testify against their partner, they will receive a lighter sentence. If neither testifies, they are both convicted of small offenses, and receive 3 years in jail. If one testifies and the other does not, the testifier is granted immunity (0 years in jail), but the other is convicted and given 10 years in jail. If both testify, they are both convicted but receive lighter sentences: 7 years in jail.

The setup of the prisoner’s dilemma is always the same. Players face four possible payoffs, for which I use Axelrod’s terminology. In Axelrod’s construct, if both players cooperate, they receive a reward payoff, R. If both defect, they receive a penalty, P. Each player has reason to defect, because if they defect while the other player cooperates, they receive a “tempting” payoff, T, while the other player receives the “sucker’s” payoff, S. The payoffs appear as follows:

<table>
<thead>
<tr>
<th>Player 1 / Player 2</th>
<th>Defect (D₂)</th>
<th>Cooperate (C₂)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Defect (D)</td>
<td>(P, P)</td>
<td>(T, S)</td>
</tr>
<tr>
<td>Cooperate (C)</td>
<td>(S, T)</td>
<td>(R, R)</td>
</tr>
</tbody>
</table>

*Table 1. Theoretical Prisoner’s Dilemma Payoffs*

For the prisoner’s dilemma condition to hold, it must be the case that T > R > P > S. If this is the case, then defecting is a strictly dominant strategy (T > R, P > S), though both players prefer mutual cooperation to mutual defection (R > P). The final condition of the game is that both players prefer mutual cooperation to alternating between unilateral cooperation and unilateral defection (R > (T+S / 2)). These conditions hold in the previous example, because actors always have an incentive to testify (7 years < 10 years, 0 years < 3 years), but both agents are better off if neither testifies (3 years < 7 years).

In a simple, one-round Prisoner’s Dilemma game, defection is the domi-
nant strategy, and mutual defection is the only Nash Equilibrium. This contradicts common sense and empirical observation, as cooperation occurs between rational actors in human interaction and between irrational actors in nature. So why does cooperation exist? The simplest explanation of cooperation in human society is coercion. Institutions like governments and religious and trade organizations can change payoffs by reducing the temptation to cheat (T), so that mutual cooperation becomes a Nash Equilibrium.

While coercion by third parties can explain some cooperation, mutual cooperation occurs in many situations without coercion, i.e. those situations where the net payoffs in the Prisoner’s Dilemma game obey the original rule, T > R > P > S. One explanation for cooperation in the absence of coercion is the use of potential future payoffs in repeated games as rewards and punishments for behaviors. In indefinitely repeated games, cooperation can be justified as a selfish strategy if both players expect the other player to play a “grim trigger” or “tit for tat” strategy. In these cases, the expected punishment given to cheaters, in the form of non-cooperation by their counterparts, is worse than the expected gain from defection, which makes long-term cooperation a Nash Equilibrium in repeated games.3

Another way to explain cooperation in Prisoner’s Dilemma situations is to relax the assumption that agents play rationally. In imitation models, agents make decisions by imitating other agents they perceive as successful, rather than calculating best responses to opponents’ anticipated strategies. This type of behavior is rational when agents lack the capacity to forecast the dynamic strategies used by other agents in their environments. In constructs with this type of imitation, agents can sustain supra-Nash payoffs and cooperate indefinitely when cooperators imitate each other.

Eshel, Samuelson and Shaked give an excellent example of this type of model in their 1998 work, “Altruists, Egoists, and Hooligans in a Local Interaction Model.”4 In this model, agents choose between three behaviors—altruism, egoism and hooliganism—in which they respectively contribute to a public good, act as free riders, or actively detract from the public good for their own benefit. The model shows that a cluster of altruists imitating one another can be robust to invasion by egoists and hooligans. The model yields persistent contribution to the public good, despite the fact that non-cooperation is a dominant strategy in a strictly rational sense. Theodore Bergstrom’s review, “Evolution of Social Behavior: Individual and Group Selection,” is a good

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3 Robert Axelrod and William Donald Hamilton, Ibid.
summary of the earlier analytical work done in this field.\(^5\)

Imitation strategies make local interaction networks susceptible to rapid transitions between majority cooperation and majority non-cooperation states. Stephen Morris’s paper “Contagion,” published in 2000, shows that information spread by imitative strategies can move rapidly through a local interaction network, with dynamics analogous to those of infectious disease.\(^6\) This phenomenon is robust to the introduction of various forms of noise and randomness.\(^7\) When these defection cascades occur, the payouts for all agents in the social network drop from the cooperative level to the mutually non-cooperative level. For this reason, the structures of interaction networks have a direct effect on the payouts agents receive.

**Social Networks**

My work models Prisoner’s Dilemma games in social networks. Social networks have always been an important factor in economic interactions, and modern technologies have opened up new avenues for research. The modern study of networks includes the study of the “small world phenomenon.”\(^8\) Small world networks are unique; their elements are highly clustered, but are also rapidly traversable and searchable.

Clustering implies that nodes which share mutual neighbors are more likely to be neighbors themselves. The rapid traversability of a network is usually measured with a parameter called the network diameter, which is the average minimum number of network links required to move from a random node in the network to another random node.

Random networks have high traversability but low clustering. As random networks increase in size, the network diameter increases at a logarithmic rate. Local, or ordered, networks have the opposite property; agents in a specific area are more likely to be connected, but the network diameter is much larger.

Watts and Strogatz demonstrated that, by randomly replacing a small portion of the links in a highly ordered local network, they could generate hybrid networks that share the properties of both types. They called these hybrids “small world networks,” because the random links allow rapid traversal from one end of the network to the other, lowering network diameter without sacrificing clustering.

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In “Cooperation in Evolving Social Networks,” Hanaki, Peterhansl, Dodds, and Watts theorize a network in which agents play a repeated Prisoner’s Dilemma game with multiple neighbors in a local interaction network. Agents have a fractional chance of being allowed to end or begin relationships with other agents in each round. Hanaki et al. study the rational decisions made by agents when determining which strategies to play against new partners.

The model developed by Hanaki et al. begins by assuming that new partners are selected randomly from the general pool of agents. They also theorize a variant of their model in which agents preferentially form links with “friends of friends,” which they call a “triadic closure bias.” In theory, the triadic closure bias is justified by the fact that cooperative agents continually end relationships with non-cooperators, so cooperative agents’ friends must be more cooperative than the population average. So, if a given agent’s friends are more likely to be cooperative, then the friends of that given agent’s friends are also more likely to be cooperative.

The triadic closure bias is a simple example of what I call a “friendship choice heuristic.” Friendship choice heuristics are rules of thumb used to preferentially create links with cooperating agents by reasonably predicting other agents’ behavior with only limited information. I study the properties of five friendship choice heuristics, including their immediate effects on the payouts of individual agents and their indirect effects on the payouts of all the other agents in the network. The five heuristics I examine are:

1. **Random:** Agents playing the Random strategy select new neighbors randomly from the pool of all agents; all other agents have an equal probability of being selected. This is my baseline heuristic.

2. **Referral:** Agents playing the Referral strategy select new friends from a pool of “friends of friends.” The more mutual friends a potential neighbor has with the selecting agent, the more likely that potential neighbor is to be selected. This is akin to requiring referrals or recommendations for new business partners or friends, and assigning preference to the number of recommendations received.

3. **Popularity:** The probability of selecting a given agent is proportional to the number of links that potential neighbor currently has. For example, an agent with four friends is twice as likely to be selected as an agent with only two friends.

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4. **Unpopularity:** This is similar to the Popularity strategy, but the relationship between a node’s number of links and likelihood of being picked is reversed. For example, a node with four links is less likely to be picked than a node with one link.

5. **Locality:** This heuristic assumes that nodes are fixed in two-dimensional space, and gives probability weights to each node inverse to their distance from the selecting node. For the purposes of this heuristic, agents are assigned random locations in a one unit by one unit square.

The following diagram shows how each of these five heuristics would work:

![Figure 1. Link Creation Example](image)

Different heuristics favor different types of nodes. In this case, A is creating a new link, and D, E, F, G, H and I are all candidates. Under each of the friendship heuristic regimes, they would have the following relative probabilities of being selected:
Cooperation and Friendship Choice Heuristics

Heuristic | Pr(D) | Pr(E) | Pr(F) | Pr(G) | Pr(H) | Pr(I) |
--- | --- | --- | --- | --- | --- | --- |
Random | 1 (16.6%) | 1 (16.6%) | 1 (16.6%) | 1 (16.6%) | 1 (16.6%) | 1 (16.6%) |
Referral | 2 (40%) | 1 (20%) | 1 (20%) | 1 (20%) | 0 (0%) | 0 (0%) |
Popularity | 2 (18.2%) | 1 (9.1%) | 2 (18.2%) | 4 (36.4%) | 1 (9.1%) | 1 (9.1%) |
Unpopularity | 2 (11.8%) | 4 (23.5%) | 2 (11.8%) | 1 (5.9%) | 4 (23.5%) | 4 (23.5%) |
Locality | 1.4 (11.1%) | 2 (15.7%) | 2 (15.7%) | 2.2 (17.6%) | 2.2 (17.6%) | 2.8 (22.3%) |

Table 2. Link Creation Example Relative Probabilities

III. Methodology

Initialization

The simulation begins by creating an array of agents and linking each of them to four other agents. The simulation runs for 5000 rounds before it starts recording payout and cascade data, to guard against any biases from the random distribution of links and behaviors when the system is initialized.

Iteration of Rounds

Each round of the game consists of four sections. First, agents decide whether to break or create new links with other agents. Second, agents decide which behavior they will adopt for the current round by imitating their most successful neighbor. Third, agents play a Prisoner’s Dilemma game with their neighbors. Finally, the program updates running average payoffs and displays results as necessary.

Updating Links

Each agent’s decision of whether to break links is simple. Because agents expect their neighbors to continue to play as they have in the past, agents should break links with any neighbors who have defected in the previous round. Agents should break these links regardless of whether they themselves defect, because even if the neighbor simultaneously defects, the agent is better off finding a new partner who may be a cooperator. Each agent has a 20% chance of being allowed to break a link in each round. This represents the
inherent difficulty in ending long-term relationships.

Agents create new links if and only if they have just broken links. This is the only circumstance in which new links are created. Only the agent that breaks the link can create a new link, meaning that any time a link is broken, the defecting agent loses a neighbor, and some other agent gains a neighbor. Thus, the agent breaking and creating links has no net change. This keeps the number of links in the simulation constant, and also prevents any agent from intentionally changing the number of links it possesses. This creates an incentive for agents to cooperate, because if they defect, they will be ostracized.

As mentioned previously, agents have a variety of options for selecting new partners with whom to form links. There are five options: the Random strategy, the Popularity strategy, the Referral strategy, the Unpopularity strategy and the Locality strategy.

Agents playing Random select new partners from the general pool of agents using the Java.Math library’s random number generator. If one of the agent’s preexisting friends is selected, the algorithm selects again.

Agents playing Referral link to agents with whom they share a common neighbor but are not currently linked. Agents implement the strategy by iterating through their neighbors and making a list of link candidates (their neighbors’ neighbors). Because they may share multiple mutual neighbors with certain candidates, those candidates may be added to the list multiple times, increasing the chance that they will be chosen. A random agent from the list of candidates is chosen to be a new neighbor.

The Popularity strategy is more complex than the Random and Referral strategies. A simple implementation would be to use a lottery system like the Referral algorithm, but to give each candidate a number of lottery entries according to the number of links they possess rather than the number of links they receive. While straightforward, this method would be computationally intensive, forcing the simulation to iterate through the entire set of agents every time Popularity was used. To increase the efficiency of the simulation, a different algorithm is used that yields the same Popularity-weighted distribution but uses less processing power.

Candidates are randomly selected from the pool of all agents. Selected candidates are then assigned a score based on their popularity divided by a constant. The simulation then generates a second random number, and if the candidate’s score is greater than the random number, the candidate becomes a new neighbor of the original agent playing the Popularity strategy. If the candidate’s score is lower than the random number, then a new random candidate is selected from the pool of all agents, and the process is repeated until a satisfactory candidate is found. Each individual’s probability of being selected is
still directly proportional to his or her number of neighbors, because the probability that an individual is selected to become a candidate is a constant, and the probability that a candidate’s score will be greater than the random number is proportional to the number of neighbors that candidate has.

The Unpopularity and Locality strategies operate by the same mechanism but use different scores. In the Unpopularity strategy, scores are inversely related to the number of neighbors the candidate has, such that a candidate with two neighbors would have a score of $\frac{1}{2}$, while a candidate with four neighbors would have a score of only $\frac{1}{4}$. In the Locality strategy, the score is the inverse of the candidate’s distance from the selecting agent, so that candidates closer to the agent are given a higher chance of being selected.

**Behavior Selection (Noisy Imitation)**

The third portion of each round is behavior selection. Agents decide what decision to play based on their observations of their immediate neighbors. Agents iterate through their set of neighbors and select the neighbor with the highest payoff in the previous round. They then change their behavior to match that neighbor’s behavior in the previous round. In this way, agents choose their behavior by imitating their most successful neighbor in the previous round.

The imitation process is noisy. Each round, there is a 1 in 1000 chance that agents will “innovate,” randomly selecting their behavior in the next round instead of imitating their neighbors. In some cases, this noise can initiate movements between homogenous cooperation and homogenous defection, but in most cases it has little effect on the long run behaviors of agents.

This procedure allows agents to make reasonable responses to their environment even though they lack the capacity to calculate rational best responses. Agents’ imitative responses can resemble rational behavior in many situations. For example, an agent whose neighbor defects may imitate that neighbor in the next round, effectively punishing that neighbor by defecting, which resembles the appropriate response dictated by the tit for tat strategy. In other situations, agents may continue to cooperate despite defection by some neighbors if their most successful neighbors are cooperators. Agents who continue to cooperate despite their neighbor’s defection can respond by severing the link with the defecting neighbor, as an alternative form of punishment. Generally, imitative responses are similar to best responses.
**Payout Generation**

The game itself is a Prisoner’s Dilemma with the following payoffs:

<table>
<thead>
<tr>
<th>A \ B</th>
<th>Defect</th>
<th>Cooperate</th>
</tr>
</thead>
<tbody>
<tr>
<td>Defect</td>
<td>0.1, 0.1</td>
<td>1.5, 0</td>
</tr>
<tr>
<td>Cooperate</td>
<td>0, 1.5</td>
<td>1, 1</td>
</tr>
</tbody>
</table>

Table 3. Simulation Prisoner’s Dilemma Payoffs

This version of the Prisoner’s Dilemma game obeys the standard rules, $T > R$, $P>S$, $R > P$ and $R > (T+S)/2$. Agents play this game against each of their neighbors. Their payoff for the round is the sum of the payoffs from each of their interactions. It should be noted that this game specification is arbitrary, and it affects the outcome of the simulation. A simulation in which agents are judged based on the average payoff they receive from their interactions would yield different results, as would a simulation where agents play a public goods game rather than a Prisoner’s Dilemma.

**Reporting Statistics**

Agents’ payoffs are stored in vectors, making it easy to find the network’s average payoff at any given time or over the life of the simulation, or to find those averages for the set of agents using a particular heuristic.

The reporting process is complicated slightly by the technical difficulty of storing every agent’s payoff history in limited memory. To work around this problem, the simulation periodically takes snapshots of the relevant simulation averages and wipes the individual payoff histories (excepting the most recent rounds, which are used in agents’ behavior decisions the following turn).

![Figure 2: Simulation Summary](image-url)
The model is implemented in Java version 1.6. For the purposes of my analysis, I ran the simulation for 55,000 rounds at a time, varying the parameters between runs. I omitted the first 5,000 rounds from the data, to avoid initialization effects. I then recorded the average payoffs for all agents over all rounds of each run of the simulation, as well as separate averages for the payoffs for agents using each of the heuristic types.

I also recorded the number and total length of the defection cascades that occurred in each run and calculated the average length of each cascade. I defined cascades according to the following criterion: a cascade begins whenever the fraction of cooperating agents in the network falls below 5% and ends when the fraction of cooperating agents returns to 40% or higher. It should be noted that these thresholds do not include all agents in the simulation; as mentioned before, islands (agents with no links) are unconnected to the network and therefore unaffected by defection cascades. My results are not sensitive to the precise details of how cascades are defined.

Using this methodology, I ran a series of experiments in which a fraction of the agent population use the Random friend choice heuristic and the remainder use a different strategy. In each experiment, I ran several hundred instances of the simulation, distributed over the range of possible combinations of the two strategies. To accelerate this Monte Carlo process, I ran the simulation on the University of Virginia’s Centurion cluster, a group of 32 IBM eServer 325s with Dual 1.6 GHz Opteron252 processors and 2GBs of RAM each.

IV. Results

The first result I observed when running my simulation was qualitative. Certain combinations of parameters yield defection cascades in which a predominantly cooperative network transitions to being predominantly non-cooperative in only a few (usually 4-5) rounds. The spread of defection through the network in these situations is rapid and complete, similar to the spread of disease in an epidemiological model. After several hundred rounds, the system recovers, reverting to cooperation over the course of 10-20 rounds.
Chart 1: Cascade Example

Chart 1 shows the fraction of agents cooperating in a typical simulation run over 2000 rounds. In the example, a severe defection cascade occurs at round 3445, which causes every agent connected to the network to defect over the course of the next four rounds. Islands, nodes that are unconnected to the network, are unaffected by these cascades, so there is some residual cooperation until round 3500. After about 200 more rounds, the system recovers, and the cascade is over. Unlike the minor defection events at rounds 2259, 2369 and 2807, the major cascade affected all of the agents in the network and as a result lasted much longer and had a more significant effect on the agents’ average payouts over the life of the simulation. In addition, during the cascade many agents had all of their links cut, thereby removing them from the network, so that when the network recovered shortly before round 3750, only 60% of the agents returned to cooperation.

Chart 2: Cascade Example without Islands
When island nodes are excluded from the data, the cascades look more extreme. Every agent defects at the beginning of a cascade, and every agent returns to cooperation at the end.

**Random vs. Popularity**

The Random and Popularity strategies were the first pair of heuristics I compared. The data show that when the majority of agents play Random, the agents playing Popularity consistently perform better. At the same time, when more than half of the population plays the Popularity strategy, first the Random and then both types of agents’ payoffs are diminished due to a large increase in the severity and number of defection cascades. This is born out in the negative correlation between the proportion of agents playing the Popularity strategy and average payouts and in the positive correlation between the proportion of agents playing the Popularity strategy and the frequency and severity of defection cascades.

In addition to this negative trend, there is a structural break in the data when roughly 40% of agents use the Random strategy. For this reason, my regressions of the data use a dummy variable to distinguish between data from above and below this structural break, so that OLS can be used to specify a piece-wise linear regression for the data.

![Graph 1: Random vs. Popularity Payoff Regressions](image_url)
**Random vs. Referral**

The Random and Referral strategies were the second pair of heuristics I compared. Interestingly, this comparison yields similar results to the comparison between the Random and Popularity strategies. The Referral strategy yields higher payouts than the Random strategy, but the more agents that use Referral, the lower payouts are for all agents.

It should be noted that the variance in payoffs to Referral agents is significantly larger than the variance in the payoffs to Popularity agents in the previous comparison. This is clearly visible in Graphs 1 and 2, and is confirmed by the difference in the standard deviations of the average Popularity and Referral payoffs and the standard errors of the regressions. A possible explanation for this effect may be the “clustering” of agents using the Referral bias into groups with highly correlated payoffs, since groups will defect or cooperate together. Because grouped agents’ payoffs will be correlated, the effective number of agents used in calculating average payoffs are lower, which raises variances.

![Graph 2: Random vs. Referral Payoff Regressions](image-url)
Random vs. Unpopularity

There is relatively little difference between the Random and Unpopularity strategies in terms of their effect on either the number of cascades that occur, the length of those cascades, or the payouts realized by the agents. Cascades are relatively infrequent, occurring on the order of 1 or 2 times per 50,000 rounds, far fewer than the 8-10 cascades caused by the Popularity and Referral strategies over the same time period.

Graph 3: Random vs. Unpopularity Payoff Regressions
Random vs. Locality

The networks generated by agents playing the Locality strategy have the fewest cascades of any of the networks studied. Random dominates Locality as a strategy, most likely due to the ability of Random agents to “escape” local neighborhoods of defecting agents. The Random strategy also correlates with a small increase in the number of cascades, which decreases the average payout for both types when most agents play the Random strategy.

Graph 4: Random vs. Locality Payoff Regressions

Summary

The data indicate that some heuristics consistently outperform others, but may reduce the total payout of the network as a system when played by more than a small fraction of the agents.

On an individual level, the Popularity and Referral strategies outperform the Random strategy; the Unpopularity strategy produces the same outcomes as Random, and the Locality strategy performs worse than Random. The average payout for the entire network is maximized in the opposite order, however, with the Locality, Unpopularity and Random strategies benefiting the entire network more than the Popularity and Referral strategies, because Random, Unpopularity and Locality don’t cause defection cascades.
V. Discussion

In this section, I give possible explanations for several of the phenomena observed in the data. I begin by discussing the similarity between the effects of the Referral and Popularity strategies, and move on to the individual benefits awarded by those strategies. I then discuss the global harms from those same strategies, and close by discussing the consequences of strategies which are individually beneficial but have negative externalities.

Similarity between Popularity and Referral

The similar performance of the Popularity and Referral strategies can be explained by the fact that agents are favored in proportion to their number of links in both cases. Even though the Referral strategy does not use the number of links as a direct criterion for selection, “popular” agents are more likely to be referred than other agents. As a result, while the Referral strategy increases the clustering of the network, it generally performs like the Popularity strategy, selecting agents with many neighbors more frequently than agents with few neighbors.

Why Do Popularity and Referral Increase Individual Payouts?

Despite the negative effects of the Popularity and Referral strategies, it is clear that agents playing these strategies receive higher payoffs than those playing Random. This is most likely because agents playing the Popularity and Referral strategies seem to accumulate more neighbors over time. Graph 5 is a histogram that shows the distribution of numbers of neighbors possessed by agents playing the Random and Popularity strategies in a representative run of the simulation with 70% Random agents and 30% Popularity agents. In this example, the Popularity agents average 4.8 neighbors each, while the Random agents average 3.7 neighbors. Because the number of neighbors agents have is directly related to their payouts (one point per neighbor in mutual cooperation), agents with more neighbors perform better.
How is it the case that agents who select partners based on Popularity themselves become more popular? This may be due to the correlation between playing Popularity or Referral and being less likely to defect when a neighbor defects. Figures 3 and 4 detail how this might work.

Figure 3: Infection Example without Role Model
Figure 3 is an example of how defection can spread through a network without a highly connected individual. After E defects in the example, A must choose whether or not to imitate E by defecting in the third round or imitate its other neighbors by continuing to cooperate. E receives a total payout of 4.5 (3 x T where T = 1.5). A’s cooperating neighbors only get payouts of 4 (3 x R where R = 1) and A gets a payout of 3 (3 x R). As a result, A imitates E in the third round and defects.

Figure 4: Infection Example with Role Model

Agents playing a Referral strategy are more likely to be connected to highly connected “role model” agents, represented by agent R in Figure 4. Role models reduce the likelihood of their neighbors converting when another neighbor defects. Because agents’ total payoffs rise with the number of neighbors they have, R provides A with an example of a very high payoff (1 point from each of 7 neighbors, 7 total) to cooperation. E gets a higher payout from each of its parasitic relationships, but has fewer of them, yielding a total payout of 4.5 (1.5 points from each of 3 neighbors). A imitates R rather than E, because R’s payout is greater than E’s payout (7 > 4.5).

In the previous example without a role model, A will imitate any of its neighbors who defect, whereas when it has a role model, it will only imitate that role model. As a result, the frequency with which A defects is reduced.
Every time agents defect, their neighbors may choose to break links with them. As a result, agents who are able to defect less can accumulate more links over time, increasing their payouts. By connecting agents with role models, the Popularity and Referral strategies can improve the payouts of the agents that use them.

Rational, forward-looking agents would want to accumulate as many links as possible to increase their payoffs, and would therefore resist the temptation to defect in order to encourage their neighbors not to abandon them. While agents playing Popularity and Referral don’t work through this logic explicitly, their imitation and friend choice heuristics cause them to take actions that appear to be fully rational.

**How Do Popularity and Referral Harm Global Payouts?**

While Popularity and Referral are each beneficial in their own respective manner, they have different effects on the network as a whole. The more agents that use the Popularity and Referral strategies, the worse the average payout for the entire population. This is due to the increasing prevalence of defection cascades as the proportion of agents using Popularity and Referral increases.

This may be caused in large part by the exclusion of a large number of agents from the network as a side effect of the Popularity and Referral strategies. When these strategies are played, many simulated agents gradually lose all of their links and no longer interact with the social network. Because agents using the Popularity and Referral strategies favor other agents with many neighbors, agents with few neighbors may lose neighbors faster than they regain them, until they are completely cut off from the network. Because the Random, Unpopularity and Locality strategies do not favor agents with many neighbors, these strategies do not have this ostracizing effect. The proportion of agents that are ostracized increases as more agents use Popularity and Referral, a relationship confirmed by Chart 6. In particular, the proportion of agents ostracized spikes when more than 60% of agents play the Random or Referral strategy, which coincides with the structural break in the payoff and cascade data.
One of the properties of the model is a conservation of the number of links. This means that as agents without neighbors accumulate, a shrinking pool of agents uses all of the links in the network. While the average number of links possessed by each agent in the simulation is constant due to the conservation of links, the average number of links possessed by each agent connected to the network increases as more agents are ejected from it.

As a result, networks such as these are more susceptible to defection cascades. Defection cascades spread faster and more completely because of the decreased network diameter and increased rate of initial exponential growth when agents have more links. This explains the upward trend in cascade rates as more agents use the Popularity and Referral biases.

When more than a certain fraction of agents use the Popularity or Referral strategies, the system enters a state of nearly continuous defection. The critical fractions of agents seem to be about 60% Popularity strategy or about 55% Referral strategy. When too many agents play the Popularity or Referral strategies, the network is unable to recover from defection cascades, and continually reshuffles the links as defecting agents end relationships with other defecting agents. As a result, the network shrinks down to a highly connected cluster of 40-50 agents, and the majority of agents are excluded from the network with no neighbors. The social network cannot recover from this disintegration, an event comparative to phase changes often observed in physics.
Prisoner’s Dilemma within a Prisoner’s Dilemma

It is clear from the results that the Popularity and Referral strategies dominate the Random and Unpopularity strategies, which in turn dominate the Locality strategy. In terms of social optima, however, the strategies are reversed. The Locality strategy is best for the network as a whole, and the Popularity and Referral strategies worst, due to their respective effects on the frequency and severity of defection cascades.

This means that agents choosing a friendship choice heuristic face a Prisoner’s Dilemma of sorts. They can choose the Popularity or Referral strategies, benefiting themselves but harming the network, or they can choose Random, Unpopularity or Local, which neither benefit the agent nor harm the network. The Social Optimum occurs when all agents choose Random, Unpopularity or Local, but the Nash Equilibrium occurs when all agents choose Popularity or Referral. To the detriment of the entire network, utility maximizing agents left to their own devices will choose to use the Popularity and Referral strategies to select their friends.

VI. Conclusion

I have shown that two link creation heuristics, the Popularity and Referral strategies, have interesting emergent properties when played by a significant proportion of the agents in a dynamic local interaction network. New partners selected using a Popularity or Referral strategy are more likely to be cooperative; therefore, agents that use these strategies consistently have higher payoffs than agents that play the Random strategy. At the same time, the more agents that play the Popularity and Referral strategies, the more frequently defection cascades occur, which lowers the average payouts of every agent in the network.

This emergent Prisoner’s Dilemma is significant because it is not obvious when studying the friendship choice heuristics analytically. Real life examples of cascades like financial contagion are rare and therefore difficult to study empirically. Backward-looking models do a poor job of predicting cascade behavior due to the lack of appropriate data necessary to calibrate the model. Dependence on these models has been the downfall of many investment companies, most notoriously Long Term Capital Management. It is worth considering whether our financial institutions create incentives for firms to use strategies that have negative externalities that destabilize networks. Hopefully someday we will have sufficient understanding of financial contagion to prevent this.
VII. Acknowledgements

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Perceptions of Female Managers in Male-Dominated Industries: Effects of Gender Rarity, Performance, and Diversity Justification

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Abstract

Two experimental studies were conducted to measure the effects of contextual and situational factors on employees’ perceptions, attitudes, and behaviors toward female managers in traditionally male-oriented jobs. Study 1 manipulated the contexts (gender rarity and diversity justification) of female perceivers through the mediating effect of social identity, while Study 2 manipulated the contexts (gender rarity and performance) of female and male targets. Results for Study 1 indicate that: (a) rare female perceivers are more likely to perceive female managers as being dominant (a stereotypically male trait) and adopt these traits, (b) rare female perceivers are also more likely to believe that they have to try harder to prove themselves in the organization, and (c) female perceivers in companies with legal compliance diversity justification are less likely to encourage prospective females to join the company. Results for Study 2 indicate that companies with female targets in positions of gender equality were assumed to have affirmative action hiring policies more often than companies with female targets in positions of gender rarity – this provides evidence for future research about the types of organizations in which rarity evokes assumptions of preferential hiring. Overall, these studies contribute to the debate over the use of affirmative action policies by providing insight into

1 Shefali Patil is a recent alumna of the undergraduate Stern School of Business, New York University, with a double major in Management & Organizations and Marketing. This research paper was completed while she was a participant of the Senior Honors Program 2008. She would like to sincerely thank her advisor, Dr. Steven Blader, Associate Professor of Management, for his guidance, keen insights, strong enthusiasm, and honest advice throughout this research process. He was the first one to welcome her to the world of academic research, and she is very grateful to him for his continued efforts and encouragement. She would also like to thank her mother and father for their never-ending care and dedication, her brother, Akhil, for his love and companionship, and her roommate and close friend, Belig Borjiged, for her help with these studies and unflagging friendship. She greatly appreciates the constant support from the aforementioned people. Comments are welcome at shefpatil@gmail.com.
the unintended consequences of their implementation. Results indicate that increasing female representation in male-typical professions is not enough to counter negative perceptions and behaviors toward traditionally underrepresented minorities – equal gender representation must be coupled with a culture that believes that diversity is intrinsically advantageous, in order to mitigate some of the effects of implicit sex-based discrimination in the workplace.
Introduction

The 1960s in American history marked the beginning of substantial changes to the organizational workplace with respect to gender equality. During those years, government and society worked to decrease discrimination against women in the workplace to create fair hiring policies and to provide equal employment opportunities. Some of these measures include Title VII of the Civil Rights Act, which barred discrimination in employment on the basis of sex and race, the Equal Pay Act, which made it illegal for employers to pay women less than men in the same jobs, and Title IX of the Education Amendment, which banned sex discrimination in schools. These efforts have had a major social and economic impact, as women’s participation in the workplace has increased significantly. The most influential change, however, has come from the increase in women’s participation in traditionally male-dominated industries, such as finance, science, and law, and from the increase in the number of degrees held by these women in preparation for these jobs. According to the U.S. Department of Labor, “almost three-quarters of women were employed in management, professional, sales, and office occupations in 2006, compared with about half of men.”2 These professional fields are perhaps among the most powerful, lucrative, and highly regarded in the job market, and changes in these fields have created an advantageous opportunity for many women.

While there has been a dramatic decrease in explicit sex-based discrimination, discrimination still continues in a less apparent yet almost equally harmful form. This implicit sex-based discrimination prevents women from fully benefiting from high-earning positions. Women, especially at the managerial level, continue to face numerous obstacles pertaining to matters, such as compensation, promotion, and representation, even years after the initial impact of the movement. For example, a woman still continues to earn seventy-three cents for every dollar that a man makes in the same job and position.

One of the factors that underlie this particular form of sex-based discrimination involves the concept of perception. In organizational behavior theory, perception is defined as the way in which people observe, view, and interpret others and events around them to create a sense of order for their environment.3 Perception greatly affects the attitudes employees have of others and themselves, as well as the decisions they make within an organization. Biases, or systematic tendencies, often distort these perceptions, leading to inaccurate assessments and evaluations. With regard to women in the workplace, this gender-based biasing and stereotyping is one of the factors that prevents full

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attainment of gender equality in male-dominated organizations.

This paper, through the execution of two experimental studies, aims to examine the surrounding contexts that cause differences in perceptions. Study 1 focuses on the context of female perceivers in the workplace and their perceptions of female targets (the ones who are perceived). Study 2 focuses on the context of female targets and the consequent perceptions of both male and female perceivers.

Study 1
Context of a Female Perceiver and Its Impact on Her Perceptions of Female Managers, and Attitudes and Behaviors in the Organization

Background

One of the prevalent forms of implicit sex-based discrimination that occurs in today’s workplace involves the negative perceptions of female employees by other females in male-dominated organizations. For example, in an experimental study on interviews, it was found that female recruiters evaluated male applicants more favorably than female applicants, while no significant differentiation was found with male recruiters.4 Graver and Powell suggested that this occurred because female recruiters, who were employees of a traditionally male profession, may have seen male applicants as more similar to themselves than female applicants; this perceived similarity affected their assessment of the applicants’ subjective qualifications. Additional phenomena can be found in prominent polls. A Work and Power survey of 60,000 participants conducted by MSNBC revealed that three out of four women expressed a preference to work for a man than a woman.5 Gallup Poll’s annual Work and Education survey revealed that half of all adult women in the United States prefer working for a man (compared to 45% of all men).6 These results are perhaps unexpected, as one might assume that women would prefer female bosses who could potentially be a source of help and advice for lower level female employees. The most surprising implication of this survey is that women themselves, who are fully aware of the disadvantages in the workplace, may be contributing to sex-based discrimination.

Some of this behavior can be explained by the mediating effect of social

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identity. Through this, people categorize and group themselves based on gender, race, ethnicity, profession, etc. The consequences of taking on a particular identity involve both positive and negative behaviors. A female recruiter’s preference for male applicants can indicate a distancing from the female identity and a stronger identification with the male group, a higher-status group in the male-dominated organization. The extent of a woman’s identification with a female social identity may therefore be related to perceptions and behaviors toward other females.

Hypotheses

It is hypothesized that the context or environment that a female perceiver is in may influence the extent to which she identifies with a female social identity, and thus her perceptions of other women. Two specific contextual factors that may influence how females react to other females are gender composition and justification of diversity measures. Parallel to the methods used in previous studies, both these contextual factors “prime” females by making their female identity salient, which may, in turn, influence the following perceptions she has about a female manager: the perceived competency, the perceived interpersonal hostility, the perceived communality (stereotypically female characteristics), the perceived agenticism (stereotypically male characteristics), the likeability of the female manager, and the satisfaction working under the female manager. Perceptions of the female manager can influence the perceiver’s behaviors and attitudes as well. Some of these include the likelihood she will seek the female manager out as a mentor and adopt her behaviors, the likelihood she will join a women’s mentoring/networking program, her adoption of stereotypical masculine and feminine traits, and her general beliefs about female managers. These are all behaviors that can potentially affect the future success of the female in the organization.

Pertaining to the first proposed contextual factor, gender composition, it is predicted that women in a situation of gender rarity (she is the only female within the organization) would identify less with the female identity because of her male-dominated surroundings. This distancing would make her the most likely to perceive female managers negatively. On the other hand, women in a situation of gender equality (equal number of women relative to men) would

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self-identify more with the female identity, decreasing negative perceptions towards other women:

**Hypothesis 1a:** Women in situations of gender rarity will have more negative perceptions of a female manager, adopt less advantageous behaviors, and hold more negative attitudes than women in a situation of gender equality.

The second proposed contextual factor aims to define the culture of the organization that the perceiver is in. Although culture is very broad, intricate, and hard to define, a sense of it can be revealed through an organization’s justification/framing of diversity recruitment. There are two mainstream justifications that are currently used: the first is for business reasons, thereby implying that diversity gives the company a competitive advantage, and the second is commonly referred to as affirmative action programs, which are perceived to be implemented in order to comply with government regulations.\(^{11}\) Prior research has shown that members of an organization have more positive attitudes toward a program that is justified through competitive advantage rather than affirmative action.\(^{12}\)

It is expected that, under the competitive advantage justification, women would be more likely to identify with the female identity because the female group would bring them higher status; it is, in essence, self-enhancement identification\(^{13}\) within an organization that values diversity. However, in an organization with affirmative action policies, or a culture of hiring females for the sake of avoiding legal penalties, a woman is perhaps more likely to move away from the disadvantaged female identity and embrace other identities.\(^{14}\)

**Hypothesis 1b:** Women in an organization with affirmative action diversity measures will have more negative perceptions of a female manager, adopt less advantageous behaviors, and hold more negative attitudes than women in an organization with competitive advantage diversity measures.

The interaction of the gender rarity and diversity justification measures provides an interesting complication in the matter. It is expected that becau-


sea woman would identify with the female group in both gender equality and competitive advantage justification, this combination would be the “best case scenario,” with women having more positive perceptions of female managers. However, rarity and affirmative action justification are predicted to be the “worst case scenario,” with strong distancing from the female identity.

**Hypothesis 1c:** Women in an organization with gender rarity and affirmative action diversity measures will have more negative perceptions of a female manager, adopt less advantageous behaviors, and hold more negative attitudes than women in an organization with gender equality and competitive advantage diversity measures.

Finally, it is hypothesized that the effects of these two contextual factors are also dependent on the personal beliefs of the perceiver, particularly with respect to her beliefs about the separation of gender roles. In prior research, egalitarian attitudes have been proven to affect other similar behaviors, such as a woman’s likelihood of engaging in nontraditional occupations. Following this pattern, it is likely that women with highly egalitarian values who believe less in the separation of gender roles would not distance themselves as much from a female social identity as those with low egalitarian values. This measure can also have an effect on women’s reactions to other women in the workplace.

**Hypothesis 1d:** Women with less egalitarian views about gender roles will have more negative perceptions of a female manager, adopt less advantageous behaviors, and hold more negative attitudes than women with more egalitarian views about gender roles.

**Method**

**Participants and Design**

The participants of Study 1 were 80 women, between the ages of 18 to 34. The vast majority were undergraduate students from various universities across the United States, with some from universities in Australia, New Zealand, Singapore, South Korea, India, and Israel. They were recruited through online networking sites. All participants were entered into a raffle for cash prizes.

The design of Study 1 was a 2 x 2 factorial design with rarity (only males in the organization, or three females and three males) and company justification of diversity measures (affirmative action or competitive advantage) as the context.

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manipulations. Participants were randomly assigned one of these four conditions.

Procedure and Stimulus Materials

All participants were emailed a link to one of four online surveys. Each survey began with an introduction containing a general, irrelevant purpose, which stated that the study explores the experiences of new hires and management’s responsibilities of facilitating these experiences. This was followed by instructions that made the participant aware that she was going to read a new-hire information letter and instructed her to imagine that she had just accepted a highly desirable job offer from the company. The latter part of these instructions was added to mitigate any pre-conceptions that the participant might have had about financial companies or finance-related jobs, considering some were not from business-oriented schools.

Participants were then directed to the following page that contained the new-hire information/orientation letter for a fictitious mid-sized financial services company named SIL Financial Services, Inc. [A fictitious company was used to (1) prevent any irrelevant biases/perceptions that a participant may have had about a real company from influencing results and (2) avoid unnecessary affiliations of diversity justification and hiring procedures with a real company. Although the company was fictitious, all efforts were made to make this letter as realistic and believable as possible].

The letter began by personally welcoming the participant to the company by providing background information on SIL Financial and describing its culture as supporting a collegial environment that provided opportunities for professional growth.

The two experimental manipulations, justification of diversity measures (presented as “Employee Diversity at SIL Financial”) and gender rarity (presented as an introduction to the participant’s team), appeared after the background and culture information. These two parts were the only sections of the information letter that were unique to each condition. These manipulations will be discussed in detail in the following section.

Finally, the new-hire information letter introduced the participant to the managing director of her team, a fictitious female. She was given strong qualifications in order to “create” the image of an objectively competent, well-qualified manager. After the new-hire information letter, participants were directed to the questionnaire.
Experimental Manipulations

(1) Company Justification of Diversity Measures: Participants were given a paragraph in the new-hire information letter under the heading, “Employee Diversity at SIL Financial,” which justified the hiring of female employees and other minorities as either a sole compliance of affirmative action policies set forth by the Equal Employment Opportunity (EEO) guidelines (affirmative action justification condition) or a voluntary adoption of minority recruitment to increase the competency of the organization (competitive advantage justification condition). Wording of these justification measures were modeled after the framing of diversity recruitment measures created by Richard & Kirby, 1998. Both of these paragraphs specifically addressed the hiring of women, as well as the hiring of other minorities.

The affirmative action justification stated:

SIL Financial operates in compliance with the affirmative action requirements set forth by the Equal Employment Opportunity (EEO) guidelines for minority representation in the workplace. We follow the mandate to hire minorities, especially women, who have been consistently underrepresented in the finance industry. SIL has thus implemented an affirmative action program to seek, hire, and promote minority group members.

The competitive advantage justification stated:

SIL Financial recognizes that today’s client base has become increasingly diverse. In order to have a competitive advantage in this type of market, we believe it is important to have employees, especially women, who reflect this diversity and understand this client base. Although SIL does not have an affirmative action program, it has voluntarily implemented a diversity initiative to seek, hire, and promote minority group members.

(2) Gender Rarity: Rarity was manipulated by changing the gender composition of the participant’s team that she would be “joining.” Participants were given a paragraph in the new-hire information letter, under the heading, “Your Team at SIL Financial,” that introduced them to the team and its fictitious members. The paragraph either contained all males (the participant would be the only female employee in this team) for the rarity condition, or three males and three females (to give the impression of gender equality) for the no rarity condition. Included with each name were the member’s position...
(Vice President, Associate, or Analyst), highest educational degree and the degree-granting institution, and hometown.

**Sex Role Egalitarian Scale**

The egalitarian scale used in this study was adapted from the Traditional-Egalitarian Sex Role Scale (TESR)\(^{16}\) and was intended to measure participants’ beliefs in the equality of gender roles. Ten out of the twenty items were selected from the scale, particularly those that were most relevant in today’s times. It appeared near the end of the study. A list of these scale items can be found in Appendix A.

**Dependent Measures**

The first half of the questionnaire measured participants’ evaluations of the female managing director. It contained seven parts. The first five measures, which consisted of competency, interpersonal hostility, communality, agenticism, and liking, were compiled from Heilman & Okimoto, 2007. Each was posed with the question, “I think the Managing Director will be:” The competency measure consisted of three 7-point Likert Scales: competent (*not very competent-very competent*), effective (*not very effective-very effective*), and productive (*not very productive-very productive*). The interpersonal conflict scale consisted of five 7-point Likert Scales with the following adjectives: abrasive (*not very abrasive-very abrasive*), pushy (*not very pushy-very pushy*), untrustworthy (*not very untrustworthy-very untrustworthy*), manipulative (*not very manipulative-very manipulative*), and selfish (*not very selfish-very selfish*). The communality scale consisted of four 7-point Likert Scales with the following adjectives: supportive (*not very supportive-very supportive*), understanding (*not very understanding-very understanding*), sensitive (*not very sensitive-very sensitive*), and caring (*not very caring-very caring*). The measure of agenticism consisted of six 7-point Likert Scales with the following adjectives: strong (*not very strong-very strong*), assertive (*not very assertive-very assertive*), tough (*not very tough-very tough*), bold (*not very bold-very bold*), active (*not very active-very active*), and dominant (*not very dominant-very dominant*). The final scale measured liking with one 7-point Likert Scale with the adjective likeable (*not very likeable-very likeable*).

The next part measured how the participant thinks she would feel working under the female managing director. This was asked in two questions: the first was a 7-point Likert Scale (*not very satisfied-very satisfied*) corresponding to the question, “How satisfied do you think you will be working under

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the Managing Director?”, and the second was a 7-point Likert Scale (*not very happy-very happy*) corresponding to the question, “How happy do you think you will be working under the Managing Director?”

The final part of this section measured how the participant thought she would behave towards the female managing director. In five 7-point Likert Scales (*not very likely-very likely*), the questionnaire asked, “How likely do you think you will be to do the following with this Managing Director…”, with regard to the following actions: seek her out as a mentor, adopt her behaviors, network with her, learn from her, and ask her for work-related advice.

The second half of the questionnaire measured the participants’ intended behaviors and attitudes in the organization. The first measured the participants’ willingness to join women mentorship and networking programs. The question stated that SIL Financial planned to implement the following three programs: General Mentorship (all lower-level employees are assigned upper-level employees as mentors), Women’s Mentorship (lower-level female employees are specifically assigned upper-level female employees as mentors), and Women’s Networking Society (group in which female employees could network with other female professionals). Participants rated on a 7-point Likert Scale (*not very likely-very likely*) how likely they were to join the above-mentioned programs.

The next measure dealt with behaviors that the participants were likely to adopt. These included six adjectives from the BEM Sex-Role Inventory, three from the masculine items list (*aggressive, dominant, and strong-willed*) and three from the feminine items list (*compassionate, understanding, and communal*). Participants were posed the question, “As an employee at SIL Financial, I think I will become,” and they rated responses for each adjective on a 7-point Likert Scale (*not very-very*).

The following measure contained all six statements that comprised the Stereotyped Beliefs about Women Managers Scale, with a 5-point Likert Scale (*strongly disagree-strongly agree*). This scale was intended to measure the beliefs in the disparity between the performance evaluation differences of managerial men and women. Appendix B contains this scale. The only changes made to each statement were that it was personalized for SIL Financial. For example, the first item read “Women managers at SIL Financial…” The questionnaire then asked how confident the participant was in being successful at SIL Financial, with a 7-point Likert Scale (*not very confident-very confident*).

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The final measure gauged the participant’s behavior towards other prospective women. The question posed a scenario where a prospective employee had applied for an analyst position at SIL Financial. No information was given about her qualifications or competency in order to measure the reactions to a female without unnecessary interference. The only information was that her name was that of a typical female and that she had applied for a job. Participants were asked on a 7-point Likert Scale (not very likely-very likely), how likely they were to: “talk up” SIL to her, recommend her for hire, and discourage her from joining SIL.

Results

Data Analysis Overview

A two-factor Analysis of Variance (ANOVA), with alpha of 0.05, was conducted for each dependent measure in the following manner: Components comprising each of the perceived competency (α = 0.79), interpersonal hostility (α = 0.70), communality (α = 0.90), and agenticism scales (α = 0.82) were combined, consistent with correlation calculations from previous research. Averages were calculated for the Stereotyped Beliefs About Women Managers Scale. The higher the average, the more the adherence to the stereotypical beliefs; all other dependent measures were individually analyzed for significant differences in variance among the four conditions.

Analysis of the predictive power of the egalitarian scale on the dependent measures involved three different regression analyzes: (1) Average scores for each participant were calculated and standardized through the assignment of a z-score. The higher the score, the more egalitarian the participant was on the scale. These standardized scores were regressed against all dependent measures. (2) An interaction term was calculated between the standardized egalitarian scores and the rarity effect, with rarity being assigned a value of zero and no rarity being assigned a value of one. This term was regressed against all dependent measures. (3) An interaction term was calculated between the standardized egalitarian scores and the justification effect, with affirmative advantage justification being assigned a value of zero and competitive advantage being assigned a value of one. This term was regressed against all dependent measures.

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A significant finding was defined as having a $p$-value less than or equal to 0.05 and a marginal finding was defined as having a $p$-value greater than 0.05 but less than 0.10.

Perceived Competency of the Female Manager

The three adjectives comprising the competency scale (competent, effective, and productive) were combined into one scale: correlation between competent and effective was 0.64, correlation between competent and productive was 0.48, and correlation between effective and productive was 0.84.

Analysis of variance for this competency scale revealed no significant effects for diversity justification $F(1, 71) = 0.28$, $p > 0.10$, rarity $F(1, 71) = 0.86$, $p > 0.10$, or the justification x rarity interaction $F(1, 71) = 0.37$, $p > 0.10$. All participants objectively perceived the female manager as competent based on her qualifications, regardless of their assignment to a particular condition.

Perceived Interpersonal Hostility of the Female Manager

Averages of ratings for the five adjectives (abrasive, pushy, untrustworthy, manipulative, and selfish) comprising the measure of interpersonal hostility were combined into an interpersonal hostility scale. Contrary to predictions, there were no differences among the four conditions. Analysis of variance for these groups revealed insignificant effects for diversity justification $F(1, 71) = 0.55$, $p > 0.10$, rarity $F(1, 71) = 0.16$, $p > 0.10$, and the justification x rarity interaction $F(1, 71) = 0.03$, $p > 0.10$.

Perceived Communality of the Female Manager

Averages of the ratings for the four adjectives (supportive, understanding, sensitive, and caring) comprising the measure of perceived communality were combined into a single communality scale. Analysis of variance revealed a marginal effect of the diversity justification x rarity interaction variable $F(1, 71) = 2.82$, $p < 0.10$, but no effect of the individual rarity $F(1, 71) = 0.02$, $p > 0.10$ or diversity justification variables $F(1, 71) = 0.49$, $p > 0.10$.

Slightly contrary to predictions, those in situations of gender rarity (where the participants’ gender was salient) were more likely to believe the female manager as communal when affirmative action was used as a diversity justification (mean = 4.24, standard deviation = 0.85) than competitive advantage (mean = 4.01, standard deviation = 0.94). But in situations of no rarity (where the participants’ gender was not salient), participants were more likely to believe that the female manager was communal when competitive advantage was used as a justification (mean = 4.36, standard deviation = 0.99) rather than affirmative action (mean = 3.82, standard deviation = 1.07).
Perceived Agenticism of the Female Manager

Averages of the ratings for the six adjectives (strong, assertive, tough, bold, active, and dominant) comprising the measure of perceived agenticism were combined into a single agenticism scale, as well as analyzed separately. Analysis of variance of the combined scale revealed no significant effects of rarity $F(1, 71) = 0.53, p > 0.10$, diversity justification $F(1, 71) = 1.47, p > 0.10$, or the justification x rarity interaction $F(1, 71) = 2.31, p > 0.10$. However, there was a significant effect of rarity on the individual dominant trait $F(1, 67) = 4.95, p < 0.05$, and a marginal effect of diversity justification $F(1, 67) = 3.31, p < 0.10$.

As predicted, those in situations of rarity were more likely to perceive a female manager as dominant (mean = 5.85, standard deviation = 1.13) than those in a situation of no rarity (mean = 5.21, standard deviation = 1.30). Those whose company’s diversity measures were justified through competitive advantage (mean = 5.80, standard deviation = 1.23) were more likely to perceive the female manager as dominant than those whose company’s diversity measures were justified through affirmative action (mean = 5.26, standard deviation = 1.24).

Likeability of the Female Manager

Analysis of variance of the participants’ likeability of the manager showed no significant effects of diversity justification $F(1, 67) = 1.41, p > 0.10$, rarity $F(1, 67) = 1.41, p > 0.10$, or the justification x rarity interaction $F(1, 67) = 0.02, p > 0.10$. Contrary to predictions, the perceived likeability of the female manager (mean = 4.57, standard deviation = 0.93) was not affected by the treatment condition of the participants.

Satisfaction of Working for the Female Manager, Intended Behaviors toward the Female Manager, and Likelihood to Join Women’s Mentoring/Networking Programs

Analysis of variance of participants’ inferences about satisfaction $F(1, 63) < 4.00, p > 0.10$ and happiness $F(1, 67) < 3.99, p > 0.10$ in working for the female manager was insignificant for the rarity, justification, and justification x rarity interaction effects. Means for intended behaviors toward the female manager (seek her out as a mentor $F(1, 71) < 3.98, p > 0.10$, adopt her behaviors $F(1, 71) < 3.98, p > 0.10$, network with her $F(1, 67) < 3.99, p > 0.10$, learn from her $F(1, 67) < 3.99, p > 0.10$, and ask her for work-related advice $F(1, 71) < 3.98, p > 0.10$) were not significantly different. Finally, means for the participants’ likelihood to join general mentorship programs $F(1, 67) < 3.99, p > 0.10$, women’s mentorship $F(1, 67) < 3.99, p > 0.10$, and women’s networking
Perceptions of Female Managers in Male-Dominated Industries

$F(1, 71) < 3.98, p > 0.10$ were insignificant across the three effects. Contrary to predictions, each of the four conditions did not influence the inferred satisfaction of working under the female manager, their attitudes toward her, or the likelihood that they would take part in women corporate programs.

**Adoption of Stereotypical Masculine and Feminine Traits**

Analysis of variance for ratings pertaining to stereotypical masculine traits (aggressive, dominant, and strong-willed) that the participant would adopt revealed a significant main effect of rarity on adopting dominant behavior $F(1, 71) = 7.40, p < 0.01$, and a marginal effect of rarity on adopting aggressive behavior $F(1, 71) = 3.06, p < 0.10$. Analysis of variance for ratings pertaining to stereotypical feminine traits (compassionate, understanding, and communal) that the participant would adopt revealed marginal effects of the justification x rarity interaction on adoption of the compassionate trait $F(1, 71) = 3.20, p < 0.10$ and the adoption of the communal trait $F(1, 67) = 3.44, p < 0.10$.

Pertaining to the adoption of masculine traits: in cases of rarity, participants were more likely to adopt dominant behavior (mean = 4.83, standard deviation = 0.88) than in cases of no rarity (mean = 4.19, standard deviation = 1.09). Similarly, participants were more likely to adopt aggressive behavior in situations of rarity (mean = 5.00, standard deviation = 0.93) than in no rarity (mean = 4.58, standard deviation = 1.08). Pertaining to the adoption of feminine traits: in situations of rarity, participants were more likely to adopt compassionate behavior when the company used an affirmative action justification (mean = 4.11, standard deviation = 1.02) rather than a competitive advantage justification (mean = 3.44, standard deviation = 1.34). In situations of no rarity, however, the opposite was true. Participants were more likely to adopt compassionate behavior when the company used a competitive advantage justification (mean = 4.11, standard deviation = 1.41) than an affirmative action justification (mean = 3.67, standard deviation = 1.46). The intended adoption of communal behavior followed a similar pattern. In cases of rarity, participants were more likely to adopt communal behavior when the company used an affirmative action justification (mean = 4.88, standard deviation = 0.78) rather than a competitive advantage justification (mean = 4.06, standard deviation = 1.52). In situations of no rarity, however, participants were more likely to adopt communal behavior when the company used a competitive advantage justification (mean = 4.88, standard deviation = 1.17) rather than an affirmative action justification (mean = 4.59, standard deviation = 1.37).
Responses to each of the six statements of the Stereotyped Beliefs about Women Managers Scale were averaged for each participant and an analysis of variance was conducted. Results showed a significant effect of rarity on the adherence to the scale $F(1, 71) = 5.22, p < 0.05$ and a marginal effect of the justification x rarity interaction variable $F(1, 71) = 3.13, p < 0.10$.

As predicted, in situations of rarity, participants were more likely to hold stereotypical beliefs about women in the company (mean = 3.38, standard deviation = 0.67) than women in situations of no rarity (mean = 3.01, standard deviation = 0.72). Also, as predicted, if the participant is in a situation of no rarity, a competitive advantage justification of diversity measures (mean = 2.81, standard deviation = 0.69) can better mitigate the strength of participants’ adherence to stereotypical beliefs compared to an affirmative action justification (mean = 3.20, standard deviation = 0.71).

Confidence in Being Successful

Analysis of variance of participants’ confidence in being successful in the company showed no significant effect for diversity justification $F(1, 71) = 0.42, p > 0.10$, rarity $F(1, 71) = 0.75, p > 0.10$, and the justification x rarity interaction $F(1, 71) = 0.42, p > 0.10$. Contrary to expectations, all participants demonstrated a higher than average confidence (mean = 5.24, standard deviation = 1.09) regardless of assigned condition.

Attitude towards Prospective Female Employee

Analysis of variance indicated a very strong main effect of diversity justification on both the participants’ likelihood of recommending a prospective female employee for hire $F(1, 63) = 5.01, p < 0.05$ and the likelihood of them discouraging the prospective female employee from joining the company $F(1, 71) = 6.44, p < 0.05$. However, there was no significant difference in means for the participants’ likelihood of “talking up” the company to the prospective female employee for all three effects $F(1, 67) < 3.99, p > 0.10$.

In situations where the company used an affirmative action justification, participants were more likely to recommend the female employee for hire (mean = 4.72, standard deviation = 0.89) than in situations of competitive advantage (mean = 4.22, standard deviation = 0.87). However, while this was true, they were more likely to discourage her from joining the company with an affirmative action justification (mean = 3.00, standard deviation = 1.07) than a company with a competitive advantage justification (mean = 2.31, standard deviation = 1.24).
**Table 1** summarizes all significant and marginal findings from the manipulations:

**Table 1: Study 1: Summary of Findings from Effects of Manipulations**

<table>
<thead>
<tr>
<th>Dependent Measure</th>
<th>Rarity x A/A</th>
<th>Rarity x C/A</th>
<th>No Rarity x A/A</th>
<th>No Rarity x C/A</th>
<th>Rarity x A/A</th>
<th>Rarity x C/A</th>
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<th>No Rarity x C/A</th>
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<th>No Rarity x A/A</th>
<th>No Rarity x C/A</th>
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<td>M SD F crit F p-value</td>
<td>M SD F crit F p-value</td>
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<td><strong>Agenticism of Female Manager: Dominant</strong></td>
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<td><strong>Adoption of Aggressive Behavior</strong></td>
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<td><strong>Recommend Prospective Female Employee for Hire</strong></td>
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<td><strong>Discourage Prospective Female Employee from Joining</strong></td>
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A/A = Affirmative Action; C/A = Competitive Advantage; n.a. = not applicable (for either insignificant data or mismatch of effects and interactions); M = mean; SD = standard deviation
Sex Role Egalitarian Scale and Dependent Measures

Regression analysis of participants’ standardized gender role egalitarian score versus dependent measures revealed a significant relationship between egalitarian beliefs and (1) the participants’ perceived satisfaction of working under the female managing director (coefficient = 0.42, \( p < 0.05 \)) and (2) the participants’ adoption of communal behavior (coefficient = 0.47, \( p = 0.05 \)). Analysis also revealed a marginal relationship between the scale and (1) the perceived competency of the female managing director (coefficient = 0.31, \( p < 0.10 \)) and (2) the likelihood of seeking out the female managing director as a mentor (coefficient = 0.27, \( p < 0.10 \)). Consistent with predictions, the more egalitarian beliefs a female employee holds about gender roles, the more likely she is to have positive perceptions of a female manager, adopt advantageous behavior by seeking her out as a mentor, and hold a more favorable attitude about working under her.

Regression analysis of the interaction variable between the standardized egalitarian score and rarity versus the dependent measures revealed four significant relationships between egalitarian beliefs and (1) the perception that the female manager is dominant (coefficient = -0.57, \( p < 0.05 \)), (2) the likelihood of joining the company’s women’s networking group (coefficient = 0.69, \( p = 0.05 \)), (3) the intended adoption of aggressive behavior (coefficient = -0.47, \( p < 0.05 \)), and (4) the stereotyped beliefs about women managers (from the SBWM scale) (coefficient = -0.328, \( p < 0.05 \)). Also consistent with predictions, in the presence of gender equality, the more egalitarian beliefs a female employee holds about gender roles, the more likely she is to positively perceive a female manager, feel comfortable in joining a women’s networking group, and feel less compelled to adopt aggressive behavior. She is less likely to believe in the stereotypical discrepancies in performance evaluations between male and female managers.

Regression analysis of the interaction variable between the standardized egalitarian score and diversity justification versus the dependent measures revealed no significant or marginal findings.
Table 2 summarizes all significant and marginal findings from the sex role egalitarian scale:

Table 2: Study 1: Summary of Findings from Effects of Sex Role Egalitarian Scale

<table>
<thead>
<tr>
<th>Dependent Variable</th>
<th>StdEgal</th>
<th>StdEgal x Rarity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Competency of Female Manager</td>
<td>2.90%</td>
<td>0.3055</td>
</tr>
<tr>
<td>Agenticism of Female Manager: Dominant</td>
<td>***</td>
<td>***</td>
</tr>
<tr>
<td>Satisfaction working under female manager</td>
<td>4.90%</td>
<td>0.4169</td>
</tr>
<tr>
<td>Seek out female manager as a mentor</td>
<td>2.70%</td>
<td>0.2666</td>
</tr>
<tr>
<td>Join Women’s Networking</td>
<td>***</td>
<td>***</td>
</tr>
<tr>
<td>Adopt communal behavior</td>
<td>3.40%</td>
<td>0.4673</td>
</tr>
<tr>
<td>Adopt aggressive behavior</td>
<td>***</td>
<td>***</td>
</tr>
<tr>
<td>Stereotyped Beliefs About Women Managers Scale</td>
<td>***</td>
<td>***</td>
</tr>
</tbody>
</table>

StdEgal = standardized z-score for egalitarian score; *** = no significant findings for interaction variable

Discussion

Even though hypotheses 1a, 1b, 1c, and 1d are only partially supported, these results indicate three very important findings about the effects of rarity and diversity justification on female employees’ perceptions of a female manager, choice of behavioral traits, and attitude towards prospective female employees. First, different patterns between rare female and non-rare female situations are clearly identifiable (Hypothesis 1a). The evidence demonstrates a pattern between a female employee’s perception of a female manager and the behavioral traits she believes she needs to adopt in order to be successful in the company. With regard to agentic, masculine traits, women in situations of rarity are more likely to perceive a female manager as dominant and to adopt aggressive and dominant behavior than when she is in a situation of gender equality. This implies that rarity causes them to both believe that higher level female employees who have achieved a high position are more “masculine,”
particularly more dominant, and that they must be “masculine” to achieve similar success. Thereby, they may be choosing to emulate the agenticism that they perceive in the female manager. Gender equality decreases this perception and need. The emulation of this dominant and aggressive behavior can be both favorable and unfavorable for the female employee. It is favorable in the way that stereotypically male-oriented characteristics are commonly believed to be vital for success in managerial positions. Those with more female-oriented characteristics are perceived to be incompetent and less likely to be successful. However, it puts the female employee in a position where she is easily victimized by the “backlash effect,” a previously studied perceptual bias. This effect holds that employees who are asked to form quick impressions of assertive female targets form less favorable impressions because of the very fact that they demonstrate less communal behavior. According to gender-based stereotypes, women are expected to behave in a certain manner involving communality (niceness, sensitivity, etc.) rather than male, agentic behavior, and any discrepancy between expectations and observations causes negative perceptions. It is thus ironic that the exact dominant and aggressive behavior that a female employee thinks will make her successful (judged by the perception that a successful female manager has this trait) is, in fact, something that can also be detrimental to her success in the organization.

The participants’ perception of a female manager’s communal behavior and their perceived need to adopt communal traits both reflect a similar pattern as well, although they are dependent on both rarity and diversity measure justification (Hypothesis 1c). In a situation of rarity, a female employee in a company with a culture of mere legal compliance (affirmative action justification) is more likely to perceive a female manager as communal (supportive, understanding, sensitive, and caring) and to believe in the need to adopt this compassionate and communal behavior than a female employee in a company that values the intrinsic nature of diversity. This may be initially counter-intuitive because it is thought that a woman in a condition of rarity and affirmative action policies would be more likely to adopt agentic behaviors, believing masculine traits would lead to success in a company that adopts diversity measures for the sole sake of avoiding legal penalties. Prior research

has shown that “token” women who belong to work groups with dominant male culture identify more with men. But, there is a two-fold consequence of this issue—women in this type of scenario may be well-aware that they will be facing many disadvantages based on their gender and would therefore feel the need to adopt communal behavior in order for the men around them to like and accept them. The mere presence of men around them may also make their female identity very salient to them, pushing them back into stereotypical feminine behavior. This is consistent with the “cognition” phase in the experiences of a focal individual in diverse work groups. Focal individuals categorize themselves based on features, traits, and behaviors consistent with gender and other salient characteristics as well as situational factors (e.g. relative representation of minority group). From here, stereotypical role expectations are internalized by the individual affecting behavior and performance. Salient women would thus confine themselves to typical gender role expectations. The major downfall in this is that while they may be more accepted by their male counterparts, perceptions of their competencies take a tremendous hit. Ultimately, in potentially the hardest situation to be in (with rarity and affirmative action), women are more likely to adopt traits that will further add to their already disadvantaged position.

There is, however, an even more interesting finding from this evidence: the perception of communality of a female manager and the perceived need to adopt communal traits are nearly the same in the “hardest” situation (rarity and affirmative action) and the possibly “better” situation (no rarity and valued diversity). In other words, when there is supposedly less pressure to compete with men and the culture of the organization is more competency-based, women may be adopting communal behaviors and falling prey to the same effects of the negative perceptions of their competency. It is important to note, though, that in the latter situation, a company that has significant minority representation and that places emphasis on the competitive advantage of diversity is perhaps more likely to form a culture where competency is far more valued and traits are less looked upon than in the former situation. In effect, the negative consequences that may result from the adoption of communal traits may not be as severe as those in the former situation.

29 Elsass & Graves, Ibid.
The second important finding demonstrates another negative effect of gender rarity: those in situations of rarity are more likely to believe in the performance evaluation discrepancies between male and female managers. In other words, “token” women succumb to the beliefs that they need to constantly prove themselves, behave in typically masculine ways, perform better than men, etc. In essence, these women are burdened with the perception that their gender group’s success in the organization would be far more difficult to achieve than that of their male counterparts; this adds to feelings of insecurity, distress, and constant fear that they will not be supported in the company. This adds yet another reason to why gender rarity could have detrimental effects on the minority gender. Increasing minority representation in an organization, however, is not the only action that a company can take to decrease these effects. Looking at the interaction between rarity and company diversity culture, it is very visible that with a culture that values diversity and gender equality, these beliefs held by women employees can be mitigated greatly. Company justification of diversity measures can therefore have an impact in decreasing the negative perceptions and feelings that women may have about the evaluative differences between men and women.

These stereotyped beliefs about women managers may also indicate why female employees may prefer male managers to female managers. Considering this evidence is occurring within the context of a finance company, a typically male profession, it is highly plausible that women with more stereotyped beliefs (in situations of gender rarity) would make other women in the organization an “outgroup” and men an “ingroup.” This formation of ingroups and outgroups, otherwise known as ingroup favoritism, is a component of intergroup attitudes. Past research has shown that individuals derive part of their positive self-concept from perceiving ingroups relatively more favorably in comparison to relevant outgroups. In an effort to psychologically avoid the perceived disadvantages that women managers have in the organization, female employees may create for themselves self-identification with males and utilize ingroup favoritism towards these males. These beliefs may violate the commonly held sex similarity paradigm that demographic similarity between two individuals (particularly pertaining to sex) leads to a positive bias because of perceived similarity in attitudes, values, and interpersonal attraction (Byrne, 1971).
1971). This finding is ironic in that a female employee in a situation of gender rarity would perhaps need the most help and assistance from other established female employees, more so than those in situations of gender equality – but, she is far more likely to be distracted by perceived gender differences.

The final finding further adds evidence to the conclusion that the way in which an organization justifies its diversity measures can indeed have an impact on female employees’ perceptions (Hypothesis 1b). Diversity justification is not just a simple statement of organizational beliefs; in essence, an organization is creating a culture that resonates among employees. While the gender composition of a female employee’s team did not have an impact on her attitudes toward prospective female employees, the diversity justification had a very significant impact on the likelihood that she would hire a prospective female employee and discourage her from joining the company. It was initially surprising to see that a female employee was more likely to recommend a female employee for hire in the affirmative action condition rather than the competitive advantage condition. But, further analysis suggests the impact that the justification had on the mindset of the female employee – having absolutely no information about competency or qualifications, she would be following the “rules” of the affirmative action policy and recommending her for hire. When the culture of the company leaned towards valued diversity, however, recommendation was less likely because there was no information about the background of the prospective female and, therefore, it wouldn’t be suitable to hire her just based on her gender. This point is further reinforced by the finding that women under affirmative action policies would discourage the prospective female from joining, possibly attributable to the fact that they felt the policy was unfair. This not only shows the impact that diversity justification may have on the mindset of female employees, but also the importance for organizations to emphasize the advantages that minority representation can have rather than to simply adopt legal compliance. Competitive advantage justifications may be able to ensure (1) that employees are hired based on competency and qualifications rather than their gender and (2) that women perceive the hiring procedures as fair and are likely to encourage further minority representation in the organization.

Lastly, it is important to note the role that a female employee’s views on the equality of gender responsibilities play in her perceptions. As expected, the more egalitarian views a woman holds, the more likely she is to view other females as competent, be satisfied with a female boss, seek out a female manager as a mentor, and feel more comfortable adopting typical feminine qualities that she may or may not naturally possess (Hypothesis 1d). But, most importantly, it shows that within a company that has gender equality, egalitarian women are
most likely to take advantage of women-specific activities, such as networking activities, and least likely to adhere to stereotypical beliefs about women. Although it is very difficult for an organization to actually change the beliefs of an employee (since these beliefs are based on a variety of other factors such as religion, culture, upbringing, etc.), an organization can work towards ensuring gender equality in an organization, so that women can be in an environment of equality, potentially shaping their beliefs. It is, however, important that an organization justifies gender equality through the intrinsic value of diversity rather than simple legal compliance because of the challenges the latter brings, as described above.

Limitations

This study does have its limitations, however, and they should be duly noted. The concluding findings above are based on statistically significant differences between data points, but it is important to keep in mind that this study was conducted in an experimental context. As can be seen in Table 1, many of the mean (average) scores from respondents are around the 4 to 5 range out of a 7-point Likert Scale. There are two possible reasons for this: (1) The materials did not provide enough information for strong judgments/responses to be made and/or (2) The respondents did not have enough real-life exposure to answer these questions – in other words, the majority of respondents were undergraduate students who most likely did not have experience in corporate situations and were not able to fully “immerse” themselves in the scenario, leading to unsure, middle of the range answers. It may also have been the case that given the highly sensitive nature of the study (which essentially deals with discrimination), respondents, despite the promise of confidentiality, attempted to decipher the “correct” answer, therefore causing a possible disconnect between what they perceived to be an acceptable response and the actual behavior they would have exhibited.

Nevertheless, prior academic research in this field and related fields has relied on undergraduate students and similar respondents and has found that they can give some insight into unconscious behavior. After all, these studies essentially tap into the basic psychological motives of implicit discrimination. Even with no hands-on experience, social stigmas and nurturing can influence judgments greatly – the concept of affirmative action, especially, is quite prevalent in today’s society and already has large influences. The fact that there are statistically significant differences between the two manipulations gives some indication that these social stigmas may exist and could be transferred to real behavior in organizations. Therefore, the significant findings from Study 1 are still reliable indicators of the effects of rarity and diversity justification.
Study 2
Context of a Target and Its Impact on the Perceptions of the Target’s Performance

Background and Hypothesis

Whereas Study 1 examines the context of a female perceiver, Study 2 examines the context of the target and effects on perceptions. Another underlying factor that is predicted to contribute to implicit sex-based discrimination is attribution bias, or the way in which people explain the causes of one’s own behaviors or those of someone else. There are two main attributions: internal (assigns causes to characteristics of the target) and external (assigns causes to circumstances outside the control of an individual). Examples of internal attributions include competency and skill, while examples of external attributions include luck and chance. When an employee’s successful performance is, for example, attributed to external circumstances (when in fact, it is based on competency), the success may likely go unrecognized and will not be accounted for in promotion or delegation considerations.35 The context of a target can heavily influence these aforementioned attributions.

Thirty years ago, academics Howard Garland and Kenneth Price studied attribution biases in the workplace with respect to female managers in traditionally male jobs. Their studies found that both males and females attribute successful performance of female managers to external attributes, while the same success of a male manager is attributed to internal aspects.36 The reasoning behind this was that traditional gender-based expectations suggest that women are not competent at traditionally male jobs; so, when women managers fail at a task, the very act conforms to expectations and thus would be attributed to the lack of competency or other positive internal attributes, whereas deficiencies in the success of a male manager are less likely to be attributed to a lack of competence and are assigned external blame such as bad luck.37 Additionally, studies were conducted by Marsha Jacobson and Walter Koch on how attributions were assigned in the context of affirmative action and performance evaluations. It was shown that when employees knew that a female manager was appointed because of gender-based considerations, they were more likely to attribute successes of the project led by the manager externally.

37 Ibid.
and failures internally.\textsuperscript{38} Conversely, if the female manager was appointed because of merit, she received more credit when the project was successful and less blame when it failed.\textsuperscript{39}

Though these studies give insight into the correlation between success and failure of a female manager and the assignment of internal and external attributions, the studies were based on the assumption that the hiring policy of an employee was clearly known. In today’s workplace, the assignment of attributes occurs when people do not know if a woman or a minority is chosen on the basis of her gender or merit and are instead left to make inferences about whether or not she is an affirmative action beneficiary. Relevant research has shown that in situations where the affirmative action policy of an organization is ambiguous and gender rarity exists (a low proportion of females in relation to males, which is typical in male-dominated industries), employees use affirmative action policy to justify the hiring of a female employee, as though the policy was explicitly stated.\textsuperscript{40} This is perhaps one of the biggest downfalls of the affirmative action policy. First created in 1967 and firmly established in public and private organizations by the Glass Ceiling Commission of the Civil Rights Act of 1991, affirmative action policies were intended to increase the number of minorities in an organization. After its continued use (and in some organizations, even after the discontinuation of its use), the assumptions that people made about the presence of minorities in organizations reverted to the concept of preferential selection. This lasting impact has therefore made rarity an influential contextual determinant of perceptual inferences.

Study 2 combines the prior research conducted on the correlation between performance of females and attributions, and the assumptions of rarity, with the prediction that:

**Hypothesis 2:** When both male and female employees are put in a situation where inferences are made as to the hiring/promotion of a female manager (affirmative action policy is uncertain), employees will be more likely to attribute successes of the manager-led project to external factors and failures to internal factors when it is assumed that the manager was hired based on gender (context of gender rarity) than when the manager is assumed to be hired based on merit (context of no gender rarity). This phenomena will be more likely to happen when the target is a female rather than when the target is a male.


\textsuperscript{39} Ibid.

Method

Participants and Design

Participants were 115 male and female MBA students from the New York University Stern School of Business completing a course in Negotiations and Consensus Building. Cash prizes were raffled off in exchange for their participation.

The design of the study was a 2 x 2 x 2 factorial with the gender of the target (male or female), rarity of the gender of the target (male rarity, female rarity, or no rarity), and performance of the target (success or failure) as the manipulations. The "target" was the person who was evaluated in the questionnaire. Participants were randomly assigned one of these eight conditions.

Procedure and Stimulus Materials

Participants were each given a survey packet. The packet consisted of introductory materials, a fictitious evaluation form, and a questionnaire.

The packet began with an introduction to the study, a brief, irrelevant explanation that the purpose of the study was to measure the effectiveness of performance evaluations and the specific trend of managers to recollect examples of an employee’s performance as part of the evaluative process. Following this, background information about a fictitious engineering company, ILS Engineering, was found. [An engineering company was chosen as it is one of the professions that are still today considered to be very “masculine” in nature, and emphasis on a male-dominated industry was needed to remove any interference from participants’ preconceptions of occupations that are more gender equitable today]. Finally, participants were introduced to the team that contained the gender rarity manipulation, described in the next section.

Following the introduction to the company was a replicated, fictitious employee performance evaluation form for either a female or male employee. It was created from real performance evaluations found in human resources departments of various organizations to make it as authentic as possible. The evaluation contained four sections: the first contained seven general appraisal factors (technical skills, quality of work, teamwork, etc.) with a 7-point scale ranging from “Exceeds Performance Expectations” to “Unacceptable.” No ratings were specified for each appraisal factor in order to prevent the employee’s competency from interfering with the participants’ responses – a solid black line appeared instead of a score. In this way, competency for both male and female employees was constant. The second section contained the final manipulation, a description of either a successful or unsuccessful performance in that year. The third section was a rating of overall performance with a 5-point
scale ranging from “Outstanding” to “Unsatisfactory.” This was once again blocked with a solid line.

Following this information was the questionnaire.

**Experimental Manipulations**

1. **Gender of Target:** The performance evaluation was either for a female employee (Rebecca) or a male employee (David). Each participant received only one of these evaluations, not both.

2. **Rarity of Gender of Target:** Rarity was manipulated through a short description of eight team members in ILS Engineering. For the female target, there was either female rarity (one female and seven males) or no rarity (four females and four males). Likewise, for the male target, there was either male rarity (one male and seven females) or no rarity (four females and four males). In summary, each participant received one of four conditions: a female target in a condition of female rarity, a female target in a condition of no rarity, a male target in a condition of male rarity, or a male target in a condition of no rarity. The description of the team members included their name, gender, and position (all equivalently “Engineer: Geotechnology”).

3. **Performance:** As part of the second section of the performance evaluation, participants either received a description of a successful performance or an unsuccessful performance.

The successful performance stated:

*This period, Rebecca (David) assisted in a project to secure an appropriate construction site for one of the company’s most valuable clients. She (he) was crucial in researching key information, gathering appropriate data, and conducting relevant studies for the project. Ultimately, she (he) was very successful in her (his) duties and contributed significantly in strengthening the company’s relationship with the client.*

The unsuccessful performance stated:

*This period, Rebecca (David) assisted in a project to secure an appropriate construction site for one of the company’s most valuable clients. She (he) failed to research key information, gather appropriate data, and conduct relevant studies for the project. Ultimately, she (he) was very unsuccessful in her (his) duties and did not contribute to strengthening the company’s relationship with the client.*
Dependent Measures

Dependent measures can be categorized into four sections. The first measured what factors participants believed played a role in the hiring of the target (education, work experience, gender, technical skills, and interviewing scales). Participants responded in accordance with a 7-point Likert Scale (small role-large role). The goal of this was to see how much participants thought the target’s gender played a role in hiring compared to the other competency factors.

The second section aimed to measure internal and external attributions. The following statement contained internal attribution factors: This employee is... (1) competent, (2) does not work hard, (3) is qualified, (4) has what it takes to succeed. The following statements contained external attribution factors: a) This employee is... (1) lucky and (2) has a difficult job, and b) ILS Engineering... (1) provides good resources and (2) values its employees. Participants were asked to rate the degree to which they agreed or disagree with the statement on a 7-point Likert Scale (strongly-disagree-strongly agree). In addition, participants were asked in a free response question to explain why they thought the target performed the way he or she did.

The third section measured the actions participants would take concerning the target. Participants were posed the question, “If you had the authority, how likely would you be to do the following for this employee?”, followed by three actions: (1) recommend for promotion, (2) delegate greater responsibilities, and (3) give a merit-based raise. This was asked using a 7-point Likert Scale (not very likely-very likely). It also asked participants, using a 7-point Likert Scale (worse than others-better than others), how they thought the target compared to others in the team.

The final section inquired about participants’ inferences about the hiring policy of ILS Engineering. This was used to gauge the effects of rarity on people’s assumptions. On 7-point Likert Scales (strongly disagree-strongly agree), participants were asked how much they thought ILS Engineering’s hiring policies were (1) fair, (2) affirmative-action based, (3) effective, and (4) based solely on merit.
Results

Data Analysis Overview

The following Analyses of Variance (ANOVAs) were conducted on each dependent measure: (1) a 2 x 2 ANOVA was conducted using the performance and gender of target manipulations, (2) a 2 x 2 ANOVA was conducted using the performance and rarity manipulations, (3) using only the data with a female target, a 2 x 2 ANOVA was conducted using the performance and rarity manipulations, and (4) a 2 x 2 x 2 ANOVA was conducted using all three manipulations.

Note: Significant findings that may have appeared based solely on the effect of the performance manipulation (with no interactions with the other two manipulations) were ignored based on the consideration that successful performance would naturally result in higher ratings of competency and qualifications of the employee and more positive ratings of the company.

Factor Roles in Hiring

All four ANOVA tests revealed insignificant variances among the manipulations, $p > 0.10$.

Internal and External Attributions

The ANOVA tests revealed insignificant variances among the manipulations, $p > 0.10$, for internal attributions. However, there were some significant findings pertaining to external attributions. Among female targets, there was a marginal effect of the female rarity x performance interaction variable $F(1, 51) = 3.55, p < 0.07$ on the “difficult job” external attribution. A three way ANOVA of all the data revealed a significant effect of the performance x rarity x target gender interaction variable $F(1,155) = 3.83, p = 0.05$ on the “lucky” external attribution.

Contrary to predictions, among female targets, those who were successful and rare (mean = 4.46, standard deviation = 0.78) were more likely to be attributed as having a “difficult job” than when they were in situations with no gender rarity (mean = 3.85, standard deviation = 1.21). However, women who failed and were rare (mean = 4.31, standard deviation = 1.49) were attributed as having a “difficult job” more than when they were in situations with no gender rarity (mean = 4.92, standard deviation = 1.12).

Consistent with predictions, a female who was successful (mean = 3.56, standard deviation = 0.36) was more likely to be attributed as being “lucky” than a man who was successful (mean = 2.83, standard deviation = 0.42) when they were both in situations with no gender rarity. Contrary to expectations,
however, a successful male in male rarity was more likely to be attributed as being “lucky” (mean = 3.69, standard deviation = 0.40) than a successful female in female rarity (mean = 2.86, standard deviation = 0.38).

**Behavior towards the Target**

All four ANOVA tests revealed insignificant variances among the manipulations, $p > 0.10$.

**Inferences about Hiring Policy**

A 2 x 2 ANOVA (rarity x performance) revealed a significant effect of gender rarity on participants’ beliefs that the company had an affirmative action policy $F(1, 51) = 5.17, p < 0.05$. A 2 x 2 ANOVA (rarity x performance) of only female targets also revealed a significant effect of rarity on these participants’ beliefs $F(1, 51) = 10.64, p < 0.01$.

Inconsistent with prior research about the assumptions made about gender rarity, participants were more likely to assume an affirmative action hiring policy when a male was rare (mean = 3.92, standard deviation = 1.22) than when a female was rare (mean = 3.12, standard deviation = 1.35). Similarly, participants were also more likely to assume an affirmative action hiring policy when a female was not rare (mean = 4.38, standard deviation = 1.42) than when a female was rare (mean = 3.12, standard deviation = 1.34).

**Discussion**

The results of Study 2 provide varied conclusions with respect to Hypothesis 2 predictions. They do not provide significant evidence to support either hiring assumptions based on gender rarity and performance or behaviors toward female and male targets. In support of the predictions, when both genders were in equality, successful females were attributed more often as being “lucky” (an external attribute) than successful males – this is consistent with the prediction that a woman’s success is attributed to aspects outside of her control and unrelated to her competency. However, there were contradictions among the results: women who were successful and in gender rarity were attributed more with having a “difficult job,” when it was expected that respondents would believe she had an “easy job” and thus was successful. Also, when looking at only rare females, those who were successful were attributed as being less lucky than their successful male counterparts in male rarity.

The lack of conclusive evidence to support Hypothesis 2 and the various inconsistencies can be attributed to two scenarios: (1) The study materials may not have provided enough information for the manipulations to have a strong influence on responses. Along the same lines, experimental conditions may
have prevented respondents from honestly answering the questions or fully immersing themselves in the scenario. (2) The insignificant findings could also indicate possible changes in perceptions over the thirty years following the research of Garland & Price, 1977, and Jacobson & Koch, 1977. Even leaving aside the rarity manipulation, there were no significant differences in the assignment of internal or external attributes (with the exception of a successful female in gender equality being attributed as “lucky” more than a successful male in gender equality), or behaviors toward the male and female targets. The increasing female representation in the workplace and in higher education, and the changing beliefs about the roles of women in society, could be causing a decrease in the differences in evaluations of men and women. It can also indicate a shift in the general attitude toward women in management. Prior research has shown that a generally positive attitude toward female managers in the workplace can increase internal attributions of female success.\textsuperscript{41} However, very recent research suggesting negative attributional rationalization of women’s success in mixed-sex dyads\textsuperscript{42} and personal derogation of women who are successful in male gender-typed tasks\textsuperscript{43} seems to suggest that this change has not fully occurred.

In support of this, there is evidence that seems to suggest that the presumptions of the rarity manipulation underlying the structure and design of the experiment may have been inaccurate. More specifically, the presumptions of rarity were based on the inference that female rarity causes inclinations towards believing in the affirmative action hiring of the “token” female and that gender equality would cause less inclinations toward this belief. This was witnessed in previous research.\textsuperscript{44} The statistical findings from Study 2, however, demonstrated an opposite effect, where affirmative action policy was assumed in the situation of male rarity more than female rarity, and it was assumed in the situation of female equality more than female rarity. The assumptions that participants were making were, therefore, not what was previously predicted, probably because of another determining context that was not examined. The research of Heilman and Blader, 2001, was conducted in the context of accep-


\textsuperscript{42} Madeline E. Heilman & Haynes, M.C. “No Credit Where Credit is Due: Attributional Rationalization of Women’s Success in Male-female Teams.” \textit{Journal of Applied Psychology}, 90 (2005), 905-916.


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tances into an educational institution, whereas this study was conducted in the context of hiring into a corporate company within a male-dominated professional field, engineering. In our society, the use of affirmative action policies are widely accepted and publicly acknowledged in educational institutions. However, these policies are quite ambiguous and unknown when dealing with private, corporate organizations – for example, there can be corporations that market diversity measures to retain public support in the spirit of political correctness, but they may not adhere to actual representation of minority groups. Therefore, whereas in an educational context the small representation of females is likely to be seen as preferential selection, in a corporate context the same small representation of females is not seen so much as preferential selection but probably as more of a neglect to actually hire more females. When there is only one man in an organization where one would expect to be all men, it is not surprising that participants would assume that the reason there is this discrepancy is because those women were hired based on preferential selection. This is especially true in a field like engineering where gaps in gender representation are common knowledge. This finding not only indicates the impact that context can have on the assumption of preferential or merit-based hiring, but it also indicates that gender equality does not necessarily decrease the assumption of affirmative action policies. In other words, even when there is gender equality compared to female rarity, employees could still be inclined to assume preferential hiring.

This finding can be used to explain why there were inconsistencies with the “difficult job” and “lucky” external attributions. A part of the hypothesis was that unsuccessful females in gender equality would be attributed as having a “difficult job” more than an unsuccessful female in gender rarity. The fact that the evidence pointed to the contrary may demonstrate that gender equality rather than gender rarity was associated with preferential selection. The same is true for the “lucky” attribute: a successful male in male rarity was more likely to be attributed as being “lucky” than a female in female rarity–there may have been an association between female rarity and merit-based hiring, believing that the target woman must have been really competent in order to be hired into an engineering company. Therefore, they were less likely to externally attribute her success. Of course, this inference is made based on the assumption that the statistically significant finding about preferential hiring holds true and the experimental manipulations were influential–this assumption still needs to be proven more conclusively in future research.

In conclusion, the discrepancy between this study and other related academic research prompts further research into the assumptions that are made about preferential and merit-based hiring with respect to gender rarity and the
context in which the hiring takes place. It is important to note that although these findings about the assumptions of hiring policy were found, participants did not significantly differ in their responses to how much they thought that gender played a role in the hiring of the target employee. This discrepancy may be attributable to a social desirability bias and hesitancy in directly pointing out the role of gender in the hiring of a specific person, but a comfort in talking about hiring policies of the general company. Nevertheless, the former findings (if proven in future research outside of the lab) may very well indicate that, years after the first implementation of affirmative action policies, the workforce would assume increased representation of traditional minority groups, and that the absence of this significant representation could be, in essence, a sign of a lack of preferential selection within the organization.

General Discussion

These two studies have revealed important points about the consequences of contextual determinants surrounding both the perceiver and the target.

Study 1 demonstrated that rarity of female perceivers, by itself, can negatively influence their perceptions of how female managers must act in an organization relative to male managers, which adds to their feelings of distress and the constant need to prove themselves. Rarity can also lead to the adoption of agentic behaviors, which may be thought to be necessary to be on a more equal level with males, but can lead to a severe backlash. But, it is not just the gender rarity of the perceiver that is important; it is also the culture that they are in, which can be influenced by how the organization markets its diversity measures. It is one thing to hire minorities to avoid legal repercussions. This imparts to employees the idea of preferential selection (as demonstrated by participants’ relative receptivity to hiring a female employee with no competency information); this process is viewed by many to be rather unfair and can cause repercussions for the “preferred group.” It is altogether another thing to impart to employees the competitive advantages that minority groups bring to the organization in terms of the conglomeration of values, approaches, experiences, ideas, and thinking behaviors that lead to better decision making and increased creativity. This provides a more equitable environment to employees and a fairer process based on competency. The emphasis on competitive

advantage can help mitigate the repercussions that women face when they choose to adopt their agentic or communal behavior. It can also influence their overall positive encouragement of similar minority groups to join the organizations. This influence of justification diversity measures is very important because even if a company, for example, does not have complete control of gender equality because not enough members of the minority group are applying for positions, it has tremendous control over the culture that they create for the organization. It can be an effective tool for managers to influence perceptions and behavior.

Study 2 inadvertently revealed an interesting point about rarity of the perceived target: gender equality in a stereotypically male company is not necessarily, by itself, going to suppress the assumption that females are hired because of preferential selection. An overabundance of women in male-typical jobs can just as likely, if not even more likely, suggest affirmative action hiring compared to female rarity. This reinforces the point that organizations must do more than manipulate minority representation; perhaps if the target was within an explicit culture based on meritocracy, inferences about affirmative action hiring would have been decreased. The development of a culture that supports and believes in the intrinsic advantages of diversity can perhaps make this difference.

These studies are not absent of limitations, however. First of all, they were both conducted in an experimental rather than a real-life setting and measured intended rather than actual behaviors. The effects that were measured pertain to very socially sensitive issues, and many behaviors that people think they will exhibit are not ones that they do end up exhibiting. In addition, many employees may exhibit behaviors and attitudes when they are put into actual situations of rarity, affirmative action culture, etc., but they are not able to predict these intended behaviors. In responding to the reasons of women’s preferences of female managers over male managers, Study 1 did not compare the perceptions of female managers to that of male managers, but it would be interesting to explore this in further studies. Finally, although similar patterns were found between how a female employee perceives the agentic and communal behavior of a female target and the subsequent masculine and feminine behaviors she chooses to adopt, it does not establish an exact causal relationship. In other words, it does not confirm that a woman chooses certain behaviors because of the behaviors she sees in a successful manager. This may also be of interest for future studies. Nevertheless, the statistically significant findings found in these experiments do provide an indication of the behaviors that may be exhibited, and gives way to conduct future research in an actual work setting to solidify the findings further. Therefore, these results should be seen as a strong indica-
tive start rather than an end to an area that continues to be highly relevant in today’s diverse workplace.

In the larger scheme, these studies shed light on the ongoing debate over the use of affirmative action policies in the workplace. Increasing the numerical representation of women in male-dominated industries (whether through affirmative action or competency-based hiring) inadvertently fuels implicit sex-based discrimination in the workplace and evokes false assumptions about preferential hiring treatment – the use of affirmative action in many non-stereotypical scenarios is a commonly adopted assumption in our society. However, these studies show that organizations can counteract this by coupling gender equality with a culture that values diversity for the intrinsic benefits that it brings. This may potentially decrease negative behaviors and attitudes of perceivers and increase positive perceptions of traditionally underrepresented targets.
### Appendix A
#### Adaptation of Traditional-Egalitarian Sex Role Scale (TESR)
Larsen & Long, 1988

<table>
<thead>
<tr>
<th>Item</th>
<th>Original Part-Whole Correlation</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. The man should be more responsible for the economic support of the family than the woman.*</td>
<td>0.48</td>
</tr>
<tr>
<td>2. The belief that women cannot make as good supervisors or executives as men is a myth.</td>
<td>0.48</td>
</tr>
<tr>
<td>3. Having a job is just as important for a wife as it is for her husband.</td>
<td>0.64</td>
</tr>
<tr>
<td>4. In groups that have both male and female members, it is more appropriate that leadership positions be held by males.*</td>
<td>0.54</td>
</tr>
<tr>
<td>5. Having a challenging job or career is as important as being a wife and mother.</td>
<td>0.56</td>
</tr>
<tr>
<td>6. Men make better leaders.*</td>
<td>0.52</td>
</tr>
<tr>
<td>7. Almost any woman is better off in her home than in a job or profession.*</td>
<td>0.60</td>
</tr>
<tr>
<td>8. A woman’s place is in the home.*</td>
<td>0.63</td>
</tr>
<tr>
<td>9. The role of teaching in the elementary schools belongs to women.*</td>
<td>0.63</td>
</tr>
<tr>
<td>10. A man who has chosen to stay at home and be a house-husband is not less masculine.</td>
<td>0.48</td>
</tr>
</tbody>
</table>

*These items were reverse coded.

Items were responded to on a 5-point Likert Scale (*strongly disagree*-*strongly agree*). The higher the score, the more egalitarian the views about sex roles.
Appendix B

Stereotyped Beliefs about Women Managers Scale
Moore, S., Grunberg, L. & Greenberg, E., 2004

1. Women managers have their ideas challenged more often than do managerial men.

2. Women managers have to perform much better than male managers in order to succeed.

3. Women managers must behave in a typically masculine way in order to be taken seriously.

4. Compared to male managers, female managers must continually prove themselves.

5. Women managers have their work judged more critically than do men managers.

6. Compared to male managers, female managers are often uncomfortable in taking credit for their successes.

Items were responded to on a 5-point Likert Scale (*strongly disagree*-strongly agree). The higher the score, the greater the belief in the disparity between the performance evaluation differences of managerial men and women.
References


Heilman, Madeline E. & Haynes, M.C. “No Credit Where Credit is Due: Attributional Rationalization of Women’s Success in Male-female Teams.” *Journal of Applied Psychology*, 90 (2005), 905-916.


Is CEO/Chair Duality Associated with Greater Likelihood of an International Acquisition?

Michael Sampson-Akpuru\textsuperscript{1}
Indiana University

Abstract

I investigate the likelihood that a firm with a combined CEO/chair (i.e., a firm in which the CEO is also the chairman of the board) will pursue an international acquisition using 2,271 firms in the S&P 1500 from 1992 to 2007. I find evidence that firms with a dual CEO/chair are more likely to announce an international acquisition, although the strength of the association varies with the specification of my control variables. International acquisitions are also more likely for larger, high-sales-growth firms with lower leverage and lower cash levels. This paper extends prior work on the relationship between leadership structure and acquisitions by investigating international acquisitions.

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I. Introduction

In this paper, I investigate the likelihood that a firm with a combined CEO/chairperson will engage in an international acquisition. CEO duality is a contentious issue that has attracted significant public and academic scrutiny. In 1992, *The New York Times* reported that 75% to 80% of U.S. firms combine the CEO and chair roles into one position. However, Grinstein & Valles show a significant jump in the number of S&P 500 companies splitting CEO/chair roles. They report that 31% of S&P 1000 firms in 2004 separated the CEO/chair roles, a marked increase from the 24% reported in 2000. They argue that corporate scandals, such as Enron and WorldCom, and the 2001 recession raised the alarm for more board vigilance and decentralization of power.

Critics of CEO duality argue that duality compromises board effectiveness in monitoring the CEO. They assert that dual CEOs are more likely to pursue selfish interests that are inconsistent with shareholders' values. Proponents of CEO duality assert that a combined CEO/chair structure provides directional clarity and judgment that is lacking within an independent leadership structure. Separation of CEO and chair may limit CEO entrepreneurship in ventures that can increase firm value because the CEO’s decisions are consistently monitored. To date, research on CEO duality attempts to determine if the benefits of CEO duality outweigh the costs. For example, Rechner and Dalton examine 141 firms with both combined and separate leadership structures finding that firms with separate titles outperformed firms with combined titles. In contrast, Baliga et al. analyze a sample of 181 firms and find that firms that switched to a dual leadership structure experienced better long-term performance. As prior results are inconclusive, my paper attempts to answer a smaller question: is a dual CEO more likely to pursue international acquisitions than a non-dual CEO?

Finkelstein identifies CEO duality as a major contributor to CEO power.

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Powerful CEOs have the capacity to make bold moves that can increase or destroy stockholder’s value.\textsuperscript{11} Acquisitions are typically proposed and overseen by the CEO\textsuperscript{12} and therefore can be viewed as a manifestation of CEO power. International acquisitions, in particular, increased significantly in 2007.\textsuperscript{13} The decision to diversify outside of the home country is risky and can significantly impact shareholder value.\textsuperscript{14} Critics of international diversification claim that CEOs engage in global diversification in order to increase salary, decrease pay-to-performance sensitivity, and to entrench themselves.\textsuperscript{15,16} Proponents argue that CEOs engage in global diversification in order to exploit untapped market opportunities that are unattainable in their home country.\textsuperscript{17} This paper expands the academic literature on CEO duality (and on corporate control) by investigating the possible effect of CEO duality on the strategic investment decision of diversifying internationally through mergers and acquisitions.

I use a dataset of 15,491 firm-year observations (for 2,271 unique firms) from 1992 to 2007 to investigate the relationship between CEO duality and international acquisitions. I determine the CEO duality status of S&P 1500 companies using the EXECUCOMP database. International acquisition announcements are taken from the SDC Mergers and Acquisitions database. Information on firm stock prices is taken from CRSP and firm financial statement information is taken from Compustat. My results suggest that a firm’s decision to diversify internationally is influenced by CEO duality, but my results are sensitive to the choice of control variables. Specifically, my results are sensitive to the inclusion of logged firm size (proxied by the total book value of assets). I interpret the results as suggesting a marginal relationship between CEO duality and international diversifications.

The rest of the paper proceeds as follows: Section II reviews relevant literature and develops the hypothesis, Section III presents data and analysis, and Section IV lays out the discussion and conclusion.

\begin{thebibliography}{9}
\bibitem{13} For example, see “Crossing the Border,” in the October 2007 issue of \textit{Mergers and Acquisitions: The Dealmaker’s Journal}. However, acquisition activity has decreased significantly in 2008.
\bibitem{17} Lehn, Zhao, Ibid.
\end{thebibliography}
II. Literature Review and Hypothesis Development

I review prior work that explores the advantages and disadvantages of CEO duality, possible motivations for acquiring foreign firms, and the impact of foreign acquisitions on firm performance. Proponents of CEO duality argue that duality is a logical business model that encourages superior firm performance through clear responsibility in formulating and implementing business strategies. In making decisions, a dual CEO is privy to a greater level of information that leads to better decision making and board leadership because communications between the CEO and chair are not required. Duality also removes the potential problems of rivalry between the CEO and chair and possible problems from having two public firm spokespersons. Having a centralized leadership structure connotes to external constituents that a firm has “strong leadership and a clear sense of direction.” Firms with formerly separate CEO and chair positions often eventually grant the chairperson role to well-performing CEOs.

Board activists argue that CEO/chair separation is driven by a need to dilute power at the top. Jensen states that duality makes it “difficult for board to respond early to failure in its top management team.” Jensen also indicates that when the CEO also holds the chair position, internal control systems fail because board members cannot effectively monitor, evaluate, or fire a poorly performing CEO (also, see Carver). Dalton and Kesner point out that the “wearing of multiple hats” by CEO/chair poses a conflict of interest for both the CEO and the board of directors. Given the weakened monitoring system in place under duality, a CEO is more able push his/her agenda, and is likely

to wield more influence over the approval of the initiatives. Board activists point out that shareholders get the short end of the stick because the failure of corporate monitoring systems allows CEOs to engage in trivial and value-destructive projects with reduced risk of punishment.

Empirical results on the effect of CEO duality on firm performance are mixed. On the one hand, Chaganti, Mahajan, and Sharma\textsuperscript{29} and Baliga, Moyer, and Rao\textsuperscript{30} find no correlation between duality and firm performance. As previously mentioned, Brickley et al.\textsuperscript{31} find that superior CEOs are often granted the chair position. In contrast, Rechner and Dalton\textsuperscript{32} and Pi and Timme\textsuperscript{33} find that dual CEO firms often outperform non-dual firms. Goyal and Park\textsuperscript{34} find that dual CEOs have lower turnover sensitivity, suggesting that dual CEOs are less likely to be ousted for destroying shareholder value.

The literature considers multiple motivations for international acquisitions. Jensen\textsuperscript{35} and Stulz\textsuperscript{36} argue that managers diversify in order to benefit from the power and prestige of running a large, diversified firm. Others assert that diversification is a vehicle for CEO entrenchment, increased compensation, and decreased pay-for-performance sensitivity.\textsuperscript{37,38} In contrast, Lehn and Zhao\textsuperscript{39} argue that US firms engage in cross-border acquisitions to exploit untapped resources and to avoid the costs associated with building from scratch (sometimes known as “greenfield entry”). By diversifying, the acquiring firm can capitalize on the intellectual and cultural assets inherent within the target firm.

As for the impact of foreign diversification on firm performance, results


\textsuperscript{31} Brickley, Coles, Jarrell, Ibid.


are mixed. Denis, Denis, and Yost\textsuperscript{40} find that increased global diversification is associated with lower firm value. Bodnar, Tang and Weintrop,\textsuperscript{41} however, find a significantly positive relationship between firm value and international acquisition. They argue that the “beneficial impact of geographic diversification arises partially from a significantly stronger association between profitability and value, capital expenditure and value for international firms.” Finally, Fatemi\textsuperscript{42} (1984) finds no difference in shareholder return from multinational firms compared to purely non-diversified firms.

Although results on whether CEO duality results in higher shareholder value are mixed, prior work unanimously concludes that dual CEOs have greater power within the firm. If the decision to acquire a foreign firm is a manifestation of CEO power, then I expect to find that CEO duality is positively associated with international firm acquisition. This expectation is important because, as past research shows, international acquisition has a significant impact on shareholder value. Therefore, my research examines the association between firm leadership structure and foreign acquisitions.

Stated formally:

\textit{H1: CEO duality is positively correlated with a firm announcement of one or more international acquisitions.}

\textbf{Control Variables}

To ensure that my results are not driven by other factors that prior research suggests are associated with acquisitions, I include the following control variables in my analysis (mostly following Harford\textsuperscript{43}). All variables are calculated as of the start of the fiscal year prior to the year that the international acquisition is announced. For convenience, all variables are also defined in the Appendix.

\textit{Cash} includes cash and cash equivalents, scaled by total assets, averaged over the past four years. As cash is another measure of financial flexibility, I expect that international diversifications are more likely to occur when firms hold high cash balance. As an alternative measure, I use estimated excess


cash (calculated following Oler and Picconi\textsuperscript{44}), which is actual cash level less an estimated “normal” or expected cash level given the firm’s industry and financial characteristics.

**Leverage** is the ratio of book value of debt to market value of equity, averaged over the past four years. Highly leveraged firms have less ability to pursue international diversifications because they face restrictions on additional borrowing to finance acquisitions. I expect a negative relationship between the number of international acquisition ventures and firm leverage.

**Market-to-book (MTB)** is the ratio of market value of equity to book value of equity, averaged over the past four years. As MTB is increasing in the firm’s market equity value, MTB also captures overvaluation, and I expect that international diversifications are more likely to occur when the MTB ratio is high.

**Momentum** is the prior year’s buy-and-hold, beta-adjusted return, which is indicative of a firm’s performance in the prior year. Jensen\textsuperscript{45} argues that firms with overvalued equity may pursue acquisitions to maintain investors’ unrealistic expectations, as high momentum firms are also more likely to be overvalued. I anticipate that international diversification will be positively associated with momentum.

**Non-cash working capital** is current assets, less current liabilities and cash and cash equivalents, normalized by total assets and averaged over the past four years. This variable indicates the degree of financial flexibility of the firm, and therefore I expect non-cash working capital to be positively associated with international diversifications.

**Price-to-earnings** is the stock price divided by earning per share averaged over the past four years, and is an alternate measure of overvaluation. I expect the likelihood of international acquisition to be positively correlated with P/E.

**Sales growth** is the average sales growth over the past four years and proxies for firm growth. I expect sales growth to be positively associated with international diversifications.

**Size** is book value of total assets (in millions of dollars). As I discuss in the results section, I also use the natural log of book value of total assets but find that using this measure of size masks my results on the dual CEO dummy. Prior works have shown that larger firms typically pursue acquisitions, so I expect to find that size is positively related to international diversifications.

\textsuperscript{44} Derek Oler and M. Picconi. “Implications of Suboptimal Cash Holdings for Current and Future Market Returns.” Working Paper, Indiana University, 2008

III. Data and Analysis

I draw data on dual CEO/chair positions from EXECUCOMP, which tracks data for the top five firm executives within the S&P 1500 firms from 1992 to 2007. I collect acquisitions data from SDC (Securities Data Corporation). Financial statement information is drawn from COMPUSTAT and stock price performance data is drawn from CRSP. After removing observations with missing data, I am left with 15,491 firm years covering 2,271 firms. There are 2,238 firm-years where at least one international acquisition is announced. I provide univariate statistics in Table 1 (means and medians) and Table 2 (Pearson correlations). Adding data on excess cash estimates from Oler and Picconi further restricts my observations from 15,491 to 13,694.

Table 1: Descriptive Statistics

Table 1 provides descriptive statistics for the variables used. All continuous variables are winsorized at the 1% level, and are defined in the Appendix.

<table>
<thead>
<tr>
<th>Variable</th>
<th>N</th>
<th>Mean</th>
<th>Standard Deviation</th>
<th>25th Percentile</th>
<th>Median</th>
<th>75th Percentile</th>
</tr>
</thead>
<tbody>
<tr>
<td>Foreign acquisition dummy</td>
<td>15,491</td>
<td>0.144</td>
<td>0.352</td>
<td>0.000</td>
<td>0.000</td>
<td>0.000</td>
</tr>
<tr>
<td>Dual CEO Dummy</td>
<td>15,491</td>
<td>0.659</td>
<td>0.474</td>
<td>0.000</td>
<td>1.000</td>
<td>1.000</td>
</tr>
<tr>
<td>Momentum</td>
<td>15,491</td>
<td>0.090</td>
<td>0.543</td>
<td>-0.192</td>
<td>0.039</td>
<td>0.298</td>
</tr>
<tr>
<td>Leverage</td>
<td>15,491</td>
<td>0.324</td>
<td>0.425</td>
<td>0.039</td>
<td>0.173</td>
<td>0.438</td>
</tr>
<tr>
<td>Market to book</td>
<td>15,491</td>
<td>3.542</td>
<td>3.276</td>
<td>1.735</td>
<td>2.548</td>
<td>4.008</td>
</tr>
<tr>
<td>Cash</td>
<td>15,491</td>
<td>0.124</td>
<td>0.151</td>
<td>0.020</td>
<td>0.058</td>
<td>0.170</td>
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<tr>
<td>Estimated Excess Cash</td>
<td>13,694</td>
<td>-0.023</td>
<td>0.396</td>
<td>-0.212</td>
<td>-0.041</td>
<td>0.113</td>
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<td>Non-cash working capital</td>
<td>15,491</td>
<td>0.093</td>
<td>0.149</td>
<td>-0.015</td>
<td>0.075</td>
<td>0.189</td>
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<td>Price to Earnings</td>
<td>15,491</td>
<td>34.421</td>
<td>46.943</td>
<td>15.793</td>
<td>21.105</td>
<td>31.764</td>
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<td>Sales growth</td>
<td>15,491</td>
<td>0.177</td>
<td>0.234</td>
<td>0.045</td>
<td>0.111</td>
<td>0.227</td>
</tr>
<tr>
<td>Book value of total assets</td>
<td>15,491</td>
<td>3.815</td>
<td>7.351</td>
<td>0.392</td>
<td>1.057</td>
<td>3.234</td>
</tr>
<tr>
<td>Market Capital</td>
<td>15,491</td>
<td>5.363</td>
<td>12.929</td>
<td>0.532</td>
<td>1.358</td>
<td>4.056</td>
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</tbody>
</table>

Table 2: Pearson Correlations

Table 2 provides univariate correlations for all variables. The variables are defined in the Appendix.

<table>
<thead>
<tr>
<th>Variable</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
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</thead>
<tbody>
<tr>
<td>Foreign Acquisition Dummy</td>
<td>1.000</td>
<td>0.028</td>
<td>-0.004</td>
<td>-0.089</td>
<td>0.060</td>
<td>-0.023</td>
</tr>
<tr>
<td></td>
<td>&lt;0.001</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dual CEO Dummy</td>
<td>0.028</td>
<td>1.000</td>
<td>-0.016</td>
<td>0.045</td>
<td>-0.009</td>
<td>-0.127</td>
</tr>
<tr>
<td></td>
<td>0.000</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Momentum</td>
<td>-0.004</td>
<td>-0.016</td>
<td>1.000</td>
<td>0.023</td>
<td>0.069</td>
<td>0.088</td>
</tr>
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<td></td>
<td>0.597</td>
<td>0.041</td>
<td></td>
<td></td>
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<tr>
<td>Leverage</td>
<td>-0.089</td>
<td>0.045</td>
<td>0.023</td>
<td>1.000</td>
<td>-0.237</td>
<td>-0.368</td>
</tr>
<tr>
<td></td>
<td>&lt;0.001</td>
<td>&lt;0.001</td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Market to book</td>
<td>0.060</td>
<td>-0.009</td>
<td>0.069</td>
<td>-0.237</td>
<td>1.000</td>
<td>0.288</td>
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<td></td>
<td>&lt;0.001</td>
<td>0.253</td>
<td>&lt;0.001</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Cash</td>
<td>-0.023</td>
<td>-0.127</td>
<td>0.088</td>
<td>-0.368</td>
<td>0.288</td>
<td>1.000</td>
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<tr>
<td></td>
<td>0.005</td>
<td>&lt;0.001</td>
<td>&lt;0.001</td>
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<td>Estimated Excess Cash</td>
<td>-0.102</td>
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<td>0.007</td>
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<tr>
<td></td>
<td>&lt;0.001</td>
<td>&lt;0.001</td>
<td></td>
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<td></td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Non-cash working capital</td>
<td>0.022</td>
<td>-0.044</td>
<td>-0.033</td>
<td>-0.144</td>
<td>-0.186</td>
<td>-0.126</td>
</tr>
<tr>
<td></td>
<td>0.007</td>
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<td>&lt;0.001</td>
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<tr>
<td>Price to earnings</td>
<td>0.013</td>
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<td>0.040</td>
<td>-0.074</td>
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<tr>
<td>Sales growth</td>
<td>0.015</td>
<td>-0.039</td>
<td>0.095</td>
<td>-0.126</td>
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<td>0.285</td>
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<td>0.058</td>
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<td>&lt;0.001</td>
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<tr>
<td>Book Value of Total Assets</td>
<td>0.119</td>
<td>0.130</td>
<td>-0.034</td>
<td>0.144</td>
<td>0.017</td>
<td>-0.177</td>
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<td>&lt;0.001</td>
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<tr>
<td>Market Cap</td>
<td>0.179</td>
<td>0.080</td>
<td>0.026</td>
<td>-0.098</td>
<td>0.236</td>
<td>-0.014</td>
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<td>Foreign Acquisition Dummy</td>
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<td>0.119</td>
<td>0.179</td>
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<td>0.007</td>
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<td>0.058</td>
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<tr>
<td>Dual CEO Dummy</td>
<td>-0.039</td>
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<tr>
<td>Momentum</td>
<td>0.044</td>
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<td>0.040</td>
<td>0.095</td>
<td>-0.034</td>
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<tr>
<td>Leverage</td>
<td>-0.023</td>
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<td>-0.074</td>
<td>-0.126</td>
<td>0.144</td>
<td>-0.098</td>
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<tr>
<td></td>
<td>0.007</td>
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<td>&lt;0.001</td>
<td>&lt;0.001</td>
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</tr>
<tr>
<td>Market to book</td>
<td>0.006</td>
<td>-0.126</td>
<td>0.191</td>
<td>0.215</td>
<td>0.017</td>
<td>0.236</td>
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<td>0.504</td>
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<tr>
<td>Cash</td>
<td>0.412</td>
<td>-0.126</td>
<td>0.191</td>
<td>0.285</td>
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</tr>
<tr>
<td>Estimated Excess Cash</td>
<td>1.000</td>
<td>0.100</td>
<td>0.029</td>
<td>0.083</td>
<td>-0.072</td>
<td>-0.071</td>
</tr>
<tr>
<td></td>
<td>&lt;0.001</td>
<td>&lt;0.001</td>
<td>&lt;0.001</td>
<td>&lt;0.001</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Non-cash working capital</td>
<td>0.100</td>
<td>1.000</td>
<td>-0.035</td>
<td>-0.016</td>
<td>-0.272</td>
<td>-0.201</td>
</tr>
<tr>
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<td></td>
<td>&lt;0.001</td>
<td>&lt;0.001</td>
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<td></td>
</tr>
<tr>
<td>Price to earnings</td>
<td>0.029</td>
<td>-0.035</td>
<td>1.000</td>
<td>0.176</td>
<td>-0.017</td>
<td>0.023</td>
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<tr>
<td></td>
<td>0.001</td>
<td>&lt;0.001</td>
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</tr>
<tr>
<td>Sales growth</td>
<td>0.083</td>
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<td>0.176</td>
<td>1.000</td>
<td>-0.070</td>
<td>-0.013</td>
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<td>&lt;0.001</td>
<td>0.052</td>
<td>&lt;0.001</td>
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<tr>
<td>Book Value of Total Assets</td>
<td>-0.072</td>
<td>-0.272</td>
<td>-0.017</td>
<td>-0.070</td>
<td>1.000</td>
<td>0.747</td>
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<tr>
<td></td>
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<td>&lt;0.001</td>
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<tr>
<td>Market Cap</td>
<td>-0.071</td>
<td>-0.201</td>
<td>0.023</td>
<td>-0.013</td>
<td>0.747</td>
<td>1.000</td>
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<tr>
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<td>&lt;0.001</td>
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</table>
Table 1 shows that 14% of the firm-years had at least one foreign acquisition announced. 66% of the firm-years have dual CEOs, consistent with the findings of Grinstein and Valles.\textsuperscript{47} The average firm has a book value of total assets of $3.8 million and an average market capitalization of $5.4 million. Table 2 shows the Pearson correlations for the variables used in the analysis. P-values for each correlation coefficient are shown below the coefficient. To highlight some key correlations, the dual CEO dummy is positively correlated with the foreign acquisition dummy (p<0.001), consistent with my hypothesis. Leverage is negatively correlated with foreign acquisitions (-0.089, p < 0.001), which is consistent with my expectation that the more debt a firm has, the less likely the firm is to pursue international acquisition. Cash (-0.023, p = 0.005) and excess cash estimates (-0.102, p < 0.001) are negatively associated with foreign acquisition. The negative correlation between cash and international acquisitions suggests that Harford’s\textsuperscript{48} results may not extend to international acquisitions. Overvalued firms are more likely to pursue a foreign acquisition, as suggested by the correlations between the foreign acquisition dummy and market-to-book, price-to-earnings, and sales growth. Larger firms are also more likely to pursue an international acquisition.


Table 3: Logistic Regressions

Table 3 provides results from logistic regressions of the foreign acquisition dummy on the dual CEO dummy and other control variables. All continuous variables are winsorized at the 1% level and defined in the Appendix. Estimated coefficients that are significant at the 5% level or better are in bold; estimated coefficients that are significant at the 10% to 5% levels are in italics.

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Exp. Sign</th>
<th>Panel A</th>
<th>Panel B</th>
<th>Panel C</th>
<th>Panel D</th>
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<tbody>
<tr>
<td>Dual CEO Dummy</td>
<td>+</td>
<td>0.174</td>
<td>&lt;0.001</td>
<td>0.089</td>
<td>0.090</td>
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<tr>
<td>Momentum</td>
<td>+</td>
<td>0.063</td>
<td>0.162</td>
<td>0.046</td>
<td>0.312</td>
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<tr>
<td>Leverage</td>
<td>-</td>
<td>-0.802</td>
<td>&lt;0.001</td>
<td>-0.470</td>
<td>&lt;0.001</td>
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<tr>
<td>Market to book</td>
<td>+</td>
<td>0.016</td>
<td>0.039</td>
<td>0.011</td>
<td>0.169</td>
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<tr>
<td>Cash</td>
<td>+</td>
<td>-1.883</td>
<td>&lt;0.001</td>
<td>-0.618</td>
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<td>Estimated Excess Cash</td>
<td>+</td>
<td>-0.204</td>
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<td>0.446</td>
<td>0.038</td>
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<td>Non-cash working capital</td>
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<td>-0.000</td>
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<td>-0.000</td>
<td>0.267</td>
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<tr>
<td>Price to Earnings</td>
<td>+</td>
<td>0.411</td>
<td>&lt;0.001</td>
<td>0.245</td>
<td>0.023</td>
</tr>
<tr>
<td>Sales Growth</td>
<td>+</td>
<td>0.498</td>
<td>&lt;0.001</td>
<td>0.544</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Book Value of Total Assets</td>
<td>+</td>
<td>0.498</td>
<td>&lt;0.001</td>
<td>0.544</td>
<td>&lt;0.001</td>
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<tr>
<td>Natural Log of Book Value of Total Assets</td>
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<td>0.455</td>
<td>&lt;0.001</td>
<td></td>
<td></td>
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<tr>
<td>Intercept</td>
<td>-1.896</td>
<td>&lt;0.001</td>
<td>-1.094</td>
<td>0.067</td>
<td>-1.361</td>
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</tbody>
</table>

One or More Foreign Acquisitions Announced
- 2,238
- 2,238
- 2,137
- 2,137

No Foreign Acquisitions Announced
- 13,253
- 13,253
- 11,557
- 11,557

PseudoR-Square
- 0.1%
- 9.0%
- 7.9%
- 10.0%

Table 3 shows the logistic regression of the foreign acquisition dummy on the dual CEO dummy and control variables. In Panel A, I use the dual CEO dummy alone and find a strong, positive relationship (0.174, p<0.001). I add additional control variables in Panel B, along with year and industry dummies that are not shown.\(^{49}\) The significance of the dual CEO dummy decreases to marginal (p=0.09), suggesting that after controlling for other factors, having a dual CEO has a marginal impact on the firm’s propensity to pursue an international acquisition.

The amount of cash needed for day-to-day firm operations likely varies by firm, and therefore excess cash may be a more appropriate measure to use

\(^{49}\) Industry dummies are based on major division, generally defined by the first digit of the firm’s SIC code.
as a control for my investigation of international acquisitions. In Panel C, I remove the cash control and insert estimated excess cash in its place, which reduces my useable observations from 15,491 to 13,694. In this analysis, the dual CEO dummy loads significantly (0.112, p=0.04). Overall, these results appear to support my hypothesis on the relationship between CEO duality and international acquisitions.

Finally, as an additional robustness check, I use the natural log of firm size. Results are shown in Panel D. Unfortunately, using this transformation of the size variable causes the significance of my dual CEO dummy to drop away (p=0.85). One explanation for this is that international diversifications are typically pursued by only the largest firms, and as these firms are more greatly affected by the log transformation of firm size, I can no longer distinguish between the relationship between firm size and foreign acquisitions and the relationship between the dual CEO dummy and foreign acquisitions.50

IV. Discussion and Conclusion

This paper investigates the link between the likelihood that a firm will pursue international acquisition given CEO duality. After controlling for other factors associated with acquisitions, I find mixed evidence that international diversification is associated with CEO duality. Specifically, univariate correlations provide strong evidence that a dual CEO is closely associated with a firm’s announcement of an international acquisition, but multivariate results suggest that the relationship is dependent on the specification of the control variables. This may be attributable to noise generated by taking the natural log of firm size (as opposed to using the non-logged value, in millions of dollars).

One explanation for my mixed findings is that only the largest of firms have the resources to pursue international acquisitions. Thus, firm size is likely the “first-order” (or strongest) effect on whether a firm will diversify internationally,51 and CEO duality is a “second-order” (or next-strongest) effect. Furthermore, successful firms are more likely to (1) grow larger, and (2) grant the CEO a dual position.52 This suggests that both CEO duality and foreign acquisitions are caused by firm success and growth. As a result, most acquisitions are made by large firms with dual CEOs.

50 Returning to Table 2, I note that the correlation between the dual CEO dummy and firm size (non-logged) is 0.13. In non-tabulated results, I find that the correlation between the dual CEO dummy and logged firm size is 0.18. Although the difference is not extreme, it may be that after controlling for other factors, this increase in correlation is sufficient to obscure results for my dual CEO dummy in my analysis.


My findings suggest that firms with a dual CEO should consider instituting stronger executive monitoring mechanisms to compensate for this increase in power. Ideally, these mechanisms should serve to check the CEO/chairperson with respect to major strategic decisions like international acquisitions but not stifle the CEO’s entrepreneurship. Specific mechanisms could include (1) increasing the proportion of outside board members to reduce the likelihood that board members will “go along” with CEO suggestions because of fear of reprisal, (2) creating an independent ad-hoc committee to evaluate a proposed international acquisition, and, as Grinstein and Hribar\(^\text{53}\) find that the M&A bonus paid to the CEO is higher if the CEO is also the board chair, (3) ensuring that the compensation committee is chaired by someone other than the dual CEO. These recommendations strive to prevent the more damaging outcomes of having a dual CEO while still maintaining the benefits of having a dual CEO.

Future research can expand these findings by using more sophisticated statistical analysis to control for possible simultaneity between firm size, CEO duality, and foreign acquisitions. Future research could also explore other manifestations of CEO power (for example, CEO stock ownership levels and years of CEO tenure) in foreign acquisitions. Research considering the future (post-acquisition) performance of acquirers pursuing a foreign acquisition might also be useful.

My research has some limitations in the fact that I do not explore the reasons why dual CEOs pursue international firms. Additionally, I only examine the effect of CEO/chair duality on firm diversification. However, a CEO can hold other titles such as the President, Vice President or co-board chairperson. I did not consider the effects of combining these positions in my research. Other limitations of this research include a limited sample size over a limited time frame. Given that the 1990’s were characterized by increased international M&A activity as more U. S. firms sought to establish a global presence, my conclusions may differ over other periods.

# Appendix

## Description and Calculation of Variables

<table>
<thead>
<tr>
<th>Variable Name</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cash Level</td>
<td>Cash and cash equivalents scaled by total assets and cash equivalents. This variable is winsorized at the 1% level.</td>
</tr>
<tr>
<td>Estimated Excess Cash</td>
<td>Cash and cash equivalents less optimal estimates, which follows Oler and Picconi (2008).</td>
</tr>
<tr>
<td>Leverage</td>
<td>Total debt scaled by market capital, winsorized at the 1% level. Missing values are set to zero to avoid unnecessary loss of observations.</td>
</tr>
<tr>
<td>Market Capital</td>
<td>Shares outstanding multiplied by share price at the end of the fiscal year.</td>
</tr>
<tr>
<td>Momentum</td>
<td>Buy-and-hold beta-adjusted returns for prior 250 trading days leading up to the start of the firm’s fiscal year.</td>
</tr>
<tr>
<td>Non-cash Working Capital</td>
<td>Non-cash working capital, excluding cash, scaled by total assets, winsorized at the 1% level.</td>
</tr>
<tr>
<td>Price to Earning</td>
<td>Stock price at fiscal year end. Based on basic earnings per share excluding extraordinary items.</td>
</tr>
<tr>
<td>Sales Growth</td>
<td>Current net sales less prior year net sales, scaled by prior year net sales. This variable is winsorized at the 1% level.</td>
</tr>
<tr>
<td>Size</td>
<td>Book value of total assets, in millions.</td>
</tr>
</tbody>
</table>
References


Sarbanes-Oxley and the Outsourcing of Accounting

Paul Cervantes
University of Arizona

Abstract

The following paper analyzes the outsourcing, offshoring, and offshore outsourcing of accounting following the passage of the Sarbanes-Oxley Act of 2002 (SOX). The outsourcing of accounting services is growing at a phenomenal pace and is affecting firms of all sizes, regardless of industry or market capitalization. This is leading to a strategic shift in what, where, and by whom accounting services are performed. The outsourcing of accounting following SOX is analyzed in five areas: First, the initial impact of SOX on onshore and offshore outsourcing of accounting, in particular, the emergence of India as a major destination for offshore outsourcing. Second, the outsourcing of accounting services in small and medium sized firms; in addition, the application of outsourcing theory as a metric to gauge sourcing decisions. Third, accounting pronouncements which impact the desirability to outsource accounting following SOX. Fourth, transaction cost economics and its application to the outsourcing of accounting. Last, the emergence of global accounting standards and the future of accounting outsourcing. These five areas provide a comprehensive outlook towards the impact of outsourcing on the accounting industry.

1 Paul Cervantes is an undergraduate of the Eller College of Management at the University of Arizona. He is a double major in Accounting and Business Economics. This research paper was completed during his Junior year as part of a two-semester set of courses focusing on outsourcing of professional services. He would like to sincerely thank Professor Amar Gupta for providing the insight and guidance necessary to cover a broad range of topics and to help him expand his view of the world. He would like to thank Professor Bill Schwartz Jr. for introducing him to the field of research and inspiring him to never quit. Katie Cordova, whom he hold’s dearly to his heart, was incremental to his development as a person and continues to be a motivator in his life. He would like to thank his family members: Francisco, Carol, Anna, and Daniel for their constant support and loving words. Kamm’s, Barragan’s, and Arslanian’s are with him always. Lastly, he would like to thank his best friend, Edward Laber, for his friendship and “knowledge” as well as Vanessa for providing motivation to move forward with publication. God is with us all, every step of the way. Comments or questions are welcome at pcervantenator@gmail.com.
I. Introduction

For the past two decades, the outsourcing and offshoring of professional services has grown phenomenally. Of particular interest is the growth of offshore Business Process Outsourcing (BPO) to the growing markets of Australia, China, Hong Kong, India, Ireland, Mexico, the Philippines, Poland, Russia and New Zealand. Among one of the fastest growing sectors of the BPO market and outsourcing of professional services is the outsourcing of finance and accounting (FAO). According to an Everest Research Institute Study, the global FAO sector has grown by 30% in 2007 alone. The market for FAO has grown by 45% since 2005 and has reached expenditures in the United States of $2 billion. The United States has accounted for close to 50% of the FAO market.

The growth in the FAO market is primarily due to a larger trend of offshore BPO. According to a Gartner report as cited by Bhatnager (2005), the global offshore BPO market will grow to $24 billion by 2007, of which India will capitalize on $13.8 billion. Today, FAO is emerging as a significant player in the overall growth of the global BPO market. In conjunction with the emergence of a robust Information Technology Enabled Services (ITES) industry in India, the FAO market in India will continue to expand over the next decade. This growth in the Indian FAO market has even affected markets outside of India. For instance, the growth of FAO in Europe is accelerating. Over the past three years the number of FAO deals in Europe has grown from 15 to around 45 to 50. Often these deals are through major business process sourcing agreements and long term partnerships in India.

Although many FAO deals began as an expansion of smaller BPO projects, FAO still carries many privacy and data protection issues which concern the accounting profession. For instance, FAO is unique due to compliance and regulatory risks dealing with network security, knowledge expertise, and the professional or ethical conduct of accountants. Numerous restrictions and legal requirements are necessary to outsource accounting related services. One such barrier to outsourcing accounting is the strict and prohibitive data protection agreements required by national governments. A few examples are the EU Data Protection Directive of 1995 and the Gramm–Leach Bliley Act of 1999.

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4 Gramm-Leach Bliley Financial Services Modernization Act repealed part of the Glass-Steagall Act.
or WTO-TRIPS. Although the Indian outsourcing industry already complies with WTO-TRIPS, many concerns still persist. The Data Security Council (DSC) of India has responded to this sentiment and will be implementing a data protection bill within the next 12 months that mitigates many concerns over data security. Nevertheless, without robust regulation and enforcement procedures, many legislative efforts will be undermined.

In addition to regulation, outsourcing accounting-related work poses many ethical and regulatory problems for practitioners. One such topic is outsourcing accounting-related work unbeknownst to the client. The American Institute of Certified Public Accountants (AICPA) has issued guidance dealing with outsourcing and the relationship between clients and third party service providers. Guidance with regard to these topics has concerned issues ranging from computer processing of client returns to ethics rules on conducting outsourcing business with third party service providers. Nevertheless, CPAs, accounting firms, and companies have expanded their use of FAO as a means to capitalize on labor arbitrage rates in developing countries, enter new markets, recruit talent, and expand services.

**Labor Arbitrage**

FAO is currently focused on cost savings for organizations’ internal accounting functions. In terms of labor arbitrage, why pay an accountant or auditor an average annual salary of $54,630 in the United States in 2006 when you could pay an equally competent chartered accountant elsewhere significantly less? According to Mercer consultants, the average accountant in China earns £4,677 ($9,214) while in India £2956 ($5,823). According to Anderson and Vita (2006), Indian knowledge workers can expect salaries 10-20% lower than their American counterparts, while Chartered Accountants (CA) in India

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5 World Trade Organization-Trade Related Intellectual Property Agreement (WTO-TRIPS)
can be hired for as little as $8 an hour.\textsuperscript{13} The labor wage differences often become a compelling case to outsource accounting-related functions. The incentives to outsource accounting become even more desirable during a recession and when profit margins narrow.

**Shift from Transactional to Specialized Accounting Services**

According to Sulakshana Patankar, an executive at WNS Global Services (major FAO provider), businesses that outsource simple and discrete tasks can only save 30-40%, while outsourcing the full range of internal accounting-related functions can save businesses up to 60%.\textsuperscript{14} For this reason, companies are shifting from only outsourcing transactional-related services to more specialized or idiosyncratic services. The reason for the shift to higher level accounting services is that simple transactional-focused processes reap lower cost savings than do more complex accounting processes. According to NASSCOM, high-end accounting work now makes up 30-40% of the market.\textsuperscript{15} Figure 1 presents this shift in specific accounting tasks, along with a timeline of the expansion of accounting services capable of being outsourced.

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Given the trend towards higher level accounting processes (specialized functions) in conjunction with the digitization of firm proprietary files/processes, it is only a matter of time before most accounting functions are capable of being outsourced. Save direct contact with the client, the ability of outsourcing firms to provide high level services is being met by the reality of paperless business transactions.

**SOX and Outsourcing**

A defining point in the analysis of the outsourcing of accounting related services is the passage of SOX. Also known as the Public Company Accounting Reform and Investor Protection Act of 2002, SOX is considered to be the most significant business legislation since the securities acts of 1933 and 1934\(^\text{16}\). In the wake of accounting fraud and corporate scandals at companies such as Enron, Adelphia, and WorldCom, SOX was passed almost unanimously in the House of Representatives by a vote of 423-3 as well as in the Senate by a vote of 99-0.\(^\text{17}\) The passage of Sox implemented the most stringent compliance regulations for company’s internal controls, financial statement reporting, and firm/personal liability. Although SOX has had both detractors and proponents, its significance for firms that outsource accounting-related functions is unprecedented. In the academic world, SOX is seen first as a benchmark from which prior accounting research and trends can be compared. Second, SOX is a factor which has augmented outsourcing risk and exacerbated accounting practitioner uncertainty. Nonetheless, companies continue to outsource accounting-related services at a growing pace.

The following paper analyzes the outsourcing of accounting following the passage of SOX. The impact of SOX is analyzed according to five separate areas: First, the initial impact of SOX on onshore and offshore outsourcing of accounting. In particular, the emergence of India as a major destination for offshore and offshore outsourcing. Second, the outsourcing of accounting services in small and medium sized firms. In addition, the application of outsourcing theory as a metric to gauge sourcing decisions. Third, accounting pronouncements which impact the desirability to outsource accounting following SOX. Fourth, transaction cost economics and its application to the outsourcing of accounting. Last, emergence of global accounting standards and the future of accounting outsourcing. From these five perspectives, the outsourcing of accounting can be ascertained in its entirety on accounting firms, internal audit functions, and the internal control infrastructure of firms.


Antecedent to SOX: US TAX Return Preparation

The FAO market began in the 1970s when processing firms such as ADP and First Data Corporation began to process payroll and repetitive transaction processes for companies looking to reduce costs. From the 70s until the mid-90s, the scope of the accounting work being outsourced was primarily lower-level or transaction–focused, and outsourcing service providers operated on a relatively small scale. This all changed during the early to mid-90s when accounting firms such as Deloitte and Touche and Arthur Anderson, among others, established partnerships with foreign accounting firms and service providers to process tax compliance work in India. Despite the fact that major accounting firms now embrace outsourcing tax compliance-related work, many tax professionals have maintained that the scope and scale of work capable of being outsourced is prohibitive given the sensitive nature of client personal information.

Tax executives from the beginning have felt conflicted about the impact of outsourcing on the profession. On one hand, the outsourcing of routine, tax-related tasks to countries such as India or the Philippines eases the workload of the tax professional. These professionals are often over-worked and/or time constrained, and they view outsourcing as a natural outgrowth from the current business environment. Conversely, some tax professionals have felt as if a “Trojan Horse has been brought into Troy.” The later perspective is intimately linked with the concerns over protecting client information and the responsibilities of CPAs. Specifically, outsourcing tax returns brings up a series of ethical issues dealing with whether clients should be notified that work is not only being outsourced but offshore outsourced as well. Regardless of the sentimentalities toward the issue, the current phenomena of the outsourcing of accounting began much earlier than SOX.

Almost 15 years since these humble beginnings, the tax return segment of the outsourcing of accounting is now significant and growing rapidly. According to research by ValueNotes, an estimate of 360,000 tax returns were prepared in India in 2006, with the potential to grow to 1.6 to 22 million by 2011. With offices in Bangalore, India, large accounting firms such as Deloitte and KPMG have even established “captive centres” which process thou-

sands of tax returns at an accuracy rate of 99.5%. Part of the drive for outsourcing tax return preparation in India is twofold. First, there is a shortage of accountants and qualified CPAs to complete the growing demand for tax compliance work. Second, CPA firms have found the offshoring of tax compliance work such as 1040s creates faster turnaround times and can be done 40-60% cheaper. According to ValueNotes CEO, Arun Jethmalani, “The industry will quickly move beyond 1040s. Both the vendors and buyers are at an inflection point on the maturity graph, and we expect tax returns preparation will drive penetration into a wider range of offshored professional accounting services.” This has led to the expansion of accounting service providers beyond the “big four” that facilitate the transfer of tax return preparation. Four of the most prominent of these companies are Commerce Clearing House (CCH), Outsource Partners International (OPI), SurePrep, and Xpitax.

Although this paper will not further analyze the impact of tax return preparation on outsourcing, it has made a significant first step in reducing the perceived risk of other accounting related outsourcing. Tax return preparation has laid the foundation for the future of accounting outsourcing post-SOX and continues to influence the outsourcing of accounting for both service providers such as accounting firms as well as industry firms.

II. Initial Impact of Sox on Outsourcing of Accounting

Early Fears

During the first year following the passage of SOX, there was conjecture that companies would face a similar scenario to Y2K, where much of the conversion programming was outsourced. For accounting, this can be seen as outsourcing of internal control related compliance. The rationale behind this early concern was that just as companies were understaffed and unprepared in their IT departments for Y2K, accounting departments lacked the staff and expertise to be fully compliant with SOX. There were two variations of this line of thinking. First, just as companies faced an immovable deadline before

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24 United States Individual Income Tax Return Code
25 NewsWire Today, Ibid.
26 NewsWire Today, Ibid.
27 “Big Four”: Deloitte and Touche, Ernst and Young, KPMG, and Price Waterhouse Coopers.
January 1, 2000, companies would face a rush to be compliant with SOX on a yearly basis. Second, becoming compliant with SOX would be a onetime fix that major software manufacturers such as Oracle or SAP could fix with a single purchase.

In retrospect, these fears were promulgated by a misunderstanding of what SOX meant for a business and its internal controls. Although Y2K forced companies to consider outsourcing as a viable solution, SOX requires a more long-term strategic partnership in terms of outsourcing accounting. According to James Carlini (2008), an adjunct professor at Northwestern University, people misunderstood the impact of SOX. They did not realize it was going to be an ongoing change in culture and practice for most accounting departments. Thus, both the uncertainty among firms concerning SOX’s implementation and the early predictions by analysts were off the mark.

**Market Reaction**

The passage of SOX in this instance did not solely encourage the outsourcing of accounting related functions immediately. In fact, many companies became apprehensive of what they would outsource and what they would keep in-house because of SOX. Overall, the more compelling factor contributing to the impact of SOX on outsourcing of accounting is that the market was going through a recession when SOX was passed.

The market immediately reacted to SOX since it raised the cost of capital for most firms, especially those that would have to revamp their entire internal control infrastructure. SOX raised the cost of capital for many firms because many corporate firms that previously outsourced accounting related functions now faced greater perceived risk, in addition to regulatory penalties for non-compliance. For example, the cost of capital of a firm already takes into account the additional risk perceived from outsourcing in-house transactional accounting work to a third party. Under new and uncertain legislation, many risks that were originally accounted for in a firm’s estimate of cost of capital are augmented by the possibility of regulatory penalties. Both personal and companywide penalties were now tied to management’s ability to meet and comply with the demands of SOX.

According to research by Zhang (2005), the passage of SOX caused a $1.4 trillion loss in the value of the stock market. Zhang’s research looked specifically at how the market would value the restructuring of non-audit services, requirement of corporate responsibility, and the forfeiture of incentive pay and insider trading. While considering these three factors, Zhang used

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cumulative abnormal returns\textsuperscript{30} as a measure of the market valuation of the passage of SOX. Empirical results showed that the cumulative abnormal returns were negative. The market weighed the costs of SOX negatively, and this was reflected in the expectation that earnings would be lower for future periods. In this scenario, when profitability goes down and the cost of capital goes up, companies look to reduce costs. Therefore, outsourcing of accounting related functions, which are often seen as non-core, become more desirable.

\textit{Section 404}

With the prospect of tightening budgets due to a recession, the added costs of complying with SOX compliance such as section 404 became a reality. Section 404 of SOX is management’s assessment of the internal control infrastructure of a company. Specifically, managers must “acknowledge their responsibility for maintaining controls and procedures that pertain to financial reporting.”\textsuperscript{31} For many firms before SOX, it was almost impossible for CFOs to be certain of every aspect of their company’s internal controls. With SOX, both criminal and legal liability issues forced companies to expand their accounting budgets to meet this new demand. In order to deal with this issue, many companies began to outsource accounting related services which were traditionally done in-house.

The recent growth in outsourcing of accounting related functions would not be growing as fast as it is without the passage of SOX and concern over compliance difficulties dealing with Section 404. Nevertheless, the impact of the 2001 recession exacerbated these additional compliance costs. One significant factor of this recession was the passage of SOX and, as Zhang’s research demonstrates, the markets negative response to its passage. Either factor alone, being the economic recession of 2001 or new SOX internal control compliance regulations, are insufficient to fully explain the growth of FAO over the past five years. But, in conjunction, they provide a convincing incentive for firms’ management to consider outsourcing as a long-term strategic decision. This long term strategic decision is most often tied to cost reduction and, in the instance of professional services, capitalizing on labor arbitrage rates.

\textit{Labor Arbitrage, Information Technology, and SOX Outsourcing}

For the past two decades companies have sought to minimize costs through labor arbitrage in many developing nations such as the popular outsourcing destinations of China and India. This trend developed into the cur-

\textsuperscript{30} Cumulative Abnormal Returns: Actual Returns-Expected Returns

rent emphasis on BPO for the purpose of focusing a firm’s resources on its core competencies. One area of the business process outsourcing trend which resisted pressures to outsource was the field of accounting. Following the passage of SOX, companies were forced to comply with stringent and complicated compliance issues demanding a new emphasis on technology and real-time data. SOX opened the way for the outsourcing of the accounting industry. This is especially true in terms of IT related compliance and information system management. As cited in the *Wall Street Journal*, AMR research found that companies will spend an additional $5.8 billion on Sarbanes Oxley compliance in 2005 (up from $5.5 billion in 2004) and a quarter of this will be related to new technology and systems. It is this quarter (new technology and systems) which many Indian outsourcing firms will be competing for. Countries such as India have an advantage for servicing FAO work for two reasons. First, they are the world’s leader in outsourcing information technology related work. Second, the cost of labor in India is still considered low in terms of the quality, knowledge, and reliability of services provided. Moreover, the ability of firms to capitalize on the cost savings attained through labor arbitrage is dependent not only on the ability of service providers to provide safe, secure, and reliable networks but also the idiosyncratic needs inherent in a firm’s specific industry.

**Outsourcing of Accounting by Industry**

Following SOX, certain industries have found it more desirable to outsource accounting related functions then in the past. According to a Nelson-Hall research survey sampling 520 firms, telecommunications, pharmaceutical, retail, consumer-packaged goods, and transport industries are the industries that are most likely to outsource accounting-related functions. The following table, FIGURE 2, from this research survey presents these findings:

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33 Nelson Hall is a BPO analyst firm focusing on market analysis and industry reports.

For the transport/logistics and telecommunications industries, the desire and ability to outsource accounting related functions are significantly higher than for other industries. This is due to these industries focus on cost savings, deregulation, and experience with BPO. The telecommunications industry, in particular, views outsourcing of business processes as a “mature and prevalent practice in the industry.”

Although outsourcing of accounting is often seen as the last area to outsource, for industries that have experience with BPO, FAO becomes very desirable. In addition, as an industry becomes more specific and focused on its core competencies, it will get rid of functions which do not add value to their core services. As noted by Jones, Bowonder, and Wood (2003), the problem with determining core competencies is that they are usually determined by a particular industry or shared marketplace. As shown in FIGURE 2, as firms move closer to the dotted line, they become more specific or customized in their service offerings. Moving up or down along the line simply shows scales of production.

The outsourcing of accounting following SOX increased the propensity for firms to outsource due to a lack of knowledge in compliance measures; moreover, industries such as local government, utilities, and insurance will

slowly move towards outsource accounting. The caveat is that when competitors begin to outsource accounting, then not outsourcing accounting may become a major disadvantage. Thus, as more firms embrace FAO, it will create a ripple effect throughout the entire industry.

The major accounting firms have already begun to pick up on this progressing trend and have already begun to outsource their own work to captive centers across the world.

**Accounting Firms**

In addition to firms outsourcing accounting based functions to service providers both onshore and offshore, accounting firms are outsourcing portions of their work as well. One global accounting firm which outsources is Deloitte. Since the late 1990’s Deloitte has looked to outsourcing as a means to capitalize on accounting skills around the world, reduce work turnaround time, cut costs, and enter new markets. Deloitte has partnered with Mastek to help attract companies to outsource business processes to India. With centers in Hyderabad and Mumbai, the joint venture, Deloitte Consulting Offshore Technology Group, is growing fast and taking on more U.S. clients.37

In addition to consulting related services, Deloitte has ventured into traditional accounting based services such as auditing and taxation. In the late 1990’s Deloitte started region “10,” now formally referred to as Deloitte India, as a means to capitalize on talent and labor arbitrage rates in India. This decision before the passage of SOX has paid off tremendously and has given Deloitte access to world class talent in India.

Post SOX, the flood of compliance related, IT related, and a host of other accounting related tasks have encouraged the major accounting firms to grow significantly. For example, Deloitte is able to capitalize on this increased demand due to the establishment of a safe, reliable, and redundant service information technology infrastructure. This allows Deloitte to transfer work abroad to captive subsidiaries or regional partners without compromising client data. According to a presentation by Neeraj Goenka and Steve Covel, auditors at Deloitte, Deloitte now leverages the world-class talent of Indian accountants and finance professionals in India to decrease work turnaround time by up to 40%.38 In this global accounting framework, teams in India would work alongside teams in the U.S. and partition work according to the specialty or strengths of the Indian practice versus the American or International practice. Under this paradigm, both work that is horizontal in nature (partitioned tasks)

and vertical in nature (individual tasks being shared and handed off overnight) are sourced back and forth between Deloitte in the U.S. and Deloitte India. According to the Deloitte auditors, this relationship has been especially beneficial in terms of compliance work that often have hard deadlines.

Accounting firms outsourcing portions of their work post Sarbanes Oxley makes a lot of sense. If secure networks can be made and clients are demanding accounting related services that few would have thought necessary to be competitive just ten years ago, then why not outsource as a means to ease workload and costs? In terms of accounting skills necessary to complete such work, accountants abroad face comparable standards and just as rigorous certification requirements as CPA’s in the United States. A good example of this is the notoriously difficult exam requirements to practice accounting in India as a Charted Accountant (CA). The pass percentage rate to become a chartered accountant of the Institute of Chartered Accountants of India (ICAI) is between 7-8 % and this amount almost never reaches double digits.\(^{39}\) Lastly, the number of accountants in India is significant. There are currently 140,000 practicing CAs in India and an additional 350,000 pursuing a CA certification.\(^{40}\)

In addition to traditional CAs, the ICAI is also instituting a new certification known as an Accounting Technician (AT). This is a natural outgrowth from the specific accounting expertise demanded by accounting software companies and the growth of BPO.\(^{41}\) Individuals with a base level of accounting expertise are necessary to fill the global sourcing phenomena in India. With the growth of variations of accounting certifications, Deloitte along with other major accounting firms have benefited from the growth of the industry, the development of new certifications, and the leveraging global talent. The growth in these sub-specialties within the traditional accounting background is strongly linked to the increasing demand for higher-level accounting services by large firms. These large firms seek consulting services/contracts with sourcing providers for specific accounting related tasks to be performed systematically and on a regular basis.

**Large Industry Firms and Outsourcing**

In the wake of the SOX, many large firms were uncertain of how to comply with new regulations and business process documentation. Specifically, the requirement of Section 404: Management Assessment of Internal Controls


has been a particular concern of many companies in terms of full compliance costs. According to a survey by Financial Executives International, the average first year compliance costs of SOX “alone average $4.36 million per company, and large companies with more than $5 billion in revenues spent more than $10 million per company”\(^{42}\). For large multi-national firms, the pressures from shareholders to reduce costs and increase profitability are tremendous. Coupled with an increase in costs due to SOX is the lack of knowledge in internal controls that even large corporations may lack. According to Karen Ikeda, a partner and global practice leader at TPI, many companies should consider outsourcing or offshoring as a means to transfer the worries and concerns of SOX to specialized service providers.\(^{43}\) This can be especially true since internal control certification is an ongoing process which cannot be met with a onetime expenditure.

Nevertheless, large firms, and specifically the Fortune 500, are outsourcing, offshoring, and offshore outsourcing accounting related work. According to research by the Center for International Business Education and Research at Duke, 60% of companies offshore either finance or accounting related work.\(^{44}\) Of this 60%, 70% of the work is done by “captive” offshore subsidiaries. This is high considering the fact that only 10% of offshore work is “captive” for IT vendors such as call centers.\(^{45}\) With the onset of SOX compliance related work, this is not surprising since many companies may want to expand accounting departments but are adverse to increasing costs. In addition, accounting related functions may be seen as too risky because they involve valuable corporate data.

**Large Firm Outsourcing Example**

Although not a Fortune 500 company, one large company which has decided to offshore outsource their accounting department is Church’s Chicken. Church’s is a major chicken restaurant diner based in the United States. During 2006, Church’s decided to offshore their entire IT department to India. This initial step opened the door for the company to consider offshore outsourcing other portions of their company. It was with the success and reliability of outsourcing IT related work that Church’s decided to offshore their entire


\(^{45}\) Rosenthal, Ibid.
accounting group to India in 2007. While considering whether to stay with their current outsourced partner Convergys or outsource to WNS Global Services, cost savings played a critical role. According to Dusty Profumo, CFO of Church’s Chicken, “Economics clearly played a role in deciding not to pursue bringing it back-in house.”

Upon review of the facilities, when deciding on a service provider, the company saw the quality of services were comparable and sometimes better than their U.S. counterparts. Ultimately, this choice has lowered the cost of Church’s accounting related functions by half.

With the success enjoyed by large firms to outsource accounting related functions, such as Church’s, smaller firms in the wake of SOX have considered the same options. Specifically, small and medium sized firms with much smaller and less sophisticated accounting departments may have even more incentive to outsource accounting functions than large firms may.

III. First Years Following Sox: Small and Medium Sized Firms

Following the passage of SOX, many companies which previously considered outsourcing accounting related functions were unsure of whether to outsource. On one hand, strict legislation had come about that few people completely understood. While on the other hand, the US economy was going through a recession and the pressures to cut costs were enormous. This dilemma was not simply played out in the conference rooms of large Fortune 500 companies, or large scale manufacturing companies, but at small firms as well. A great example is the restaurant industry. The restaurant industry which is one of the first industries to feel the impact of a recession, advocated the outsourcing of accounting to deal with this issue.

According to Michael Kaufman, the CEO of Metromedia Restaurant Group, his company is adapting its corporate structure to “navigate better through uncertain economic times and position itself for the future.” Many restaurants and small businesses alike have embraced this attitude because of the perceived benefits of cost savings. In addition, many small businesses recognize that although accounting information supplemented the business process at restaurants, it did not differentiate their business; it was not a core competency.

SMEs and SOX Costs

Of particular interest to smaller firms is the impact of SOX on accounting work. Since its passage, small and medium enterprises (SMEs) have dis-
proportionately borne the weight of Section 404 specific compliance costs as compared with larger firms. According to United States Representative Nydia Velásquez, Chairwoman of the Committee on Small Business, small businesses are indeed being impacted, and I call on the SEC to delay implementation of SOX 404(b) until the needs of small ventures are taken into account.48 In addition, Chairwoman Velásquez alluded to a recent survey which found that the cost of compliance for nearly half of small companies (non-accelerated filers) was 3% of net income, and close to 60% have contracted with an outside auditor to provide compliance related services.

The additional costs of SOX compliance are a major cost driver for firms to consider when deciding whether to outsource accounting. Part of the reason for this is due to the disproportionate impact of compliance costs on small firms in terms of their ability to absorb these costs. Although all firms, regardless of firm size, found few internal control experts immediately following SOX, large accounting departments can proportionately absorb additional work and have access to better technical knowledge. Where large firms have accounting departments with proportionately larger budgets, highly structured accounting departments, and more CPAs, small firms often have fewer accounting professionals and informal management structures.49 Despite SOX’s passage in 2002, it has been just over the past year or so that the SEC has commented on this controversy and issued new guidance.50 Unfortunately, following the passage of SOX, many accounting firms immediately recognized the burdensome costs of full compliance. This immediately led many small firms to reevaluate their core competencies, department efficiencies or inefficiencies, and reconsider whether to outsource or keep accounting functions in house. These considerations are all tied to the long term economic considerations facing a firm.

Small and Medium Firm FAO and Application of Theory

On the flipside of the growing trend of large firms outsourcing accounting-related functions to vendors abroad, the outsourcing trends for small and medium sized firms pose different questions. In order to analyze this scenario, Everaert, Sarens, and Rommel (2006) utilize the Transaction Cost Economics (TCE) framework in conjunction with Resource Based Theory (RBT) in order

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to analyze outsourcing for small firms.\textsuperscript{51} In this study, the authors gauge outsourcing by “outsourcing intensity,” which is the product of the percentage of work outsourced by the degree to which the outsourced tasks are outsourced. An outsourcing intensity of 0% would indicate no outsourcing while 100% would indicate every portion of the accounting function was operated externally by a service provider.

Their research points to three main factors of small to medium sized firms; first, that outsourcing intensity on average was 87%; second, a resource deficit in accounting-related skills leads to firms looking to outsource accounting-related functions; third, firms that do not have a CEO with a background in economics or a separate CFO function will outsource accounting related work. Although their study focused specifically on Belgian firms, its insight provides context for the knowledge deficit inherent in implementing SOX compliance and overall transaction costs for small and medium sized firms.

Following SOX, many firms that had small internal auditing functions immediately looked for outsourcing of accounting-related functions following the passage of SOX. Many of these firms lacked the knowledge or capabilities to be compliant with SOX. This led to an increase of costs, and these have dipped into company profitability. The costs of compliance with SOX for smaller firms are significantly large. Since 2001, SOX compliance for firms under $1 billion in revenues has increased from $1.7 million to $2.8 million.\textsuperscript{52} Nonetheless, these additional costs for firms have not necessarily encouraged a universal embrace of FAO.

\textbf{Accounting Department Expansion and Lowering SOX Costs}

Just as many companies have immediately looked to outsourcing for compliance with SOX, many firms see SOX compliance in a different light. In particular, many small and medium sized companies have discontinued contracting with independent IT consultants or other SOX compliance consultants. According to Geoff Zodda, a Director of SOX Compliance at the Glenmont Group, SOX has created two trends: the emergence of SOX departments and the growth of audit departments at firms (2006). According to Zodda, although outsourcing and consulting were seen as a viable option during the first few years following the passage of SOX, many companies have begun to consider long-term solutions besides outsourcing. Specifically, bringing accounting functions previously outsourced for efficiency purposes back in-house due to prohibitive costs associated with additional risk. Overall, it is

\begin{footnotesize}
\begin{itemize}
\item \textsuperscript{51} Small firms in this study are firms with less than 250 employees.
\item \textsuperscript{52} Nikki Swartz, “SOX Costs Sock Small Firms.” \textit{International Information Management Journal}, March-April (2008).
\end{itemize}
\end{footnotesize}
primarily smaller firms which often lack the accounting expertise or know-how who are more inclined to outsource their key accounting related services to foreign service providers. Nevertheless, under the pressures of paying high consulting fees or finding few positive returns for contracting these services, many of these companies are bringing accounting work back in-house and establishing larger accounting departments.

An interesting finding is the slowdown in the cost originally anticipated in the field of SOX compliance. Of particular interest is the effect of compliance with Section 404 for small businesses that have argued over the past five years that SOX compliance disproportionately affects these companies profitability as compared to large sized firms. According to a report by Lord & Benoit LLC, as cited by Search CIO midmarket.com, the average first year cost of compliance with Sarbanes Oxley related cost are 13.8% less for non-accelerated filers (market cap below $75 million) than previously estimated by the Securities and Exchange Commission.53 The reduction in anticipated costs for small business could signal that a state of normalization is setting in with respect to internal control compliance with SOX. Companies that are just starting out seem to immediately understand how to comply with SOX and what to look for. This could inadvertently lead to a slowdown of the outsourcing of accounting due to the traditional focus on labor arbitrage in markets such as India. With many costs of SOX decreasing, many companies’ internal audit committees may reconsider their plans to outsource if long-term contracts and potential security concerns exist. Of particular interest is the possible methodology embraced or complementary decision making metric utilized for making these decisions.

DEA Theory and Small and Medium Firms

Similar to research by Everaert, Sarens, and Rommel (2006), Barrar and Wood (2002) analyze the choice to outsource for small and medium firms by looking at organizational structure, efficiency, and whether accounting functions for firms are either non-core or core. In their research, firms first evaluate their business processes as a starting point to decide whether to outsource. The reasoning behind this evaluative approach is that, following SOX, companies have to consistently evaluate their core competency and strategic aims. According to Stainer and Stainer (1998), this can be summed up by the following, “those who have never effectively measured their performance cannot seriously claim to know their business might progress.” Barrar and Wood

provide the following diagram, FIGURE 3, to evaluate a decision framework once processes are well understood:

![The Efficiency Matrix Diagram](image)

**Figure 3**  
(Reproduced from Barrar and Wood 2008)

With this framework in mind, firms looking to outsource their accounting functions have the following four scenarios:

1. **Low Efficiency and Non-Core**: In this case, firms that are not efficient in their business processes, whether this is due to a lack of technical knowledge or scale factors in comparison with other firms (i.e. large or specialized accounting firms), should outsource their accounting functions. Following SOX, lack of compliance knowledge in SOX could drive firms to outsource or alternatively contract with consulting firms to improve efficiency.

2. **Low Efficiency and Core**: Firms that have low efficiency but whose accounting functions are core to the business should re-engineer these very functions. Although a firm could not persist in this scenario for very long, this could be solved by developing new software, changing how accounting functions are operated companies, or a host of other changes.

3. **High Efficiency and Non-Core**: Firms that have accounting functions that are high efficiency but non-core could consider insourcing. A good example of this scenario was the formation of the company ‘Tasco’. ‘Tasco’ is a joint venture between Shell and Ernst and Young in which the efficiency of accounting related work, which was non-core to its business, became so high that it partnered with a major accounting firm to attract additional work. Spe-
specifically, ‘Tasco’ provides accounting services to multinational companies.  

4. High Efficiency and Core: Firms that operate accounting functions at high efficiency and are Core to the business will simply keep accounting processes in-house. They will look for alternatives to outsourcing that reduce costs for an accounting department, function, or service.

For the majority of small firm and medium size firms, the first scenario (low efficiency and non-core) is probably the most realistic evaluation of a company’s accounting department or functions. With this framework in mind, Barrar and Wood utilize a non-parametric linear programming methodology called data envelopment analysis (DEA) to analyze how resources are utilized in relation to volume and complexity of the work done by an accounting department. Within this framework the traditional make or buy decision is analyzed. In this scenario, “make” alludes to keep accounting functions in house where as “buy” alludes to outsource. The researchers look to service providers in the UK and Italy for the focus of their analysis.

By utilizing decision making units (DMUs) to weigh multiple inputs and outputs, the researchers find that accounting service providers offer a more efficient platform for small firm accounting functions. Given that the majority of firms fall into the first category of low efficiency and non-core accounting departments, these results are not surprising. Furthermore, the efficiency matrix of FIGURE 3 in context of a firm’s choice to make (in-house) or buy (outsource) provides a compelling case to consider outsourcing accounting. The only remaining questions then are, why, in the midst of improvements in network security, digitization of imaging technologies, and new cost effective communications, would some companies be reluctant to outsource? Despite the growth in FAO, why would small companies, which have the greatest incentive to outsource, not do so? What are some of the factors beyond Section 404 impacting the outsourcing of accounting? The answer to these questions are specific rules and regulations tied to SOX, contract restrictions between firms, and auditing standards promulgated in the practice of accounting.

IV. Sections 302, 404 and SAS 70, 94: Impediments to Outsourcing

One major impediment to the outsourcing of accounting related services is Sections 302 and 404 of SOX. Under Section 302, company executives such as the CEO, CFO, or other managing executives are held accountable for any material weakness in internal controls at a company. In addition, they

55 For Large Firms, this analysis will continue with section V: Service Agreements, Transaction Cost Economics, and Outsourcing of Accounting.
56 Inputs and outputs are comparative resource variables.
must report any fraud whether it be material or not to shareholders. Section 404 requires management’s assessment of internal control in every quarterly or yearly report. Both of these sections of SOX impede the ability or desirability of a company to outsource accounting related services. Any service or process which is outsourced from the company, although external to the traditional internal control framework, is considered to be an extended portion of the company wide internal control structure. Ultimately, it is the company itself and not the service provider that is liable.

**SAS 70**

In order to mitigate the concerns with outsourcing and internal controls, many companies now require service providers to provide certification by an external auditor on the reliability and robustness of a company’s internal controls. This certification is known as a Statement of Auditing Standards (SAS) 70 Type II audit. A SAS 70 Type II audit provides a Type I audit, which is a description of a service providers’ internal controls and their ability to reach described control objectives. In addition, SAS 70 Type II audits provide the opinion (attestation) of the independent auditor regarding the effectiveness of the company’s internal controls. In this respect, companies that outsource accounting-related services to an external service provider require this form of attestation in order to certify whether or not the internal controls at a particular company are sufficient.

In addition to this requirement, the SAS 70 Type II certification must be made in sync on a regular basis with the client company’s quarterly and annual report. The reasoning behind this is that a company cannot certify the strength of its internal controls on any financial report unless the certification of controls effective at the service provider’s end meets the standards demanded by auditors for either the sponsor or host company. External auditors of the host company cannot be the same auditors for the sponsor company due to a regulatory restriction that auditors are not allowed to provide both attestation and consulting services for the same client. Simply put, because of regulation by the Public Company Accounting Oversight Board (PCAOB), the external auditor for the sponsor company would not be allowed to provide SAS Type II certification of the host company.

**Offshoring Contracts**

One fear of outsourcing accounting-related functions to offshore vendors is that they in turn will outsource portions of their business process to other

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57 Typically within 90 days.

58 “Sponsor” company alludes to a company outsourcing a specific task or process and “host” company alludes to company insourcing the outsourced work.
vendors. Although this is common in the outsourcing/offshoring industry, it is often unacceptable to companies whose main intent was to lower costs without substantially increasing risk. One means to mitigate this problem in the future will be the development of a more active outsourcing/offshoring relationship. Often this relationship is cited as a partnership in which the processes of the vendor are transparent to the client and vice versa. In terms of outsourcing accounting-related functions, companies will begin to have more complex contracting methods and demands from one another. One trend is the “right-to-audit clause.” The “right-to-audit clause” is simply a natural extension to the requirement of SOX to consider outsource service providers as part of the firm during internal control testing. Companies will demand more transparency due to coupling of the host and sponsor companies. According to Smith (2007), the “right-to-audit clause” will be more than a single paragraph clause and will allow companies to have greater access to and know-how of a vendor’s operations. Therefore, firms will go beyond SAS 70 audits for risk assurance and will regularly conduct “surprise” audits of vendors. In turn with the new demands for security, companies will feel safer and more in control of their outsourced accounting functions.

On the other hand, BPO vendors that traditionally have kept away from these types of services, due to restrictions on sharing proprietary business processes, will have to rethink their strategy. Vendors who acknowledge these demands sooner will reap the benefits of more contracts. Overall, increased coupling between a host and sponsor company in the BPO industry will increase the amount of work performed by BPO vendors and allow for outsourcing of higher level accounting functions.

**SAS 94**

Although passed in 2001, the Statement of Auditing Standards (SAS) 94 has played a critical role in the outsourcing of accounting. Following the passage of SOX, Section 404 mandated that company executives provide their assessment of a company’s internal control infrastructure. In this light, SAS 94 provides critical guidance towards understanding and assessing the risk of how a company’s information technology is used to provide assurance to both internal and external auditors.

SAS 94 is formally titled “The Effect of Information Technology on the Auditor’s Consideration of Internal Control in a Financial Statement Audit.” SAS 94 is considered to be an update to SAS 55 (1988), with an emphasis on the role that information technology has in current business processes. In particular, SAS 94 comes at a time when the traditional methods of providing assurance through substantive tests of paper documents or file cabinets are
quickly becoming obsolete. In place of the paper “audit trail” are the paperless audits of information systems and the internet based networks utilized to communicate with both vendors and customers. Auditors are still performing substantive tests of controls and have transitioned to the reality of paperless transactions. The decentralized nature of the initiation of transactions, management decision making, and monitoring of transactions has changed. The impact of SAS 94 is uncertain at this point, but SAS 94 augments the ability to provide assurance to both vendors and firms that their accounting functions are protected.

In summary, although SAS 70/94, past vagueness found in off-shoring contracts, and restrictions mandated by SOX make outsourcing prohibitive in many instances, there are mitigating factors. These mitigating factors may be the cause of why companies are able to transcend many perceived barriers and continue to outsource accounting-related functions. The next section will discuss these factors in addition to how today’s global supply chains facilitate more efficient markets.

V. Service Agreements, Transaction Cost Economics, and Outsourcing of Accounting

Legal Uncertainty and SLA’s

Despite the growth in the ITES sector, offshoring or offshore outsourcing of accounting-related functions poses numerous risks that are both unique and shared by the ITES industry. In particular, legal precedence such as the EU Data Protection Directive of 1995 or SOX impose both transfer restrictions and increased liability that may prohibit outsourcing. In the absence of legal protections governing privacy, intellectual property, data protection, and transfer regulations, companies must negotiate their own agreements. These often come in the form of service level agreements (SLAs).

SLAs are considered to be the most common way to mitigate fears or increases in perceived risk that come with outsourcing of accounting related functions post-SOX. Some accounting vendors such as Global Infosys, a UK accounting firm and Indian service provider partnership, provide clients with a simple one page printout of timescales and process descriptions. Other vendors such as OPI (an independent outsourcing vendor in New York and India), however, feature a “more comprehensive arm’s-length type contracts.”

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Post-SOX, these agreements range from providing clients with lease and sale back options, reverse transition causes for not meeting outsourcing agreements, or even gain sharing. Without these stipulations, risk factors due to uncertainty of legal protection would not allow for cost savings to be realized from outsourcing. In addition, some companies set limits to customization of accounting services provided to its clients. Service vendors may set limits on customization because it often decreases the economies of scale gained by offering lower level, transactional focused processes. Therefore, cost drivers are significant not only for the company looking to outsource but also for the sourcing provider as well.

**Cost Drivers and Accounting Outsourcing**

While outsourcing accounting-related work is the most obvious selection in perfect markets, the increased legal risk and uncertainty may make it more expensive than keeping in house. In order to analyze this issue, the outsourcing literature uses various techniques that include both quantitative and qualitative determinates of whether to outsource.

An analytical technique which uses a quantitative measurement for whether to outsource work is done by Gupta, Seshasai, Mukherji, and Ganguly (2008). These researchers utilize a two country model followed by a decision model in order to gauge the impact of complexity and time duration on cost savings and risk perception. Gupta et al (2008) found that over time, outsourcing more complex and strategic tasks becomes a viable and desirable option for the company. In the case of outsourcing accounting, these tasks may be higher level work such as managerial accounting, M&A support, or treasury functions. The results of the two country model allude to the fact that companies can realize higher profitability by outsourcing or offshoring more complex (higher risk) projects and should forge strategic long term partnerships between vendor and client. This quantitative measure is very sophisticated and contemporary in approach. Conversely, Transaction Cost Economics (TCE), a qualitative approach, offers similar guidance for decision makers.

**Transaction Cost Economics**

One of the more common techniques for analyzing the cost of outsourcing a product or service is utilizing TCE. In this case, TCE is used to gauge which processes should be outsourced and which processes should be kept within the firm. TCE provides a qualitative measure or guide to analyze the benefits and hurdles that companies must overcome in order to outsource work. Although

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no measurement variables exist for considering SOX, there has been general research on how TCE provides a gauge for outsourcing accounting-related functions. Nicholson et al. (2006) tackle the issue of FAO with TCE by analyzing the three phases of outsourcing: contact, contract, and control. These are identical to the outsourcing stages of evaluation, negation, and control utilized as a framework by Barrar, Wood, and Jones (2002).62 Within these three phases, the researchers analyze the viability of outsourcing accounting-related services using three types of outsource service providers:

1. Subsidiaries
2. Former subsidiary servicing former parent
3. Third party vendors.

Utilizing TCE which covers the contact and contract phase of FAO, there are three contributing factors to estimating transaction costs. The first of these is uncertainty. Uncertainty is the degree to which the intended performance of a task or the environment in which a task is being performed cannot be predicted. The second of these is asset specificity. Also referred to as idiosyncrasy, asset specificity measures the degree of customization that is required by both the client and the vendor. A case which demonstrates this point is in comparing accounting functions. Accounting functions such as accounts receivable and accounts payable are considered to be non-specific transactions because they do not require additional assets or specialized knowledge by the vendor. On the other hand, tax planning, financial reporting, and management accounting demand specialized accounting knowledge and experience. Lastly, task frequency is critical in calculating the viability of outsourcing within TCE.

According to Nicholson et al. (2006), uncertainty and task specificity are critical. In terms of low specificity and low uncertainty, the market provision is seen as the most efficient option (market provision or outsource). Alternatively, when task specificity becomes more frequent and complex, then costs and risk increase. Therefore, the accounting function should not be outsourced (firm provision or in-house). Overall, the market provision to outsource is dependent on these three factors in conjunction. FIGURE 4 presents a framework in the contact and contract phase for outsourcing accounting functions as previously described:

62 Revisit section titled DEA Theory and Small and Medium Firms.
Study Results

The results from this research are that TCE presents a rational framework for understanding the outsourcing of accounting and finance. In addition, if the TCE framework is understood and applied as a metric to gauge outsourcing decisions, then transaction costs can be minimized for both the outsourcing vendor and sponsor company. What is interesting from this research is that two of the three third party vendors surveyed are able to transcend the predictions of a firm provision for frequent, idiosyncratic, and high uncertainty transactions. This is counter to the TCE prediction that the market provision is undesirable under these circumstances. According to the example used by Nicholson et al (2006), the two Indian vendors OPI and Inaltus have developed methods and practices to mitigate the potential opportunism or uncertainty that comes with outsourcing accounting related functions to India. This is interesting because prior research has alluded to the fact that companies may face problems with poor telecommunications, separate time zones, cultural differences, and language barriers.  

Transcend TCE

Part of the reason why outsourcing accounting-related functions to India occurs despite the perceived risks are because Indian firms have high levels of certification that are recognized around the globe. These can alert the sponsor client of qualifications, standards, and possible weaknesses at an accounting service provider. These certifications come in a variety of forms but can range from ISO 9001, SAS Type II audits, and Capability Maturity Model (CMM) to name a few. In fact, 75% of the world’s CMM level 5 software centers are in India, and many of the firms which have transitioned from being software service providers now provide a range of BPO related services. In addition to certification, vendors such as WNS and OPI provide codes of conduct regarding secrecy of client data by incorporating technological limitations and industry standards for data protection. For instance, these centers do not allow employees to bring personnel items such as cell-phones and personal computers, and they prohibit access to the internet for the purposes of web-browsing and/or checking personal email. In addition, employees are searched upon entry to the buildings, are separated by frosted glass, must sign non-disclosure agreements, and are not allowed to talk to interviewers. This level of security is unheard of in U.S. accounting firms or service providers, and this allows Indian firms to transcend the firm provision predicted by TCE to a market provision. Moreover, working with the increased propensity for firms to select the market provision for higher level accounting functions and services is the development of more sophisticated supply chains.

Changing from Supply Chain to Supply Web

The success of firms performing accounting related functions post-Sarbanes Oxley may be attributable to the changing nature of companies supply chains. According to Jones, Bowonder, Wood (2003), traditional supply chains or “value chains” are being reassembled into “value webs” which transcend both industry boundaries and geographical boundaries. Although SOX calls for more stringent monitoring of a company’s internal controls and that of its suppliers, the fragmentation of the “service value chains” may actually ensure greater control and reliability of financial information. In terms of TCE, not all exchanges reflect transaction efficiency. This is due to the underwriting

64 CMM level 5 is the highest possible score.
of outsourced transactions/processes by large industry specialists along with allowing the organization to be more nimble and exploit economic benefits outside of traditional industry.\textsuperscript{68}

SOX reflects the traditional hierarchies and business process expectations of the past, even though its intent is to protect investors and ensure that companies operate fairly and ethically in the future. Although SOX may increase risks for firms which outsource in the short run, these companies themselves will be at a greater risk of liability and data protection issues if they do not outsource in the long term. From an organizational standpoint, this is due to non-core competencies such as accounting departments which have little incentive to improve and will often result in “defective monopolies.”\textsuperscript{69} These “defective monopolies” do not make sense from a strategic perspective when more reliable, cost efficient and long-term solutions are available.

Although the TCE framework provides a flawed gauge of outsourcing based on the assumption of “homo economicus” and with disregard for bounded rationality, its application to FAO is a decent measure. Overall, a new wave of outsourcing is occurring which is changing the rigid structure orientation of TCE. As suggested by Nagpal (2006), the TCE framework should be seen as one piece of analyzing the global sourcing of IS related work and should be combined with a discussion of “co-evolutionary drivers of outsourcing”. SOX could be one of these drivers in FAO along with the blending of industries and vendor supply chains. Ultimately, transaction costs are becoming one piece in the drive for outsourcing accounting related work following SOX.

VI. The Impact of Sox on the Future of Outsourcing

Global Accounting Standards

The future of the outsourcing/offshoring of accounting-related functions or services is dependent on the emergence of global accounting standards. Global accounting standards or International Accounting Standards (IAS), as proposed by the International Accounting Standards Committee (IASC), would lower the barriers of entry to the global economy, lower the cost of capital for many firms facing outsourcing decisions, and improve the quality of financial statement comparability. Countries such as the United States, Canada, England, Germany, and India will be the net beneficiaries of the ongoing convergence of U.S. Generally Accepted Accounting Principles (GAAP) and International Financial Reporting Standards (IFRS).

Minimally, the transition to IFRS could further spur India’s growing


knowledge process outsourcing industry. While on the upside, the emergence of global accounting standards coupled with the growth of the Indian ITES sector could be a major precursor to the development of world class accounting firms in India. According to a KPMG report in *Economic Times*, an Indian publication, “Elimination of these differences on adoption of IFRS may have a significant impact for corporate India.”

One significant step towards the emergence of global accounting standards is permitting foreign companies interested in being traded on a U.S. stock exchange to submit financial statements following IFRS to the Securities and Exchange Commission (SEC). The net effect of this standard is that foreign firms would only need one set of financial statements following IFRS. They would not need to produce a second financial statement that reconciles IFRS to U.S. GAAP.

On November 15, 2007 the Securities and Exchange Commission (SEC) voted in favor of this measure with the exception that foreign companies must comply fully with the International Accounting Standards Board’s (IASB) version of IFRS. In terms of the outsourcing of accounting, smaller regional firms in Europe, India or other markets may now find it desirable to seek financial funding from capital markets in the United States. Similarly, chartered accountants in countries outside of the U.S. do not necessarily need to be trained in U.S. GAAP in order to file financial reports with the SEC.

On the other hand, U.S. companies have questioned whether they would have the same option to file with IFRS. Accountants in the U.S. held roundtable discussions on this issue in December of 2007. Although U.S. firms currently must follow U.S. GAAP, the results of these talks are that U.S. capital markets should move towards IFRS.

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72  IASB is the standard setting body of the IASC. This body is congruent to the US standard setting body FASB.


Barriers to Filing IFRS

Unfortunately, filing financial statements with the SEC following IFRS is not a panacea towards minimizing financial statement drafting and accounting overhead at foreign firms. For example, it is a misconception that because the European Union follows IFRS that it is in full compliance with the version of IFRS suggested by IASB. Rather, they follow a regional version of IFRS or European IFRS. In all, according to a speech by Chairman Christopher Cox of the SEC, over 100 countries from around the world prescribe to a version of IFRS.

Of these countries following IFRS, the SEC has identified approximately 30 different versions of IFRS established by various governmental jurisdictions. In terms of outsourcing portions of financial statement preparation, many regional differences still exist. A push over the next few years for greater convergence to IFRS as proposed by the IASB is necessary.

In order to list on U.S. stock exchanges, the companies must first reconcile regional IFRS to IFRS from the IASB. Although the option to not reconcile with U.S. GAAP is available, it still requires reconciliation to IFRS proscribed by IASB. Thus, countries following versions of IFRS are in some ways on par with the U.S. in that both standards are not fully compliant with IFRS.

Although the European Union and other regions have unanimously accepted IFRS, they are not fully compliant themselves. Nevertheless, both the Financial Accounting Standards Board (FASB), which follows U.S. GAAP, and IASB share the same goal of fully converging national accounting practices with the version of IFRS proscribed by IASB by 2011. Globally, many companies competing on the world economy have decided on 2011 as the convergence year. In particular, The Institute of Chartered Accountants of India (ICAI) has specifically set a full compliance deadline of April 1, 2011. Furthermore, all countries are working towards a global accounting standard convergence that is still a long way away.

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77 Even though European IFRS must reconcile to IFRS by IASB, this is much closer than reconciling US GAAP to IFRS by IASB.
Metric for Gauging Convergence

In terms of outsourced accounting work, it is uncertain as to the level of convergence between GAAP and IFRS necessary to begin outsourcing all accounting related work. Post SOX, national legislative self-interests, especially in valuations, continue to exist between countries that are preventative towards full convergence. Because of this, certain metrics that look beyond regional legal barriers have been proposed for evaluating convergence.

Erchinger and Melcher (2007) propose a metric to gauge the progress of the convergence between US GAAP and IFRS. In their metric, a “0” alludes to diversity in the accounting practices and a “1” alludes to an identity or no difference. Between these two extremes is convergence and divergence. This dynamic process of comparing areas of convergence and divergence in accounting methodology provides a means to gauge the progress made in converging IFRS and U.S. GAAP. Ultimately, the closer this gauge comes to “1”, the more likely firms will begin to outsource or offshore accounting related work to lower labor cost markets or take advantage of accounting talent from around the world. Within this gauge, companies that switch sooner to IFRS and fully comply with regulation by the SEC will become specialists and global sourcing providers for accounting-related work.

Current Restrictions

Most countries have their own version of GAAP or systems of valuations based on historical precedent and economic stability. This diversity in accounting regulation and practices is more common than one may initially perceive. In addition, the emergence of global accounting standards does not mean complete convergence or little diversity. For instance, historical methods of valuating assets have to be taken into consideration when converting to IFRS.

In the case of Mexico, Mexican GAAP takes the fair market value of assets. In contrast, U.S. GAAP uses historical cost when accounting for most assets, although there are recent changes even in this standard. Although Mexico’s system may seem problematic for an accountant in the U.S., the U.S. accountant may be unaware that the reasoning behind Mexico’s system is historically high inflation rates. Thus, adoption of IFRS would not discriminate between national differences like this one, and region specific experts would still be required if the complexity of business transactions become too

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idiosyncratic.

While both systems are appropriate for their governments, their financial statements under IFRS would not provide investors with congruent information. Therefore, presentation and implied meaning from regional differences may continue regardless of the adoption of global accounting standards. In terms of outsourcing of accounting functions overseas, these regional problems are exacerbated when one country’s accounting information is viewed as congruent to another country’s information. With a variety of cultural, temporal, linguistic and historical differences, the perceived risk of outsourcing may be too high.

To understand how development issues and differences in practice can occur, one only has to look at the development of GAAP in the U.S. An example is FASB statement No 95 (FAS 95), commonly referred to as the statement of cash flows. FAS 95 took almost 20 years to fully develop and implement the methodology now used in financial accounting. This development began with GAAP mandating the reporting of sources and use of funds (1971) to the final implementation of the statement of cash flows (1987). During this interim, many firms assessing the operating cash flows at a firm utilized an imperfect measure of cash flows known as the “statement of changes in financial position.” In many ways, the thought of using the latter financial statement methodology, reporting of sources and use of funds, seems irreconcilable to accounting valuation practitioners today who rely on the statement of cash flows for Discounted Cash Flow (DCF) analysis. Bearing this in mind, changes in accounting practices, although non-intuitive in some respects, take time to develop in order to consider the opinions and methodology of a practice that is constantly changing.

Following SOX and the significant drive toward convergence between US GAAP and IFRS, many accounting methodologies will undergo changes which may end up differing significantly from their initial form. The example of differences between national GAAP’s and development within a country’s own national GAAP demonstrate that a shift to IAS by the convergence date of 2011 may be complicated and difficult. The outsourcing of accounting following SOX will be contingent on the speed and efficiency in which companies adopt the global accounting methodology and whether global accounting standards are successful. The uncertainty as to the number of years necessary to transition is one contingency which may hinder outsourcing of accounting.

**Long Term Perspective**

Although the emergence of a global capital market presents a more permanent transition and challenge to accounting practices, it will drastically reduce
the barriers of entry across all markets and improve the quality of accounting standards throughout the world. When considering outsourcing or offshoring accounting-related functions, companies must evaluate not only whether they follow IFRS but the historical and cultural practices that will continue to persist beyond the switchover date in 2011.

Allowing foreign firms to file financial statements in IFRS versus a second reconciliation financial statement in U.S. GAAP is a significant step towards allowing accounting-related work and analysis to be performed in multiple locations around the world. Deloitte India, as previously discussed, already trains Indian accountants in U.S. GAAP as a means to decrease work turn-around time. A single standard of financial reporting would enable firms to reduce training costs and tap accounting talent from around the world without asymmetric differences. A homogenous accounting methodology and system of rules regardless of location would allow accounting firms to leverage chartered accountants or those knowledgeable in internal controls on a 24-hour basis.

**24-Hour Knowledge Factory**

Post SOX, the future of outsourcing of accounting presents numerous opportunities for firms to reduce compliance related costs, improve quality of accounting work, and reduce turn-around time. In the natural progression from outsourcing tactical accounting work to more strategic alternatives, public accounting firms or firms in industry may push towards a new global work paradigm.

One such model is the 24-Hour Knowledge Factory envisioned by Professor Amar Gupta. In the 24-Hour Knowledge Factory, work that is semi-structured in nature is partitioned across multiple time zones in three succinct 8-hour shifts. Work that is done in one time zone is worked on for eight hours. At the end of the first time zone’s work day, the work is succinctly passed on to another accounting team or department. This work is then further developed for an additional eight hours until it is eventually passed on to the original accounting department. By utilizing the 24-Hour Knowledge Factory, accounting firms and industry can take advantage of global talent, expertise, and entry to new markets. Although the 24-Hour Knowledge Factory focuses on a normal eight hour work day, its application can be applied in a less stringent hybrid method. For example, a particular hybrid method would be an audit team working at an audit engagement with support from a 24-Hour

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Knowledge Factory audit team.

Following SOX, the level of outsourcing of accounting related work has grown considerably. Although many firms are outsourcing work, eventually the cost saving from outsourcing work will diminish. In this scenario firms will shift from tactical costs saving decisions to allocating accounting work based on strategic long term planning. In this manner, the 24-Hour Knowledge Factory would allow firms to leverage talent from around the world.

VII. Conclusion

Over the next few years the outsourcing of accounting related services will accelerate in conjunction with the growth of the global BPO market. India will be the largest net beneficiary of this trend due to the competitiveness of India’s ITES sector. Currently, the growth of FAO will encourage more firms, both domestic and international, to consider outsourcing accounting related functions to the lowest-cost location where quality accounting skills and expertise are not sacrificed.

Just over the course of the past few years the sophistication and complexity of accounting tasks which were traditionally done in-house by accounting departments are now being performed by competent outsourcing vendors. This has taken the form of BPO vendors attracting transactional focused work along with BPO vendors partnering with European or American accounting firms to outsource accounting work. Although many accounting departments already outsource a significant portion or all of their accounting function, even the CFO or comptroller positions are capable of being outsourced. Although some sourcing firms feel uncomfortable with this arrangement, outsourcing firms such as Geller & Co. may be willing to absorb these positions. This is especially the case as firms become more and more specialized.

Following the passage of SOX, the huge increase in compliance work and the reduced profitability during the 2001 recession forced many companies to evaluate the long-term goals and purpose of their accounting departments. As a result, many companies have decided to outsource portions of their accounting department to service providers offshore. Small and medium sized firms are key examples of this trend because they disproportionately bear the cost of SOX compliance as compared to large firms. The cost driver of SOX compliance internal control work coupled with narrowing profitability makes outsourcing, despite an increase in perceived risk, a desirable option.

In conjunction with this rationale, several methods have been developed which have allowed for an academic study of whether firms should outsource accounting-related functions. The two methods—one (DEA) for small and medium firms, and another (TCE) for all firms—provide a framework for the future analysis of outsourcing decisions. Although both have controversial applications, they are a quantitative (DEA) and qualitative (TCE) method which have frequently been used.

Nonetheless, some limits persist on the outsourcing of accounting. These primarily are regulatory issues ranging from protection of intellectual property, information transfer restrictions, and accounting differences. The convergence of U.S. GAAP to IFRS to form a global accounting standard or IAS is one such hurdle. Although global markets are moving toward IFRS, it is unlikely that conversion issues will cease for at least a decade or so after the transition date of 2011. Until then, many companies will continue to have redundant accounting personnel in locations all over the world and may be reluctant to outsource work.

The trend to outsource accounting is leading to a strategic shift in what, where, and by whom accounting-related services are performed. Firms may begin to consider forming 24-Hour Knowledge Factories as quality accounting services abroad coupled with secure and reliable networks are increasingly becoming the norm. The accounting fields of auditing, tax, consulting, and financial planning may begin to see this occur in some variation or another. The public accounting industry may be the first to apply such a model because the big four firms, such as Deloitte and Ernst and Young already partition work both horizontal and vertical in nature between offices in the US and India.

Overall, firms will continue to outsource accounting-related functions as long as lower cost alternatives are available and quality is not sacrificed. The outsourcing and offshoring of accounting may have lagged behind the general BPO wave in IT, but FAO may soon become the most profitable portion of the BPO industry. As outsourcing vendors continue to offer services and assurances which transcend language, culture, and perceived risk, firms will continue to outsource accounting. Post SOX, it is only a matter of time until the majority of firms outsource or offshore accounting-related services to accounting service providers.
References


