

**THE ECONOMIC AND BEHAVIORAL EFFECTS OF OFFERING FINANCIAL  
REWARDS FOR INTERNAL WHISTLE-BLOWING**

by

**Bryan Richard Stikeleather**

B.A., Economics-Accounting, Claremont McKenna College, 2001

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This dissertation was presented

by

Bryan Richard Stikeleather

It was defended on

June 18, 2013

and approved by

John H. Evans III  
Katz Alumni Professor of Accounting  
University of Pittsburgh

Mei Feng  
Associate Professor of Business Administration  
University of Pittsburgh

Xi “Jason” Kuang  
Associate Professor of Accounting  
Georgia Tech University

Andrew H. Newman  
Assistant Professor of Accounting  
University of South Carolina

Dissertation Director: Donald V. Moser  
Professor of Business Administration and J.R. Allen Faculty Fellow  
University of Pittsburgh

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## **ABSTRACT**

### **THE ECONOMIC AND BEHAVIORAL EFFECTS OF OFFERING FINANCIAL REWARDS FOR INTERNAL WHISTLE-BLOWING**

Bryan Richard Stikeleather, PhD

University of Pittsburgh, 2013

I compare two approaches employers can use to induce workers to blow the whistle on internal misconduct such as co-worker theft. Employers can improve control over their resources and mitigate their substantial economic losses from internal misconduct if they can induce workers who observe such misconduct to report it. Prior research suggests that non-financial motivations drive worker whistle-blowing. Consistent with this perspective, employers in practice rarely offer workers explicit financial rewards for whistle-blowing but instead rely on workers' non-financial motivations to blow the whistle. My dissertation compares the economic and behavioral effects of this approach relative to offering workers an explicit financial reward for whistle-blowing.

My study examines whistle-blowing using both analytical and experimental research methods. First, I formulate an analytical model of whistle-blowing that integrates behavioral theory to help explain the conditions under which employers would prefer to induce whistle-blowing by relying on workers' non-financial motivation versus offering workers an explicit financial reward. I find that neither approach strictly dominates, but rather that the optimal approach depends on the social norms that govern the interactions between workers and employers. My model also predicts that the approaches are mutually exclusive, i.e., employers

will induce whistle-blowing by relying either on workers' non-financial motivations *or* on their financial self-interest, but not on both.

Second, I conduct experimental labor markets to determine whether employers can improve their welfare by offering workers an explicit financial reward for whistle-blowing and the behavioral consequences of doing so. I find that employers can induce more whistle-blowing and earn higher payoffs by offering workers explicit financial rewards for whistle-blowing, but that this comes at the cost of decreasing workers' non-financial motivation to blow the whistle.

My study contributes to the theoretical understanding of whistle-blowing and provides practical insights that will help employers decide whether to offer workers an explicit financial reward for whistle-blowing. In turn, this should help employers design better incentive contracts to induce whistle-blowing and improve their welfare. I also discuss some potentially fruitful avenues for future research on whistle-blowing that could extend the analytical and experimental findings documented in my study.

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## PREFACE

The next 100+ pages are in the formal academic style. I hope this provides me sufficient cover to write more informally here. I owe the individuals acknowledged below much more than mere thanks, but that is the only currency with which a poor graduate student can afford to pay his debts. The journey of a 1,000 miles begins with the first step. The journey to my doctorate also began with a first step—a step into a freezing afternoon in February in Pittsburgh with a jacketless Don Moser at my side, earnestly recruiting me for Pitt’s doctoral program in accounting. He gave excellent guidance then, and I am pleased to say he has given excellent advice ever since. Further, I expect he will continue to do so, even if unsolicited, until he passes to his eternal reward. He is a wonderful man, and I would not have lasted without him. I also want to thank Harry Evans, Mei Feng, Jason Kuang, and Drew Newman for serving on my committee, for their feedback, and for the formation they have given me as an academic. Carrie Woods and Chris Fedor also deserve high praise for all of their administrative support for our students. Without them, we students would be lost. I would also like to thank my friends and colleagues for their support, especially Patrick Martin and Michele Pulaski. Likewise, I also wish to thank Douglas J. Sisterton, the Deloitte Foundation, Jake Birnberg’s Research Fund, and the Dean’s Small Research Grant Program for their financial support. Most especially, I would like to thank my wife, Elissa, my children, and my parents for their emotional support and encouragement. Finally, I owe many thanks to St. Matthew (patron of accountants), Ss. Thomas Aquinas and Albert the Great (Patrons of students), and my guardian angel for their spiritual support.

## 1.0 INTRODUCTION

Workers who blow the whistle on co-worker misconduct, such as theft, mitigate their employers' losses and improve internal control over resources. Both academic researchers and corporate executives have actively discussed how to induce more workers to blow the whistle on such misconduct, with the general consensus suggesting that workers do so primarily for non-financial reasons (see, e.g., Miceli et al. 1991, Dozier and Miceli 1985, Miceli et al. 2008, and Barlyn 2011). Consistent with this, while employers could offer workers explicit financial rewards to blow the whistle, they instead generally rely only on workers' non-financial motivation to do so (Miceli et al. 2008). However, to induce more whistle-blowing, some employers are currently considering adopting formal programs that offer explicit financial rewards to workers who report misconduct (Barlyn 2011, Hirsch 2012). My dissertation compares the behavioral and economic effects of relying only on workers' non-financial motivation to blow the whistle versus offering workers an explicit financial reward to do so. Such a comparison can help employers make more informed decisions about whether they should offer workers a financial reward for whistle-blowing and what the consequences of doing so might be.

My study uses two complementary methodologies to compare each approach of inducing whistle-blowing. First, I draw on prior research on gift exchange and motivation crowding (further details provided below) to formulate a behavioral-analytical model of whistle-blowing

that helps to explain when and why employers will prefer to induce whistle-blowing by relying on workers' non-financial motivation or by relying on their financial self-interest. In brief, my model suggests that employers will prefer to rely on workers' non-financial motivations to blow the whistle under certain conditions but will prefer to offer financial rewards to induce whistle-blowing under other conditions. That is, neither approach to inducing whistle-blowing clearly dominates the other but rather the preferred approach depends heavily upon the social norms that govern interactions between employers and workers. My model also suggests that the approaches are mutually exclusive in that employers will rely on workers' non-financial motivations or their financial self-interest to blow the whistle, but not both.

Second, I conduct an experiment on whistle-blowing using the methods of experimental economics to provide empirical data about the relative effects of using each approach. The experiment incorporates strategic interactions between employers and workers in an experimental labor market in which employers earn higher payoffs by inducing their workers to blow the whistle. In practice, employers rarely offer explicit financial rewards for whistle-blowing, which limits our ability to use field data to draw inferences about the effects of doing so. Further, many confounds exist in the field that make it difficult to cleanly compare the two approaches. In contrast, conducting an experiment in a controlled laboratory setting allows me to isolate the effects of each approach on employer welfare and worker behavior. Thus, my study provides initial empirical evidence about (i) conditions under which employers could improve their welfare by offering workers explicit financial rewards for whistle-blowing and (ii) the behavioral consequences of offering workers such rewards. I find that employers can induce more whistle-blowing and earn higher payoffs by offering workers explicit financial rewards for whistle-blowing, but that this comes at the cost of decreasing workers' non-financial motivation

to blow the whistle. Thus, my findings suggest employers should carefully consider whether the benefit of offering an explicit financial reward to induce more internal whistle-blowing outweighs the potential cost of decreasing workers' non-financial motivation to help their employer.

My dissertation proceeds as follows. [Chapter 2](#) provides the background and motivation for my study by reviewing prior whistle-blowing research. Specifically, I review three streams of literature. First, I provide background on the institutional features of whistle-blowing, i.e., I review survey data on the frequency and determinants of whistle-blowing. This includes a review of relevant whistle-blowing research in organizational behavior, management, and social psychology. Most prior research on whistle-blowing views it as pro-social organizational behavior intended to improve employer welfare. Further, I discuss whistle-blowing practices currently observed in corporate and other economic settings. Important differences exist between inducing internal whistle-blowing as a private employer and inducing external whistle-blowing as a regulator or other third party. I discuss these differences and their implications for designing incentive contracts to induce *internal* whistle-blowing, which is the type of whistle-blowing my study addresses.

Second, I discuss relevant findings on work relationships based on *gift exchange*, in which employers pay wages above the market-clearing level (i.e., gift wages) and workers positively reciprocate by providing effort above the enforceable level or by performing other beneficial acts for their employer. Paying gift wages strongly increases workers' non-financial motivation to help their employer, which can include increasing workers' motivation to blow the whistle on co-worker misconduct. Further, experimental gift exchange settings have features that make them ideal for studying incentive contracts and whistle-blowing. I also discuss a novel

feature of my setting that extends prior work on gift exchange. Given that employers rarely offer explicit financial rewards for whistle-blowing, they might instead offer incremental gift wages to increase workers' non-financial motivation to blow the whistle.

Finally, [Chapter 2](#) also provides background on the psychological phenomenon of *motivation crowding*. Motivation crowding research suggests that offering financial rewards for pro-social behavior can actually decrease workers' other-regarding behavior by decreasing their intrinsic motivation to perform beneficial tasks for their employer while providing them with insufficient extrinsic motivation to do so. I discuss how concerns about motivation crowding might account for why employers in practice generally forgo offering explicit financial rewards for whistle-blowing. I also refer back to the idea of motivation crowding in [Chapter 3](#) when I develop my behavioral-analytical model of whistle-blowing and also in [Chapter 4](#) in the development of several of my research questions.

In [Chapter 3](#), I formulate a behavioral-analytical model of whistle-blowing within a principal-agent framework. I begin by first constructing a model based on conventional economic assumptions of human behavior (i.e., all individuals are self-interested wealth-maximizers). My conventional model predicts that workers will always blow the whistle at no cost to the employer, and, consequently, employers will never expend financial resources to induce whistle-blowing, either in the form of an explicit financial reward or in the form of a gift wage. I then extend the conventional analytical model by incorporating other-regarding behavior into the principal-agent framework. Ultimately, I derive conditions under which risk-neutral employers will prefer to offer a financial reward for whistle-blowing in lieu of a gift wage or prefer to offer a gift wage in lieu of a financial reward.

I find that neither approach to inducing whistle-blowing strictly dominates the other. However, my model predicts that the two approaches are mutually exclusive in that employers will offer a financial reward or a gift wage to induce whistle-blowing but will not offer both simultaneously. Because the conventional model suggests employers will never expend incremental financial resources in any form to induce whistle-blowing and that workers will nonetheless always blow the whistle, conventional economic explanations cannot account for any deviations I observe from this predicted equilibrium when I conduct my experiment. This, in turn, makes it more likely that the behavioral theory I integrate into the conventional model accounts for any such deviations (Brown et al. 2009).

[Chapter 4](#) develops the hypotheses and research questions that I test in my experiment. While I use the experiment to test certain predictions implied by the model I develop in [Chapter 3](#), I also use it to test other important features of whistle-blowing. Complex behavioral theory underlies workers' decisions about whether to blow the whistle on misconduct. Consequently, at times this complexity leaves me unable to form directional hypotheses because two behavioral forces may simultaneously influence behavior in opposite directions. Thus, I state several of the motivating questions of my study as research questions rather than as directional hypotheses.

[Chapter 5](#) presents the experimental design and procedures I use to test my hypotheses and research questions. Unlike most prior whistle-blowing studies, which use hypothetical scenarios, employers and workers in my study strategically interact while facing real financial consequences for their decisions. Employers make wage offers to workers for a fixed level of effort; probabilistically incur welfare losses from theft that only workers observe; and recover their losses if their worker blows the whistle (i.e, reports the theft). Employers can try to strengthen their worker's goodwill toward them by offering gift wages, which can induce more



whistle-blowing. Using two treatment conditions, I vary whether employers can or cannot also offer workers a financial reward for whistle-blowing (*Can Reward* condition vs. *Cannot Reward* condition). The *Cannot Reward* condition examines whether and how employers use gift wages to induce whistle-blowing in a setting similar to the natural context in that workers do not expect employers to offer them a financial reward for whistle-blowing. The *Can Reward* condition examines whether and how employers complement or substitute gift wages with explicit financial rewards to induce whistle-blowing. To test whether employers in these two treatment conditions offered incrementally higher compensation *specifically* to induce whistle-blowing, I use a third control condition identical to the *Cannot Reward* condition except that no theft or whistle-blowing can occur (*No W/B* condition). Any difference in the level of compensation employers offered between the treatment (*Can Reward* and *Cannot Reward*) and control (*No W/B*) conditions implies that employers expended financial resources specifically to induce workers to blow the whistle.

[Chapter 6](#) reports my experimental results. I find that employers in the *Can Reward* condition generally offered workers a financial reward for whistle-blowing, and those that did obtained a higher average payoff than employers in the *Cannot Reward* condition. As detailed below, this higher payoff occurred because employers offered similar levels of compensation across the two treatment conditions, but workers blew the whistle significantly more frequently in the *Can Reward* condition. Employers who offered a reward in the *Can Reward* condition offered a level of expected compensation (i.e., wage offer + the expected cost of the reward) similar to the level of expected compensation offered by their counterparts in the *Cannot Reward* condition (i.e., wage offer only), and thus employers' expected costs did not significantly differ based on the mix of incentives they used.

By comparing expected compensation levels in the *Cannot Reward* and *Can Reward* conditions to the level in the *No W/B* condition, I can determine whether employers offered higher levels of compensation specifically to induce whistle-blowing. I find that they did so in both conditions, but, consistent with my behavioral model's predictions, the form of the incremental compensation differed. Specifically, employers in the *Cannot Reward* condition offered higher wages than those in the *No W/B* condition, suggesting that they attempted to use incrementally higher gift wages to induce whistle-blowing. However, employers who offered a reward in the *Can Reward* condition did *not* offer higher average wages than employers in the *No W/B condition*. Rather, these employers on average relied solely on offering a financial reward to induce workers to blow the whistle.

Though employers offered workers similar levels of expected compensation across the *Can Reward* and *Cannot Reward* conditions, workers' whistle-blowing decisions differed significantly across the two conditions. Workers whose employer offered them a reward in the *Can Reward* condition blew the whistle on theft over twice as frequently as workers in the *Cannot Reward* condition. Thus, financial rewards motivated whistle-blowing more than gift wages. I also find that no worker in the *Can Reward* condition ever blew the whistle unless their employer had offered them a reward for doing so. This suggests that rewards change workers' perceptions of whistle-blowing from a pro-social to a self-interested act. Exploring this further, I find that offering a whistle-blowing reward crowds out the positive effect of offering higher gift wages on workers' whistle-blowing decisions. Consistent with motivation crowding, I find that workers' wages and perceived moral preference for whistle-blowing positively correlate with whistle-blowing in the *Cannot Reward* condition but not in the *Can Reward* condition. Thus, offering a reward induces more whistle-blowing than offering higher gift wages, but doing so

decreases workers' non-financial motivation to blow the whistle. Nonetheless, employers who offered an explicit financial reward still received higher payoffs relative to those in the *Cannot Reward* condition.

Finally, [Chapter 7](#) concludes my dissertation. I discuss the contributions and limitations of my study as well as potential future research to extend my findings. My dissertation provides new theoretical and methodological insights regarding whistle-blowing and also offers practical insights that senior executives may find useful when deciding whether and how to commit financial resources to induce whistle-blowing. I find that the effectiveness of expending financial resources to induce whistle-blowing depends upon the incentive approach employers adopt. Offering workers a higher level of gift wage increases their non-financial motivation to blow the whistle and positively affects whistle-blowing, but in my study it induces less whistle-blowing and results in lower employer welfare than offering workers a financial reward to blow the whistle. This suggests that, in certain settings, employers might benefit by offering workers an explicit financial reward for blowing the whistle—a practice rarely observed in current corporate practice but under consideration by some employers. However, as discussed further in [Chapter 7](#), employers must weigh any expected improvement in welfare from offering a financial reward against the potential costs of decreasing workers' non-financial motivation to perform beneficial tasks for their employer.

## 2.0 BACKGROUND AND MOTIVATION

### 2.1 OVERVIEW OF CHAPTER

My dissertation examines and compares two possible approaches employers can take to induce whistle-blowing. [Section 2.2](#) provides the broad motivation for my study. [Sections 2.3](#) through [2.5](#) provide further background motivation. First, [Section 2.3](#) provides some institutional detail with respect to the incidence and nature of *internal* misconduct and whistle-blowing within firms. Specifically, I review relevant surveys on internal misconduct and whistle-blowing as well as empirical and theoretical research on the determinants of whistle-blowing by researchers in organizational behavior, management, and social psychology. Further, I discuss practices related to motivating whistle-blowing in corporate and other economic settings and include illustrative examples of corporate and non-corporate practices designed to induce whistle-blowing. This section also discusses differences between inducing internal whistle-blowing as a private employer and doing so as a public regulator or other external third party.

Second, [Section 2.4](#) describes the phenomenon of *gift exchange*, in which employers pay wages above the market-clearing level and workers reciprocate by providing effort above the enforceable level. After briefly reviewing this literature, I explain how employers could possibly rely on gift exchange to induce whistle-blowing, and I also describe a novel feature of my setting that extends prior work on gift exchange.

Third, [Section 2.5](#) provides background on *motivation crowding*. Prior research in this area suggests that tying explicit financial compensation to desired behavior may actually

*decrease* rather than increase the level of the desired behavior. I discuss how this may help explain why employers generally do not offer explicit financial rewards for whistle-blowing.

## 2.2 MOTIVATION FOR DISSERTATION

Employers incur significant losses because their workers steal from them and commit other forms of misconduct. They also incur costs to prevent internal misconduct from occurring and to detect when it has occurred. For example, employers hire internal auditors and supervisors to review and monitor workers' actions; they employ technology such as cameras and inventory tracking devices; and they expend resources to develop policies about ethical workplace behavior and to train workers on those policies. Whistle-blowing constitutes a type of detective internal control, and it can help mitigate employers' losses by allowing them to learn which workers commit misconduct and how they do so. Employers may not need to expend any incremental financial resources to induce whistle-blowing if their workers have sufficient non-financial motivation to report misconduct. Alternatively, if workers possess insufficient non-financial motivation to blow the whistle, employers could expend financial resources to induce more of it. My dissertation examines two ways of doing this. First, employers could offer workers a gift wage (i.e., a fixed wage that exceeds the market-clearing level), which increases workers' *non-financial* motivation to blow the whistle and thus induces more whistle-blowing. Second, employers could offer workers an explicit financial reward for whistle-blowing, which increases workers' *financial* motivation to blow the whistle.

My dissertation examines and compares how relying on non-financial versus financial motivation to induce whistle-blowing affects employer welfare through their effect on workers' whistle-blowing behavior and employers' expected compensation costs. Given the economic

magnitude of employers' losses from internal misconduct and the potential to mitigate those losses through whistle-blowing, examining different approaches to inducing whistle-blowing is a timely and important research area. Prior whistle-blowing research has generally examined institutional and personal characteristics that influence whistle-blowing (Miceli et al. 2008). In contrast, my study examines and compares two different ways employers could expend financial resources to induce more whistle-blowing within a context that incorporates gift exchange and strategic interaction between employers and workers.

Employers rarely offer explicit financial rewards for whistle-blowing, and it remains unclear why they do not. The gift exchange literature suggests that workers report observed misconduct more frequently when their employers treat them fairly (e.g., Zhang 2008). Thus, employers may rarely offer whistle-blowing rewards because they believe doing so constitutes an inefficient use of financial resources. If employers already pay their workers gift wages, offering a financial reward may actually decrease employer welfare if the cost of rewarding whistle-blowers exceeds the incremental benefit from doing so. This would happen if employers pay rewards to workers who would have chosen to blow the whistle without receiving financial remuneration for doing so. As discussed later, it could also occur if a financial reward decreases worker's non-financial motivation to blow the whistle.

My study provides evidence about workers' natural inclination to blow the whistle under "optimal" conditions: workers possess anonymity, have assurance that they will suffer no retaliation from colleagues and that their employer will correct the misconduct, and cannot diffuse responsibility for whistle-blowing to other workers. I examine how the wages employers offer workers, a proxy for fairness (Zhang 2008), influences workers' whistle-blowing behavior. I also examine how offering workers an explicit financial reward for whistle-blowing affects

both their motivation to blow the whistle and employers' total costs. Employers often do not know the base rate of misconduct in their firm, especially with respect to white-collar crime. Thus, field data alone cannot isolate the incremental cost and benefit of various approaches of inducing whistle-blowing. Not only do financial incentives to blow the whistle affect whistle-blowing behavior, they may also indirectly affect the incidence of theft itself. Because of the noise inherent in field and archival data, an experiment is especially well-suited for comparing variation in employer and worker behavior across the two different approaches I study.

My dissertation mitigates potential confounds by holding constant the frequency (i.e., base rate) and magnitude of theft within the firm. This allows me to isolate the *direct* effect of each approach to induce whistle-blowing on the behavior of employers and workers. To the extent that offering an explicit financial reward or a gift wage induces relatively more whistle-blowing, it should also serve, indirectly, as a greater *deterrent* to theft. I do not incorporate this indirect deterrent effect into my study, which allows me to attribute any difference in the rate of whistle-blowing across approaches directly to each approach's ability to induce whistle-blowing. Comparing each approach under *ceteris paribus* conditions allows me to isolate and compare employers' ability to improve their welfare by increasing the incidence of whistle-blowing.

Models of whistle-blowing in the organizational behavior literature generally do not incorporate workers' preferences for wealth into workers' decision about whether to blow the whistle on misconduct or instead remain silent. Rather, these models generally assume that non-financial, pro-social motives drive whistle-blowing (Miceli et al. 2008). However, such assumptions stand in stark contrast to those found in conventional economic models, which assume financial self-interest primarily drives workers' behavior. Thus, conventional behavioral models of whistle-blowing generally incorporate no role for workers' financial self-interest while

conventional economic models generally incorporate no role for workers' non-financial motivation and other-regarding preferences. I attempt to bridge these two extremes by developing an analytical model that assumes workers possess both non-financial motivation to blow the whistle *and* preferences for more wealth. I then examine the implications of this model for employers wishing to induce whistle-blowing. As explained in [Chapter 3](#), my model suggests that employers will prefer to offer a financial reward in certain cases and a gift wage in other cases.

Employers can use my findings to make more informed decisions about how best, if at all, to use financial resources to induce whistle-blowing in their firm. Some employers are currently considering whether to offer workers a financial reward for whistle-blowing, and a small percentage of firms (< 10%) already do so (ACFE 2012). My findings should help employers considering whether to offer whistle-blowing rewards to assess the likely benefit of doing so, and it can also help them assess the cost-effectiveness of offering rewards to induce whistle-blowing relative to an alternative approach that relies on strengthening workers' non-financial motivation to blow the whistle.

## **2.3 MISCONDUCT AND WHISTLE-BLOWING WITHIN THE FIRM**

### **2.3.1 Internal Misconduct**

For the purposes of this study, I define *internal misconduct* as undesired actions workers commit to the detriment of employer welfare and about which employers wish to know so that they can recover their losses. Internal misconduct constitutes a specific type of employee wrong-doing. Miceli et al. (2008) define wrong-doing as “illegal, immoral, or illegitimate practices (activities and omissions).” Thus, internal misconduct constitutes wrong-doing committed by workers *that*



*harms the employer*—a key point because employers suffer loss as the *victims* of internal misconduct rather than derive benefits as the *perpetrators* of it. In my dissertation, I examine only internal misconduct rather than other types wrong-doing. Workers' concerns about retaliation for whistle-blowing often stem from cases in which their employer desires to perpetrate wrong-doing rather than prevent it or cases in which employers provide workers with insufficient protection against co-worker retaliation. Individuals who commit misconduct sometimes retaliate against those who blow the whistle either internally or to external parties such as regulators. Employers who countenance wrong-doing already know of its existence and do not want workers to report it to external parties because the misconduct benefits the employer at the expense of others such as investors or society. In contrast, I examine internal whistle-blowing to *employers* about misconduct committed by co-workers that *harms* employer welfare and about which employers want to know so that they can recover their losses.

Internal misconduct occurs frequently, carries high economic costs, and comes in a variety of forms. Miethe and Rothschild (1994), citing two earlier works (Coleman 1989, Hollinger and Clark 1983), explain that employee theft during the 1980's cost retail employers billions in stolen merchandise, adding an additional 2-4% to the cost of merchandise. More recently, a 2008 industry survey finds retailers lose as much as \$16 billion annually from worker theft (NRSS 2008), consistent with figures found in a follow-up 2012 survey (NRSS 2012). Specifically, the 2012 survey estimates retail inventory shrinkage, from both internal misconduct by workers and shoplifters, cost employers 1.41 percent (1.49 percent) of retail sales in 2011 (2010), at a cost of \$34.5 billion (\$37.1 billion) (NRSS 2012). Of this, employee theft constituted 43.9 percent of the total 2011 loss, or \$15.15 billion. A separate study estimates that 35%, or \$41.65 billion, of world-wide retail inventory shrinkage results from employee theft

(Centre for Retail Research 2011). Dickens et al. (1989) estimate employee theft may account for 5%-30% of business failures per year. Likewise, Willis (1986) estimates that, within the air cargo and freight shipping industries, employee theft constitutes 80% of employers' losses.

Asset misappropriation refers to the theft and misuse of cash or other assets, such as inventory, either directly or indirectly through skimming, larceny, billing and payroll schemes, fraudulent write-offs, check tampering, etc. In the Association of Certified Fraud Examiners' (ACFE) 2012 corporate fraud survey, firms report that asset misappropriation plays a role in over 85% of discovered cases of internal misconduct, potentially costing the typical firm 5% or more of its revenue each year (ACFE 2012). In 2011, Pricewaterhouse Coopers surveyed senior executives at 3,877 firms in 78 countries regarding economic crimes (i.e., crimes committed to deprive firms of money and/or property) and found 34% of all respondents (45% of U.S. respondents) reported discovering incidents of economic crime within the last 12 months. Of these, 56% report that inside jobs comprised the most serious incidents and 72% reported the crime related to asset misappropriation (PwC 2011).

Based on the available survey data, the average act of internal misconduct appears to have less economic significance than the average act of external misconduct, but it occurs much more frequently. Of the fraudulent schemes reported in its annual fraud survey, the ACFE (2012) finds the average estimated size of external financial statement fraud to be \$1 million per act versus \$120,000 per act for internal fraud from asset misappropriation. However, the survey also finds that financial statement fraud accounted for only about 8% of the total frauds reported to it, whereas asset misappropriation comprised over 85% of cases. Accurate estimates of the level of non-retail theft remain difficult to obtain because many employers never learn that their white-collar workers have committed internal misconduct. If formal anti-fraud measures and

other internal controls fail to prevent or detect internal misconduct, then employers may never learn that such misconduct has occurred. Likewise, even if, as in the retail industry, employers know the magnitude of losses from employee theft, the formal internal controls may still fail to prevent the losses. However, as discussed next, employers could possibly rely on a more informal control—whistle-blowing by workers who observe a co-worker’s internal misconduct and choose to report it to the employer.

Finally, employers incur significant costs not just from internal misconduct by their workers but also from the related costs they bear to implement preventive and detective controls related to preventing misconduct from occurring in the first place. Employers spend billions of dollars annually to prevent and detect internal misconduct (Dickens et al. 1989). Thus, for example, estimates on global loss prevention expenditures alone run to \$28.3 billion in 2011, including \$8.7 billion for security equipment and almost \$16 billion for loss-prevention employees (Centre for Retail Research 2011). Likewise, employers also incur significant costs from hiring internal auditors and supervisors to help detect and prevent internal misconduct.

### **2.3.2 Determinants of Whistle-blowing**

Prior to discussing some determinants of whistle-blowing, I first clarify what I mean by *whistle-blowing*. The standard reference text on whistle-blowing, Miceli et al. (2008), draw on earlier work by Near and Miceli (1985, p. 4) and define whistle-blowing as “the disclosure by organization members (former or current) of illegal, immoral, or illegitimate practices under the control of their employers, to persons or organizations that may be able to effect action.” The ability to “effect action” implies that employers can recover losses and prevent future acts of internal misconduct once they learn the identity of the wrong-doers or how misconduct occurs. For example, learning the identity of wrong-doers enables employers to stop the internal

misconduct simply by firing the wrong-doers, while learning how misconduct occurs allows employers to implement more effective controls over their resources and the actions of their workers.

Employers can learn about internal misconduct by inducing their workers to report any wrong-doing that they observe a co-worker commit. Co-workers often observe a colleague's internal misconduct but do not participate in it (i.e., do not collude). Thirty-four percent of U.S. workers surveyed by Labaton Sucharow (2011) report observing or having firsthand knowledge of workplace misconduct. Forty-five percent of workers in a 2011 survey on workplace behavior by the Ethics Resource Center ("ERC") report observing workplace misconduct such as theft, falsifying work hours, or misusing company resources within the prior year (ERC 2011a). Employers discover internal misconduct primarily through co-worker tips. The ACFE's fraud survey reports that for cases in which employers detected workplace fraud, over 43% of detections resulted from a tip, and over half of these tips (50.9%) came from workers (ACFE 2012). The 2011 PwC survey previously cited reports that 16% of respondents reported discovering economic crime as a result of tips/whistle-blowing by workers, down from 29% in 2005 (PwC 2011). A 2009 PwC survey reports that internal whistle-blowers provide U.S. employers with more information about economic crimes than all other internal controls combined (PwC 2009).

What causes workers to report observed misconduct? Prior studies typically suggest that workers blow the whistle *primarily* to aid others, even if the worker might also benefit personally from doing so (see, e.g., Dozier and Miceli 1985, Brief and Motowidlo 1986, Miceli et al. 1988, Brennan and Kelly 2007, Miceli et al. 2008, Xu and Ziegenfuss 2008, Seifert et al. 2010). This perspective also reflects commonly observed practice, in which a significant proportion of

workers blow the whistle despite the fact that they have no financial incentive to do so and may risk incurring financial costs in the form of retaliation by co-workers. Thus, for example, the 2011 ERC survey finds that 65% of workers who observed internal misconduct indicate they reported it, up from 53% who did so in 2005, even though 22% of these whistle-blowers reported experiencing some form of retaliation in return (ERC 2011a).<sup>1</sup> Almost every whistle-blower surveyed by the ERC (99.5%) claims to have reported observed misconduct because it was the “right thing to do” (ERC 2011b). Consistent with these responses, prior studies find a positive association between workers’ level of moral reasoning and their whistle-blowing decisions (Miceli et al. 1991, Xu and Ziegenfuss 2008, Liyanarachchi and Newdick 2009).

None of the most commonly cited reasons in the ERC survey for why workers remain *silent* about internal misconduct relate to the lack of financial incentives for whistle-blowing, which suggests that the potential for a financial reward has little salience to workers when deciding whether to blow the whistle.<sup>2</sup> Rather, workers cite four primary factors for why they remain silent: (i) a belief that no corrective action would occur; (ii) a fear of retaliation; (iii) concerns about a lack of anonymity; and (iv) a belief others would report the misconduct (ERC 2011b). As shown later, my experimental design controls for all of these factors, and thus they cannot explain my results.

Firms typically frame internal whistle-blowing as pro-social behavior that strengthens their ethical culture. Corporate codes of conduct also tend to emphasize protection for whistle-blowers from retaliation by others. For example, the cover of Proctor & Gamble’s worldwide

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<sup>1</sup> 69 percent of workers who observed misconduct in the form of theft say they chose to report it (ERC 2011a). However, this survey relies on self-reporting by workers, and thus fewer workers may have actually reported misconduct than those who claimed to have done so.

<sup>2</sup> The potential for a receiving a financial reward also does not appear to motivate workers deciding whether to blow the whistle on *external* misconduct to outside parties. Workers rate the potential for a financial reward as the factor least likely to motivate their external whistle-blowing decision, while rating the severity of the crime and the harm to others caused by keeping silent as most important (ERC 2011b).

business conduct manual says, “We do the right thing” and, later, “You also have a duty to our Company and your fellow P&Gers to report any known or suspected violations of our [conduct manual], Company policy, or the law. By making such a report, you are protecting the reputation and integrity of our Company, our Brands, and our People” (Proctor 2012).<sup>3</sup> Likewise, employers rarely offer workers an explicit financial reward for reporting misconduct (Miceli et al. 2008), which suggests that they adopt a pro-social approach toward inducing whistle-blowing.

In contexts other than employment settings, certain entities often choose to offer conditional financial incentives to induce whistle-blowing (i.e. offer a financial reward). This provides individuals with a strict financial incentive to report the wrong-doing that they observe. Less than 10% of firms offer workers an explicit financial reward for whistle-blowing (ACFE 2012), but the practice occurs quite frequently in other settings. For example, a worker can charge his employer with defrauding the government and can file a *qui tam* lawsuit on behalf of the government against the employer, which, if successful, gives the worker a 10% – 30% share in any settlement, penalties, or fines levied on the employer. Two recent archival studies find that workers blow the whistle more frequently in industries that rely heavily on government contracts (e.g., healthcare and defense) and thus offer a greater possibility of filing *qui tam* lawsuits (Bowen et al. 2010, Dyck et al. 2010). Likewise, the SEC, IRS, and Commodity Futures Trading Commission (CFTC) offer “bounties” that pay whistle-blowers 10%-30% of any fines or penalties collected by the regulator from a company as a result of the whistle-blower’s information (SEC 2012, IRS 2012, CFTC 2012).

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<sup>3</sup> Coca-Cola’s Code of Business Conduct states: “We all have an obligation to uphold the ethical standards of The Coca-Cola Company. If you observe behavior that concerns you, or that may represent a violation of our Code, raise the issue promptly” and “The Company values the help of employees who identify potential problems that the Company needs to address. Any retaliation against an employee who raises an issue honestly is a violation of the Code...” (Coca-Cola 2008).

The U.S. Department of Justice pays confidential informants up to \$25,000 per case and up to \$100,000 per year for providing “useful and credible information...regarding felonious criminal activities” (DOJ 2001). Crime Stoppers, a private organization devoted to fighting crime by eliciting tips from witnesses, pays individuals who provide tips a modest cash reward when their information leads to arrests. From 1976-2010, Crime Stoppers reports having paid \$93.8 million in rewards in exchange for information that led to the recovery of \$2.0 billion worth of stolen property, the seizure of \$7.9 billion worth of illegal drugs, and over 825,000 arrests (Crime Stoppers International 2010).

However, significant differences exist between the settings described above and internal whistle-blowing. Regulators and Crime Stoppers may offer whistle-blowers a financial reward because they have limited ability to foster the goodwill of individuals who have no recurring relationship with their organizations.<sup>4</sup> Likewise, if individuals fear retaliation for blowing the whistle, goodwill alone may not suffice to induce workers to report co-workers’ illegal deeds. In cases of *internal* misconduct, employers are the victims rather than the perpetrators of crime and thus would not want to retaliate against whistle-blowers. Further, employers can more easily protect internal whistle-blowers from retaliation by co-workers than the police can protect their informants from retaliation by external criminal groups. For example, employers can protect internal whistle-blowers from co-worker retaliation by firing the co-worker who has committed misconduct or by providing workers with access to anonymous reporting hotlines. Regulators may also offer a reward because external whistle-blowing typically involves mixed moral consequences. Some individuals may want to report corporate wrong-doing to regulators but believe that doing so could harm the innocent, such as when whistle-blowing causes innocent

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<sup>4</sup> Likewise, regulators may care less about the cost of a reward and thus more likely to offer one because the cost of the reward is often borne not by the regulator but by firms. Often, firms’ settlements with regulators include punitive fines and penalties, which can substantively cover the cost of a whistle-blowing reward.

shareholders to lose their life savings or costs innocent workers their jobs. These mixed moral consequences may lead workers to view remaining silent as morally appropriate. Consequently, regulators must overcome this by offering an explicit financial reward for workers who report misconduct. In contrast, employers can usually ensure that they do not harm the innocent members of their organization when they punish the guilty.

One recent survey finds 8.6% of U.S. firms surveyed offer financial rewards for internal whistle-blowers (ACFE 2012). Likewise, some firms are considering offering workers a reward for reporting misconduct, while others remain resistant (Barlyn 2011, Katz 2010). Recent articles in *Forbes* (Hirsch 2012, Kelton 2012) suggest firms *should* offer a reward to encourage workers to report co-worker misconduct: “Consider offering cash rewards for tips that save money through process improvement, as well as for tips that identify fraud, waste, and abuse” (Hirsch 2012). However, Joe Murphy, the director of public policy for the Society of Corporate Compliance and Ethics, argues that most whistle-blowers report misconduct not because of the influence of money but because “...they see something wrong with the company and want it fixed...Offering money is insulting...Make it clear you won’t retaliate. Then you won’t have to give people money” (Barlyn 2011). Consistent with this view, a 2010 PwC survey of representatives from 111 U.K. organizations found that when asked whether offering a cash reward program for whistle-blowing would encourage an open and transparent whistle-blowing culture, over 52.2% of all respondents either *disagreed* or *strongly disagreed* versus only 24.3% who either agreed or strongly agreed (PwC 2011b). This suggests that senior executives in many firms do not believe financial rewards would significantly improve workers’ whistle-blowing behavior.



## 2.4 PRIOR RESEARCH ON GIFT EXCHANGE

As described above, employers could induce workers to blow the whistle by offering them financial resources in the form of an explicit financial reward for whistle-blowing. However, rather than offer an explicit financial reward for whistle-blowing, employers could offer higher *fixed* wages. Doing so may increase workers' non-financial motivation to blow the whistle by increasing their goodwill toward the employer. As described below, offering workers high fixed wages increases their non-financial motivation to help their employer, which can improve employer welfare. Thus, employers could expend financial resources in the form of an explicit financial reward to increase workers' *financial* motivation to whistle-blow and/or could offer higher fixed wages to increase workers' *non-financial* motivation to blow the whistle. This section examines the latter approach.

Like any other factor of production, labor has a market-clearing price. Under conventional economic theory, the quantity of labor that workers supply and the quantity employers demand converge at an equilibrium price, or "market-clearing wage," at which all employers who wish to hire workers at the market wage can do so and all workers who wish to provide labor in exchange for the market wage can also do so. Consequently, no unemployment should exist (see, e.g., Nicholson 2005). However, in contrast to this prediction, some employers pay wages above the market-clearing level even though they could hire sufficient workers at the market wage (Krueger and Summers 1988, Dickens and Katz 1986a, Dickens and Katz 1986b), while simultaneously we observe persistent unemployment in the labor market.

Akerlof (1982) first proposed the idea of labor market gift exchange to help explain this phenomenon. He theorized that a norm of reciprocity could help explain why employers paid wages in excess of the market-clearing level, or "gift wages." Specifically, he theorized that

employers could offer workers gift wages, and, in exchange, workers would provide effort that exceeds the minimum enforceable level as a way to reciprocate the gift wage. Experimental economists have thoroughly documented gift exchange in laboratory settings (see, e.g., Charness and Kuhn 2011, Fehr et al. 1993, 1997, 1998, Anderhub et al. 2002, Hannan et al. 2001). This documentation also includes settings with multiple workers (Charness and Kuhn, 2007, Choi 2012, Gächter et al. 2012, Abeler et al. 2011, Maximiano et al. 2007), and, to a weaker extent, field studies (Bellemare and Shearer 2009, Chen and Sandino 2012, Cohn et al. 2012, Dellavigna 2009, Falk 2007, Gneezy and List 2006, Kube et al. 2006, 2012). These studies typically find that gift exchange results in greater employer *and* worker welfare relative to that predicted using conventional economic theory. Thus, gift exchange can result in social welfare improvements, including Pareto optimal social welfare improvements (Charness et al. 2004, Charness and Kuhn 2011, Kuang and Moser 2009).

Employers also self-select into offering gift wages even when they could offer a theoretically optimal “forcing” contract (Kuang and Moser 2009). Thus, employers appear to recognize the mutually beneficial exchanges that can take place when they deviate from theoretically optimal self-interested behavior and instead offer workers gift wages. Further, most of the studies cited earlier use single-period interactions between employers and workers. Thus, reputational concerns cannot account for gift exchange, but rather gift exchange must arise from underlying norms of reciprocity not considered by conventional economic theory.

Gift exchange also helps to explain why stark wage disparities may exist between two closely matched competitors. For example, Costco pays its workers an average wage of around \$17 per hour versus only \$9.86 - \$11.52 per hour paid by Sam’s Club, its primary competitor (Cascio 2006). Offering a higher wage provides Costco with many incremental benefits as a

result of the voluntary tasks its workers perform to reciprocate their wages. As Cascio (2006) states, “In return for its generous wages and benefits, Costco gets one of the most loyal and productive workforces in all of retailing—and, probably not coincidentally, the lowest shrinkage (employee theft) figures in the industry.” Thus, gift wages can provide multiple unobservable benefits to employers besides higher levels of effort. In sum, certain employers, such as Costco, exploit gift exchange to improve their welfare in multiple areas. As discussed below, gift wages could possibly yield incremental benefits to employers by inducing whistle-blowing; offering workers generous gift wages increases their loyalty and goodwill toward their employer, which in turn could increase whistle-blowing on internal misconduct.

In addition to influencing the level of non-contractible effort that workers provide, offering a gift wage also correlates with lower rates of worker theft (Greenberg 1990 and Chen and Sandino 2012), more honest reporting by managers (Zhang 2008), and higher levels of whistle-blowing on dishonest peers (Zhang 2008).<sup>5</sup> Thus, offering a gift wage can induce more whistle-blowing. Firms may forgo offering a reward for whistle-blowing because they believe maintaining a good working relationship with their workers, which gift wages help foster, makes offering a reward unnecessary. Further, if workers have other non-financial preferences to report misconduct, such as their personal morality, a financial reward may result in employers needlessly bearing incremental costs to reward whistle-blowing that workers would otherwise have provided at no cost to the employer.

My dissertation introduces a novel feature into the standard gift exchange context. In prior gift exchange settings, employers and workers have misaligned financial incentives.

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<sup>5</sup> Zhang (2008) compares the effect of offering a gift wage while holding constant all other forms of compensation. This study, in contrast, compares the interactive effect of both the level and the form of compensation offered to workers. Likewise, Zhang’s (2008) setting focuses on preventing collusion among managers. In my setting, managers cannot collude and, unlike Zhang’s (2008) setting, obtain no possible financial benefit from remaining silent about the misconduct they observe.

Employers benefit financially when they induce their workers to take a desired unobservable action, such as providing higher effort, but workers do not find it in their financial interest to do so. Gift wages help mitigate the negative effects of such a misalignment by strengthening workers' non-financial concern for their employers' welfare. This in turn makes workers more willing to make costly sacrifices to help their employer (Akerlof 1982). Thus, offering a gift wage increases workers' propensity to provide costly, unobservable effort; to forego profitable collusion in the form of budgetary slack (Zhang 2008); and to temper opportunistic thefts of inventory and cash (Chen and Sandino 2012).

In my setting, no conflicting incentives exist between employers and their workers, and thus no conventional principal-agent problem exists to overcome. Workers incur neither gains nor losses from a co-worker's misconduct. Rather, they observe any misconduct that occurs but do not participate in it, which, as described earlier, mirrors situations commonly encountered in the natural setting.<sup>6</sup> Further, workers in my setting incur no financial cost to blow the whistle. As such, no financial disincentive exists to discourage workers from reporting observed misconduct.

As discussed in more detail later, the lack of conflicting financial incentives between employers and workers makes it unclear whether employers will choose to expend any incremental financial resources specifically to induce whistle-blowing. The fact that workers have no financial disincentives to blow the whistle makes whistle-blowing an inherently pro-social activity that can only increase social welfare in a Pareto optimal fashion. Consequently, given that whistle-blowing makes Pareto improvements in social welfare, both conventional

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<sup>6</sup> In Zhang's (2008) study, whistle-blowing occurs in the context of a prisoner's dilemma between managers, who must decide whether to collude together to commit misconduct or blow the whistle. In order to prevent collusion from occurring, the firm relies on a mutual monitoring incentive contract that provides whistle-blowers with a reward in addition to their base wages.

economic theory and pro-social organizational models of whistle-blowing suggest workers will voluntarily choose to blow the whistle to their employer without demanding that their employer offer them an explicit financial reward for doing so.

## **2.5 PRIOR RESEARCH ON MOTIVATION CROWDING**

### **2.5.1 Motivation Crowding Theory**

This section provides background on the relationship between financial and non-financial motivation for behaving pro-socially. Individuals behave as they do for many reasons. In the present context, for example, workers may have moral preferences to blow the whistle and, if employers offer a financial reward for whistle-blowing, also have a financial incentive to do so. Prior research examines the effect on other-regarding behavior of having both a financial and a non-financial incentive to behave pro-socially. Conventional economic theory, which has not historically incorporated other-regarding preferences into individual utility functions, suggests that offering financial incentives for behaving pro-socially should only (weakly) increase the incidence of pro-social behavior and should never decrease it. As such, offering a nominal reward should induce complete whistle-blowing because even a small reward provides workers with a strictly positive financial incentive to blow the whistle.

In this section, I review prior studies in experimental economics that suggest that offering conditional financial incentives for behaving pro-socially can have perverse effects. These studies find that conditioning financial incentives on pro-social behavior can actually *decrease* individuals' willingness to behave pro-socially, a phenomenon known as *motivation crowding*. As such, offering financial incentives can “crowd out” non-financial motivations. In other words, while offering financial incentives has a *direct positive* effect on pro-social behavior

because individuals value wealth, it also has an *indirect negative* effect on behavior because financial and non-financial motivations appear to act as substitutes for one another rather than as complements. Thus, the cost employers incur to overcome this substitution effect may outweigh the incremental benefit they receive from providing financial incentives for pro-social behavior such as whistle-blowing. If workers frequently blow the whistle for no explicit financial reward, then little reason exists to offer them one. If, however, workers have weak non-financial motivation to whistle-blow, even in cases in which they remain financially indifferent to whistle-blowing versus remaining silent, then offering a reward might actually increase employer welfare by inducing more whistle-blowing. The key issue in such cases is the direct *and* indirect cost of using financial incentives to motivate pro-social behavior. Below, I discuss the motivation crowding literature further and consider it as a possible explanation for why employers rarely offer workers explicit financial rewards for whistle-blowing.

Gneezy et al. (2011) suggest that financial incentives affect human behavior both directly, through individuals' utility for wealth, and also indirectly via psychological mechanisms that affect individual's non-financial motivation. Thus, for example, financial incentives can decrease the strength of a social norm of reciprocity between employers and workers. As Gneezy and Rustichini (2000a) explain:

“A...social norm that may be undermined by monetary compensation is reciprocity. Suppose that an action is originally performed in return for a previous benefit, but that money is paid for it. Then the compensation rather than the reciprocity will probably be taken as a motivation for that action. The incentive for reciprocity is destroyed, and the action becomes less appealing on its own merits.”

Titmuss (1971) argued that offering financial payment to blood donors for blood donations could lower their willingness to donate blood because it “crowds out” their non-financial motivation to do so. Since Titmuss' work, economists have developed a significant stream of

literature, especially in the last 15 years, that examines how financial incentives that reward (penalize) a certain behavior can actually decrease (increase) the frequency of the behavior (see, e.g., Bowles 1998, Frey and Jegen 2001, and Bowles and Polania-Reyes 2012 for surveys). Bowles and Polania-Reyes (2012) provide a concise and accurate description of “crowding out”:

“Explicit economic incentives designed to increase contributions to public goods and to promote other pro-social behavior sometimes are counterproductive or less effective than would be predicted among entirely self-interested individuals. This may occur when incentives adversely affect individuals’ altruism, ethical norms, intrinsic motives to serve the public, and other social preferences” (Bowles and Polania-Reyes 2012).

Crowding out occurs when financial and non-financial motivation act as substitutes rather than as complements for each other. Bowles and Polania-Reyes (2012) survey 50 experimental studies in economics regarding crowding out and find substantial evidence that crowding out occurs in both field settings (Gneezy and Rustichini 2000b) and laboratory settings, including in laboratory gift exchange settings (Fehr and Schmidt 2007, Fehr et al. 2007, Dickenson and Villeval 2008, Stanca et al. 2009, Fehr and Gächter 2002, Houser et al. 2008, Irlenbusch and Sliwka 2005, Gächter et al. 2011).<sup>7</sup> Based on their survey of the literature, Bowles and Polania-

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<sup>7</sup> Of the gift exchange studies cited, two deserve further mention. Fehr and Schmidt (2007) allow employers to offer one of two contract types. Employers may either (i) announce an unenforceable bonus payable subject to providing a desired level of unenforceable effort or (ii) use a combined contract that couples the unenforceable bonus with a fine that workers probabilistically incur if they shirk. They find that most employers forgo the combined contract in favor of the bonus contract. This results in greater social welfare and worker payoffs at no significant decrease in profit for the employer or decrease in worker effort. Likewise, workers perceive that employers “who are less fair are more likely to choose a combined contract and are less likely to pay the announced bonus” (Bowles and Polania-Reyes 2012). This is consistent with the idea that the employer’s choice in how to structure financial incentives provides workers with information about the employer’s beliefs and motivations. Irlenbusch and Sliwka (2005) find evidence that introducing piece rates into compensation functions can alter both employer and worker perceptions of the job situation. In one condition of their study, employers offer a fixed wage “trust” contract for effort, whereas in the other condition employers can supplement the fixed wage with a variable “piece-rate” contract. They find that workers offered the piece-rate contract provide *lower* levels of effort, and this effect continues even after a fixed wage contract replaces the piece-rate contract. When employers must offer only the fixed-wage contract, workers provide significantly more effort and employers obtain significantly higher profits relative to when employers can choose which contract to offer. Irlenbusch and Sliwka (2005) conjecture that choosing an incentive scheme may “lead agents to adopt an individual maximization frame under which individuals tend to focus on the maximization of current payoffs rather than a cooperative frame, where they may be guided towards a more cooperatively oriented or reciprocal behavior.”

Reyes (2012) propose three related reasons for *why and when* motivation crowding occur, which are consistent with those given by Frey and Jegen (2001). Each of these reasons assumes individuals have state-dependent preferences to some extent, which means that individuals' preferences, including their other-regarding preferences, vary depending upon the type of social situation in which they find themselves.

First, motivation crowding can occur when individuals feel a loss of autonomy and put upon or boxed in to a decision (see James 2005). Thus, for example, if individuals believe anti-littering laws that impose fines for littering restrict their personal autonomy too much, then such laws can actually induce *more* littering, i.e., more anti-social behavior. However, financial rewards provide a financial incentive for *voluntary* pro-social behavior rather than a financial disincentive that penalizes anti-social behavior. Thus, when considering the possible effect of offering a financial reward for whistle-blowing, concerns about restricting personal autonomy appear less pertinent because workers' welfare remains unchanged if they remain silent and only increases if they blow the whistle.

Second, and of more pertinence, offering financial incentives can influence individuals' beliefs about the intentions of the one offering the financial incentive, which in turn can influence subsequent decisions. Thus, for example, using a two-person (A and B), two-stage symmetric gift exchange setting, Stanca et al. (2009) show that B exhibits weaker levels of positive reciprocity toward A when B believes that strategic concerns rather than generosity motivate A's initial decision. In short, individuals exhibit less positive reciprocity when they believe strategic self-interest rather than genuine selflessness motivates another's generosity. In the context of whistle-blowing, employers who offer workers a financial reward for whistle-blowing may signal to those workers that they believe the workers lack sufficient non-financial



motivation to report wrong-doing and will do so only if they receive explicit financial compensation in return. Such a signal might result in a self-fulfilling prophecy. This is especially true if, as some claim (Hirsch 2012), workers would view offers of reward money as “insulting.”

Third, financial incentives can influence how individuals perceive the social setting that governs their interactions with others, which can influence the actions individuals consider socially appropriate or normal (see also List and Levitt 2007 and Fiske 1992). Fiske (1992) proposed that four elementary social settings govern most social interaction among humans; (i) communal, (ii) authority ranking, (iii) equality matching, and (iv) market pricing. Of these four, I focus on equality matching and market pricing, the two settings most pertinent to this study. Interactions marked by equality matching are guided by the perceived fairness with which individuals in the interaction treat each other. As Fiske (1992) states, “The idea is that each person is entitled to the same amount as each other person in the relationship, and that the direction and magnitude of an imbalance are meaningful.” Social interactions under equality matching tend rely heavily on a balanced notion of reciprocity among individuals. Thus, social norms that encourage the payment of gift wages and discourage offering financial rewards signal that equality matching should govern social interactions and therefore the norm of reciprocity should apply.

In contrast, individuals typically quantify social interactions governed by market pricing norms, often in monetary fashion. In these cases, individuals do not rely on reciprocity but rather on financial incentives to get what they want from others. Thus, offering an explicit financial reward for whistle-blowing quantifies how much an employer values a whistle-blower’s information and communicates to the worker the employer’s belief about the level of money required to purchase the desired information. Offering an explicit financial reward

implies that that social norms of market pricing should govern workers' whistle-blowing decisions rather than those of equality matching. As such, the potential to receive a financial reward may drive workers to behave more self-interestedly than they would have had the employer not offered a financial reward.

Cynicism generally wins when uncertainty exists about whether workers behave pro-socially for reasons of personal gain or due to concern about their employer's welfare. Benabou and Tirole (2006) argue that, "agents' pro-social behavior...reflects an endogenous and unobservable mix of three motivations: *intrinsic*, *extrinsic*, and *reputational*, which must be inferred from their choices and the context." Offering an explicit financial reward for whistle-blowing makes it difficult for a worker and employer to interpret whether intrinsic pro-social motives or financial opportunism motivated the worker to blow the whistle. This in turn clouds workers' true motivation. As Benabou and Tirole (2006) explain, "rewards amplify the noise, leading observers (or a retrospecting individual) to attribute less of a role to intrinsic motivation in explaining variations in behavior."

Employers do not need to offer workers a financial reward in order for workers to believe that market pricing social norms should govern their whistle-blowing decisions. Within experimental contexts, List and Levitt (2007) argue that the design of participants' choice sets (i.e., experimenter's decisions about the options available to participants and the choices they can make in the experiment) can affect how participants interpret the social norms that should govern their interactions and decisions. Consequently, manipulating whether employers have the *ability* to offer workers an explicit financial reward for whistle-blowing may significantly influence how individuals perceive the social norms governing whistle-blowing and subsequently how they behave when they observe misconduct. Within an experimental context, simply *allowing*

employers to offer a financial reward could cause both employers and workers to believe that offering a whistle-blowing reward is socially normative behavior, which in turn would lead employers to offer financial rewards and workers to expect them in exchange for whistle-blowing.

As described in [Section 2.3](#), researchers commonly view whistle-blowing primarily as pro-social behavior intended to help others. Thus, employers might not offer workers whistle-blowing rewards because, while financial rewards increase workers' financial motivation to blow the whistle, explicitly rewarding whistle-blowing could crowd out workers' non-financial motivation. With severe crowding out, employers could suffer one of two negative outcomes by offering financial rewards for whistle-blowing. First, they could induce less whistle-blowing by offering an insufficient financial reward to overcome the negative effect of crowding out on workers' willingness to whistle-blow. Second, offering an explicit financial reward could induce similar or higher levels of whistle-blowing relative to not doing so, but employers could also find the level of reward required to overcome crowding out exceeds the incremental financial benefit attributable to inducing more whistle-blowing. In sum, offering token rewards may induce less whistle-blowing than offering no reward at all, and, if workers are especially greedy, employers may find that the level of reward necessary to increase whistle-blowing exceeds the incremental benefits obtained.

### **2.5.2 Alternative Arguments Against Offering Whistle-blowing Rewards**

Besides conventional economic agency theory and the motivation crowding theory reviewed above, several other explanations might explain why employers rarely offer whistle-blowing rewards. I now briefly discuss these alternative explanations and why I have chosen not to focus on them in my study. First, many employers may lack sufficient resources or expertise to

administer a formal whistle-blower reward program. Such a constraint would result in a social setting similar to the *Cannot Reward* condition I study, in which employers cannot offer a whistle-blowing reward and workers do not expect them to do so. However, this explanation appears less plausible when considering the significant financial resources employers expend to combat misconduct. Further, if this explanation actually drove employer behavior, we would expect employers with significant financial resources at their disposal and greater administrative expertise to be more likely to offer explicit financial rewards for whistle-blowing. However, employers generally do not offer such rewards regardless of their size.

Second, if firms incur significant costs to investigate allegations of misconduct, employers may not wish to offer whistle-blowing rewards for fear that doing so will encourage workers to make baseless or “weak” allegations in the hope of obtaining a reward. However, if workers only receive a reward when employers make a recovery, then this mitigates concerns about baseless allegations because workers have no financial incentive to falsely accuse a colleague of misconduct. Further, employers can always threaten to penalize workers who make baseless allegations, which should deter baseless allegations. What about cases in which the worker has less than perfect certainty that misconduct has occurred, but nonetheless has suspicions? Employers could design a mix of rewards and penalties to ensure that such workers only blow the whistle when they possess a certain amount of confidence in the quality of their private information about misconduct. While introducing penalties complicates incentive contracting and likely distorts the level of whistle-blowing away from the first-best, this fact alone seems unlikely to account for why employers would forgo offering workers explicit financial rewards for whistle-blowing.

Third, employers may worry that offering a reward will distort workers' effort allocation and use of time away from other desired tasks. To the extent that workers must exert costly effort to observe misconduct or choose to devote time to "snooping around" to uncover it, employers may have concerns that this will result in too little effort and time spent on other productive activities that the employer values. As pointed out by Holmstrom and Milgrom (1991), the structure of workers' compensation influences not just how much time and effort they expend on their jobs, but also how they choose to *allocate* their time and effort. In some cases, distortions in the allocation of effort can lead employers to choose not to condition compensation on a desired behavior, such as whistle-blowing, even if they could do so. This explanation is more compelling than the preceding alternatives. However, it has two weaknesses. First, employers can adjust the level of any whistle-blowing reward to mitigate undesired distortions in effort allocation. If employers worry that rewarding whistle-blowers will result in workers expending too much effort to detect misconduct, then they can decrease the level of financial reward relative to other areas of compensation for the worker. However, decreasing the level of reward does not imply that employers should forgo offering rewards entirely. Second, employers generally do not offer whistle-blowing rewards even in settings with fairly complete contracting. Thus, even when little uncertainty exists concerning how workers allocate effort, employers still do not appear to offer whistle-blowing rewards.

Fourth, employers may also have concerns that financially rewarding pro-social behavior will weaken their reciprocal relationship with workers. Kuang and Moser (2009) find that a reciprocity-based incomplete contract can lead to as high a firm profit as one that relies on a theoretically optimal complete contract. As described earlier in this chapter, employers can obtain many positive benefits from fostering a reciprocity-based work environment besides

whistle-blowing (see Cascio 2006). If an employer has chosen to use incomplete contracts and to rely on a reciprocity-based work environment, the employer may worry that offering financial rewards for whistle-blowing will lead workers to expect contingent financial remuneration for acting pro-socially in other domains, such as providing unobservable effort. However, many firms do not rely heavily on reciprocity-based incentive contracts, and thus this explanation does not account for why these firms forgo offering whistle-blowing rewards. Likewise, many employers often rely on a mix of both fixed and conditional financial incentives to induce desired behavior. Thus, it appears that fixed compensation in one domain can co-exist with conditional compensation in other domains.

My study's experimental design rules out each of these four alternative explanations for why employers might not offer financial rewards for whistle-blowing. First, employers incur no cost to investigate allegations of misconduct, and no other transaction costs exist that would preclude them from offering explicit financial rewards for whistle-blowing. Second, workers know with certainty when misconduct occurs, and employers' investigations into misconduct reveal it with certainty. Third, workers who accept their wage offer in my study provide a fixed level of effort. Thus, offering a reward cannot distort workers' effort allocation. Fourth, once workers accept a wage offer, their only other choice is whether to blow the whistle when they observe misconduct. As such, offering a reward for whistle-blowing cannot affect workers' expectations about how employers should compensate them for other tasks because they perform no other task once they accept the wage offer.

## 3.0 AN ANALYTICAL MODEL OF WHISTLE-BLOWING

### 3.1 OVERVIEW OF CHAPTER

In this chapter, I develop analytical theory that incorporates gift exchange, motivation crowding, and whistle-blowing into one model. I begin in [Section 3.2](#) with a brief overview of the experimental setting I use later to test my hypotheses and research questions. I then derive equilibrium predictions under conventional economic assumptions of behavior. Specifically, I assume employers and workers are fully rational, self-interested, wealth-maximizing economic agents.

Then, in [Section 3.3](#), I extend the analysis by incorporating behavioral theory into the setting, which incorporates other-regarding, non-financial preferences into individual utility functions. This in turn leads to a role for both explicit financial rewards and for gift wages. I derive equilibrium conditions under which an employer would prefer to rely on one approach versus the other (i.e., on a financial reward versus a gift wage) to induce whistle-blowing. I formulate a behavioral model in order to incorporate insights from psychology and behavioral economics into a classic analytical framework. The analysis proceeds in a non-technical fashion without formal lemmas or technical proofs. Nonetheless, the analysis should provide readers with greater insight into the social dynamics between employers and workers that affect whistle-blowing. These social dynamics in turn affect an employer's optimal approach to induce whistle-blowing. However, difficulty in mathematically quantifying the magnitude of behavioral effects limits the analysis, which in turn makes it difficult at times to clearly predict behavior.

Nonetheless, my behavioral model provides a good foundation that allows a greater understanding of the hypotheses and research questions I subsequently develop in [Chapter 4](#).

## **3.2 EXPERIMENTAL SETTING AND DERIVATION OF CONVENTIONAL ECONOMIC PREDICTIONS**

### **3.2.1 Experimental Setting**

My experimental setting consists of one benchmark condition and two treatment conditions (i.e., a 1 x 3). Neither internal misconduct nor whistle-blowing can occur in the control condition (*No W/B* condition). However, in the two treatment conditions (*Cannot Reward* and *Can Reward* conditions), employers probabilistically suffer loss from an internal theft that their workers privately observe. If workers choose to blow the whistle, then their employers recover the amount stolen with certainty; however, if workers choose to remain silent then their employers never know that a theft occurred nor do they recover their losses. Workers can report theft only when a theft actually occurred (i.e., no false allegations allowed).

In all three conditions, employers select a wage to offer their workers in exchange for a fixed level of productive effort and can choose to offer a wage above workers' cost of effort (i.e., a gift wage). In the treatment conditions, such gift wages may promote goodwill and supplement workers' pre-existing non-financial motivation to whistle-blow. In the *Cannot Reward* condition, employers offer their worker a wage only, whereas in the *Can Reward* condition employers offer their worker a wage but, in addition, can also credibly offer a financial reward for whistle-blowing if they wish.

In the both the *Cannot Reward* and *Can Reward* conditions, workers who observe theft can blow the whistle or remain silent and bear no financial cost, such as from retaliation, if they do blow the whistle. Whistle-blowers in the *Cannot Reward* condition receive no financial



benefit from reporting theft, but whistle-blowers in the *Can Reward* condition receive any financial reward offered by their employer. Thus, employers in the *Cannot Reward* condition must rely on workers' non-financial motivation to induce whistle-blowing because the lack of reward makes workers financially indifferent between blowing the whistle and remaining silent. In contrast, employers in the *Can Reward* condition can rely on workers' non-financial motivation, financial self-interest, or on some combination of the two to induce whistle-blowing. The *No W/B* and *Cannot Reward* conditions differ only with respect to whether theft and whistle-blowing can occur, whereas the *Cannot Reward* and *Can Reward* conditions differ only with respect to the possibility of offering/receiving an explicit financial reward for whistle-blowing.

The *Can Reward* condition has the benefit of allowing employers to decide how to structure workers' incentives to induce whistle-blowing and maximize welfare. However, employers' decisions about how to structure whistle-blowing incentives may be unnaturally salient to employers and workers. Levitt and List (2007) argue that the decisions participants make within laboratory settings can affect their perceptions about what constitutes normatively appropriate behavior (see also Bardsley 2005 and List 2007 for related empirical evidence). As explained earlier, employers rarely offer whistle-blowing rewards in practice and workers neither encounter them as part of their job nor do they appear to expect them. Thus, while the *Can Reward* condition reflects the natural setting in allowing employers to decide how to structure whistle-blowing incentives, the salience of this decision could cause employers and workers to view a whistle-blowing reward as expected. As such, I expect that many employers in the *Can Reward* condition will choose to offer a reward, even though they can forgo doing so. To provide a realistic benchmark against which to compare behavior in the *Can Reward* setting, I use the *Cannot Reward* condition. Participants in this condition receive no mention of the

possibility of a financial reward for whistle-blowing nor can they offer/receive such a reward. Thus, similar to the current natural setting, a financial reward plays no role in the social interactions between employers and workers, and instead non-financial motivation, such as worker goodwill toward the employer, drives workers' whistle-blowing decisions.

Linking back to concepts developed in [Chapter 2](#), these two treatment conditions in effect manipulate whether a social norm of market pricing (*Can Reward* condition) or equality matching (*Cannot Reward* condition) governs interactions between employers and workers with respect to whistle-blowing. That is, employers in the *Can Reward* condition quantify the value they believe workers are willing to accept in exchange for providing information about misconduct, and workers who observe theft either “accept” the employer’s offered price (i.e., the reward) by blowing the whistle or reject it by remaining silent. This leads to a norm of market pricing in which employers and workers explicitly negotiate the exchange of information for money as two self-interested parties. In contrast, workers’ provision of information about misconduct in the *Cannot Reward* condition is not predicated upon the receipt of money, but rather on workers’ non-financial motivation to blow the whistle, which employers can strengthen by paying generous wages. As such, because employers do not explicitly quantify the value of workers’ information about theft nor exchange money for it, this condition fosters a social norm of equality matching as opposed to market pricing.

### **3.2.2 Derivation of Conventional Economic Predictions**

I now derive the economic equilibrium for all three conditions using conventional economic assumptions of human behavior. Specifically, I assume that individuals are rational, self-interested, and wealth-maximizing. I also assume that only two arguments comprise individual utility functions; utility for wealth and disutility for providing costly effort. Further, I assume

these two arguments are additively separable in any individual's utility function. Recent work (e.g., Henrich et al. 2001) suggests that these two assumptions have limited generalizability to the natural setting and that other inputs besides wealth and effort aversion often factor into individual utility functions. These other inputs may include other-regarding preferences such as preferences for fairness or reciprocity (Fehr and Gächter 2000).

Despite these potential concerns about generalizability, deriving equilibrium predictions using conventional economic theory remains a useful exercise. Such derivations strengthen my study's internal validity because it ensures that conventional economic reasoning cannot explain any observed departure from the predicted equilibrium (Brown et al. 2009), thus ruling out a potentially confounding explanation for my results. Also, by deriving the economic equilibrium for each condition, I can ensure that each condition yields an identical expected equilibrium, which allows me to directly compare the economic outcome for one condition to that of another condition.

As a preview, the conventional economic analysis below yields five key results: (i) employers will offer workers the minimum possible wage that covers workers' fixed cost of effort (i.e., employers will not offer gift wages); (ii) workers will accept all wage offers (i.e., no unemployment will occur); (iii) employers will not offer a financial reward for whistle-blowing in the *Can Reward* condition; (iv) workers who observe theft will always blow the whistle; and (v) employers will obtain a "first-best" outcome in all conditions and payoffs will not differ among the three experimental conditions. The predictions that employers will not expend incremental financial resources to induce whistle-blowing and that workers will nonetheless always choose to blow the whistle on observed misconduct hinge upon the assumption that workers who are financially indifferent between blowing the whistle and remaining silent will

always choose to blow the whistle. I assume weakly indifferent workers will prefer to whistle-blow because doing so increases employer welfare at no cost to the worker, which is a common assumption in analytical research. Because workers (i) incur no cost to blow the whistle and (ii) cannot gain financially from remaining silent about another worker's misconduct, employers do not need to insure workers against retaliation or expend incremental resources to induce them to blow the whistle.<sup>8</sup>

I begin the analysis by deriving the equilibrium for the *No W/B* condition in which no misconduct occurs and workers do not blow the whistle. I assume employers are risk-neutral, which allows me to equate the employer's expected utility with his expected profit without loss of generality. I also assume workers are weakly risk-averse. The employer offers the worker a fixed wage ( $w$ ) in exchange for a *fixed* level of productive effort that costs the worker ( $e$ ) to provide, where  $w \geq e > 0$ . Denote the worker's utility function as  $U_w$  where  $U_w = (w - e)^\alpha$ , where  $0 < \alpha \leq 1$ . The parameters for  $\alpha$  ensure that the worker's utility function is concave, indicating both (weak) risk-aversion and diminishing marginal utility for wealth. For simplicity, I model a setting in which the worker has no choice over the effort provided but rather must provide a fixed amount upon accepting the employer's wage offer. The effort the worker provides generates a low level of revenue ( $\pi_l$ ) with probability ( $p_l$ ) and generates high revenue ( $\pi_h$ ) with probability ( $1 - p_l$ ), where  $0 < \pi_l < \pi_h$ . The employer does not observe the actual level of revenue generated but the worker does. If the worker rejects the employer's wage offer, the employer receives no revenue, and the worker receives no wage. Denote the employer's utility as  $U_p$ . In

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<sup>8</sup> The general results hold when workers incur costs to blow the whistle except that in such cases employers must insure the whistle-blower against the costs incurred. However, the employer would not need to expend any financial resources to induce whistle-blowing *beyond the cost of insuring the whistle-blower*. In other words, the employer must insure whistle-blowers against financial loss but need not them promise financial gain to induce whistle-blowing.

this setting, the employer's objective function is to maximize his expected utility subject to ensuring that the worker accepts the employer's wage offer:

$$\max_w U_p = (p_l * \pi_l) + [(1 - p_l) * \pi_h] - w$$

Subject to:

Worker's IR constraint:

$$(p_l) * (w - e)^\alpha + (1 - p_l) * [(w - e)^\alpha] \geq 0$$

Solution:

Note that the employer need not satisfy any incentive compatibility constraint for the worker because once the worker accepts the wage then the worker *must* provide a *fixed* level of productive effort.<sup>9</sup> Likewise, the worker receives no wage should he reject the employer's wage offer. Thus, the employer must simply ensure that the worker prefers, at least weakly, to accept rather than reject the wage offer. The wage  $w = e$  satisfies the worker's IR constraint as an equality, ensuring the worker weakly prefers working to not working. The employer's utility clearly decreases in  $w$ , so any wage offer of  $w > e$  provides the employer with lower expected welfare than offering  $w = e$ . As such, the optimal wage for the employer to offer is  $w = e$ .

I now derive the economic equilibrium for the *Can Reward* condition. Assume the same setting as for the *No W/B* condition, but now assume that when revenue equals  $\pi_h$ , with probability  $p_t$  another individual besides the worker steals  $[\pi_h - \pi_l]$ , the difference between the high and low levels of revenue. The worker privately observes any such theft that occurs. When

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<sup>9</sup> This is economically equivalent to a setting in which the employer can observe the worker's effort with certainty and can therefore impose a forcing contract on the worker. For the sake of simplicity, I assume workers who accept the employer's wage offer automatically provide the requisite level of effort demanded by the employer in exchange for the wage.

the worker observes a theft, the worker can choose to blow the whistle, which allows the employer to recover the amount stolen  $[\pi_h - \pi_l]$  with certainty, or the worker can choose to remain silent. If the worker remains silent, the employer does not recover the loss. Now assume the employer chooses a wage and reward  $(w^*, r^*)$  to offer the worker that will maximize the employer's expected utility. If and only if the worker blows the whistle, the employer will pay the worker a financial reward  $(r)$  in addition to the worker's wage  $(w)$ , where  $(\pi_h - \pi_l) \geq r \geq 0$ . By assumption, workers cannot blow the whistle unless they have observed a theft.<sup>10</sup>

In my setting, employers always improve their welfare by inducing workers to accept rather than reject their wage offer and also by inducing workers to blow the whistle on misconduct rather than remain silent about it. The employer desires to maximize his expected utility (i.e., expected payoff) subject to ensuring that the worker has sufficient incentive to accept the mix of wage and reward offered by the employer (the IR constraint) and sufficient incentive to report theft when observed rather than remain silent (the IC constraint). Given the information above, the employer's objective function is:

$$\max_{w,r} U_p = (p_l * \pi_l) + (1 - p_l) * [p_t * (\pi_h - r) + (1 - p_t) * \pi_h] - w$$

Subject to:

Worker's IR constraint:

$$(p_l) * (w - e)^\alpha + (1 - p_l) * [p_t * (w + r - e)^\alpha + (1 - p_t) * (w - e)^\alpha] \geq 0$$

Worker's IC constraint:

$$(w + r - e)^\alpha \geq (w - e)^\alpha$$

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<sup>10</sup> This assumption less restrictive than it might at first appear. In the natural setting, whistle-blowers receive financial rewards only when the information they report leads to a recovery of losses. This mitigates concerns about false allegations for the sake of receiving a reward. However, as discussed later, if workers have imperfect information about the likelihood a theft occurred (i.e., they have suspicions but not hard evidence) then mitigating false allegations become more important to the employer.

Intuitive Discussion of the Solution:

The compensation package ( $w = e, r = 0$ ) satisfies the worker's IR and IC constraints as equalities. Therefore, workers offered this compensation package will accept the employer's employment offer and will choose to blow the whistle when they observe theft. Further, workers obtain no information rent from their private information about theft. Given that the (weakly) risk-averse agent bears no risk and earns no information rent, the employer obtains a first-best solution. Finally, this solution is unique for two reasons. First,  $r = 0$  is a necessary condition to ensure the worker bears no risk in compensation (i.e., to satisfy  $w + r - e = w - e$ ). Offering  $r > 0$  imposes risk on the worker, which by implication cannot result in a first-best outcome. Thus, any combination of  $(w, r)$  in which the employer offers a strictly positive reward will be less efficient than offering no reward because it imposes unnecessary risk on the worker and does not increase the level of predicted whistle-blowing. Second, at  $r^* = 0$ , any  $w > e$  results in lower welfare for the employer because the employer pays a higher wage than at  $w = e$  but obtains no expected benefit from doing so because workers provide a fixed level of effort for any offer accepted and will always choose to accept the compensation package ( $w = e, r = 0$ ).

Finally, note that the optimal compensation package for the *Can Reward* condition ( $w = e, r = 0$ ) must equal the optimal compensation package for the *Cannot Reward* condition. This arises because by definition the level of reward in the *Cannot Reward* condition is  $r = 0$ , which equals the *optimal* level of reward in the *Can Reward* condition. In sum, it is optimal for employers who can offer a financial reward for whistle-blowing to forgo doing so and offer a wage equal to the fixed cost of effort ( $e$ ) the worker incurs by accepting the employer's offer. Thus, precluding employers from offering a reward will not decrease their expected welfare or affect either party's expected behavior under conventional economic assumptions.

The identical equilibrium prediction for the two treatment conditions hinges on the assumption that indifferent workers will choose to blow the whistle because they have no financial incentive not to do so and whistle-blowing increases employer welfare. Some may view this as a “knife’s edge” equilibrium because, *ex ante*, purely self-interested economic agents have no incentive to take even costless actions to improve a principal’s welfare. However, even if we assume that financially indifferent workers always choose to remain silent rather than whistle-blow, the resulting optimal compensation package remains quite similar to the one obtained under conventional assumptions. Specifically, the employer’s optimal solution in such a setting is to offer the smallest possible reward that is strictly positive (i.e., a token reward). Doing so provides workers with a strict, rather than a weak, financial incentive to blow the whistle and thus ensures that they blow the whistle. Therefore, employers will never offer more than the minimum possible reward, even when assuming that workers will not blow the whistle without a reward.

Likewise, the assumption that financially indifferent workers only blow the whistle when offered a reward seems far-fetched when one considers that workers in the natural setting commonly blow the whistle when they have no expectation of receiving a reward. Thus, assuming that weakly indifferent workers *always* blow the whistle appears more defensible and realistic than assuming that they *never* do so. Further, costly whistle-blowing does not change the nature of the solution derived above. To the extent that whistle-blowing carries a personal cost for the worker, the employer’s optimal strategy expends only those financial resources sufficient to make a whistle-blower “whole” (i.e., provides the worker with insurance). In such cases, employers still have no need to offer incremental compensation to workers to try to induce whistle-blowing.



Conventional economic theory suggests that employers will not offer financial rewards to induce whistle-blowing as long as they can credibly insure whistle-blowers against retaliation or other costs. Under assumptions that financially indifferent workers remain silent about misconduct, employers may offer a nominal or token reward to provide some slight financial incentive to induce whistle-blowing. This prediction is consistent with observations of the natural setting, in which firms rarely offer workers explicit financial rewards for whistle-blowing. Thus, employers may not offer workers whistle-blowing rewards because they believe doing so inefficiently uses financial resources. If workers have pre-existing non-financial motivation to blow the whistle, perhaps because of morality or goodwill toward their employer, then they may report information about observed misconduct to their employer at no incremental cost. Consequently, offering a financial reward would pay workers for information about misconduct that they would otherwise provide for free. Employers who already offer gift wages to workers to induce other types of desired behavior may be able to rely on only the goodwill generated by the gift wage to induce whistle-blowing or may only need to increase its level by a modest amount to foster further goodwill and induce more whistle-blowing.

### **3.3 BEHAVIORAL ANALYSIS OF WHISTLE-BLOWING**

#### **3.3.1 Behavioral Analysis of *Cannot Reward Condition***

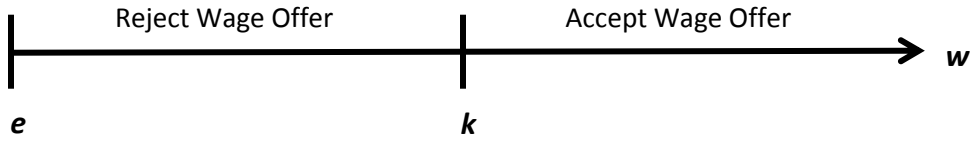
In this section, I extend the economic analysis presented in [Section 3.2](#) by incorporating notions of worker goodwill and motivation crowding. Specifically, I relax the assumption that workers are strictly self-interested and instead assume that their propensity to blow the whistle increases in both the level of goodwill they have toward their employer and the level of financial resources their employers provide them. Incorporating these ideas makes the employer's optimization problem more generalizable to the natural setting, but it also makes it less mathematically

tractable. As such, this section does not contain formal proofs but rather shows how motivation crowding and worker goodwill might affect the way in which employers prefer to expend financial resources to induce whistle-blowing.

Consider the *Cannot Reward* setting, in which employers cannot offer a whistle-blowing reward and workers do not expect them to do so. Previously, I assumed that workers would accept a wage offer as long as doing so provided as much expected utility as rejecting the offer and also that only wealth and effort-aversion comprised workers' utility functions. Because workers provide a fixed level of effort, the minimum wage at which the worker chooses to work equals the cost of the effort, ( $e$ ), that the worker provides upon accepting the offer. Further, though workers remain financially indifferent between whistle-blowing and remaining silent, conventional economic theory assumes that they will choose to blow the whistle because this improves employer welfare.

Given that workers provide effort ( $e$ ) at a fixed cost, we can map their reservation utility directly to their wage (i.e., order utility in terms of wage). Let  $k$  equal the worker's privately known reservation wage. That is, let  $k$  signify the wage level below which the worker rejects the employer's wage (i.e., when  $w < k$ ) and accepts the offer otherwise (i.e., when  $w \geq k$ ). Only the worker knows  $k$  and the worker cannot credibly communicate it to the employer. My conventional model assumes workers' reservation wage equals their fixed cost of effort (i.e.,  $k = e$ ). However, as discussed in [Chapter 2](#), prior findings in gift exchange suggest that employers must often offer workers more than their cost of effort to induce wage acceptance. This implies that workers' true reservation wage exceeds their cost of effort (i.e.,  $k > e$ ).

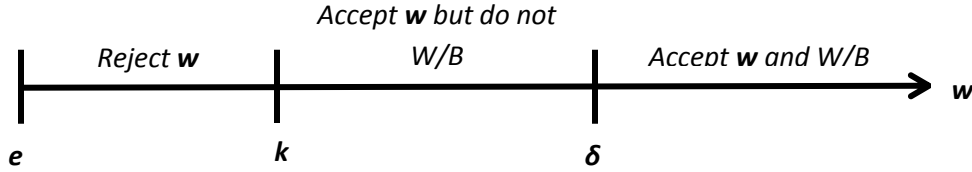
The worker will accept any wage offer,  $w$ , that satisfies  $w \geq k > e$ . Thus, even if  $w > e$ , the worker will reject the offer if  $w < k$ . I illustrate this in [Figure 1](#) below:



**Figure 1: Worker's wage acceptance decision**

Now assume that workers who accept the wage offer of  $w$  decide to blow the whistle only if they have sufficient non-financial motivation to do so. Gift exchange suggests that employers can rely on the social norm of reciprocity and that workers will reciprocate high wages with more pro-social behavior; that is, employers can increase worker goodwill by offering higher fixed wages. Therefore, I assume that workers' propensity to blow the whistle on internal misconduct increases in the level of goodwill they have toward their employer. Thus, assume that worker goodwill monotonically increases in the employer's wage offer of  $w$ .

Just as a reservation wage  $k$  exists for each worker, let  $\delta$  denote the wage level at or above which workers will choose to blow the whistle rather than remain silent, where  $\delta \geq k$ . That is, for all  $w \geq \delta$ , the worker will not only accept the employer's wage offer, but the wage level will induce sufficient goodwill toward the employer that the worker will also choose to blow the whistle if the worker observes misconduct. However, for wage offers where  $k \leq w < \delta$ , the worker will accept the wage offer but will choose to remain silent rather than blow the whistle. As before, for wage offers  $w < k$ , the worker will reject the employer's wage offer. [Figure 2](#) illustrates the worker's decision to accept or reject the wage offer and to blow the whistle or remain silent about misconduct in the *Cannot Reward* condition:



**Figure 2: Worker's decisions: *Cannot Reward* condition**

Note that under conventional economic theory any wage that exceeds the cost of effort constitutes a “gift wage,” with the size of the gift equaling  $(w - e)$ . The difference  $(k - e)$  equals the portion of the gift wage employers pay to induce wage acceptance while the difference  $(w - k)$  equals the portion of the gift wage employers pay to induce whistle-blowing. So long as the gift wage premium required to induce whistle-blowing does not exceed the expected financial benefit from doing so, then employers should pay the premium (i.e., employers should always pay  $\delta$  when  $[\delta - k] \leq p_t * (\pi_h - \pi_l)$ ). Within an actual population of workers, there will be a distribution of both reservation wages for wage acceptance and for whistle-blowing (i.e., a distribution of  $k$ 's and  $\delta$ 's). From these distributions, employers can construct a joint probability distribution that shows, as a function of wage offer, the probability that a randomly selected worker will (i) accept a wage offer and (ii) blow the whistle on observed misconduct.

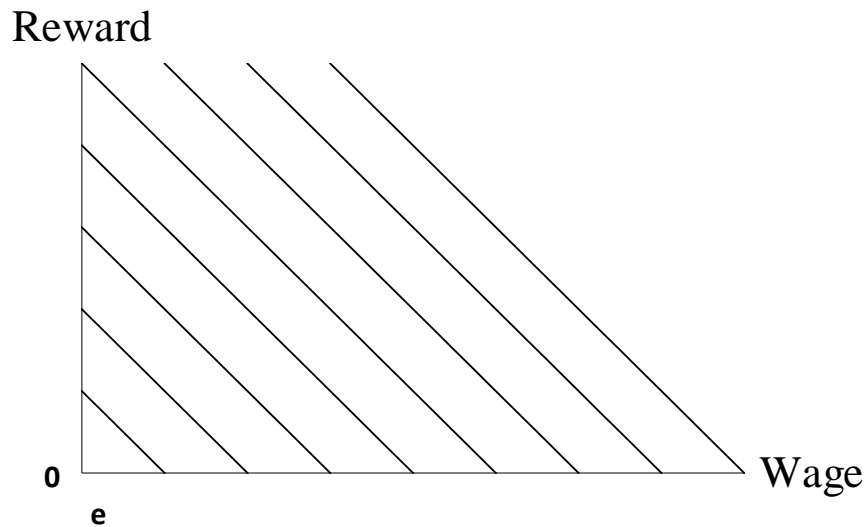
### 3.3.2 Behavioral Analysis of the *Can Reward* Condition

The analysis of the previous section holds for situations in which social norms of equality matching govern whistle-blowing. What happens when the social norms of market pricing govern whistle-blowing? In such cases, workers no longer view whistle-blowing as pro-social act influenced by their goodwill toward employers but rather as self-interested act done for money, and they likely expect employers to offer a financial reward regardless of the level of gift wage the employer offers. As such, while paying an incremental gift wage to induce whistle-blowing might reflect optimal in the *Cannot Reward* condition, such a strategy might prove sub-

optimal in the *Can Reward* condition. The key question centers upon the expected cost of the reward employers must offer to induce whistle-blowing when market pricing norms govern behavior relative to the incremental gift wage they must offer when equality matching norms govern behavior (i.e.,  $\delta - k$ ). I explore this further below.

In the *Cannot Reward* setting, I could map each unique wage level,  $w$ , to a unique utility level the worker would obtain from that wage on a one-to-one basis. I could do this because workers provided effort ( $e$ ) at a fixed cost, and thus their utility varied only due to their wage level. However, in the *Can Reward* condition I can no longer map each wage to a unique level of utility on a one-to-one basis because employers have an additional degree of freedom when structuring compensation. Specifically, employers in the *Can Reward* condition can offer different combinations of wages and rewards that nonetheless provide workers with identical expected utility. Thus, these employers will seek to offer that particular combination of  $(w, r)$  that induces workers to accept the wage offer and blow the whistle *at the lowest expected cost* to the employer.

In the *Can Reward* condition, employers must make a two-dimensional decision regarding  $(w, r)$  instead of a one-dimensional decision about  $w$ . The expected cost to the employer of offering a particular  $(w, r)$  package equals the sum of the wage,  $w$ , and the expected cost of the reward. The expected cost of the reward equals the level of the reward multiplied by the probability of theft ( $p_t * r$ ). Thus, the total expected compensation cost of offering  $(w, r)$  equals the sum  $[w + p_t * r]$ . Employers can combine wage and reward levels in multiple ways to yield the same level of expected compensation cost. [Figure 3](#) illustrates some various *compensation isoquants*, in which each diagonal line shown represents all combinations of wage and reward levels that yield the same level of expected compensation cost to the employer:



**Figure 3: Expected compensation isoquants**

In [Figure 3](#) isoquants that fall further from the origin imply higher expected compensation costs to employers, and consequently lower expected profits. As such, the employer would like to stay as close to the origin as possible subject to inducing workers to accept the wage offered *and* to blow the whistle in the event they observe misconduct. Doing so minimizes the employer’s expected compensation cost. However, for a given level of expected compensation, risk-neutral employers remain indifferent to the specific combination of wage and reward they offer. That is, risk-neutral employers care about the distance of a compensation isoquant from the origin rather than the precise location of their  $(w, r)$  offer on the isoquant.

Bowles and Polania-Reyes (2012) posit that “categorical crowding out” can occur when conditional financial incentives alter individuals’ perception of the nature of a situation. This occurs because offering financial incentives can cause moral disengagement and make individuals more self-interested by inducing a market mentality toward whistle-blowing. Likewise, offering financial rewards can signal to workers a belief by employers that they lack sufficient intrinsic motivation to report observed misconduct. To illustrate categorical crowding

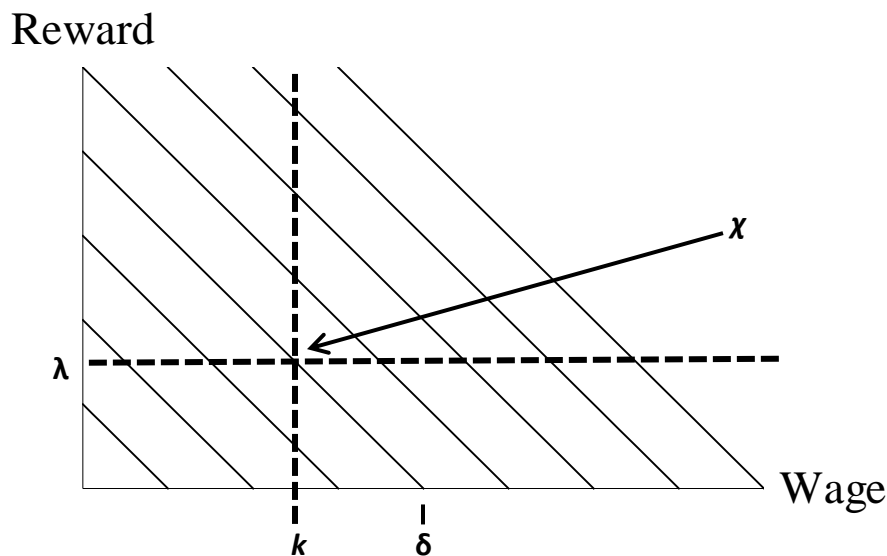
out, I assume that, just as workers reject a wage offer below  $k$ , workers in the *Can Reward* condition will also choose to remain silent rather than blow the whistle when the employer offers a reward of less than  $\lambda$ , where  $\lambda > 0$ . They will do so regardless of the level of wage employers offer them because market pricing norms decouple the link between worker goodwill and whistle-blowing. Under market pricing norms, workers establish a minimum level of reward they are willing to accept in exchange for their private information about misconduct. Just as for other types of goods, if the price that employers offer is too low, no exchange takes place. Specifically, if  $r < \lambda$ , then workers remain silent, but blow the whistle for  $r \geq \lambda$ .

Below, [Figure 4](#) extends [Figure 3](#) by incorporating two important compensation thresholds and shows the optimal  $(w^*, r^*)$  the employer should offer when workers expect financial remuneration for whistle-blowing. First, I show the effect of the reward threshold,  $\lambda > 0$ , on the isoquant map. For any reward level where  $r < \lambda$ , the worker will choose to remain silent when observing theft regardless of the magnitude of the wage offer  $w$ . Thus, employers will wish to ensure that they do not offer a reward below  $\lambda$  (i.e., the employer wishes to remain on or above  $\lambda$  line). Note that this implies the optimal offer in the *Cannot Reward* condition,  $w = \delta$  and  $r = 0$ , cannot remain optimal once workers begin to expect a reward because workers will not blow the whistle if employers offer them only a wage and no reward.

Second, I show  $k$ , the “wage threshold” below which workers will reject the employer’s wage offer in the *Cannot Reward* condition. Recall that in the *Cannot Reward* condition, each unique wage, including  $k$ , can be mapped to a unique level of utility for the worker. As such, a wage offer of  $k$  in effect offers workers sufficient additional utility such that they accept the employer’s wage offer. Given greater flexibility in structuring compensation, how should employers in the *Can Reward* condition structure their  $(w, r)$  offers to provide workers with

sufficient incentive to *accept the wage offer*? Though insufficient to induce whistle-blowing by itself, offering a wage of  $k$  represents the minimum wage workers will accept when  $r = 0$ . To induce wage acceptance, employers could offer workers a wage of less than  $k$  while offering incrementally higher compensation in the form of a reward. However, given risk-averse workers, such a strategy clearly costs employers more than simply offering a wage of  $k$  to ensure wage acceptance. Thus, employers will not impose risk on risk-averse workers simply to induce *wage acceptance*.

In order to induce wage acceptance *and* whistle-blowing at the lowest expected cost, employers in the *Can Reward* condition should offer ( $w = k, r = \lambda$ ), which I label as  $\chi$  on [Figure 4](#). All compensation offers that fall within the area ( $w \geq k, r \geq \lambda$ ) will induce both wage acceptance and whistle-blowing, but  $\chi$  is optimal because it does so at the lowest expected cost to employers (i.e.,  $\chi$  lies closest to the origin).



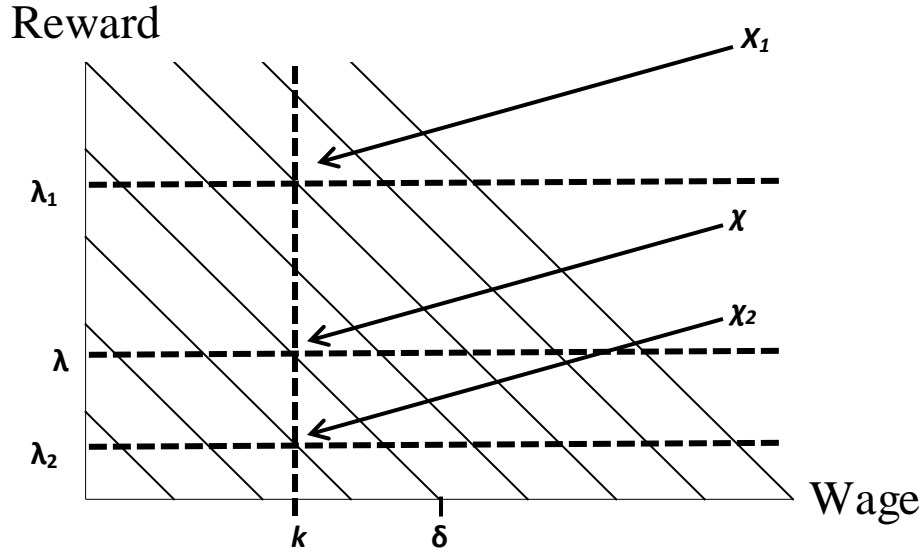
**Figure 4: Effect of reward and wage thresholds on expected compensation costs**



### 3.3.3 Comparison of *Can Reward* and *Cannot Reward* Conditions

Consider the case, as shown in [Figure 4](#), in which  $\chi$  in the *Can Reward* condition lies on the same compensation isoquant as the optimal  $\delta$  wage in the *Cannot Reward* condition. In such a case employers would have identical expected compensation costs and, consequently, identical expected welfare across the *Can Reward* and *Cannot Reward* settings. Consequently, employers would be indifferent between offering  $\chi$  in the *Can Reward* setting and offering  $\delta$  in the *Cannot Reward* setting. However, due to categorical crowding out, employers in the *Can Reward* condition could not simply substitute  $\delta$  for  $\chi$  without lowering their expected welfare because workers in the *Can Reward* condition will not blow the whistle unless offered a reward of at least  $\lambda$ .

The relative cost of relying on financial versus non-financial motivation to induce whistle-blowing depends critically on the minimum reward workers demand (i.e.,  $\lambda$ ) in the *Can Reward* condition relative to the incremental gift wage required to induce whistle-blowing in the *Cannot Reward* condition (i.e.,  $\delta - k$ ). Consider the reward threshold  $\lambda_1$  shown below in [Figure 5](#). At this  $\lambda$ -threshold, the optimal compensation package is  $\chi_1$ , which consists of  $(k, \lambda_1)$ . However,  $\chi_1$  lies on a compensation isoquant further out from the origin than the isoquant on which  $\delta$  rests, which suggests employers will incur higher expected compensation costs than if workers perceived non-financial motivations should govern their whistle-blowing. In other words,  $\lambda_1$  indicates workers demand too much compensation for whistle-blowing under market pricing norms, and thus the employer will prefer to foster equality matching norms, which frame whistle-blowing as selfless rather than self-interested behavior.



**Figure 5: Effect of various reward thresholds on employers' preferred setting**

The opposite holds at the reward threshold denoted by  $\lambda_2$ . Here,  $\chi_2$  falls on a lower expected compensation isoquant than  $\delta$ . At  $\chi_2$ , market pricing norms still lead workers to behave in a self-interested fashion, but the cost of appealing to their self-interest with a reward is less than the cost of increasing their non-financial motivation by offering higher gift wages. Thus, neither incentive approach clearly results in higher employer welfare but rather the employer's preferred approach depends upon how social norms influence the compensation workers require in order to whistle-blow.

What can we say about the original  $\lambda$ -threshold at which employers remain indifferent between offering a gift wage of  $\delta$  in the *Cannot Reward* condition and a wage/reward package of  $\chi$  in the *Can Reward* condition? Recall that, by definition, the worker will always blow the whistle when  $w = \delta$  in the *Cannot Reward* condition and when  $\chi(w, r) = (k, \lambda)$  in the *Can Reward* condition. That is, the employer can theoretically induce complete whistle-blowing using *both* approaches, and thus their preference between the two hinges upon the *relative cost* of using each approach. Given identical incremental benefits of inducing whistle-blowing, employers

remain indifferent in their preferred incentive approach when the expected cost of inducing whistle-blowing under one approach equals the expected cost of doing so under the other approach. This implies:

$$(1a) \quad \delta = \chi(w, r) , \text{ or}$$

$$(1b) \quad \delta = k + p_t(\lambda)$$

$$(1c) \quad \delta - k = p_t * \lambda$$

In the *Can Reward* condition, the incremental cost to induce whistle-blowing equals the expected value of the reward payable to a whistle-blower (i.e.,  $p_t * \lambda$ ). Recall that employers in this condition find it inefficient and ineffective to induce whistle-blowing by offering higher gift wages. In the *Cannot Reward* condition, the cost to induce whistle-blowing is the incremental gift wage offered by the employer specifically to induce whistle-blowing (i.e.,  $\delta - k$ ). Thus, the employer primarily cares about whether the required gift wage premium to induce whistle-blowing in the *Cannot Reward* condition exceeds or is exceeded by the expected cost of the reward required to induce whistle-blowing in the *Can Reward* condition. Note that the base rate of theft affects the expected cost of the reward ( $\lambda$ ) paid for whistle-blowing but not the gift wage premium ( $\delta - k$ ) because workers receive the gift wage premium *unconditionally* but receive  $\lambda$  only when they observe theft and blow the whistle, which they will always do for a reward of  $\lambda$ .

Recall that  $\delta$  represents the minimum wage at which workers will blow the whistle in the *Cannot Reward* condition, while  $k$  represents the minimum wage workers will accept. As such,

the difference  $(\delta - k)$  represents a measure of the strength of workers' intrinsic whistle-blowing motivation. If workers have strong intrinsic motivation to blow the whistle, then employers must pay only relatively small gift wage premiums to induce whistle-blowing (i.e.,  $\delta - k$  is small). As such, employers become more likely to prefer paying  $(\delta - k)$  to offering a reward when  $(\delta - k)$  is "small" because offering a reward would crowd out a large amount of intrinsic motivation, resulting in the loss of too much "free" whistle-blowing.

In contrast, if workers have weak intrinsic motivation to blow the whistle (i.e., if  $\delta - k$  is relatively large), employers must pay significant incremental gift wages to increase workers' non-financial motivation to blow the whistle. In these cases, employers become more likely to find it too expensive to use gift wages to increase whistle-blowing and instead will prefer to offer a reward. Though a reward will crowd out workers' intrinsic whistle-blowing motivation, in such cases workers possess little intrinsic motivation to begin with. As such, the employer "sacrifices" only a small amount of free whistle-blowing.

Paying an unconditional wage premium to all workers in the *Cannot Reward* condition increases worker goodwill and induces reciprocity. First, it increases worker goodwill because the employer guarantees every worker a whistle-blowing wage premium even though not every worker will observe theft, which indicates to the worker that the employer will sacrifice wealth to the worker even if the employer receives no gain for doing so. Second, it induces positive reciprocity because, by paying a wage premium unconditionally, the employer places implicit trust in the worker, which likely prompts workers to positively reciprocate by blowing the whistle when they observe theft. If the minimum incremental gift wage that induces whistle-blowing is less than the expected cost of the minimum reward necessary to induce whistle-blowing, then the employer will prefer the gift wage approach.

Finally, Equation (1c) suggests employers will prefer offering gift wages to induce whistle-blowing when:

$$(1c) \quad \delta - k \leq p_t * \lambda$$

We can re-arrange (1c) to show:

$$(1d) \quad p_t \geq \frac{\delta - k}{\lambda}$$

Equation (1d) suggests a simple rule for determining the employer's preferred incentive approach. When the base rate of theft is greater than the ratio of the gift wage premium ( $\delta - k$ ) to the reward ( $\lambda$ ), employers will prefer to use gift wages. When it is less, they will prefer to offer financial rewards for whistle-blowing. Workers' endogenous social preferences determine each input on the right-hand side of Equation 1d ( $\delta$ ,  $k$ , and  $\lambda$ ). By assumption, exogenous forces determine the base rate of theft  $p_t$ . Thus, employers can compare workers' endogenous preferences to a single exogenous benchmark to determine which approach they should use to induce whistle-blowing at the lowest expected cost.

Equation (1d) also implies that, as the level of theft increases, relying on gift wages to induce whistle-blowing becomes relatively more attractive to employers than relying on rewards. In designing the study, I set the base rate of theft ( $p_t$ ) to equal 50%, which does not bias in favor of either approach and thus biases against finding differences across approaches. My initial study does not assess how varying the base rate of theft affects employer welfare but rather examines whether, *for a given level of theft*, employers obtain different levels of welfare based on the incentive approach they use. As discussed in the conclusion, future studies may wish to examine how variation in the base rate of theft particular affects the relative optimality of each incentive approach.

As discussed in [Section 7.4](#), the model I develop here is subject to certain limitations. However, the key limitation, and one I discuss here, is that I do not incorporate a strategic role for workers who are considering whether to commit internal misconduct. Instead, workers *always* commit misconduct whenever revenue is high and never do so when revenue is low. However, in both the conventional and the behavioral model developed above, the optimal incentive contract induces the worker to always blow the whistle, which in turn should fully deter any worker from attempting to commit misconduct to begin with. Thus, some readers may question why my model incorporates no endogenous choice to commit misconduct or why, if workers will always blow the whistle on internal misconduct, a worker would ever attempt to commit it.

The purpose of my analysis is to examine the direct effects of financial incentives on whistle-blowing behavior, rather than their indirect effect at deterring misconduct. For analytical convenience, my model assumes that workers have perfect information about misconduct and always observe it when it occurs and also assumes that employers' can conduct costless investigations that uncover any misconduct with certainty. In the natural setting, these assumptions are less likely to hold. As such, when information is imperfect or investigations are costly, workers may find it in their self-interest to commit misconduct from time to time, perhaps playing a mixed strategy in which they probabilistically commit misconduct in order to maximize their welfare. My study has a more narrow focus in that I do not attempt to analyze the indirect effect of each approach on *detering* misconduct but rather seek to isolate the direct effects of offering financial incentives on workers' *whistle-blowing* behavior. As such, in both this model and my experiment I take misconduct as a given, exogenous feature of the setting I analyze. Future analytical research could enrich the model developed here by relaxing some of

the assumptions I incorporate such as perfect knowledge of theft or perfect investigations, which in turn would likely provide more of a strategic role for workers considering whether to commit misconduct.

I do not believe restricting the strategic decision-making of the would-be thief significantly limits the implications of the current model for predicting workers' whistle-blowing behavior. Yes, the contracting relationship between the employer and the worker will certainly affect the strategic decisions of an individual considering whether to commit misconduct. However, the indirect effect of the employer's incentive approach on the would-be thief's choice of whether to steal is consistent in direction with the direct effect of the incentive approach on the worker's choice to blow the whistle. That is, to the extent that one incentive approach may dominate the other in terms of inducing more whistle-blowing, it will also dominate the other in terms of deterring theft from occurring in the first place. As such, any empirical differences I find when comparing the incentive approaches would likely be amplified if I allowed strategic behavior on the part of the would-be thief.

Despite the limitation described above, two key implications arise from the model above, which would likely hold in future extensions of the model that incorporate strategic behavior from the would-be thief. First, neither incentive approach clearly dominates the other. Offering a financial reward to induce whistle-blowing or offering an incrementally larger gift wage can be optimal depending on the social norms that govern interactions between employers and workers. Second, each approach is mutually exclusive of the other. That is, employers will not attempt to rely both on financial rewards and on incrementally larger gift wages to induce whistle-blowing but rather motivation crowding leads them to fully commit to one approach at the exclusion of the other.

## **4.0 DEVELOPMENT OF HYPOTHESES AND RESEARCH QUESTIONS**

### **4.1 OVERVIEW OF CHAPTER**

This chapter develops my hypotheses and research questions related to employer welfare, compensation costs, workers' whistle-blowing behavior, and motivation crowding. My study focuses on whether employers can obtain higher welfare by offering financial rewards for whistle-blowing, and as such [Section 4.2](#) develops a related research question. Employer welfare is a function of employers' expected compensation costs and the financial benefit they receive from workers' whistle-blowing. I address each of these in separate sub-sections. [Section 4.3](#) develops a research question and two hypotheses related to employer compensation costs while [Section 4.4](#) develops a research question and hypothesis related to workers' whistle-blowing behavior across conditions and their underlying motivation for whistle-blowing.

### **4.2 EMPLOYER WELFARE ACROSS APPROACHES**

My primary question concerns whether employers could improve their welfare if they offered their workers a financial reward for blowing the whistle rather than relying on non-financial motivation. As discussed in [Chapter 3](#), from an analytical perspective it remains unclear, *for a given rate of theft*, whether one approach will more cost-effectively induce whistle-blowing. The relative effectiveness of relying on non-financial motivation depends upon the strength of workers' pre-existing non-financial motivation and the ease with which employers can foster worker goodwill through the use of gift wages. Likewise, the relative effectiveness of relying on financial rewards depends upon how strongly financial rewards crowd out workers' non-



financial motivation and how strongly it fosters a market mentality among workers. To the extent that offering an explicit financial reward results in motivation crowding, the beneficial direct effect of offering a financial reward on workers' propensity to whistle-blow is offset by the negative indirect effect of crowding out their non-financial motivation to whistle-blow. As such, it remains unclear whether offering an explicit financial reward will increase or decrease employer welfare relative to relying only on worker's non-financial motivation to whistle-blow. Thus, I pose the following research question:

***RQ1. Do employers earn higher payoffs when they offer workers a financial reward for whistle-blowing relative to when they do not?***

As discussed at the end of section 3.3.3, employers' preference for offering a financial reward to induce whistle-blowing decreases in the rate of theft while their preference for offering gift wages to induce whistle-blowing increases in the rate of theft. However, the level of theft at which employers' preferences switch remains unclear because the actual level of theft at which employers remain indifferent between incentive approaches also depends upon the behavioral thresholds of workers described in [Chapter 3](#). My dissertation focuses on the relative size of these behavioral thresholds for a *given* level of theft. Therefore, I set the rate of theft to equal 50%, which equals the mid-point of the set of possible base rates for theft and thus biases against finding differences across approaches in employer welfare.

### **4.3 THE COST OF INDUCING WHISTLE-BLOWING**

Conventional economic theory predicts that any strictly positive reward will suffice to induce whistle-blowing. However, as discussed in section 2.5, offering a small financial reward for pro-social behavior may actually lead to more *anti*-social behavior (here, more silence) if workers view the reward as too small. Small financial incentives for pro-social behavior may back-fire

by crowding out intrinsic motivation to act pro-socially while providing insufficient extrinsic motivation to do so. Intuitively, therefore, appealing to workers' self-interest and opportunism to induce whistle-blowing would appear to cost employers more than appealing to their goodwill. From this perspective, the level of wages *and* rewards offered in the *Can Reward* condition could exceed the level of wages offered in the *Cannot Reward* condition.

While employers who offer a financial reward for whistle-blowing clearly bear an incremental cost when they pay out the reward, those who do not offer a financial reward also likely incur incremental costs but in a more subtle form. Presuming that workers intrinsically have goodwill toward their employers is potentially naïve. As reviewed in [Chapter 2](#), prior studies on gift exchange show that employers often try to strengthen workers' preferences to act pro-socially by offering them gift wages (see, e.g. Charness and Kuhn 2011). Workers who receive gift wages generally reciprocate by providing additional costly effort (e.g., Fehr et al. 1993, Hannan et al. 2002, Hannan 2005, Kuang and Moser 2009) or stealing less (Greenberg 1990, Zhang 2008, Chen and Sandino 2012). That is, gift wages successfully foster workers' goodwill toward their employers and induce them to make costly sacrifices to improve their employers' welfare.

In my study, workers can potentially reciprocate a gift wage with a gift of information that they can provide at no cost. Their willingness to do so likely depends upon the level of goodwill that they have toward their employers, which employers can increase by offering them higher gift wages. Thus, mean wage offers in the *Cannot Reward* condition will likely exceed those in the *Can Reward* condition because employers in the *Cannot Reward* condition must rely solely on workers' goodwill to induce whistle-blowing.

Each approach to inducing whistle-blowing carries its own incremental costs. In the *Can Reward* condition, employers likely offer workers a substantial reward for whistle-blowing, but they actually pay the reward only when their workers observe theft and blow the whistle. In the *Cannot Reward* condition, employers likely offer their workers a relatively higher level of gift wage to foster more worker goodwill. However, unlike with a reward, employers pay these higher gift wages regardless of whether their workers observe theft or blow the whistle. Thus, I cannot predict whether offering versus not offering a financial reward for whistle-blowing results in higher expected total compensation costs ( $w + p_i*r$ ) for employers. Therefore, my second research question is:

**RQ2. Are employers' expected compensation costs higher when they offer workers a financial reward for whistle-blowing relative to when they do not?**

I can make two directional predictions regarding the level and structure of workers' compensation, both of which are consistent with the analytical model I develop in [Chapter 3](#). First, employers likely expend some *incremental* level of financial resources in order to induce workers to blow the whistle on observed misconduct. Employers in both conditions will likely offer gift wages to ensure workers accept their employment offers because acceptance alone increases employer welfare. However, I also expect employers to offer additional incremental compensation *specifically* to induce whistle-blowing. In the *Cannot Reward* condition, this must take the form of incremental gift wages, which foster worker goodwill, while in the *Can Reward* condition employers could offer higher gift wages and/or a reward. To isolate the incremental wage employers offer specifically to induce whistle-blowing, I can compare the mean wage offer when theft can occur (i.e., in the *Can* and *Cannot Reward* conditions) to the mean wage offer when no theft can occur and thus employers have no need to induce whistle-blowing (i.e., in the *No W/B* condition). Thus, I make the following prediction:

**H1. To induce whistle-blowing, employers will offer workers higher compensation when misconduct is possible than when it is not possible.**

Second, my analysis in [Chapter 3](#) suggests employers who choose to offer a financial reward for whistle-blowing should not offer any incrementally higher fixed compensation in the form of higher wages. Rather, they should offer only the wage level they believe just suffices to induce workers to accept the wage offer and should not offer higher fixed wage offers to induce whistle-blowing. In effect, once employers decide to offer a financial reward, they should anticipate it will result in crowding out workers' non-financial motivation and therefore will abandon any attempt to foster such non-financial motivation. Thus, I predict the following:

**H2. Employers who offer a financial reward for whistle-blowing will not offer incremental fixed compensation specifically to induce whistle-blowing.**

#### 4.4 WORKERS' WHISTLE-BLOWING BEHAVIOR

Both offering a financial reward and offering gift wages likely induce workers to blow the whistle. However, I cannot predict that one approach will induce *more* whistle-blowing than the other. Indeed, my model assumes that employers can fully induce whistle-blowing under both approaches. Offering a financial reward for whistle-blowing provides workers with a strict financial incentive to blow the whistle, though workers with a strong market mentality may still choose to remain silent rather than blow the whistle if they view the employer as having offered a stingy reward. Relying on workers' non-financial motivation and fostering goodwill could induce a similar level of whistle-blowing because: (i) employers typically can ensure their workers bear no cost to blow the whistle on internal misconduct, and (ii) employers can increase workers' wages to foster worker goodwill without crowding out workers' pre-existing non-financial motivation to blow the whistle. However, workers who have little goodwill toward their employer or lack non-financial motivation to whistle-blow incur no opportunity cost by

choosing to remain silent, thus making fixed compensation in this respect a “weaker” incentive relative to a financial reward. Thus, my third research question is:

***RQ3. Does the rate at which workers blow the whistle depend upon whether they are offered a financial reward for whistle-blowing?***

As stated in [Chapter 3](#), offering explicit financial rewards for whistle-blowing decouples the link between worker goodwill and whistle-blowing. Rather, offering explicit financial incentives for behaving pro-socially often induces a market mentality among workers, who no longer view the behavior as other-regarding but self-interested. Thus, when workers find themselves in a social setting in which employers can financially reward whistle-blowers, the level of reward offered likely influences their decision to blow the whistle more than the level of their wage. Thus, I make the following prediction:

***H3. When workers can receive a financial reward for whistle-blowing, wage levels have less influence on their whistle-blowing decisions than when they cannot receive a reward.***

## 5.0 RESEARCH DESIGN

### 5.1 OVERVIEW OF CHAPTER

This chapter describes the experimental design and procedures used to test my hypotheses and research questions. [Section 5.2](#) provides an overview of the experimental setting and design. [Section 5.3](#) describes the experiment's participants, procedures, and three experimental conditions in more detail. [Section 5.4](#) discusses the calculation of participant payoffs.

### 5.2 OVERVIEW OF EXPERIMENT

I test my hypotheses and research questions using a 1 x 3 between-subjects design with two treatment conditions in which misconduct and whistle-blowing can occur (*Can Reward* and *Cannot Reward* conditions) and one control condition in which no misconduct or whistle-blowing occur (*No W/B* condition). As described below, in all three conditions employers make wage offers to workers in exchange for a fixed amount of productive effort that generates revenue for the employer. In the two treatment conditions, with a 50% probability workers who accept the wage offer privately observe a co-worker steal a portion of their employer's revenue. In the *Can Reward* condition, employers could offer workers a financial reward in exchange for blowing the whistle on the theft, but they could not do so in the *Cannot Reward* condition. In the *No W/B* condition, employers make wage offers to workers for productive effort but theft does not occur, and thus workers cannot blow the whistle. As explained in the results, I use the *No W/B* condition to further analyze data from the *Can Reward* and *Cannot Reward* conditions.

## 5.3 PARTICIPANTS AND EXPERIMENTAL PROCEDURES

### 5.3.1 Participants

118 individuals participated in one of six experimental sessions (two sessions per condition), with 40 participants each in the *Can Reward* and *Cannot Reward* conditions and 38 in the *No W/B* condition.<sup>11</sup> I recruited participants as volunteers from the participant pool of an experimental economics lab at a large university and completed the study using zTree software (Fischbacher 2007) on private computer terminals located within the lab. Each session lasted about one hour and consisted of 10 periods, except for one session of the *No W/B* condition, which consisted of 9 periods.<sup>12</sup> As explained in [Section 5.4](#), participants' payoffs depended on their decisions and the decisions of others during the experiment. At the end of the experiment, a participant drew one period at random, which served as the payment period. Participants privately received their payoff for that period. Payoffs averaged \$14.97, including a \$5 participation fee, and ranged from \$5 to \$27.

Participants had a mean age of 24.0; had mean full-time work experience of 2.8 years; had completed a mean of 1.9 courses in economics; and men comprised 43% of the sample. An ANOVA indicates no significant differences exist ( $p > 0.10$ ) between the three conditions in gender balance, work experience, or number of economics courses completed. I do find significantly older participants in the *Cannot Reward* versus *Can Reward* condition ( $t = 2.8$ ,  $p < 0.01$ , two-tailed). However, the statistical inferences presented in the next chapter do not change when I control for this difference.

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<sup>11</sup> All sessions had 20 participants except for one *No W/B* session in which only 18 individuals participated.

<sup>12</sup> Because only 18 individuals participated in one *No W/B* session (see Footnote 10), my turnpike design (described below) limited the number of periods for this session to 9 to ensure unique pairings of employers with workers.

### 5.3.2 Experimental Procedures

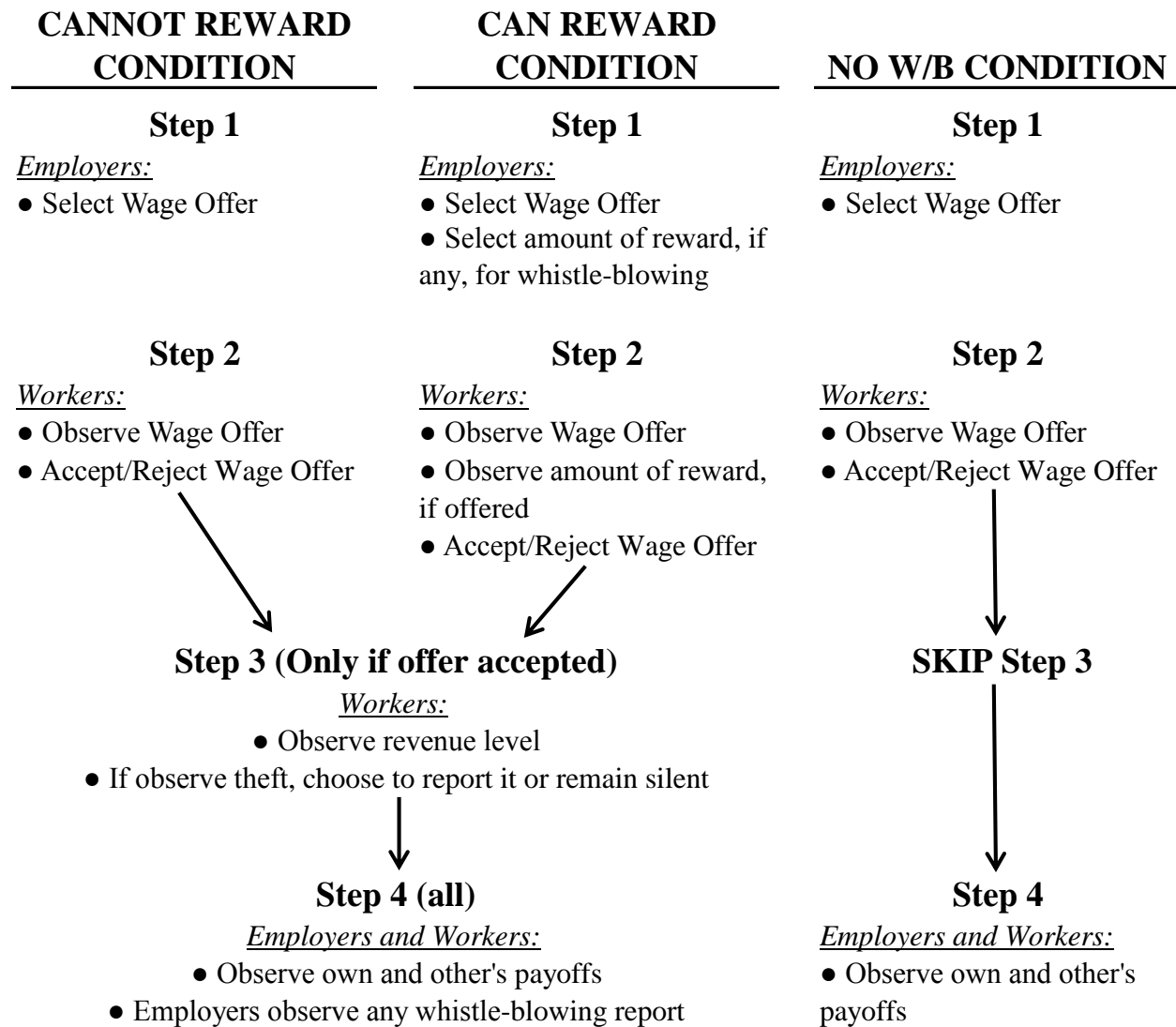
Prior to the start of a session, I randomly assigned participants to the role of either an employer or a worker, and this assignment remained fixed for the duration of the session. I used a turnpike design (Cooper 1996) to pair each employer with a new worker in each period to prevent contagion effects and reputation formation. Participants knew each pairing would occur no more than once, and anonymous pairings ensured that they never knew the identity of the other participant in their pair. [Figure 6](#) provides a timeline for the steps followed in the experiment, which I detail below.

In Step 1, employers in all three conditions decided on a wage to offer their worker. Employers made wage offers to their worker in order to obtain a fixed amount of productive effort from the worker that generates revenue for the employer (further details provided below). Employers could offer from \$4 to \$20, inclusively.<sup>13</sup> In the *Can Reward* condition, employers also decided whether to offer a reward in exchange for whistle-blowing. Employers who wished to offer a reward could offer from \$0.50 to \$10 in \$0.50 increments.

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<sup>13</sup> The minimum and maximum wage ensures workers and owners received no less than their \$5 participation fee.





**Figure 6: Experimental procedures and timeline**

In Step 2, the worker observed the employer's wage offer and either accepted or rejected it. In the *Can Reward* condition, workers also observed any reward the employer offered for whistle-blowing. If employers chose not to offer a reward, then workers received no mention of a reward. Likewise, in the *Cannot Reward* and *No W/B* conditions, neither employers nor workers received any mention of a reward because employers could not offer one.<sup>14</sup> Workers who accepted the employer's wage offer automatically provided a fixed amount of productive effort at a cost of \$4. Employers and workers knew that a worker's effort would generate departmental revenue for an employer of either \$20 or \$30 with equal probability and also that random drawings would determine the actual level of revenue generated.<sup>15</sup> Workers who rejected the employer's wage offer incurred no cost of effort and employers received no departmental revenue.

In the *Can Reward* and *Cannot Reward* conditions, workers who accepted the wage offer in Step 2 proceeded to Step 3 in which they learned the level of departmental revenue for the period (\$20 or \$30), but their employers did not. For cases in which departmental revenue equaled \$30, workers were informed that a co-worker had stolen \$10 of the revenue from their employer. These workers then indicated whether they wished to blow the whistle to their employer (i.e., report the theft) or remain silent. If a worker chose to report the theft, the employer recovered the stolen \$10 of revenue with certainty. If a worker chose to remain silent, employers could not recover the stolen \$10 of revenue, never learned that they incurred a loss from theft, and instead received revenue of \$20 instead of \$30. Thus, workers could remain credibly silent because employers only learned about a theft if the worker chose to report it, and

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<sup>14</sup> This did not draw undue attention to the absence of any reward, which more closely reflects the natural setting.

<sup>15</sup> Prior to the experiment, a private random drawing with replacement determined whether the worker's effort for the period would generate revenue of \$20 or \$30. For each period, there was a 50% chance that either level of revenue would occur. This resulted in six periods with revenue of \$30 (3, 5, 7, 8, 9, and 10) and four periods with revenue of \$20 (1, 2, 3, and 6). Period 10 was not run in the *No W/B* session that had 9 periods (see Footnote 11).

employers could never force workers to blow the whistle. Workers in the *No W/B* condition skipped Step 3 and went to Step 4 because theft did not occur in this condition, and therefore they could not blow the whistle.

In Step 4, employers and workers observed a final payoff screen. This screen disclosed whether the worker had accepted or rejected the employer's wage offer; the level of departmental revenue received by the employer; a whistle-blowing notification if the worker blew the whistle (in the *Can Reward* and *Cannot Reward* conditions), and the respective payoffs of the employer and the worker (described below). A new period then began with new, unique pairings of employers and workers. After the final period, all participants completed a post-experimental questionnaire (PEQ) and received their compensation privately.

#### 5.4 CALCULATION OF PARTICIPANT PAYOFFS

Figure 7 shows the calculation of participants' payoffs.<sup>16</sup> When a worker rejected an employer's wage offer, neither the worker nor the employer had any earnings for that period. When workers accepted the employer's wage offer, workers and employers received earnings as described below.

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<sup>16</sup> For simplicity, Panel B does not include participants' \$5 participation fee, though each participant received one.

(1) If worker *rejects* employer's wage offer:

**Worker Payoff:** \$0

**Employer Payoff:** \$0

(2) If worker *accepts* employer's wage offer:

**Worker's Payoff:**

*No W/B Condition* : Wage Offer - \$4 (Cost of Effort)

*Cannot Reward Condition* : Wage Offer - \$4 (Cost of Effort)

*Can Reward Condition* :

(i) Worker observes theft and blows whistle: Wage Offer - \$4 (Cost of Effort) + Reward (if offered by Employer)

(ii) Worker observes theft and remains silent OR does not observe theft: Wage Offer - \$4 (Cost of Effort)

**Employer's Payoff:**

*No W/B Condition* : Revenue generated (\$20 or \$30) - Wage Offer

*Cannot Reward Condition:*

(i) Worker blew the whistle: \$30 - Wage Offer

(ii) Worker did not blow the whistle: \$20 - Wage Offer

*Can Reward Condition:*

(i) Worker blew the whistle: \$30 - Wage Offer - Reward (if offered)

(ii) Worker did not blow the whistle: \$20 - Wage Offer

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\*For simplicity, participants' \$5 participation fee is not shown in the payoff calculations.

**Figure 7: Payoff calculations for workers and employers**

### 5.4.1 Worker Payoffs

As shown in [Figure 7](#), workers who accepted an employer's wage offer always received their wage less a \$4 cost of effort. However, in addition to their wage, workers in the *Can Reward* condition who blew the whistle also received any reward their employer offered.

### 5.4.2 Employer Payoffs

As also shown in [Figure 7](#), employers in the *No W/B* condition always received the actual level of revenue generated less the wage offered to their worker. In the *Cannot Reward* and *Can Reward* conditions, employers did not know the actual level of revenue generated but knew that it equaled either \$20 or \$30 with equal probability and also knew a \$10 theft would occur with certainty if it equaled \$30. If their worker observed theft and blew the whistle, employers were informed of both the theft and the worker's whistle-blowing. Further, they recovered the \$10 of stolen revenue with certainty, thus receiving \$30 in total revenue. If, however, their worker remained silent about the theft, employers received only \$20 of revenue, were not informed about the theft, and therefore could not infer whether the actual level of revenue generated equaled \$30 or only \$20. Consequently, employers could not determine if a theft occurred unless their worker blew the whistle. Employers in the *Can Reward* condition also paid any whistle-blowing reward offered to workers who blew the whistle in addition to the worker's wage. As explained in [Chapter 3](#), conventional economic theory suggests employers and workers will make identical decisions across the *Can Reward* and *Cannot Reward* conditions, and that all payoffs will be identical across all three conditions.

## 6.0 EXPERIMENTAL RESULTS

### 6.1 OVERVIEW OF CHAPTER

This chapter presents descriptive statistics concerning my results as well as statistical tests of my hypotheses and research questions. [Section 6.2](#) summarizes the decisions employers and workers made during the experiment and their respective payoffs. I divide the formal statistical analysis of my hypotheses and research questions into three sections. First, [Section 6.3](#) provides statistical tests comparing employer welfare across the *Can Reward* and *Cannot Reward* settings (i.e., tests of RQ1). Second, [Section 6.4](#) provides statistical tests regarding employers' decisions about both the level of compensation to offer workers (i.e., tests of RQ2 and H1) and, within the *Can Reward* condition, the form of compensation (i.e., tests of H2). Third, [Section 6.5](#) provides statistical tests regarding workers' whistle-blowing behavior (i.e., formal tests of for RQ3 and H3). [Section 6.6](#) provides supplemental analysis of PEQ data that provides additional support for the presence of motivation crowding in the *Can Reward* condition in which employers could offer a whistle-blowing reward. Finally, [Section 6.7](#) briefly summarizes and discusses the results.

### 6.2 SUMMARY OF THE DATA

I summarize my data into three broad categories. First, [Section 6.2.1](#) summarizes employer behavior. Specifically, I summarize employers' average wage offers and, for employers in the *Can Reward* condition, the frequency with which they offered a financial

reward and the average level of reward offered. Second, [Section 6.2.2](#) summarizes workers' decisions about whether to accept the employer's offer and, when they observed theft, whether to blow the whistle. Third, [Section 6.2.3](#) presents descriptive information regarding employers' and workers' average respective payoffs.

### 6.2.1 Employer Behavior

[Table 1](#) summarizes employers' mean wage offers for all conditions and, for employers in the *Can Reward* condition, the mean reward employers chose to offer their worker for whistle-blowing.<sup>17</sup> Based on prior work by Levitt and List (2007), I expected many employers to offer a reward in the *Can Reward* condition, and they did so in 88% of cases ( $n = 176 / 200$ ).<sup>18</sup> Employers chose *not* to offer any financial reward for whistle-blowing in 12% of cases ( $n = 24 / 200$ ). 20 of these 24 cases arise from two employers who never offered a financial reward in any period. I categorize the 200 total offers in the *Can Reward* condition according to whether the employer did or did not offer a reward (*Reward Offered* = 176 cases and *No Reward Offered* = 24 cases). I distinguish offers within the *Can Reward* condition because I wish to compare the effect of offering a financial reward relative to cases in which employers do not offer a reward *and workers do not expect them to do so*. In the natural setting, workers do not appear to expect whistle-blowing rewards, but workers in the *Can Reward* condition likely expected to receive

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<sup>17</sup> Analysis of the data indicates that an employer in the *No W/B* condition made anomalously large wage offers that result in severe outliers and skew the data for that condition. The employer offered a wage of \$19 in the first period and the maximum possible wage of \$20 in each of the remaining nine periods. These offers are over 3 standard deviations greater than the mean offer in the *No W/B* condition, and \$4-\$5 above the next highest wage offer. For purposes of comparison, no other wage offer is more than \$2 from the next closest offer. This employer also made wage offers much higher than those commonly observed in related types of bargaining games (e.g., the ultimatum game). Thus, including these offers would distort the true nature of the wage offers that employers made and workers' subsequent acceptance decisions. To mitigate the effect of this anomalous participant's decisions and present a more representative picture of employer behavior, I exclude data related to this participant from reported analyses.

<sup>18</sup> I allowed this choice because conventional economic theory suggests employers will forgo offering a reward or offer no more than the minimum positive amount (\$0.50). Employers appear to have believed that their workers would not blow the whistle for the minimum positive reward of \$0.50 given that they offered an average reward of \$3.66.

such rewards given the frequency with which employers offered them. Thus, the expectation of a reward likely distorts workers' behavior in these 24 cases relative to how workers behave in the natural setting, and, in addition, these cases do not appear to reflect typical employer behavior for this condition. At times my statistical tests and subsequent discussion refer to a sub-sample of cases in the *Can Reward* condition rather than the full sample for this condition. When this occurs, I append a category label to the condition to distinguish the sub-sample from the full sample of cases: the term *Can Reward-Reward Offered* refers to the 176 cases in the *Can Reward* condition in which the employer offered a reward, while the term *Can Reward-No Reward Offered* refers to the 24 instances in the *Can Reward* condition in which the employer did *not* offer a reward.

**Table 1: Mean (Standard Deviation) of employers' wage and reward offers**

	CONDITION				
	No Whistle-Blowing	Cannot Reward	Can Reward.....		
			Reward Offered	No Reward Offered	Combined
Wage Offer	\$8.95 (\$1.50)	\$10.12 (\$1.88)	\$8.97 (\$2.30)	\$8.79 (\$3.09)	\$8.95 (\$2.40)
Reward Offer	n/a	n/a	\$4.15 (\$1.54)	\$0.00 (\$0.00)	\$3.66 (\$1.98)
Expected Costs*	\$8.95 (\$1.50)	\$10.12 (\$1.88)	\$11.05 (\$2.77)	\$8.79 (\$3.09)	\$10.78 (\$2.90)
Sample size	n = 171	n = 200	n = 176	n = 24	n = 200

\*Expected costs = Wage Offer + 50% \* Reward Offer

From [Table 1](#), employers appear to have made similar mean wage offers across all conditions except that the mean wage offer in the *Cannot Reward* condition (\$10.12) appears higher than both the mean wage offer in the *No W/B* (\$8.95) condition and *Can Reward-Reward Offered* (\$8.97) cases. Higher wage offers in the *Cannot Reward* condition suggest that



employers attempted to rely on gift exchange to increase worker goodwill and induce more whistle-blowing. Likewise, the similarity in mean offer between the No W/B condition (\$8.95) and *Can Reward-Reward Offered* cases (\$8.97) suggests employers did not rely on gift exchange to induce whistle-blowing.

I also calculate employers' expected costs for each condition, which represents the total financial resources the employer expects to expend in order to induce acceptance of the offer and whistle-blowing. In the *No W/B* and *Cannot Reward* conditions an employer's expected cost simply equals the wage offered to the worker. In the *Can Reward* condition, however, the employer's expected costs must incorporate the value of any reward offered. The expected cost of the reward equals the base rate of theft (here, 50%) multiplied by the level of the offered reward and, when added to the employer's wage offer, yields the employer's expected cost. Employers' expected costs appear highest in the *Can Reward-Reward Offered* cases (\$11.05), lower in the *Cannot Reward* condition (\$10.12), and lowest in the *No W/B* condition (\$8.95). Thus, though employers who offer a reward do not appear to rely on gift exchange to induce whistle-blowing, they appear to incur higher expected costs than their counterparts in the *Cannot Reward* condition.

### **6.2.2 Worker Behavior**

Workers made two decisions in my study. First, in all cases they decide whether to accept or reject the employer's wage offer. Second, in cases in which the worker accepted the wage offer, they observed theft probabilistically and, in such cases, decided whether to blow the whistle or remain silent. [Table 2](#) summarizes workers' wage acceptance decisions and their whistle-blowing choices.

**Table 2: Descriptive summary of workers’ wage acceptance and whistle-blowing**

	CONDITION				
	No Whistle-Blowing	Cannot Reward	Can Reward		
			Reward Offered	No Reward Offered	Combined
% of Wage Offers Accepted:	90.6% (155/171)	82.0% (164/200)	90.3% (159/176)	79.2% (19/24)	89.0% (178/200)
Frequency Theft Occurred	n/a	60.4% (99/164)	59.7% (95/159)	63.2% (12/19)	60.1% (107/178)
% Whistle-Blowing Given Theft	n/a	41.4% (41/99)	94.7% (90/95)	0.0% (0/12)	84.1% (90/107)

From [Table 2](#), workers appear to have accepted wage offers at similar rates in the *No W/B* (90.6%) and *Can Reward* (89.0%) conditions. However, wage acceptance rates appear relatively lower in the *Cannot Reward* (82.0%) condition. To test this, I run an ANOVA with mean wage acceptance as the dependent variable and condition as the independent variable. ANOVAs require a continuous dependent variable, but wage acceptance is a dichotomous choice (Accept or Reject). To address this, I calculate the mean rate of wage acceptance for each worker and then compare these means by condition using a simple ANOVA. Using each worker’s *mean* rate of wage acceptance controls for repeated measurements and provides a continuous dependent variable with which to run an ANOVA. The ANOVA indicates that no significant differences exist in the mean rate of wage acceptance among the three conditions ( $F = 1.21, p = 0.31$ ). Given that employers could adjust the level of their wage offers based on their beliefs about workers’ expectations, it is unsurprising that the rate at which workers accepted wage offers did not vary across conditions.

The random drawing procedure used to determine whether theft occurred used a base rate for theft of 50%, but the drawings themselves led to an actual rate of theft of 60%. A slight difference in the actual rate of theft between the *Cannot Reward* (60.4%) and *Can Reward*

(60.1%) conditions exists because workers in the *Can Reward* condition rejected wage offers relatively more frequently in periods in which theft *would have* occurred had they accepted the wage offer. However, this variation did not lead to significant differences in the actual rate of theft between the two conditions (Pearson  $\chi^2 < 0.01$ ,  $p = 0.96$ ). Thus, workers in both conditions observed theft at similar rates and had equal opportunity to blow the whistle.

Finally, workers blew the whistle over twice as frequently in the *Can Reward-Reward Offered* cases (94.7%) as in the *Cannot Reward* condition (41.4%). Also, note that workers who observed theft in the *Can Reward* condition never blew the whistle without a reward—that is, workers never blew the whistle in the 12 instances of the *Can Reward-No Reward Offered* cases in which theft occurred. This suggests the possibility of receiving a financial reward may have crowded out workers' non-financial motivation to whistle-blow. In sum, it appears that offering a financial reward powerfully motivates whistle-blowing relative to offering only a fixed wage. Though workers receive wages of \$10.12 versus only \$8.95 in the *Cannot Reward* versus *Can Reward* condition, this induced much less whistle-blowing, even though workers incur no cost to blow the whistle.

### **6.2.3 Employer and Worker Payoffs**

[Table 3](#) summarizes employer and worker payoffs by condition. Employers averaged the highest payoff in the *No W/B* condition (\$14.99), which should be expected given they need not expend financial resources to induce whistle-blowing. The average payoff for employers and workers appear higher in the *Can Reward-Reward Offered* cases (\$12.59 and \$10.60, respectively) than in the *Cannot Reward* condition (\$9.78 and \$8.67, respectively). Further, rejected wage offers do not appear to drive the relative ranking of employer and worker payoffs because the ranking remains the same when comparing only the wage offers that workers accepted.

Employers received the highest average payoff (\$18.90) in cases in the *Cannot Reward* condition in which workers blew the whistle. That is, employers consistently received lower payoffs in the *Cannot Reward* condition except for instances in which workers blew the whistle. Thus, while it appears that workers blew the whistle more frequently in the *Can Reward-Reward Offered* cases, employers appear to have received higher payoffs from whistle-blowing in the *Cannot Reward* condition. Thus, it remains unclear whether offering a whistle-blowing reward yields higher employer payoffs than not doing so. Finally, note that workers' gross payoffs (excluding their cost of effort) also appear highest in the *Can Reward* condition, which suggests that offering a reward can lead to Pareto improvements in welfare.

**Table 3: Mean employer and worker payoffs**

	CONDITION				
	<u>No Whistle- Blowing</u>	<u>Cannot Reward</u>	<u>Can Reward</u>		
			<i>Reward Offered</i>	<i>No Reward Offered</i>	<i>Combined</i>
<b><u>All Cases</u></b>					
Employer Payoff	\$14.99	\$9.78	\$12.59	\$8.08	\$12.05
Worker Gross Pay	\$8.28	\$8.67	\$10.60	\$7.75	\$10.26
Sample Size	n = 171	n = 200	n = 176	n = 24	n = 200
<b><u>Wage Offer Accepted</u></b>					
Employer Payoff	\$16.54	\$11.93	\$13.93	\$10.21	\$13.53
Worker Gross Pay	\$9.14	\$10.57	\$11.73	\$9.79	\$11.52
Sample Size	n = 155	n = 164	n = 159	n = 19	n = 178
<b><u>Worker Blew Whistle</u></b>					
Employer Payoff	n/a	\$18.90	\$16.47	n/a	\$16.47
Worker Gross Pay	n/a	\$11.10	\$13.53	n/a	\$13.53
Sample Size	n/a	n = 41	n = 90	n = 0	n = 90
<b><u>Worker Remained Silent</u></b>					
Employer Payoff	n/a	\$9.69	\$12.80	\$11.00	\$11.53
Worker Gross Pay	n/a	\$10.31	\$7.20	\$9.00	\$8.47
Sample Size	n/a	n = 58	n = 5	n = 12	n = 17
<b><u>No Theft Occurred</u></b>					
Employer Payoff	\$16.54	\$9.52	\$10.45	\$8.86	\$10.30
Worker Gross Pay	\$9.14	\$10.48	\$9.55	\$11.14	\$9.70
Sample Size	n = 155	n = 65	n = 64	n = 7	n = 71

Gross Pay excludes \$4 cost of effort and \$5 participation fee

### 6.3 EMPLOYER WELFARE ACROSS CONDITIONS

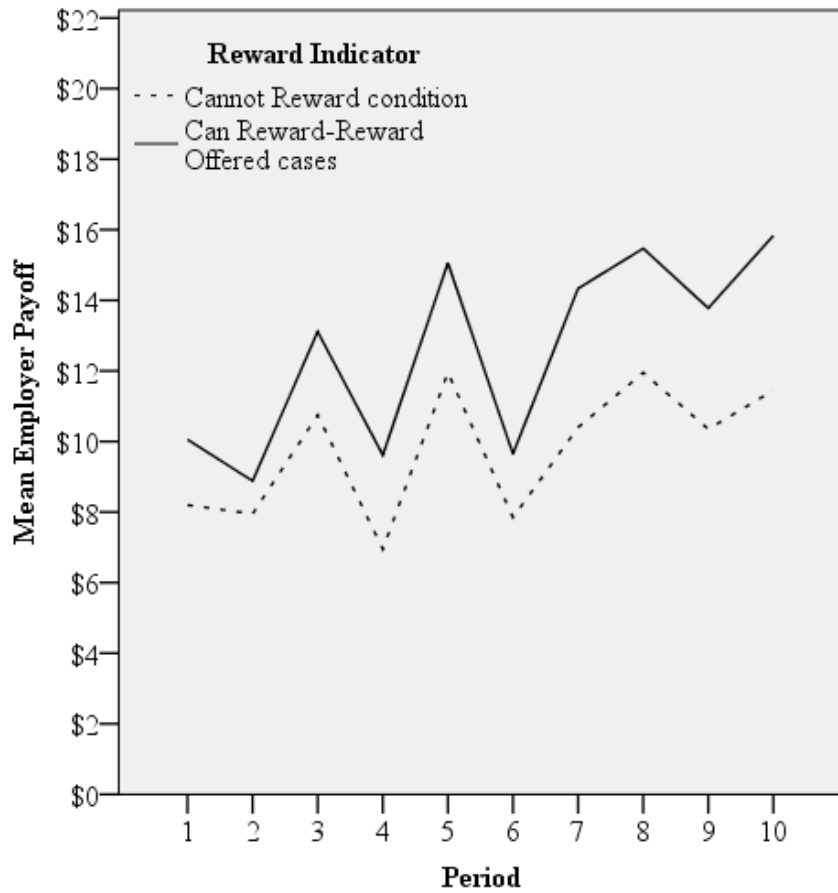
My first research question asks whether employers earn higher payoffs when they offer workers a financial reward for whistle-blowing relative to when they do not. To test RQ1, I compare the mean employer payoff for the 176 *Can Reward-Reward Offered* cases (mean = \$12.59) to the mean employer payoff for the 200 cases in the *Cannot Reward* condition (mean = \$9.78). I regress the employer payoffs on an independent indicator variable for condition (*Reward* = 1 if *Can Reward-Reward Offered* case, = 0 if *Cannot Reward* condition). I also include an independent indicator control variable for whether the worker accepted the employer's wage offer (*Accept* = 1 if worker accepts wage, = 0 if rejects) because workers' wage acceptance decision should explain a substantial part of the variation in employers' payoffs. Because employer and worker decisions jointly affect employers' payoffs, I cluster observations on each unique employer-worker pair and thus obtain a sample size of 376 unique observations.

$$(1) \quad \text{Employer Payoff} = \alpha + \beta_1 * \text{Reward} + \beta_2 * \text{Accept} + \epsilon$$

I find that  $\beta_1$ , the co-efficient on *Reward*, is significantly positive ( $\beta_1 = 1.75$ ,  $t = 4.37$ ,  $p < 0.001$ ), indicating that payoffs in the *Can Reward-Reward Offered* cases significantly exceed those in the *Cannot Reward* condition. As expected, I also find  $\beta_2$ , the co-efficient on *Accept*, is significantly positive ( $\beta_2 = 12.61$ ,  $t = 21.9$ ,  $p < 0.001$ ).<sup>19</sup> Further, as shown in [Figure 8](#) below, employers who offered a whistle-blowing reward earned higher mean payoffs in every period, including periods in which theft did and did not occur. Thus, the beneficial effect of offering a reward on employer welfare persists over time and does not appear to depend upon either learning effects or whether theft actually occurred.

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<sup>19</sup> My statistical inferences remain unchanged when I omit the *Accept* indicator variable.



**Figure 8: Employer payoffs across time**

I test for period effects using regression (2) below, which runs regression (1) including a variable indicating period (*Period*) and an interaction term between the *Period* and *Reward* terms (*Period\*Reward*):

$$(2) \quad \text{Employer Payoff} = \alpha + \beta_1 * \text{Reward} + \beta_2 * \text{Accept} + \beta_3 * \text{Period} + \beta_4 * \text{Period} * \text{Reward}$$

I find significantly positive signs for both  $\beta_3$ , the co-efficient on *Period* ( $\beta_3 = 0.22$ ,  $t = 2.4$ ,  $p < 0.02$ ), and also  $\beta_4$ , the co-efficient of the interaction term between *Period* and *Reward* ( $\beta_4 = 0.46$ ,  $t = 3.5$ ,  $p < 0.001$ ). Thus, while employer payoffs increased over time in both conditions,

payoffs increased at a *faster* rate for employers who offered a reward versus those in the *Cannot Reward* condition.<sup>20</sup> As such, the disparity in employer payoffs across conditions appears to be growing over time.

#### 6.4 EXPECTED COMPENSATION COSTS

The analysis in [Section 6.3](#) shows that employers receive higher payoffs when they offer their workers a financial reward for whistle-blowing. An employer's payoff function consists of two inputs: (i) the cost incurred to induce wage acceptance and whistle-blowing and (ii) the financial benefit obtained from doing so. To explore *why* employers obtained higher payoffs by rewarding whistle-blowers, I examine both payoff components. This section examines employers' decisions about how to compensate workers, while the next section examines workers' whistle-blowing as a function of compensation choices.

Three parts comprise this section, each of which provides respective tests for RQ2, H1, and H2. All tests relate to employers' *expected* costs. Workers' *actual* compensation consists of their wage and any reward received for whistle-blowing, but their *expected* compensation consists of the employer's wage offer plus the expected value of any financial reward the employer offers for blowing the whistle. The expected value of a whistle-blowing reward equals the base rate of observing misconduct (here, 50%) multiplied by the value of the reward. I compare *expected* rather than *actual* compensation because this better reflects the true level of the compensation that employers offer to workers. Employers make their compensation decisions based on the information they have available to them at the time. In my study, employers only know the probability of theft rather than whether a theft actually occurred. Thus,

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<sup>20</sup> Employer payoffs increase over time in part because theft occurred more frequently in the second half of the experiment than in the first half. However, this increase in the frequency of theft cannot account for why the disparity in employer welfare between reward conditions increases over time.



the expected value of rewards offered in the *Can Reward* condition better measures the level of reward employers expect to pay over time. In the *Cannot Reward* condition and *Can Reward-No Reward Offered* cases, the employer's expected compensation cost equals only the wage offered to the worker because employers in this condition do not offer any whistle-blowing reward.

#### 6.4.1 Test of RQ2

My second research question asks whether employers have higher expected compensation costs when they offer workers a financial reward for whistle-blowing relative to when they do not. To answer this question, I compare the mean expected cost of compensation for the 200 cases in the *Cannot Reward* condition (mean = \$10.12) to that for the 176 *Can Reward-Reward Offered* cases (mean = \$11.05). I regress the expected value of the compensation offered to workers on *Reward*, the independent indicator variable condition (*Reward* = 1 if *Can Reward-Reward Offered* case, = 0 if *Cannot Reward* condition). Because one employer makes repeated decisions about the level of compensation to offer a worker, I cluster the analysis on employers to control for repeated measures.

$$(3) \quad \text{Expected Compensation} = \alpha + \beta_1 * \text{Reward} + \varepsilon$$

I find that  $\beta_1$ , the co-efficient on *Reward*, does not differ significantly from zero ( $\beta_1 = 0.9$ ,  $t = 1.3$ ,  $p = 0.19$ , two-tailed). This indicates that, on an expected basis, employers who offer a reward do not offer higher overall expected compensation relative to those in the *Cannot Reward* condition. Rather, it appears that employers who can offer a reward prefer to offer a similar level of *total* expected compensation relative to employers in the *Cannot Reward* condition but also prefer to incorporate a reward into workers' pay. To offset the expected cost of the reward,

employers appear to reduce their wage offers: employers in the *Cannot Reward* condition offered mean wages of \$10.12, which appears greater than the mean wage offer of \$8.97 for employers who offered a reward.<sup>21</sup>

Finally, as shown in [Figure 9](#) below, plotting the expected compensation across time shows that the disparity between expected compensation actually *narrows* as employers become more familiar with offering financial rewards. While employers consistently offer quantitatively higher expected compensation when they offer a financial reward for whistle-blowing, this difference does not differ significantly from zero and actually appears to decrease over time as employers become more experienced with offering rewards.

To check for an interaction over time (i.e., periods), I run regression (3) including an indicator variable for Period (*Period*) and an interaction term between *Reward* and *Period* (*Reward\*Period*):

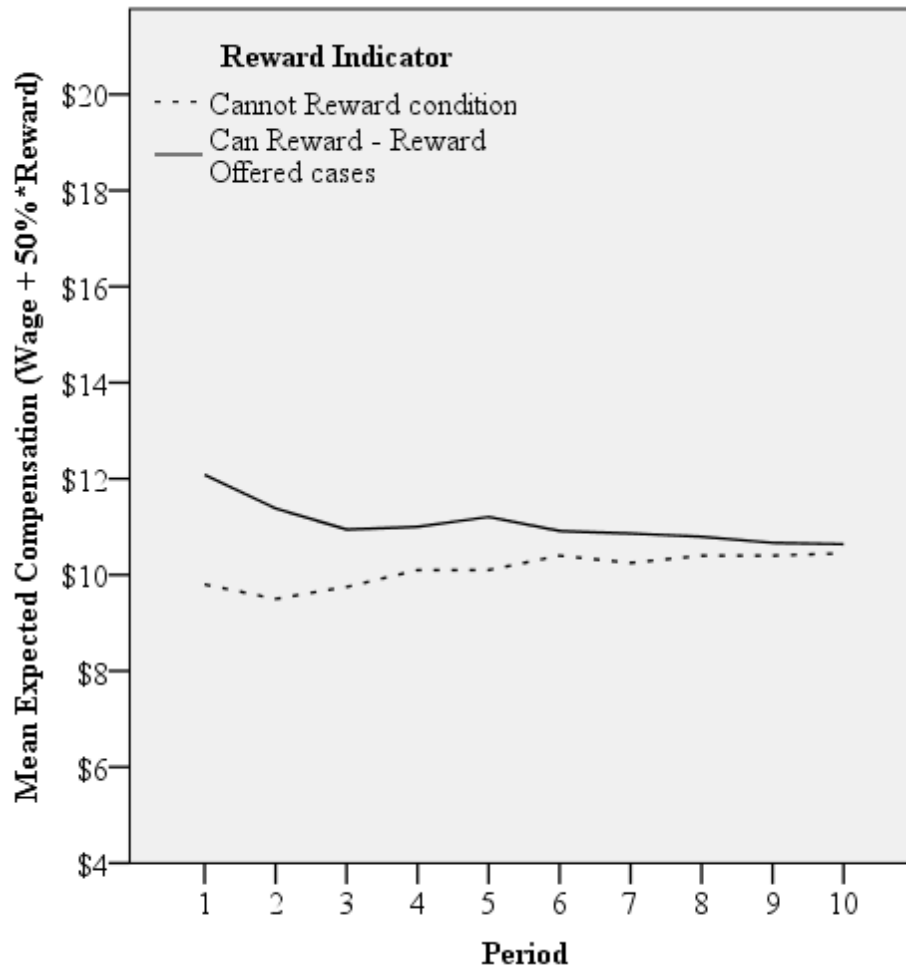
$$(4) \quad \text{Expected Compensation} = \alpha + \beta_1 * \text{Reward} + \beta_2 * \text{Period} + \beta_3 * \text{Reward} * \text{Period} + \epsilon.$$

I find that the interaction coefficient  $\beta_3$  is significantly negative ( $\beta_3 = -0.22$ ,  $t = 2.53$ ,  $p = 0.016$ , two-tailed), which indicates that the already insignificant disparity in expected compensation costs decreases over time for employers who offer a reward versus employers in the *Cannot Reward* condition.<sup>22</sup>

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<sup>21</sup> My statistical inferences remain unchanged when I run regression (3) while combining the 24 *Can Reward-No Reward Offered* cases and the *Cannot Reward* cases.

<sup>22</sup> A comparison of expected compensation costs shows the mean expected compensation cost for *Can Reward-Reward Offered* cases is significantly higher ( $t = 1.9$ ,  $p = 0.06$ ) than the mean for the *Cannot Reward* condition only in the first half of the study. No significant difference exists in mean expected compensation for the second half of the study ( $t = 0.57$ ,  $p = 0.57$ ).



**Figure 9: Mean expected compensation across time**

### 6.4.2 Test of H1

Hypothesis 1 predicts that, *to induce whistle-blowing*, employers will choose to offer workers higher compensation when misconduct can occur relative to when it cannot occur. In order to isolate the incremental compensation employers offer *specifically* to induce whistle-blowing, I compare employers' mean wage offer in the *No W/B* condition to the mean wage offer in the treatment conditions (i.e., the combined *Can Reward* and *Cannot Reward* conditions). Because employers did not need to induce whistle-blowing in the *No W/B* condition, any difference in mean wages between the *No W/B* condition and the two treatment conditions must result from

employers attempting to induce whistle-blowing. Thus, comparing the mean wage offer for the *No W/B* condition to the other two conditions allows me to isolate the incremental effect of workers' whistle-blowing ability on employers' wage offers (see Fehr et al. 1998).

To test H1, I compare the 171 observations of employers' wage offers in the *No W/B* condition (mean wage offer = \$8.95) to the 400 combined wage/reward offers from the *Can* and *Cannot Reward* conditions (mean total expected compensation offered = \$10.45, untabulated).

I regress a dependent variable for the expected value of the compensation offered by the employer (*Expected Compensation*) on an independent variable indicating whether misconduct could occur (*Misconduct* = 1 if theft possible, = 0 if theft not possible). I control for repeated measurements by clustering offers of compensation on the individual employer.

$$(5) \quad \textit{Expected Compensation} = \alpha + \beta_1 * \textit{Misconduct} + \varepsilon$$

$\beta_1$ , the coefficient on *Misconduct*, is significantly positive ( $\beta_1 = 1.5$ ,  $t = 3.30$ ,  $p < 0.01$ ), which indicates that employers offered incrementally higher compensation *specifically* to induce whistle-blowing. Specifically, to induce whistle-blowing employers offered workers on average 16.8% more compensation than they did when misconduct and whistle-blowing could not occur, or about \$1.50 in absolute terms.<sup>23</sup> Recall that that employers incur expected losses from theft of \$5 (= \$10 theft \* 50% probability). As such, employers offered workers a thirty percent "share" (\$1.50 / \$5.00) of the expected recovery from whistle-blowing.

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<sup>23</sup> I calculate this by dividing the difference in the average expected compensation offered when misconduct was and was not possible by the average compensation employers offered when misconduct was not possible: [(\$10.45 - \$8.95) / \$8.95] = 16.8%.

### 6.4.3 Test of H2

My second hypothesis predicts that employers who offer a financial reward for whistle-blowing will not offer incrementally higher fixed wages in order to induce whistle-blowing. This prediction arises from some analytics presented in [Chapter 3](#) in which I demonstrate that employers who choose to offer a reward will induce whistle-blowing solely by relying on workers' extrinsic financial motivation and will not attempt to foster workers' goodwill as a means of doing so. To test H2, I compare the mean of the 176 wages employers offered in the *Can Reward-Reward Offered* cases (mean wage offer = \$8.97) to the mean of the 171 wages employers offered in the *No W/B* condition when misconduct and whistle-blowing could not occur (mean = \$8.95). I regress a dependent variable for wage offer (*Wage*) on an independent indicator variable for whether misconduct could occur (*Misconduct*). I also cluster the observations by employer to control for repeated measurements.

$$(6) \quad Wage = \alpha + \beta_1 * Misconduct + \varepsilon$$

I find that  $\beta_1$ , the co-efficient on *Misconduct*, does not differ significantly from zero ( $\beta_1 = 0.02$ ,  $t = 0.04$ ,  $p = 0.97$ ). This indicates that, on average, employers who offered a whistle-blowing reward *did not* also offer higher incremental compensation in the form of gift wages to induce whistle-blowing, but rather attempted to induce whistle-blowing solely by offering a reward.

[Table 4](#) shows quartile data for (i) mean wage offers for *Can Reward-Reward Offered* cases; (ii) the mean reward level that corresponds to the wage offered; (iii) mean expected compensation offered (i.e.,  $wage + 50\% * reward$ ); (iv) mean wages offered for the combined

*Cannot Reward* condition and *Can Reward-No Reward Offered* cases; and (v) mean wage offers in the *No W/B* condition. As shown in Table 4, the quartile means for employers' wage offers appear consistently larger for cases in which employers did not offer a reward relative to cases in which they did and, with the exception of the lowest quartile, relative to wage quartile means in the *No W/B* condition. Also, quartile means for wages offered when employers offered a reward appear roughly similar to the quartile means in the *No W/B* condition. Thus, it does not appear that a narrow segment of employers drove observed behavior.

The size of a reward offered and the size of a wage offered appear positively correlated. A bivariate correlation between wage offers and reward offers confirms a significant positive correlation (Pearson correlation = 0.572,  $p = 0.013$ , two-tailed,  $n = 18$ ).<sup>24</sup> Thus, employers who offered workers relatively high rewards also tended to offer a relatively high fixed wage. Within the population of employers, some offer relatively stingy wages while others offer relatively generous ones. The data in Table 4 show that employers in the *Can Reward-Reward Offered* cases who offer relatively generous fixed wages also offer relatively generous rewards for whistle-blowing. This suggests these employers *did not* view high wages as substitutes for offering a large reward but instead believed offering both high wages and high rewards would maximize their welfare. That is, employers did not rely on offering relatively high gift wages to induce whistle-blowing, but also offered high rewards along with high wages. This suggests employers within the *Can Reward-No Reward Offered* sub-sample who offered relatively high gift wages had reasons for doing so besides inducing whistle-blowing.

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<sup>24</sup> I control for repeated measurements in the calculation of the correlation as follows. I calculate the mean wage and corresponding mean reward offered for each employer with at least one observation in the sample of 176 cases in which employers offered a reward. I then use these means to calculate the correlation.

**Table 4: Compensation offered by wage quartile**

Percentile	Mean Wage Offer with reward	Mean Corresponding Reward Offered	Mean Expected Compensation	Mean wage offer with no reward	Mean wage offer No W/B condition
1% - 25%	\$6.14	\$3.20	\$7.74	\$7.18	\$7.21
26% - 50%	\$8.25	\$3.68	\$10.09	\$9.54	\$8.19
51% - 75%	\$9.66	\$4.86	\$12.09	\$10.79	\$9.65
76%- 100%	\$11.84	\$4.86	\$14.27	\$12.39	\$10.79
Average	\$8.97	\$4.15	\$11.05	\$9.97	\$8.95

Finally, I could not predict whether employers who *did not* offer a reward would offer incrementally higher fixed wages in order to induce whistle-blowing. Employers could simply rely on workers' intrinsic non-financial motivation (e.g., moral preferences) to induce whistle-blowing. To test this, I run regression (6) and compare the mean wage offer (\$10.12) of the 200 wage offers in the *Cannot Reward* condition to the mean wage offer (\$8.95) of the 171 wage offers in the *No W/B* condition. I find that employers in the *Cannot Reward* condition offered significantly higher fixed compensation to induce whistle-blowing, consistent with an attempt to induce gift exchange ( $\beta I = 1.17$ ,  $t = 2.54$ ,  $p = 0.016$ , two-tailed).<sup>25</sup>

## 6.5 WORKERS' WHISTLE-BLOWING BEHAVIOR

### 6.5.1 Comparing Whistle-blowing Behavior With and Without a Reward

My third research question asks whether workers blow the whistle more frequently when employers offer a reward for doing so relative to when they do not. Recall from [Section 5.4](#) that employers offered similar levels of total expected compensation to their workers regardless of whether they offered a reward. While offering a reward provides a strict financial incentive to whistle-blow, offering a high, unconditional fixed wage can foster worker goodwill and also

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<sup>25</sup> My statistical inferences remain unchanged when I run the regression while combining the 24 *Can Reward-No Reward Offered* with the 200 *Cannot Reward* cases.

induce whistle-blowing. As shown in Panel B of [Table 2](#), the rate of whistle-blowing in the *Can Reward-Reward Offered* cases (94.74%) appears substantially higher than the rate of whistle-blowing in the *Cannot Reward* condition (41.41%), and both of these rates exceed the rate (0%) of whistle-blowing in the 12 *Can Reward-No Reward Offered* cases.

To formally test RQ3, I compare whistle-blowing frequency for the 99 instances of theft in the *Cannot Reward* condition to the whistle-blowing frequency for the 95 instances of theft in the *Can Reward-Reward Offered* cases. Using a repeated measures logistic regression, I regress a dependent indicator variable for whistle-blowing ( $WB = 1$  if worker blew the whistle,  $= 0$  if worker remained silent) on the *Reward* independent indicator variable ( $Reward = 1$  if *Can Reward-Reward Offered* case,  $= 0$  if *Cannot Reward*).

$$(7) \quad WB = \alpha + \beta * Reward + \varepsilon$$

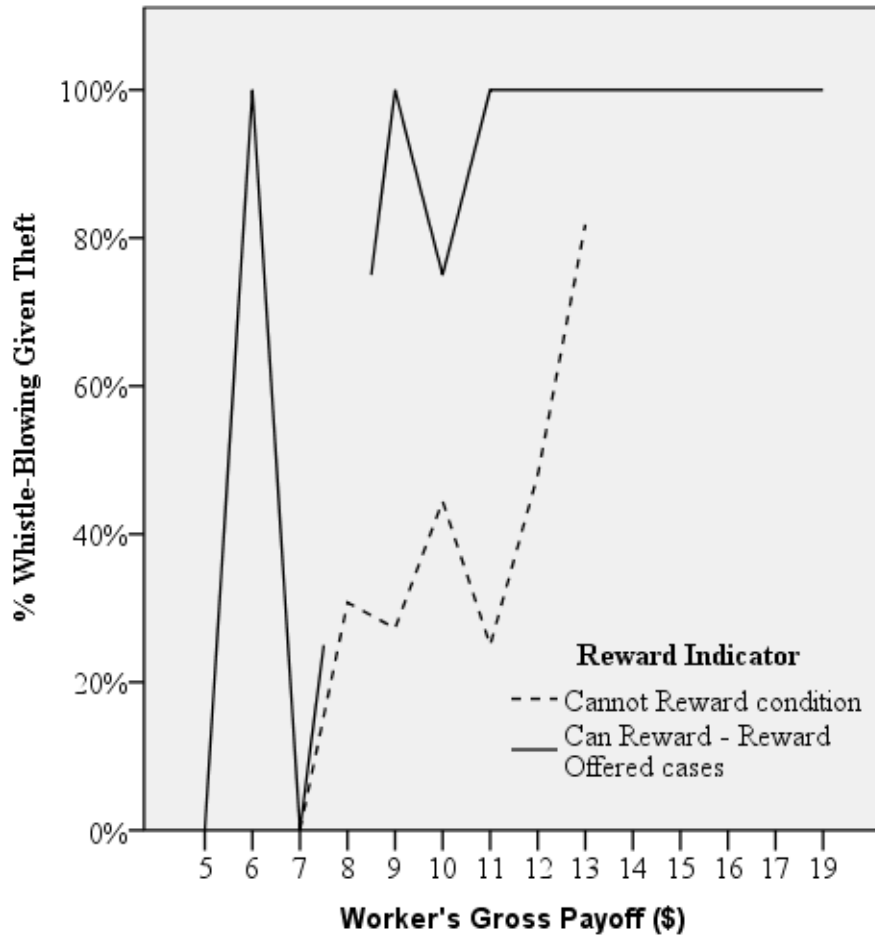
I find that workers blow the whistle significantly more often when employers offer them a reward for doing so ( $\beta = 3.24$ ,  $z = 6.44$ ,  $p < 0.001$ ).

Workers may also blow the whistle more frequently when employers offer them a reward simply because they receive greater actual *total* compensation for doing so relative to when employers do not offer a reward. To test this, I run regression (7) above with a control variable for the worker's actual payoff (*WorkerPay*):

$$(8) \quad WB = \alpha + \beta_1 * RewardOffered + \beta_2 * Worker Pay + \varepsilon$$



While *WorkerPay* significantly predicts the level of whistle-blowing ( $\beta_2 = 0.48$ ,  $z = 4.3$ ,  $p < 0.001$ ), the co-efficient on *Reward* remains statistically significant ( $\beta_1 = 3.08$ ,  $z = 5.3$ ,  $p < 0.001$ ).<sup>26</sup> This indicates that the *form* of compensation provides an incremental effect on workers' whistle-blowing decisions in addition to the *level* of their actual payoff. [Figure 10](#) illustrates this effect by plotting the mean rate of whistle-blowing for cases in the *Cannot Reward* condition and *Can Reward-Reward Offered* sample in which workers observed theft by the amount of workers' payoff.



**Figure 10: Mean whistle-blowing frequency by worker compensation**

<sup>26</sup> My statistical inferences remain unchanged when I combine the 12 *Can Reward-No Reward Offered* cases of theft with the 99 cases of theft in the *Cannot Reward* condition.

As shown in Figure 10, for every level of worker payoff, workers blew the whistle at (weakly) greater rates when employers offered them a reward relative to when they did not. For example, workers who received a fixed wage of \$13 blew the whistle less frequently than workers who received \$13 paid as a combination of wage and reward. This implies that fostering worker goodwill by offering high gift wages is a weaker mechanism to induce whistle-blowing than offering workers a financial reward.

### 6.5.2 Effect of Rewards on the Relationship between Wages and Whistle-blowing

In H3, I hypothesized that wages have less influence on workers' whistle-blowing decisions when workers can receive a whistle-blowing reward relative to when they cannot. The basis for this prediction was workers are more likely to perceive that norms of market pricing apply to whistle-blowing and less likely to perceive that norms of equality matching apply when employers can offer them a financial reward. Market pricing norms should decouple the link between wages and whistle-blowing.

To test this, I examine the 206 cases (99 in *Cannot Reward* and 107 in *Can Reward*) in which workers observed theft and made a whistle-blowing decision.<sup>27</sup> I regress workers' whistle-blowing decisions on their compensation and the experimental condition (*Can Reward* or *Cannot Reward*) in which they made their decision. Specifically, I regress a dependent indicator variable for whether the worker blew the whistle ( $WB = 1$  if worker blew whistle;  $= 0$  if remained silent) on (i) the worker's wage offer ( $Wage$ ); (ii) an independent indicator variable for cases in the *Can Reward* condition ( $CanReward = 1$  if *Can Reward* condition,  $= 0$  if *Cannot*

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<sup>27</sup> Because I am interested in the effect of perceived social norms on worker motivation, I include the 12 cases in which employers in the *Can Reward* condition did not offer a reward in my statistical tests.

*Reward* condition); (iii) an interaction term between wage offer and condition ( $Wage * CanReward$ ); and (iv) a control variable for the level of reward offered ( $Reward\$$ ):<sup>28</sup>

$$(9) \quad WB = \alpha + \beta_1 * Wage + \beta_2 * CanReward + \beta_3 * Wage * CanReward + \beta_4 * Reward\$ + \varepsilon$$

If crowding out occurs, then the interaction between *Wage* and *CanReward* should negatively affect whistle-blowing, implying a smaller positive effect of wages on whistle-blowing in the *Can Reward* versus *Cannot Reward* condition. I find  $\beta_3$ , the coefficient on  $Wage * CanReward$ , is marginally significantly *negative* ( $\beta_3 = -0.47$ ,  $z = 1.89$ ,  $p = 0.06$ ), indicating crowding out occurs and providing support for H3. This is consistent with categorical motivation crowding, in which the effect of wages on whistle-blowing decisions depends upon whether workers can receive a whistle-blowing reward.

Next, I test for simply effects by separately regressing *WB* on wage (*Wage*) in the *Cannot Reward* condition and on wage and reward level (*Wage* and *Reward\$*) in the *Can Reward* condition:

$$(9a) \quad \text{Cannot Reward:} \quad WB = \alpha + \beta_1 * Wage + \varepsilon \\ (\beta_1 = 0.33, z = 1.87, p = 0.06)$$

$$(9b) \quad \text{Reward:} \quad WB = \alpha + \beta_1 * Wage + \beta_2 * Reward\$ + \varepsilon \\ (\beta_1 = -0.14, z = 0.77, p = 0.44; \beta_2 = 1.93, z = 4.66, p < 0.001)$$

I find wages have a marginally significant positive effect on whistle-blowing in the *Cannot Reward* condition ( $p = 0.06$ ) but have no significant effect on whistle-blowing in the *Can Reward* condition after controlling for reward size ( $p = 0.44$ ). Thus, it appears that wages affect

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<sup>28</sup> I do not include an interaction between *Reward\$* and *CanReward* because  $Reward\$ * CanReward = Reward\$$ , and thus this interaction term is redundant and unnecessary.

workers' whistle-blowing decisions only in the *Cannot Reward* condition, and the possibility of a reward in the *Cannot Reward* condition crowds out any effect of wages on workers' whistle-blowing decisions.

## 6.6 SUPPLEMENTARY ANALYSIS

To provide further insight into the relationship between financial rewards and motivation crowding, I examine data obtained from a post-experimental questionnaire (PEQ). As part of the PEQ, workers rated the influence of various factors on their willingness to blow the whistle on a 5-point Likert Scale with endpoints of "Greatly decreased willingness" (-2) and "Greatly increased willingness" (+2) and a midpoint of "No influence at all" (0). This included rating how the following affected whistle-blowing:

- (i) The reward the employer offered me was high (*Can Reward* condition only);
- (ii) The reward the employer offered me was low (*Can Reward* condition only);
- (iii) The wage the employer offered me was high (both reward conditions);
- (iv) The wage the employer offered me was low (both reward conditions).

Below, [Table 5](#) shows workers' mean responses to these PEQ questions.

**Table 5: PEQ data about workers' perceived whistle-blowing influences**

Workers' mean responses to the following PEQ question:

When you accepted the employer's wage offer and then observed theft, please indicate how each of the following factors influenced your **willingness to report** the theft to your employer (-2 = Greatly decreased my willingness, 0 = Had no influence at all, +2 = Greatly increased my willingness):

	<b>Condition</b>	
	<i>Reward</i> (n = 20)	<i>No Reward</i> (n = 20)
<b><u>Factors:</u></b>		
(1) The <i>reward</i> the employer offered me was high	1.60	n/a
(2) The <i>reward</i> the employer offered me was low	-0.75	n/a
<i>High Reward - Low Reward [(1) - (2)]</i>	<i>(i)</i> 2.35	<i>n/a</i>
(3) The <i>wage</i> the employer offered me was high	0.95	1.40
(4) The <i>wage</i> the employer offered me was low	-0.70	-1.30
<i>High Wage - Low Wage [(3) - (4)]</i>	<i>(ii)</i> 1.65	<i>(iii)</i> 2.70

**Tests:**

Test (1): Paired t-test of whether (i) 2.35 > (ii) 1.65

**Test Result: t = 1.89, p = 0.04, one-tailed**

Test (2): Simple t-test of whether (ii) 1.65 < (iii) 2.70

**Test Result: t = 2.10, p = 0.02, one-tailed**

To gain additional insight into whether the possibility of receiving a reward led to motivation crowding among workers, I conduct two tests using a difference-in-difference analysis of worker responses to the PEQ questions. The first test comprises a within-subject comparison using workers in the *Can Reward* condition while the second comprises a between-subjects comparison using workers in both treatment conditions. First, I test whether workers in the *Can Reward* condition perceived the level of financial reward for blowing the whistle as more influential to their whistle-blowing decisions than the level of wage they received. To test this, I use a difference-in-difference analysis using the 20 workers in the *Can Reward* condition. For each worker, I calculate the mean difference in the perceived willingness to blow the whistle for a high versus low reward (overall mean = 2.35), which serves as a measure of the perceived influence of *reward size* on whistle-blowing. Similarly, I calculate the mean difference in the worker's perceived willingness to blow the whistle for a high versus low wage (overall mean = 1.65), which serves as a measure of the perceived influence of *wage level* on whistle-blowing. I then conduct a paired t-test of whether reward size exerts greater perceived influence than wage level on workers' whistle-blowing. I find that workers in the *Can Reward* condition perceive reward size exerts marginally significant more influence than wage level on their whistle-blowing decisions ( $t = 1.89$ ,  $p = 0.08$ , two-tailed,  $n = 20$ ). Thus, the potential for a reward appears to weigh more heavily on workers' whistle-blowing decisions than their wages.

The second test examines whether workers in the *Can Reward* condition perceive that wage level has less influence on their whistle-blowing decisions than workers in the *Cannot Reward* condition. To test this, I use a difference-in-difference analysis that compares mean responses for the 20 workers in the *Can Reward* condition to the 20 in the *Cannot Reward* condition. As I did the prior test for workers in the *Can Reward* condition, I calculate the mean

difference in the worker's perceived willingness to blow the whistle for a high versus low wage in the *Cannot Reward* condition (overall mean = 2.70). I then conduct a simple t-test and find a significantly smaller ( $t = 2.10$ ,  $p = 0.04$ , two-tailed) overall mean difference in the *Can Reward* condition (overall mean difference = 1.65) than in the *Cannot Reward* condition (overall mean difference = 2.70). These findings suggest that, when making their whistle-blowing decisions, workers in the *Can Reward* condition focus more on rewards than wages and also have less sensitivity to wage variation than workers in the *Cannot Reward* condition.

I also ask workers to rate the extent to which their personal moral preferences influenced their whistle-blowing choices. Workers rated the perceived influence on a 5-point Likert scale with endpoints of "Greatly decreased willingness" (-2) and "Greatly increased willingness" (+2) and a midpoint of "No influence at all" (0). I find that workers' perceptions about the effect of their personal morals on their whistle-blowing decisions did not differ significantly across conditions ( $t = 0.81$ ,  $p = 0.42$ ). This is not necessarily surprising because workers may perceive their own intrinsic moral values to be independent of the level of wages or rewards offered to them or the social settings in which they interact.

To test whether these moral preferences influenced workers' whistle-blowing decisions differentially across reward conditions, I average each worker's rate of whistle-blowing conditional upon observing theft, which controls for repeated measurements.<sup>29</sup> This yields 40 ratings of perceived moral influence and 40 average rates of whistle-blowing. Subsequently, I then regress a dependent variable for the mean rate of whistle-blowing (*WB\_Mean*) for each worker on an independent indicator variable for the *Can Reward* condition (*CanReward* = 1 if *Can Reward* condition and = 0 if *Cannot Reward* condition); an independent variable for the

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<sup>29</sup> Every worker observed theft at least once during the course of the study.

worker's perceived influence of personal morality on whistle-blowing (*Morality*); and an interaction term between reward condition and morality rating (*CanReward\*Morality*):

$$(10) \quad WB\_Mean = \alpha + \beta_1 * CanReward + \beta_2 * Morality + \beta_3 * CanReward * Morality + \varepsilon$$

I find  $\beta_3$ , the co-efficient on the interaction between perceived moral influence and reward condition, is negative and marginally significant ( $\beta_3 = -0.22$ ,  $t = 1.9$ ,  $p = 0.06$ , two-tailed). A negative interaction term implies that workers' perceived personal morality as less influential in their whistle-blowing decisions. I then regress the perceived influence of morality on worker's whistle-blowing behavior for each reward condition (i.e., test for simple effects):

$$(11) \quad WB\_Mean = \alpha + \beta_1 * Morality + \varepsilon$$

For the *Cannot Reward* condition, I find  $\beta_1$  is significantly positive ( $\beta_1 = 0.27$ ,  $t = 4.0$ ,  $p < 0.01$ ) but does not differ significantly from zero in the *Can Reward* condition ( $\beta_1 = 0.06$ ,  $t = 0.7$ ,  $p = 0.48$ ). Thus, personal morality appears to have affected whistle-blowing decisions *only* when employers could not offer a reward. This is consistent with categorical motivation crowding: the potential for a reward causes workers to no longer view whistle-blowing as a decision made on the basis of moral convictions.

Finally, also consistent with motivation crowding, I find that workers in the *Can Reward* condition never blew the whistle unless their employer offered them a reward for doing so. As shown in [Table 2](#), in 12 instances workers in the *Can Reward* condition observed theft when their employer offered no whistle-blowing reward. Employers offered a mean wage of \$9 in these cases (untabulated). In comparison, workers in the *Cannot Reward* condition who received



a wage offer of \$9 observed 11 instances of theft and blew the whistle in three of those instances (27.3%). In summary, workers responded more strongly to wages when making whistle-blowing decisions in the *Cannot Reward* condition; wages and personal morality were positively associated with whistle-blowing in the *Cannot Reward* condition but had no significant association with whistle-blowing in the *Can Reward* condition; and workers never blew the whistle without a reward in the *Can Reward* condition. Combined, these results provide substantial support for categorical motivation crowding; that is, the idea that market pricing norms crowd out workers' non-financial motivation to blow the whistle.

## 6.7 SUMMARY AND DISCUSSION OF RESULTS

This section briefly summarizes and discusses the results of the study. Panel A of [Table 6](#) below lists my hypotheses and research questions and briefly states the results of the statistical analysis for each hypothesis and research question. Panel B of [Table 6](#) lists the statistical analysis used to test each hypothesis and research question and indicates the sample of data included in the analysis. The primary question of the study was whether employers would obtain higher welfare by offering a whistle-blowing reward to induce whistle-blowing or by relying on workers' non-financial motivation (i.e., RQ1). To provide a benchmark against which to test the effect of offering a reward, I used a setting (*Cannot Reward*) that mirrors the natural setting in that employers do not offer financial rewards for whistle-blowing *and workers do not expect them to do so*. I find that employers' payoffs were significantly higher when they offered an explicit financial reward for whistle-blowing than when they did not, indicating that the incremental financial benefit from offering a reward outweighed the incremental cost.

**Table 6: Summary of hypotheses, research questions, and statistical analysis**

**Panel A. List of hypotheses and research questions**

*RQ1:* Do employers earn higher payoffs when they offer workers a financial reward for whistle-blowing relative to when they do not?

**Result:** Yes: employers earn higher payoffs when they offer workers a financial reward for whistle-blowing.

*RQ2:* Are employers' expected compensation costs higher when they offer workers a financial reward for whistle-blowing relative to when they do not?

**Result:** No: employers' expected compensation costs are not significantly higher when they offer workers a financial reward.

*H1:* To induce whistle-blowing, employers will offer workers higher compensation when misconduct is possible than when it is not possible.

**Result:** H1 supported.

*H2:* Employers who offer a financial reward for whistle-blowing will not offer any incremental fixed compensation specifically to induce whistle-blowing.

**Result:** H2 supported.

*RQ3:* Does the rate at which workers blow the whistle depend upon whether they are offered a financial reward for whistle-blowing?

**Result:** Yes: workers blow the whistle more frequently when they are offered a financial reward for doing so.

*H3:* When workers can receive a financial reward for whistle-blowing, wage levels have less influence on their whistle-blowing decisions than when they cannot receive a reward.

**Result:** H3 supported.

**Table 6 (Continued).**

**Panel B. Summary of statistical analysis**

Formal Test of:	Regression #	Equation	Cases from which regression sample drawn				
			No W/B	Cannot Reward	.....Can Reward..... <i>Reward Offered</i>	<i>No Reward Offered</i>	<i>Combined</i>
RQ1	1	Employer Payoff = $\alpha + \beta_1 * \text{Reward} + \beta_2 * \text{Accept} + \epsilon$		X	X		
RQ1	2	Employer Payoff = $\alpha + \beta_1 * \text{Reward} + \beta_2 * \text{Accept} + \beta_3 * \text{Period} + \beta_4 * \text{Period} * \text{Reward} + \epsilon$		X	X		
RQ2	3	Expected Compensation = $\alpha + \beta_1 * \text{Reward} + \epsilon$		X	X		
RQ2	4	Expected Compensation = $\alpha + \beta_1 * \text{Reward} + \beta_2 * \text{Period} + \beta_3 * \text{Reward} * \text{Period} + \epsilon$		X	X		
H1	5	Expected Compensation = $\alpha + \beta_1 * \text{Misconduct} + \epsilon$	X	X			X
H2	6	Wage = $\alpha + \beta_1 * \text{Misconduct} + \epsilon$	X		X		
RQ3	7	WB = $\alpha + \beta * \text{Reward} + \epsilon$		X	X		
RQ3	8	WB = $\alpha + \beta_1 * \text{RewardOffered} + \beta_2 * \text{Worker Pay} + \epsilon$		X	X		
H3	9	WB = $\alpha + \beta_1 * \text{Wage} + \beta_2 * \text{CanReward} + \beta_3 * \text{Wage} * \text{CanReward} + \beta_4 * \text{Reward} + \epsilon$		X			X
H3	9a	WB = $\alpha + \beta_1 * \text{Wage} + \epsilon$		X			
H3	9b	WB = $\alpha + \beta_1 * \text{Wage} + \beta_2 * \text{Reward} + \epsilon$					X
PEQ Analysis	10	WB Mean = $\alpha + \beta_1 * \text{CanReward} + \beta_2 * \text{Morality} + \beta_3 * \text{CanReward} * \text{Morality} + \epsilon$		X			X
PEQ Analysis	11	WB Mean = $\alpha + \beta_1 * \text{Morality} + \epsilon$ (Simple effects)		X			X

Employer payoffs are a function of the cost that employers bear to induce workers to blow the whistle and the benefit they receive from workers who do so. Thus, my subsequent analysis for RQ2 compared the level of expected compensation employers offered when they offered a whistle-blowing reward relative to when they did not. While employers incur higher compensation costs by offering workers a financial reward for whistle-blowing, they also incur compensation costs by offering workers a gift wage to increase worker goodwill and induce whistle-blowing. Recall that the behavioral-analytical model developed in [Chapter 3](#) suggests that the relative cost of inducing whistle-blowing depends upon the strength of crowding out that occurs when workers expect employers to offer them a financial reward for whistle-blowing. While I find employers in the *Can Reward-Reward Offered* cases offered directionally higher compensation than those in the *Cannot Reward* condition in all periods, this slight disparity did not differ significantly from zero.

Given no significant differences in expected costs among the whistle-blowing conditions, I then tested, in H1, whether employers offered incrementally higher compensation *specifically* to induce whistle-blowing by comparing mean expected compensation offered for the whistle-blowing treatment conditions (*Can Reward* and *Cannot Reward* combined) to mean expected compensation in a third control condition in which no theft or whistle-blowing can occur (*No W/B* condition). Any difference in expected compensation between the treatment (*Can Reward* and *Cannot Reward*) and control (*No W/B*) conditions implies that employers expended financial resources specifically to induce whistle-blowing. I find that employers offered incrementally higher expected compensation in both treatment conditions relative to the *No W/B* condition. However, my behavioral-analytical model suggests that employers would not offer incrementally higher fixed wages to induce whistle-blowing if they could offer an explicit financial reward

instead. Thus, in H2, I test this component of my model and find that, as it predicts, employers in the *Can Reward* condition offered similar fixed wages relative to their counterparts in the *No W/B* control condition.

After examining the costs related to inducing whistle-blowing, I also tested which approach—offering an explicit financial reward or relying only on nonfinancial motivation—induced higher levels of whistle-blowing (RQ3). While financial rewards provide strict financial incentives to blow the whistle, workers in the *Cannot Reward* condition received higher levels of gift wages and incurred no cost to blow the whistle. Thus, I could not predict whether whistle-blowing rates would differ under the two approaches. I find that offering a financial reward more strongly influences workers to blow the whistle than offering a gift wage. Specifically, workers blew the whistle on observed theft over twice as frequently when they would receive an explicit financial reward for doing so as when they were in the *Cannot Reward* condition. Further, workers in the *Can Reward* condition never blew the whistle unless offered a financial reward. The rate of whistle-blowing when employers offered a reward (~95%) is close to the maximum possible rate (i.e., 100%). The real surprise lies in the relatively low rate of whistle-blowing in the absence of a reward, even though workers who were not offered a reward (i) could blow the whistle at no cost and (ii) received similar levels of expected compensation *and* higher guaranteed (i.e., fixed) wages than those who were offered a reward. This raises the possibility that gift wages may induce less positive reciprocity from workers when employers cannot make clear inferences about workers' reciprocal behavior, as is the case when workers can remain credibly silent about observed misconduct. However, additional research is necessary before asserting this definitively.

Finally, I analyzed the effect of motivation crowding on whistle-blowing behavior. I find workers' whistle-blowing propensity increases in wage level, but only in the *Cannot Reward* condition. In the *Can Reward* condition, wages have no predictive value for whistle-blowing after controlling for the level of explicit financial reward offered by employers. This suggests that allowing employers to reward whistle-blowers shifts the perceived motivation for whistle-blowing away from non-financial motivations and toward financial self-interest. Consistent with this interpretation, I find in subsequent PEQ analysis that while workers' personal morality positively influences their whistle-blowing choices in the *Cannot Reward* condition, personal morality has no influence on whistle-blowing in the *Can Reward* condition. In sum, offering a whistle-blowing reward appears to strengthen workers' self-interest and weaken the efficacy of gift exchange between employers and workers. Despite this, employers in my setting obtain significantly higher payoffs from offering an explicit financial reward because they induce significantly more whistle-blowing from workers at no increase in expected compensation cost.

## **7.0 DISCUSSION AND CONCLUSION**

### **7.1 OVERVIEW OF CHAPTER**

[Section 7.2](#) briefly discusses the results of the study. In [Section 7.3](#), I discuss both the contributions of the study to the academic literature and also to corporate practice. [Section 7.4](#) concludes the chapter by discussing the limitations of my dissertation and suggesting possible extensions to my study that future projects could address.

### **7.2 DISCUSSION OF RESULTS**

My study examines strategic interactions between employers and workers in experimental labor markets to determine whether (i) employers expend financial resources *specifically* to induce whistle-blowing even when workers blow the whistle at no cost and believe doing so is the right thing to do; (ii) the ability to contract on whistle-blowing, in the form of offering workers an explicit financial reward for whistle-blowing, affects the amount and form of financial resources employers expend to induce whistle-blowing; (iii) offering workers an explicit financial reward for whistle-blowing in addition to a fixed wage affects workers' whistle-blowing choices and employer welfare; and (iv) expending financial resources to induce whistle-blowing decreases workers' non-financial motivation to whistle-blow. Under conventional economic theory, employers in my setting should not expend any financial resources to induce whistle-blowing, whether in the form of offering a higher fixed wage ("gift wage") or in the form of offering an explicit financial reward for whistle-blowing.

While I did not set out to test conventional economic predictions, deriving them allowed me to rule out alternative economic explanations for the behavior observed in my study. My key results follow below. First, I find strong evidence that employers expend incremental financial resources to induce whistle-blowing, even though workers in my setting blow the whistle at no cost and have non-financial motivations to do so. In my *Cannot Reward* condition, employers attempt to induce whistle-blowing by offering incrementally higher gift wages to workers, whereas in my *Can Reward* condition employers generally offered higher incremental compensation only in the form of an explicit financial reward rather than in the form of higher fixed wages. Second, despite differences between the two conditions in the *form* of incremental compensation offered to workers to induce whistle-blowing, the overall *level* of compensation employers offered to workers did not differ significantly between the two conditions.

Third, despite similarities in expected compensation, I find workers blow the whistle more often in response to financial incentives offered in the form of an explicit reward than in the form gift wages, and this leads employers who offer an explicit financial reward to earn higher payoffs relative to those who do not. Specifically, workers observing misconduct blew the whistle over twice as frequently when their employer offered them an explicit financial reward. Because employers offered similar amounts of total compensation to workers in the *Cannot Reward* and *Can Reward-Reward Offered* cases, the higher rate of whistle-blowing that occurred when employers offered an explicit financial reward led those employers to earn relatively higher payoffs. Whistle-blowing rates approached 95% when employers offered workers a reward but only 41.4% in the *Cannot Reward* condition. Thus, workers appear to respond less to non-contingent financial incentives (i.e., higher gift wages) than to contingent ones (i.e., financial rewards payable contingent on the worker blowing the whistle).



Recall that workers in my setting could remain credibly silent about observing theft and their employer would never know if a theft had occurred. This could potentially explain the relatively low level of whistle-blowing observed in the *Cannot Reward* condition. The ability to remain credibly silent about theft distinguishes my setting in an important way from prior gift exchange studies that examine motivation crowding. Workers in the classic gift exchange context can always choose to positively reciprocate a gift wage with higher levels of effort, and employers can infer if they did so based on the level of firm performance observed. In my setting, workers could not reciprocate a gift wage when they did not observe theft, and, further, employers could not infer whether low levels of revenue occurred due to chance or due to workers remaining silent when they observed theft. In the next section, I discuss the implications of this feature of my setting.

Finally, I find evidence that the expectation of receiving a financial reward for whistle-blowing crowds out gift exchange between employers and workers. As explained above, when employers can offer explicit financial rewards for whistle-blowing, on average they do not offer any incremental fixed compensation to induce whistle-blowing (i.e., no incrementally higher gift wage). In addition, I find that whereas gift wages positively influence workers' whistle-blowing decisions when employers cannot reward them for whistle-blowing, wages have no significant association with workers' whistle-blowing choices when employers can reward them for whistle-blowing. Likewise, personal morality positively influences workers' whistle-blowing when employers cannot offer a financial reward, but has no significant effect on whistle-blowing when employers can do so.

### 7.3 CONTRIBUTIONS

My study extends prior academic work on both whistle-blowing and motivation crowding. Consistent with observed practices in the natural setting, prior studies on internal whistle-blowing generally treat whistle-blowing as pro-social behavior that helps the employer. To date, however, no prior study has provided a clean test of the relative efficacy and behavioral effects of offering workers an explicit financial reward for reporting observed internal misconduct versus relying only on their non-financial motivation to report such misconduct. Such a test is important because some firms currently offer financial rewards to internal whistle-blowers while others are weighing whether to adopt this approach for themselves.

Prior related studies struggle to make clear inferences regarding the determinants of whistle-blowing because they rely on field surveys, hypothetical scenarios, or archival data. While valuable in answering certain questions, these methods suffer shortcomings that limit their internal validity. For example, workers' self-reported behavior in surveys may not correspond to their actual behavior due to concerns for self-image. Likewise, the presence of confounds in the natural setting make it difficult to assess the economic impact of different whistle-blowing approaches. Thus, for example, the inability to determine the true base rate of employee theft within an organization makes it difficult to isolate the incremental effect of a new policy or approach on workers' willingness to blow the whistle from their likelihood of actually observing misconduct in the first place. My dissertation studies whistle-blowing using the methods of experimental economics, which tests questions using real financial incentives and allows strategic interaction between self-interested parties within a controlled laboratory environment. As discussed in [Chapter 2](#), prior research has rarely applied this methodology to the area of whistle-blowing.

My findings will help employers considering whether to adopt formal whistle-blowing reward programs to make more informed decisions about the relative costs and benefits of doing so. Those employers who care less about the negative effects of motivation crowding may find it worthwhile to offer such programs. However, employers who rely heavily on fostering positive, reciprocity-based relationships with workers (e.g., Costco) may wish to continue their current practice of offering workers only gift wages. Rewarding whistle-blowers appears to crowd out gift exchange between employers and workers. A whistle-blowing reward could possibly crowd out not just worker's non-financial motivation to blow the whistle but also their non-financial motivation to aid their employer in general. Thus, if rewarding whistle-blowers decreases other pro-social behavior, workers may provide less unobservable effort or steal more from their employer.

My study also contributes to the analytical literature on whistle-blowing and motivation crowding by presenting the first behavioral model that integrates these two phenomena. Specifically, I derive conditions under which employers will prefer either offering a gift wage or offering a reward to induce whistle-blowing. I find that these two approaches appear mutually exclusive, which helps to explain why we do not observe companies offering a mix of whistle-blowing rewards coupled with gift wages in the natural setting. As discussed in the next section, I conduct an experiment that tests certain implications of my model, but future studies could test other implications.

In addition, I know of no prior study that examines motivation crowding in the context of information asymmetry. Prior work on motivation crowding usually examines participant behavior under conditions of moral hazard. Information asymmetry provides workers with the ability to remain credibly silent about what they know. This leads to “noisy feedback” for

employers about the relative effectiveness of using gift wages versus rewards to induce whistle-blowing. In the classic gift exchange setting, employers can infer worker effort based on observed output because no state uncertainty exists, but nonetheless cannot contract on worker effort. Likewise, workers know that employers can perfectly infer their effort level. Thus, workers know whether their employer has treated them well, and employers know whether their worker has positively reciprocated their generosity by providing more effort or has negatively reciprocated by shirking. In the context of whistle-blowing, workers still know whether their employer has treated them well, but when workers remain silent employers cannot infer if the silence reflects poor treatment from their worker or if the worker simply did not observe theft. The ability to remain credibly silent appears to heighten workers' apathy toward their employer's welfare and dampen their reciprocal impulses more than would occur if workers could not remain credibly silent. My findings suggest employers can overcome these deleterious effects more easily by offering workers a financial reward than by offering them a gift wage.

Finally, I believe my study has implications for corporate codes of ethics and public policy. Recent whistle-blower legislation has emphasized more stringent anti-retaliation standards in order to encourage workers to come forward with information (e.g., the Sarbanes-Oxley and Dodd-Frank Acts). Similarly, most corporate codes of ethics strongly emphasize protection for internal whistle-blowers against retaliation. My results show that, even when workers do not fear retaliation and know that whistle-blowing benefits their employer, a large number of them may still choose to remain silent rather than blow the whistle when they have no financial incentive to come forward. Thus, the stringent anti-retaliation standards included in regulations and corporate codes of ethics may not increase whistle-blowing as much as conventional wisdom suggests. In other words, merely protecting whistle-blowers from

retaliation may not suffice to induce workers to come forward. Instead, the key may lie in taking proactive steps to ensure workers can improve their own welfare by speaking up. My findings suggest that offering a financial reward may more effectively accomplish this than relying only on workers' non-financial motives.

#### **7.4 LIMITATIONS AND FUTURE RESEARCH**

Motivation crowding is an intuitively appealing explanation for why in practice employers forgo offering rewards for whistle-blowing. However, alternative explanation exist, and the fact remains that employers in my study obtain relatively higher welfare by offering whistle-blowing rewards, even though doing so crowds out workers' non-financial motivation to blow the whistle. Thus, reasons other than concerns about motivation crowding could explain why employers forgo offering whistle-blowing rewards. Below, I offer three possible *behavioral* explanations. By *behavioral explanations*, I mean those grounded in social psychology rather than explanations based on institutional constraints such as limitations in technology or other resources.

First, social norms and taboos may favor an approach that offers *indirect* financial incentives for whistle-blowing. Generally, society appears to frown on those who exploit others' misfortune for their own financial gain. Social mores encourage us to help the victims of crime and discourage us from profiting from their loss. In the context of whistle-blowing, this implies that employers and workers might perceive offering or accepting a reward for blowing the whistle on internal misconduct as immoral, even though workers blow the whistle more often when they have a financial incentive to do so than when they do not. My study incorporates many of the key features of the natural setting that one would wish to find in a study on whistle-

blowing (e.g., credible silence, no retaliation, whistle-blower anonymity), but it may not perfectly capture the strength of social norms that deter rewarding whistle-blowers financially.

My study's design seeks to strike a balance between two opposing concerns that experimenters commonly face. Specifically, the instructions provided to participants had to avoid inducing behavior merely from demand effects, but they also had to ensure participants had sufficient context such that their observed behavior would generalize to behavior one would observe in similar settings in the natural environment. I believe my study strikes a reasonable balance between these two concerns, but, on the basis of the relatively low level of whistle-blowing I find in the *Cannot Reward* condition, future studies may wish to provide a stronger ethical context for whistle-blowing. One possible approach to achieve this might be to incorporate a strong corporate code of conduct that explicitly addresses whistle-blowing into the experimental instrument provided to participants.

Second, employers may forgo offering financial rewards because they believe that fostering non-financial motivation for whistle-blowing results in higher *overall* welfare improvements. My study does not incorporate all the potential benefits of gift wages, but merely examines the incremental effect of a gift wage on whistle-blowing. Offering a financial reward for whistle-blowing may reduce workers' pro-social behavior in other areas that can benefit the firm. For example, workers may provide less effort or steal more when offered a whistle-blowing reward because they perceive themselves as relatively more opportunistic and less reciprocal toward their employers. Thus, employers may not offer a whistle-blowing reward because of concerns this could negatively affect workers' behavior in other ways. Third, employers in my study offset the cost of whistle-blower rewards by offering lower wages. In the natural setting, workers may be accustomed to receiving a certain level of gift wage. To the

extent that this is the case, employers may not wish to replace workers' gift wages with whistle-blowing rewards if they believe doing so could lead workers to exhibit more anti-social behavior in response to a wage cut (see, e.g., Greenberg 1990, Hannan 2005).

Readers may also wonder about the sensitivity of my results to the fact that workers in my study bore no cost to blow the whistle and could not make false allegations (i.e., report theft when none occurred). While these two features may at first appear restrictive, they are quite realistic for the type of whistle-blowing I study. Employers likely will not retaliate or allow others to retaliate against internal whistle-blowers who report co-worker misconduct against the employer because workers' whistle-blowing increases rather than decreases employer welfare. Workers also have no incentive to make false allegations in either of my conditions. They receive a reward in the *Can Reward* condition only if the employer recovers the loss caused by internal misconduct, and they never benefit financially from making false allegations in the *Cannot Reward* condition, and thus they have no incentive to make such allegations.

In the natural setting, employers could strengthen workers' non-financial whistle-blowing motivation in ways that do not entail offering higher wages, and these ways could potentially induce more whistle-blowing than simply offering a higher gift wage. I chose to examine gift wages as opposed to other mechanisms that increase workers' non-financial motivations for three reasons. First, gift exchange is a robust and well-vetted method of boosting workers' non-financial motivations, especially within laboratory settings. Second, unlike other approaches to strengthening non-financial motivation, the gift exchange mechanism allows me to objectively quantify the *financial* cost employers' incurred to strengthen workers' *non-financial* motivations and thus allowed me to compare this cost to the expected cost of the explicit financial rewards employers offered for whistle-blowing in another condition. Third, to the extent that employers

consider expending financial resources to induce whistle-blowing, my study can help them make an informed decision about the relative efficacy of two different approaches of doing so. Future research could examine the efficacy of alternative indirect mechanisms of inducing whistle-blowing.

A future study could also incorporate other implicit incentives into my setting. For example, a follow-up study could examine a setting in which employers would not bind need to bind themselves to offering whistle-blowers an explicit financial reward but rather could pay a reward amount of their choice on an *ex post* basis with no *ex ante* promises. Such a setting might represent the “best of both worlds” in that it may mitigate the negative effects of motivation crowding while allowing employers to offer lower rewards than they had to offer in order to induce whistle-blowing in my *Can Reward* condition.

In any experiment that tests welfare across conditions, readers often have concerns about the sensitivity of the results to the parameters present in the experiment. My study should alleviate some of these concerns because I incorporate strategic interaction into my setting. Thus, the key parameters of my study—wage levels, reward levels, and whistle-blowing rates—all arise endogenously as a result of decisions made by employers and workers who may wish to maximize their welfare. I as the experimenter imposed none of these parameters exogenously. However, note that I do exogenously manipulate my three experimental conditions. As such, my experiment examines endogenous behavior across exogenously manipulated conditions.

My behavioral model suggests that only one exogenous parameter, the base rate of theft, will affect the relative performance of each incentive approach at improving employer welfare. I do not test this prediction in the current study, but a promising follow-up study would manipulate the base rate of theft to determine the empirical validity of this prediction. However, note three



key points related to the base rate of theft. First, I set the base rate of theft to equal the mid-point of the range of possible rates of theft (i.e., I set it at 50%). This should mitigate concerns that I am biased in favor of finding that one approach bested the other. Second, though the base rate of theft in the experiment equals the mid-point of 50%, it is likely that this rate *exceeds* the rate of misconduct in the natural setting. One wonders how long a company could survive in the natural setting if it lost half of its revenue to worker misconduct. As such, it seems reasonable to presume that companies likely have lower rates of misconduct than that imposed here. However, recall that my model predicts that lower rates of misconduct actually bias in favor of reliance on rewards and bias against the use of gift wages. Thus, my finding that employers received higher payoffs by offering a reward even when the base rate of theft equaled 50% only strengthens the case for offering a reward if lower rates of theft exist in the natural setting.

Finally, to make my model more tractable I assume that the rate of theft does not affect workers' behavioral thresholds, but little empirical evidence exists either to support or refute this assumption. Thus, higher rates of theft increase the relative attractiveness of gift wages under *ceteris paribus* assumptions, but we simply do not know whether the incidence of theft within a firm affects these thresholds. Likewise, neither do we know whether the magnitude of theft affects these thresholds. I do not wish to imply that the frequency and magnitude of theft have no effect on workers' thresholds: I simply do not attempt to incorporate them into my behavioral model because doing so would greatly increase the complexity of the model and reduce its tractability. Likewise, as discussed extensively in [Chapter 3](#), my model also does not incorporate strategic behavior on the part of the would-be thief. Follow-up research, including analytical research, may wish to examine this further.

In conclusion, I believe the limitations and opportunities I describe above offer accounting researchers a promising stream of future research. This is especially true for researchers employing experimental economics and analytical methods of research. Prior studies have generally not examined whistle-blowing using these methods, which has left gaps in our knowledge of why workers blow the whistle and how best to induce more of them to do so. I believe my dissertation begins to fill in some of these gaps, but much work in this area remains. My dissertation also provides researchers with a new way of thinking about the relationship of internal whistle-blowing and financial incentives and also provides a new way of operationalizing internal whistle-blowing within a controlled laboratory setting that incorporates real financial incentives. I believe these theoretical and methodological contributions in turn can provide a good foundation upon which to build future work that can provide employers with additional important insights about how to foster whistle-blowing in order to mitigate their losses and improve their welfare.

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