FLORIDA INTERNATIONAL UNIVERSITY

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FIXED EFFECTS ESTIMATION OF PRIVATE HEALTH INSURANCE INFLUENCE ON FACTORS AFFECTING WORKPLACE OUTCOMES: SURVEY OF INCOME AND PROGRAM PARTICIPATION ANALYSIS

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by

Scott Aaron Phillips

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To: Interim Dean William G. Hardin
College of Business

This dissertation, written by Scott Aaron Phillips, and entitled Fixed Effects Estimation of Private Health Insurance Influence on Factors Affecting Workplace Outcomes: Survey of Income and Program Participation Analysis, having been approved in respect to style and intellectual content, is referred to you for judgment. We have read the dissertation and recommend that it be approved.

Karlene Cousins

Ravi Gajendran

George M. Marakas, Co-Major Professor

Fred O. Walumbwa, Co-Major Professor

Date of Defense: May 24, 2021

The dissertation of Scott Aaron Phillips is approved.

Interim Dean William G. Hardin
College of Business

Andrés G. Gil
Vice President for Research and Economic Development
and Dean of the University Graduate School

Florida International University, 2021

DEDICATION

Firstly, I dedicate this research and the impending terminal degree to those in our lives who have selflessly sacrificed countless hours the past years, remaining still and quiet upon request, proofing drafts at a moment's notice, and tolerating the indescribable moments of intolerance when the educational process overwhelmed. Secondly, I commemorate the desire to elucidate in honor of our "life manager," may he rest easy in knowing his credibly consistent tutelage made it all more clear. Lastly, I recognize our beloved, near and far, for their encouragement, honesty, and, most importantly—loving patience.

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ABSTRACT OF THE DISSERTATION

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by

Scott Aaron Phillips

Florida International University, 2021

Miami, Florida

Professor Fred O. Walumbwa, Major Co-Professor

Professor George M. Markakas, Co-Major Professor

As a critical component of thriving administrative culture and management, I find the need to improve workplace outcomes by better understanding factors that influence worker demographics and employment characteristics influenced by private health insurance. As such, I conducted this quantitative longitudinal, panel survey analysis on Survey of Income and Program Participation (SIPP) variables. Fixed effects regression is employed to analyze the factors among the two predictors and one outcome variable. The interactions among the thirteen variables tested and mediation from private health insurance are examined and substantiated via a series of Sobel tests. Results showed that independent variables of employment characteristics and private health insurance influenced the likelihood of sickness absenteeism and productivity. Additionally, results showed that private health insurance partially mediates the influence of the independent variables on the outcomes. These findings suggest that businesses and policymakers ought to ensure health insurance coverage for all workers.

Keywords: Employment Characteristics, Fixed Effects, Health Insurance, Sickness Absenteeism, Survey of Income and Program Participation, Productivity, Worker Demographics, Workplace Outcomes

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I: INTRODUCTION

Developing practical health insurance programs that meet both business and worker needs continues to be debated among policymakers and scholars. The direct costs of employer-sponsored health insurance (ESI) remain a crucial topic. Claxton et al. (2020) explained that 56% of firms offer health insurance to at least a portion of their workers. ESI provides benefits to nearly 157 million Americans. Ultimately, companies face the difficult decision of balancing wages, personnel, or health insurance benefits wherein too many changes in the composition may negatively shift the company's earnings. While employers recognize that financing human capital enriches the business's bottom line, the influence health insurance has on worker health and productivity is something still to grasp (Division of Population Health, 2020). As firms debate the value and effects of ESI, workers weigh the same but with different outcomes considered. The labor force faces income, absenteeism, and productivity measures influenced by private health insurance costs. Thus, while ESI drives direct costs in deductibles and cost-sharing on companies and workers, indirect costs influence the firm and labor through absenteeism and reduced workplace outcomes. These productivity losses cost U.S. employers $1,685 per employee annually—$226 billion per year. This study focuses on the influence private health insurance has on worker demographics and employment characteristic effects on workplace outcomes. The specific foci are worker sickness absenteeism and productivity.

Researchers suggest correlations between worker retention, income levels, private health insurance program participation by employees among employers, and effects that influence workplace outcomes. This quantitative study used a longitudinal design to investigate the factors affected specifically by private health insurance. I

investigated the 2014-2018 panels of randomly selected respondents (workers) on the national noninstitutionalized level from the U.S. Census Bureau Survey of Income and Program Participation (SIPP) data.

Chapter one is a background discussion on private health insurance and its implications to the U.S. workforce before proceeding with the study problem, purpose, and significance statement.

Background

Labor productivity within organizations is a standard and widely used measure to determine workers' efficiency and the cost-efficiency of interventions and changes. Productivity is commonly defined as the output value that a worker produces per labor unit of input. Generally, productivity is comparatively spoken, in which I compared productivity to relative baselines in a historical context. As productivity declines across industries alongside increases in chronic health issues, absenteeism, and healthcare costs, managers seek novel ways of increasing productivity while decreasing absenteeism due to illness (Biesebroeck, 2015).

Various interventions have been tested and implemented throughout the industrial and information ages to increase productivity while decreasing organizations' costs. Such interventions include increasing compensation as a motivational factor, implementing transformational leadership, and expanding employee benefits, such as healthcare programs. One such intervention is the inclusion of private health insurance coverage for employees. However, scholars remain unclear about the influences health insurance coverage has on productivity and the factors that influence workplace productivity. Such factors influencing productivity include wellbeing, illness, and absenteeism from work. Literature suggests that despite increased costs involved with providing private healthcare

coverage for workers, the cost may be offset by decreases in absenteeism, which translate into increased productivity (Biesebroeck, 2015; Kim & Philips, 2010). Research also indicates that providing private health insurance coverage to employees may increase worker retention by up to 41% for union workers (Kim & Philips, 2010).

Nonetheless, despite these promising implications, practical applications of health insurance programs that meet both needs and demands of workers and business managers continue to be debated and continue to be a source of stakeholder division and uncertainty. Framed within the agency theory context (Bendickson et al., 2016; Boose, 1990; Eisenhardt, 1989; Panda & Leepsa, 2017), which is discussed later within this dissertation, managers and subordinates hold different values and goals concerning health insurance provision. These conflicts and goals—in which managers seek to optimize cost efficiency, and in which subordinates seek to increase compensation gains—tension arises, creating difficulty in decision-making. The latter is clarified with the prospect theory (Barberis, 2012; Kahneman & Tversky, 1979), which explains how I arrived at decisions. In such cases, I needed more information to align manager-subordinate goals and aid in managerial decision-making related to providing health insurance coverage for employees. Currently, just over half of the major firms nationwide offer health insurance to at least a portion of their employees (Claxton et al., 2020).

As chronic health issues compound and increase healthcare costs, and as the fear of the COVID pandemic escalates worldwide, U.S. health insurance coverage is becoming an increasingly necessary component for many employees, especially those with comorbidities and preexisting conditions. From both workers' and managers' perceptions, I needed this perspective to minimize the risk of worker absenteeism due

to compounded health issues. This phenomenon of an increasing need alongside increasing health costs begs employers to critically evaluate the implications and return on investment of participating in private health insurance coverage for all workers (Kachan et al., 2015; Tolbert et al., 2019).

Problem and Purpose

The need for affordable private health insurance coverage is an issue for the U.S. labor force (Gerfin, 2019; Tolbert et al., 2019), considering that nearly 28 million Americans are still uninsured (Tolbert et al., 2019). Additionally, a need exists to identify worker and firm values as a critical component of thriving organizational culture and management (Stepanek et al., 2019). A better understanding of private health insurance influenced factors influencing workplace outcomes. Thus, the purpose of this quantitative study was to determine to what degree private health insurance influences the effects of worker demographics and employment characteristics on workplace outcomes.

Significance

Numerous studies have quantified the effect of diseases and risk factors on absenteeism (Asay et al., 2016). However, these studies mainly focus on a single data set and one specific characteristic (e.g., age, sex, work arrangement, industry). Alternatively, some of these studies used multiple data sets and periods drawing from various samples. This array makes it challenging to estimate the benefits of outcomes affecting multiple variables simultaneously (Asay et al., 2016).

This study provides relevant and valuable statistics drawn from the longitudinal SIPP data, specifically relating to the determinants of sickness absenteeism and productivity in workplace outcomes. Although absenteeism and

worker illness are increasing and correlated to increased production costs, few studies have examined their determinants (Dionne & Dostie, 2007). While the Affordable Care Act (ACA) has significantly increased the proportion of younger Americans with health insurance coverage, a need still exists to expand affordable healthcare resources and coverage to working Americans. Rutledge (2016) found that health insurance provisions are dramatically correlated to improved health in employees, both mentally and physiologically. This finding is consistent across studies of different demographics. Also, studies have found that the provision of health insurance minimizes mortality.

Moreover, studies indicate that improved health allows for increased worker productivity and, therefore, labor supply. Based on such findings, I anticipated that the results of this study would be statistically significant, supporting existing literature. This research also clarifies the gaps in literature and provides knowledge related to specific factors influencing productivity in the workplace. It stands to provide managers with the vital information they can use to decide how to navigate private health insurance coverage for workers for the best workplace outcomes. Utilizing the factors identified by this research, administrators may better identify the subsets of workers wherein private health insurance has the most influence. Additionally, this work highlights the variables that most affect sickness absenteeism and productivity.

Research Questions

This study's research questions came from my professional industry experience, from seeking personal knowledge in the health insurance space, and through a thorough review of the works of literature on applied health economics and health policy, applied business and economics, human resource management,

occupational and environmental medicine, and health equity disciplines. The primary intent of this study was to advance the literature. I may additionally provide recommendations to firms seeking adoption of benefit program reform. These insights deduce through the examination of the relationships between worker demographics and employment characteristics on workplace outcomes (sickness absenteeism and productivity) and how private health insurance affects these relationships. The research questions are:

1. Do worker demographics relate to workplace outcomes?
2. Do employment characteristics relate to workplace outcomes?
3. Does private health insurance mediate the relationship between worker demographics and workplace outcomes?
4. Does private health insurance mediate the relationship between employment characteristics and workplace outcomes?

Chapter Summary

Chapter one framed the study's intent by introducing the current statistics to be investigated. It presented a background of the terminology used throughout the dissertation. Then, I described the problem statement and the statement of purpose. I briefly described the significance of the research and an overview of the chapter before highlighting the research questions and ending with the chapter conclusion. Chapter two is the literature review—an in-depth theoretical framework supporting the introduction, specifically the purpose. I then develop predictor and outcome factors supported by the relevant literature before concluding the chapter.

II: LITERATURE REVIEW

This chapter is an examination of the relevant literature supporting this quantitative study that investigated to what degree private health insurance influences worker demographics and employment characteristics on workplace outcomes. Industry administrators may use factor determinants to affect decisions made on private health insurance provisioning, sickness absenteeism policy, and productivity goals.

Scholars perform literature reviews to assimilate theories from the existing literature, identify knowledge gaps and substantiating the research questions' relevance at the base of an analysis (Hart, 2018). This literary examination includes discussions of several similar theories analyzing the conceptual framework relevant to the research foci. I analyzed the extant literature on private health insurance in the labor force, various employment characteristics, and worker demographics as they relate to worker sickness absenteeism and productivity. This consisted of a review of information published in books, business journals, dissertations, government websites, and scholarly peer-reviewed journals. I searched key terms that incorporate groupings of relevant factors such as absenteeism, agency, characteristics, demographics, employment, firms, health, insurance, prospect, theory of demand, two-factor, and others.

I utilized multiple academic databases and online libraries, searching multiple mediums, including but not limited to the Academy of Management, American Medical Association, *BMJ*, Cambridge University Press, Centers for Disease Control and Prevention, Elsevier, Florida International University library, Google Scholar, International Labour Office, Kaiser Family Foundation, Mary Ann Liebert Inc., National Academies Press, National Bureau of Economic Research, Oxford

University Press, Pearson, Public Library of Science, *Scandinavian Journal of Work*, Environment and Health, Springer Science and Business Media, The Commonwealth Fund, The Korean Academy of Family Medicine, The United States Census Bureau, University of California, Irvine Graduate School of Management, University of Wisconsin Press, and Wiley.

As shown in Table 1, the total references reviewed included 10 books and e-books, six book sections, 60 journals and research reports, and 10 government websites. Of these 86 sources, 42 were from scholarly peer-reviewed sources published within the past five years (2016-2020). Eight are considered seminal works, which exceed a 10-year span.

Table 1

Literature Review Statistics

Literature review content	≥ 5 years old at review	Published in					Total	% ≤ 5 years old at defense
		2016	2017	2018	2019	2020		
Books/ eBooks	6	0	0	0	2	2	10	40.00
Book section	4	1	0	0	1	0	6	33.33
Government websites	0	0	0	4	3	3	10	100.00
Peer-reviewed journals	11*	4	3	9	16	10	53	79.00
Research reports	2	0	0	2	1	2	7	71.00
Total	23	5	3	15	23	17	86	73.26

Note. * eight of 11 journals (73%) older than five years are seminal works.

Theoretical framework

This review first discusses the literature harnessing Herzberg's two-factor theory's underpinnings (Bohm, 2012; Dartey-Baah & Amoako, 2011; House & Wigdor, 1967; Maidani, 1991) and the theory of demand for health insurance by Nyman (2004). Furthermore, I explored agency theory (Bendickson et al., 2016; Boose, 1990; Eisenhardt, 1989; Panda & Leepsa, 2017) and prospect theory (Barberis, 2012; Kahneman & Tversky, 1979) and their implications for the insurance industry. Then I delved into the specifics supporting our argument, looking at worker demographics, employment characteristics, and the relevant extant literature surrounding the theorized relationships with workplace outcomes.

The literature reviewed herein laid the foundation for understanding what I know about the degree to which private health insurance influences the effects of worker demographics and employment characteristics on workplace outcomes. The agency theory and the prospect theory provide appropriate theoretical frameworks and context for understanding the problem of increasing demand and need for affordable private health insurance in the United States and more effective corporate strategies. Additionally, the theoretical frameworks provide a context for this study to understand and fill the literature gap related to what factors influence workplace outcomes that private health insurance influences.

Two-factor Theory

Herzberg's (1959) two-factor theory (TFT) provided a relevant and applicable supporting theoretical framework to contextualize this study (Dartey-Baah & Amoako, 2011; House & Wigdor, 1967; Maidani, 1991). Dartey-Baah and Amoako (2011) posited that managers in organizations utilize multiple motivation theories to inspire and achieve a productive workforce. These theories seek to explain the

behaviors workers produce and advise on productivity tactics. Longe (2016) stated that two categorical influencing factors motivate relational engagement and behavior in workplace settings. These include benefits (positive) and risks (negative). Herzberg taught that there is a decrease in workplace dissatisfaction with positive compensation. These dualistic motivational factors are also described as hygiene factors (e.g., external motivators, salaries, and benefits, work status) and internal motivators (e.g., responsibility, achievement, recognition) respectively (Herzberg, 1959; Herzberg, 1987; House & Wigdor, 1967; Maidani, 1991; Myers & Sadaghiani, 2010).

Deci (1972) argued that worker productivity is intrinsically motivated if there is no obvious reward other than the performance or the outcomes resulting from the production. Within this perspective, one may understand that the study's predictor variables relating to respondents' worker demographics may be intrinsic motivators (such as age and sex). Simultaneously, respondents' external factors (such as income level and wage earnings) may also influence behavior—conduct measured through productivity, and sickness absenteeism. Some research suggests that such influential hygiene and intrinsic motivational factors influence workplace outcomes (Campione, 2015; Kanessa, 2019). Specifically, firms institute wellness programs and insurance coverage; employees say they believe wellness programs improve their health and perceived workplace productivity (United Healthcare, 2018).

Theory of Demand for Health Insurance

Nyman (2004) explained that the welfare effect of moral hazard is frequently characterized by costly, life-saving treatments for the seriously ill and often by elective and sometimes frivolous procedures for the healthy. Pauly (1968) explained moral hazard in health insurance, which refers to the concept that insurance coverage

possibly increases health care use. This use increase is attributed to the marginal decrease of the individual's out-of-pocket expense. Consequently, as moral hazard increases, available money increases for this income transfer for those who need it most. Within this theory, as examined by Kelman and Woodward (2013), it may be understood that health insurance is in demand by medium- to low-income earners as a means to increase health and financial standing and offset the moral hazard otherwise present due to socioeconomic (e.g., education and income) gaps. Nyman (2004) summarized this theory as follows:

> "People buy health insurance to obtain additional income when ill. When a person purchases insurance, he pays a premium into an insurance pool in return for a contract that obligates the insurer to pay for his care out of the same pool, if he were to become ill. Because not all who pay in become ill, the consumer needs to pay in only a fraction of the cost of his or her medical care when ill. In essence, the insurance contract obligates the insurance company to transfer income from the many who pay into the pool and remain healthy to the few who become ill enough to need medical care." (p.196)

Campione (2015) and Kanessa (2019) argued that increased health insurance coverage and the provision of wellness programs contribute to workplace productivity (especially for Millennials). These findings support Nyman's (2004) theory. Hence, the theory of demand for health insurance is relevant in explaining the proposed study hypotheses, as Nyman posited that rather than health insurance merely functioning as a risk reduction mechanism, private health insurance provisions maximize welfare and act as an income transfer between ill and healthy individuals, which affects earnings and ultimately workplace outcomes (Kelman & Woodward, 2013).

Agency Theory

Agency theory is a philosophical framework used to explain and rectify issues that arise within business relationships, specifically and most commonly between principals, shareholders, and executives (Eisenhardt, 1989). The theory rests upon three primary assumptions: (a) that agents are primarily interested in self-serving actions or initiatives, (b) that agents are rational in a bounded way, and (c) that agents differ from principals in the sense that agents' goals are different and that agents have different preferences concerning risk-taking. This third assumption results in issues when a principal employs an agent to act and decide on their behalf. In such a case, the agent's choice is likely to differ from the principal's preference due to goal/value discrepancies (Bendickson et al., 2016; Eisenhardt, 1989; Panda & Leepsa, 2017).

Boose (1990) and Panda and Leepsa (2017) explored the agency theory's practical applications in secondary reviews of the literature. Boose (1990) examined incentive conflicts between stakeholders in the insurance industry specifically, concentrating on conflict mitigation from an agency theory perspective. Boose (1990) noted that the agency theory provides a common analytical ground for the insurance industry, long characterized by stakeholders' value diversity. Boose also found and highlighted that many insurers demonstrate contractual relationships that are highly complex.

The organizational structure is a function of those complex interactions, the byproducts of which originate from often diverse goals and values among agents and principals. Boose (1990) also argued that in cases in which principals and agents act as assumed, with diverse and differing goals and objectives, agents are incentivized to deviate from the maximization of principals' utility. In this case, managers can behave in such a way as to maximize their utility, which might be inconsistent with

principals' best intentions. In other words, managers ought to be aware of the tendency and risk of agents deviating from maximizing principals' and managers' goals due to goal differences and take actions to value align and incentivize actions that align with principals' goals.

In such cases, one should not assume, and hierarchical power dynamics or structures should not be relied on alone to yield aligned organizational goal-driven action. Said another way, based on the agency theory, managers ought to take the initiative to ensure agents are goal-aligned and informed and continually collect feedback and monitor progress, actions, and the organization's climate.

Additionally, Boose (1990) asserted that it costs principals to monitor agents to ensure their behaviors are aligned and their welfare considered and upheld. However, this is a cost that is likely to result in more long-term return on investment (ROI) than the cost of failing to invest in agent monitoring and wellbeing, as described by Morieux and Tollman (2014), who discussed the importance of a transformational leadership style when implemented. I uphold this welfare by implementing more efficient corporate insurance policies and private insurance programs offered to subordinates and agents.

Leepsa (2017) reviewed empirical evidence supporting the validity and practical applicability of the agency theory. Leepsa (2017) discussed conflicts of interests and costs that arise organizationally by exploring ideas, issues, and perspectives associated with the agency theory. For instance, in cases of conflicts of interest, separation of ownership from risk preferences, control, and the phenomenon of information asymmetry have been found to increase the risk of moral hazard. Potential solutions, documented by Leepsa (2017), from the context of agency theory, include the implementation of solid ownership control, the use of managerial

ownership, the implementation of independent board members, and the use of diverse steering committees that may control agency and the cost of conflict arising. Implications for the insurance industry include using third-party, neutral board committees and implementing transformation leadership styles in which principals and leaders inspire subordinates and agents (Morieux & Tollman, 2014).

Prospect Theory

The prospect theory is a theoretical framework that demonstrates a model of behavior (Barberis, 2012). This behavioral model illustrates how individuals think and decide between alternatives in uncertainty or risk situations. The model explains that individuals think and decide concerning utility relative to a specific reference point, which usually relates to the percentage of expected likelihood of gain or loss (instead of an expected absolute outcome; (Kahneman & Tversky, 1979). In other words, the prospect theory posited that individuals make decisions based on the gains and losses they perceive and expect to occur.

Additionally, the prospect theory involves assuming two phases involved in any decision-making process: the editing and evaluation phases. The first phase involves an individual's process of characterizing or differentiating options that may be decided upon or chosen based on how those options are differentiated. The second phase involves an individual's speculation and analysis of the costs and benefits of each choice. In this way, characterizing and evaluating constitute the process by which individuals make risk-involved situations (Kahneman & Tversky, 1979).

Thus, this context provides a practical framework for understanding how decision making may take place in companies in which the company, or executives within the company, attempt to decide on whether or not instituting private insurance

coverage for employees will result in ROI and benefits to both the employees and the company productivity.

Prospect theory originated in 1979 and remains the most widely used theory to describe the process of decision-making in risk-characterized or uncertain situations (Kahneman & Tversky, 1979). Current empirical evidence documents how prospect theory describes a wide variety of economic behavior across industries, including the insurance and financial sectors **(**Barberis, 2012). The prospect theory also assumes that reasonable individuals prefer to make decisions in which the possible benefit outweighs any scenario's possible costs. In this sense, perceived benefits and perceived costs are essential factors in the evaluation phase, as is the probability of those possible benefits. Most reasonable individuals abide by these principles (Kahneman & Tversky, 1979).

Hence, the prospect theory can explain whether corporate executives choose to institute insurance programs for their employees due to the perceived possible costs or benefits of doing so. Additionally, leaders may decide on private insurance coverage based on perceived benefits and costs regarding its influence on workplace outcomes, regardless of actual influence. Hence, this study used the prospect theory as a framework for understanding the decision-making process that may characterize current behavior in this area while aiming to fill the gap in understanding what private health insurance factors influence workplace outcomes.

Worker Demographics and Insurance Affordability

Education and Income

Two worker demographics that are pivotal in health insurance are education and income. Education forges the potential attainable occupational opportunities and, thus, the worker's relative income potential (Kim et al., 2019). In their study, Festin et

al. (2017) argued that employees with lower education and income are considered less healthy than employees in higher education brackets. Low health status attributes include limited health care provisioning, which in the U.S. is most often associated with the uninsured.

As socioeconomic status (SES) denotes an individual's particular social stratification, their class element reveals the material resources they control, such as physical living conditions and spending power. The status component depicts differences in their attitudes and lifestyles, education, and occupation levels associated with social class (Festin et al., 2017). These differentiations are but a few of the variances among workers.

According to Dunn (2010), socioeconomic inequalities in health insurance result from the SES effect on health by way of specific determinants and lifestyle aspects (e.g., education, income, and healthy lifestyle decisions, which can include private health insurance). Dunn further asserted that the correlation between income and health appears to be stronger than the correlation between health and regularly applied occupational class indicators.

I pondered whether that same logic is applicable when asking whether employment status is related to health insurance. For instance, the unemployed are less healthy than employed and are generally less educated. High income enables workers to afford health insurance coverage, decreasing health-associated issues.

Norström et al. (2014) asserted that the most fundamental socioeconomic status element (denoting probable insurance affordability) is education because it shapes the future earning potential and occupational opportunities. It offers life skills and knowledge, permitting individuals to access resources and information to promote health.

Hence, educated workers are prone to use private health insurance, enhancing overall health, which fosters workplace outcome productivity (Norström et al., 2014), which, in turn, leads to stable jobs and higher income, which studies show most often receive substantially dominant benefits earnings (Kaiser Family Foundation, 2019). Perhaps this proficiency explains the approximately 160 million Americans under the age of 65 receiving health insurance coverage from their employers (Nicholson et al., 2005) and firms' vested interest in understanding what factors most suitably afford these relationships.

Therefore, it would seem that further investigation is needed to find, when an income provides means to purchase private health insurance and higher income offers a superior socioeconomic position, do these, in turn, promote productivity and reduce sickness absenteeism? However, unfortunately, the correlation between health and income is stronger for lower earnings, suggesting that the effects of income persist far beyond the level of poverty. Furthermore, health effects from higher income distribution depict relative status. In contrast, the lower income correlates to absolute health deprivation—evidence poised for future investigations.

Consistent with the scope of this study, through research on the potential extrinsic benefits of compensation as factors influencing employee participation in health insurance coverage, the Society for Human Resource Management (2018) provide data on recruitment, retention, and employee performance, all positively influencing the individual by including extrinsic, compensation-based benefits such as health insurance. Health insurance benefits increase overall company performance from 34% to 58%, improve recruitment efficacy from 8% to 19%, and increase retention efficacy from 11% to 28% (Society for Human Resource Management, 2018). These

increases are significant and imply tremendous ROI for companies, including compensation packages of which ESI is among the benefits.

Insurance Affordability

According to Claxton et al. (2019), the expense of insurance also influences workers' choices to participate in health coverage programs (further affecting health and, ultimately, workplace outcomes). To collect income data on subjects, insurance coverage variability, employment status, and other demographic characteristics, Claxton et al. (2019) used the Annual Social and Economic Supplement to the current population survey. Claxton et al. found that low-income workers with coverage devote a higher percentage of pay to premiums and out-of-pocket medical costs than high-income earners also covered by employers (Claxton et al., 2019). This fact suggests that employer-sponsored coverage is not only a critical incentive or determinant of workplace wellness (outcomes) and health insurance but also that total monthly person-level earnings likely play an important role in coverage.

Workplace Outcomes Associated with Health Insurance Coverage

Sickness Absenteeism

Absenteeism incurs tremendous costs for employers (Asay et al., 2016). O'Brien (2003) found sickness absenteeism to be most prominently evident among employees with existing chronic health conditions, especially those without sufficient health insurance coverage. Asay et al. (2016) individually evaluated associations between risk factors of smoking, physical inactivity, obesity, hypertension, and diabetes. They found that among 100 employees absenteeism ranged between one and two days more annually per individual and increased in correlation to the number of risk factors associated. These findings demonstrate a direct link between health status and absenteeism.

Moreover, it is worth noting that since the 1980s, chronic disease prevalence has risen from a single percentage point to above 24% among the U.S. workforce (Asay et al., 2016). This statistic is significant because it illustrates the need for coverage and treatment provisions addressing an increasingly ill and potentially frequently absent working population.

Another study evaluated the influences of health status on absenteeism and worker productivity in China using longitudinal research similar to this study's design. Li et al. (2019) found that senior workers with poor health conditions are more apt to miss work for a more significant period of days annually than younger workers with equally poor health, and health deterioration over time was detrimental to the labor market efficiency. These findings suggest that senior adults with chronic conditions may be a primary target for increased health insurance coverage and incentivized healthcare participation. Moreover, that age may be an influential or significantly correlated variable with workplace outcomes.

Examining other related variables, Bankert et al. (2015) explained the indirect costs of employee productivity loss due to absenteeism. They argued that absenteeism negatively influences business labor-related productivity[1]. Similarly, Xu and Jensen (2012) examined whether health insurance provisions minimize absenteeism in the workplace. The researchers evaluated 1,780 U.S. respondents ages 52 to 64 using ex-post facto data from the Health and Retirement Study. They employed logistic regression to analyze and estimate results. Ultimately, the researchers argued that

[1] Through quantification of absenteeism and evaluation in correlation to quantified cost output per labor hour, the researchers evaluated the employees of three selected health coverage firms, among the compiled costs of absenteeism, were calculated at nearly $9 million cumulatively (Bankert, B., Coberley, C., Pope, J. E., & Wells, A. (2015). Regional Economic Activity and Absenteeism: A New Approach to Estimating the Indirect Costs of Employee Productivity Loss. *Population Health Management, 18*(1), 47-53. https://doi.org/10.1089/pop.2014.0025

senior workers lacking health insurance coverage over a year similarly are absent due to illness, same as insured workers. They found no correlation between workers having and not having insurance. The findings of Xu and Jensen (2012) conflict with those of Asay et al. (2016) and Li et al. (2019), whose studies revealed correlations between health insurance and sickness absenteeism days. Hence, additional research is needed to clarify this discrepancy.

Zhang et al. (2016) investigated the relationship between chronic illness variables, missed workdays, and associated employer costs. Negative binomial regression evaluates the relationship between several absent days due to being sick[2] and associates it with chronic conditions among respondents. Zhang et al. then calculated the cumulative productivity loss in conjunction with overall productivity loss within the population. The sample consisted of over 28,000 respondents. Results revealed an average of 1.35 missed days due to chronic conditions over three months. This was due to mood disorders, bowel diseases, and cardiac distress. Compared to national average data and results, migraines, mood disorders, and back problems accounted for the most productivity loss – millions of dollars. Hence, the results of the Zhang et al. (2016) study suggests that mood and psychological illness is a verified health factor having a strong influence on productivity. These results highlight the importance of supporting physical and mental wellness—whether through insurance provisions or wellness programs—to maintain and increase workplace productivity.

Productivity

Like health insurance, as the benefit may increase workplace outcomes, productivity may correlate with coverage (Mitchell & Bates, 2011). Mitchell and Bates (2011)

[2] Participants between 15 and 75 years of age reported over three months.

sought to understand the relationship between health status and absenteeism to speculate implications for businesses' declined productivity. Their quantitative measure of nearly one million participants reveals that the cost of lost productivity due to sickness is statistically significant, suggesting a positive ROI from employer-provided health insurance for workers (Mitchell & Bates, 2011).

Phillips et al. (2012) examined how income and health insurance affect worker productivity, specifically among participants with acute spinal cord injuries, assessing more than 100 participants at a large southeastern U.S. rehabilitation center. Phillips et al. found positive correlations with being covered by Medicaid and increased age and decreased likelihood of returning to work productively. They concluded that worker demographics and employment characteristics (e.g., race, income) influence the period it takes before one returns to workplace productivity. Although there is evidence supporting the idea that Medicaid plays a role in general postinjury productivity, Phillips et al.'s (2012) findings lead to questions about whether or not being covered by private health insurance is a more significant asset to organizational productivity than federal welfare programs. Specifically, the findings suggest that type of insurance coverage (e.g., ESI) plays a role in workplace outcomes such as productivity.

I posited that there lacks a singular agreed-upon operation in the occupational and environmental medicine and the economic literature, defining workplace outcome, productivity, and factors that plausibly affect them. These are present in many historical accounts (Bankert et al., 2015; Goetzel et al., 2003; Stepanek et al., 2019; Stewart et al., 2003). For instance, (Stepanek et al., 2019) evaluated a broad scope of influencers on production losses in the workplace by collecting information from

almost 32,000 U.K. participants. Assessed factors included socioeconomic status, mental and physical health status, lifestyle, job position, and commuting practices. Results were that organizational support, psychological and physical health, and workplace characteristics were most influential on productivity. Hence, Stepanek et al. (2019) provided helpful information regarding potential demographic factors that may influence productivity and workplace outcomes.

Chapter Summary

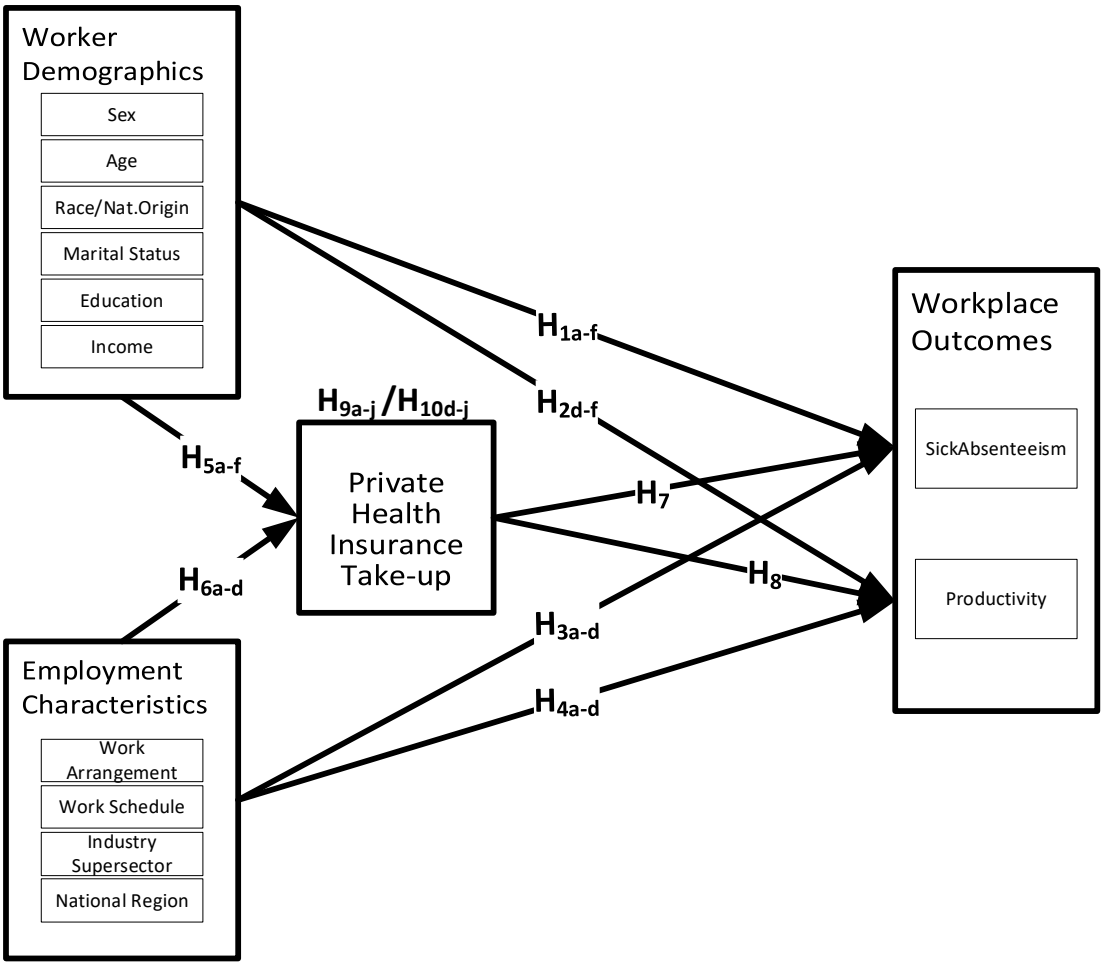
Chapter two gave an introduction to the theoretical underpinnings guiding this research and the supporting literature of each. It develops the framework for which this study follows, as well as the factors examined throughout. The independent variables and their construct were discussed in-depth, while I developed the dependent variables equally. Chapter three presents the conceptual research model and hypotheses of the study.

III: RESEARCH MODEL AND HYPOTHESES

The following research model and its operationalization were adopted. Depicting the theorized relationships between worker demographics, employment characteristics, and workplace outcomes, a conceptual research model (**Figure 1**) illustrates the three constructs' associations. The model proposes that private health insurance acts as a potential intermediary explaining the relationships between worker demographics, and employment characteristics, and workplace outcomes.

Figure 1

Conceptual Model



Variables

This section contains an explanation of the factors in the conceptual model. The three measured constructs consist of 10 observed variables. The predictors include (a) worker demographics comprised of six independent variables—sex, age, race, marital status, education, and income; and (b) employment characteristics made up of four independent variables—work arrangement, work schedule, industry supersector, and national region; and (c), the dependent variable represented by two distinct outcomes—namely, sickness absenteeism and productivity. I evaluated the variable of time independently and observed the workplace outcome measures using days at work and the number of sickness absenteeism (illness + hospitalization) days reported by each respondent over the analyzed period.

Operationalization of Constructs

As noted, the study data are compiled by the United States Census Bureau and originate from the Survey of Income and Program Participation (SIPP). I used the four available waves from 2014 and the wave one data set from 2018. What follows is a construct of four types of variables: worker demographics, employment characteristics, the mediating variable, and the outcomes.

Worker Demographics

As measures of worker demographics, I included six variables. First, I constructed a dummy variable for sex (previously ESEX) with a value of 1 for males and 0 for females. Second, I included a continuous variable for a person's age (previously TAGE) ranging from 27 to 64. Third, I constructed a variable for a person's race (previously ERACE and EORIGIN) as a categorical variable including five categories: White, Black, Asian, Latino, and other. The latter mostly covers respondents of American Indian and Alaska Native origin. Fourth, I included a

variable for marital status (previously EMS) spanning four categories: married, widowed, divorced or separated, and single. Then, I generated an indicator for a person's education (previously EEDUC) based on the highest degree obtained by the end of the reference year. This variable included five categories: dropout from high school, high school diploma, Bachelor's degree, Master's degree, and Ph.D. Finally, I constructed an indicator for income (previously TPTOTINC) as a sum of monthly earnings and income amounts received in USD during the reference year.

Employment Characteristics

The employment characteristics construct measure includes four variables—work arrangement, work schedule, industry supersector, and national geographical region. Work Arrangement (previously EJB1_JBORSE) was divided into three categories: private employment, self-employment, and other, wherein the latter group mainly includes workers in the military or government. The second variable, work schedule (previously EJB1_WSJOB) also consists of three categories: regular, difficult, and irregular. Though the third, industry supersector (previously TJB1_IND), originally included about 280 different industries, I used three categories for ease of interpretation: goods-producing, service-providing, and public. Finally, geographic region (previously TEHC_ST) was produced by recoding the workers' state of residence into a categorical variable spanning four categories: Southeast, Northeast, Midwest, and West.

Mediating Variable

I included one mediating variable of interest—namely, private health insurance (previously RPRIMTH). This variable was constructed as a dummy variable with a value of 1 if a respondent had obtained private insurance coverage and 0 if a respondent did not have private insurance coverage. In *Table A - 1* in the

Appendix 1, I repeated the primary analyses with a more detailed private health insurance measure that includes three categories (previously RPRITYPE1, RPRITYPE2, and RPRITYPE3): employer-related, direct-purchase, and Medigap.

Outcome Variables

The author generated the dependent variables as the construct of workplace outcomes. First, I coded a continuous proxy for sickness absenteeism (previously TDAYSICK), based on the number of days an illness or injury kept the person away from work for more than half of the day. Then, I constructed a proxy for worker productivity based on the number of hours worked during the month (TWKHRS1, TWKHRS2, TWKHRS3, TWKHRS4, TWKHRS5). Thought to be the seminal work on labor productivity, I first considered developing my proxy variable based on Florence's (1920) man-hour recordkeeping that specific indirect measures of productivity are sometimes also used. Hence, I specified my productivity variable using O'Donnell (2018), wherein the measure of output (total weekly labor hours worked) is divided by the monthly measures of input (total monthly labor hours worked)[3]. The construction of this variable took place in three steps. First, I calculated the number of hours worked during the four or five weeks within a month. In a second step, I divided the total number of hours worked by either four or five, depending on the number of weeks within a month. Lastly, I divided this number by 35, the usual minimum number of hours worked within a month, considered full-time, in the United States.

[3]"Measurement theory says that so-called index numbers must be assigned in such a way that the relationships between the numbers mirror the relationships between the baskets" (O'Donnell, C. J. (2018). Measures of Productivity Change. In *Productivity and Efficiency Analysis. An Economic Approach to Measuring and Explaining Managerial Performance* (pp. 93-143). Springer. https://doi.org/10.1007/978-981-13-2984-5_3

Hypotheses Development

We synthesize four primary theoretical models to develop a synthetic, analytical paradigm that can affirm the hypotheses. Herzberg's (1959) two-factor framework relates employee considerations regarding matters of hygiene and its relationship to employee motivation (House & Wigdor, 1967). I expect that the availability of private health insurance influences both worker demographics and employment characteristics in ways that will influence the displayed traits by the workplace environment. There is an influence on employee performance as well. For example, there is an influence of private health insurance on employee demand for health insurance benefits as compensation.

The theory of demand for health insurance indicates that the degree to which employees lack access to private health insurance, either individually or through enrollment in public programs, will correspond to how employees will demand health insurance from their employers (Eisenhauer, 2006; Kelman & Woodward, 2013; Nyman, 2004). Agency theory indicates that the employer-employee relationship will be affected by the level of demand for private health insurance and employee expectations concerning employer-provided health insurance (Fama, 1980; Panda & Leepsa, 2017). Prospect theory similarly indicates that employees' level of risk of lacking access to health insurance will influence the degree to which employee demands for employer-provided health insurance intensify. The level of risk will significantly influence the elasticity of demand (Barberis, 2012; Kahneman & Tversky, 1979).

I have 10 primary hypotheses regarding factors that influence the adoption of private health insurance on worker demographics and employment characteristics' effects on workplace outcomes. The first hypothesis involves the relationship between

worker demographics (i.e., age) and absenteeism generated by illness and poor health (Xu & Jensen, 2012). The second hypothesis postulates that worker marital status, worker education, and worker income likewise influence workplace outcomes, namely, productivity. The third hypothesis indicates that workplace sickness absenteeism is heavily related to employment characteristics. The fourth hypothesis relates the employment characteristics displayed by workers to productivity factors. The fifth hypothesis is that private health insurance influences the worker demographics' effects on workplace outcomes. In the sixth hypothesis, I acknowledge the relationship between employment characteristics and the availability of private health insurance. The seventh hypothesis relates sickness absenteeism to private health insurance. The eighth hypothesis is that private health insurance correlates with productivity. The ninth hypothesis is that the availability of private health insurance mediates the relationship between the specific aspects of worker demographics and sickness absenteeism. The tenth hypothesis postulates that the availability of private health insurance mediates the relationship between the specific aspects of employment characteristics (marital status, education, income) and productivity.

In identifying the intersection of the characteristics and what degree private health insurance influences worker demographics and employment characteristics on workplace outcomes, I posit that worker demographics include the full range of categories involving personal characteristics resulting in social consequences (Baron & Kenny, 1986b). For example, sex and gender are primary areas of concern given identifiable disparities related to gender involving income, professional status, lifetime earnings, healthcare needs, and related factors. Gender heavily influences the demand for health insurance, given the role of women as primary caregivers for children.

Age is an additional innate and primary characteristic related to worker demographics. The level of demand for health insurance can depend on age. Older workers are much more likely to be concerned with health insurance benefits and experience health-related challenges that require the utilization of such benefits. Consideration of health insurance concerns will be a primary factor in the retention rates of older employees. However, health insurance-related factors are critical to the employment-related, decision-making processes of younger workers as well. Employees' marital status influences the demand for benefits related to health insurance and the degree to which the employee will have access to private health insurance (Festin et al., 2017). Married workers are more likely to demand insurance benefits from employers. This demand may come because they are usually older and more likely to have children or experience health challenges of their own.

A range of other factors significantly influences the interlocking relationship between workplace demographics, workplace outcomes, employment characteristics, and private health insurance. The worker's race is a factor that is essential to recognize, including the influence of racial disparities in health outcomes and healthcare access. Education levels influence each of the four categories in multiple ways. I postulated that an intersecting relationship exists between education and income. The higher the employee's level of education, the higher their income will likely be, although certain variables may influence outcomes in this realm (Gerfin, 2019). Lastly, factors such as employment characteristics, work arrangements, work schedules, industry supersectors, and national regions influence the relationships described in a myriad of ways.

Specific Hypotheses Tested

H_{1a} Worker sex positvely relates to sickness absenteeism.

H_{1b} Worker age positively relates to sickness absenteeism.

H_{1c} Worker race negatively relates to sickness absenteeism.

H_{1d} Worker marital status positively relates to sickness absenteeism.

H_{1e} Worker education negatively relates to sickness absenteeism.

H_{1f} Worker income positively relates to sickness absenteeism.

H_{2d} Worker marital status positively relates to worker productivity.

H_{2e} Worker education positively relates to worker productivity.

H_{2f} Worker income positively relates to worker productivity.

H_{3a} Work arrangement positevely relates to sickness absenteeism.

H_{3b} Work schedule positively relates to sickness absenteeism.

H_{3c} Industry supersector negatively relates to sickness absenteeism.

H_{3d} National region negatively relates to sickness absenteeism.

H_{4a} Work arrangement positively relates to worker productivity.

H_{4b} Work schedule negatively relates to worker productivity.

H_{4c} Industry supersector negatively relates to worker productivity.

H_{4d} National region positively relates to worker productivity.

H_{5a} Worker sex positively relates to private health insurance.

H_{5b} Worker age positively relates to private health insurance.

H_{5c} Worker race negatively relates to private health insurance.

H_{5d} Worker marital status positively relates to private health insurance.

H_{5e} Worker education positively relates to private health insurance.

H_{5f} Worker income positively relates to private health insurance.

H_{6a} Work arrangement positviely relates to private health insurance.

H_{6b} Work schedule negatively relates to private health insurance.

H_{6c} Industry supersector positively relates to private health insurance.

H_{6d} National region negatively relates to private health insurance.

H_{7} Private health insurance positively relates to sickness absenteeism.

H_{8} Private health insurance positively relates to productivity.

H_{9a} Private health insurance mediates the relationship between sex and sickness absenteeism.

H_{9b} Private health insurance mediates the relationship between age and sickness absenteeism.

H_{9c} Private health insurance mediates the relationship between race and sickness absenteeism.

H_{9d} Private health insurance mediates the relationship between marital status and sickness absenteeism.

H_{9e} Private health insurance mediates the relationship between education and sickness absenteeism.

H_{9f} Private health insurance mediates the relationship between income and sickness absenteeism.

H_{9g} Private health insurance mediates the relationship between work arrangement and sickness absenteeism.

H_{9h} Private health insurance mediates the relationship between work schedule and sickness absenteeism.

H_{9i} Private health insurance mediates the relationship between industry supersector and sickness absenteeism.

H_{9j} Private health insurance mediates the relationship between national region and sickness absenteeism.

H_{10d} Private health insurance mediates the relationship between marital status and productivity.

H_{10e} Private health insurance mediates the relationship between education and productivity.

H_{10f} Private health insurance mediates the relationship between income and productivity.

H_{10g} Private health insurance mediates the relationship between work arrangement and productivity.

H_{10h} Private health insurance mediates the relationship between work schedule and productivity.

H_{10i} Private health insurance mediates the relationship between industry supersector and productivity.

H_{10j} Private health insurance mediates the relationship between national region and productivity.

Supporting Literature Rationale

This section includes explicit examples of the literature that support our synthesized theoretical framework and hypotheses. I entered an inclusive production for the first series of sub-hypotheses tested. I then provided additional evidence supporting what I believed to be the most meaningful factors in the research. Providing rationale to H_{1a} through $H_{1f,}$ I draw on the literature investigating the various interrelational factors between worker demographics and sickness absenteeism and the theoretical frameworks mentioned earlier. I took research from "*Gender difference in sickness absence from work: A multiple mediation analysis of*

psychosocial factors" that found that when compared to men, women were significantly more absent from work due to sickness absenteeism with a mean of 22.31 days compared to 14.18 days for males (Casini et al., 2013). Furthermore, Laaksonen, Mastekaasa, et al. (2010) explained that women's excess sickness absenteeism most prominently originates from mental and behavioral health disorders, musculoskeletal disease, and respiratory disease prevalence. Thus, I hypothesized that worker sex relates to sickness absenteeism (H_{1a}).

I examined Xu and Jensen's (2012) study, which found that elders without health insurance are just as prone to suffer sickness absenteeism as those with insurance over 12 months. They claimed there is little to no disparity in the magnitude of absenteeism among both groups. Contrary to this, Asay et al. (2016) and Li et al. (2019) found that the rising age of the worker may increase chronic disease prevalence and associated costs. As such, I hypothesized that worker age negatively relates to sickness absenteeism (H_{1b}).

Shannon et al. (2009) argued that primarily descriptive archetypal case studies highlight the disparate risk minorities frequently encountered in the workplace. They elaborate by saying that "Hispanic workers, particularly recent immigrants, are at particularly high risk of occupational illness and injury" (p. 4). They attest that, compared to Whites, racial and ethnic minorities have unduly developed rates of lethal work-related injuries and greater mortality rates due to occupational disease and danger (Shannon et al., 2009). Through this evidence, I hypothesized that worker race relates to sickness absenteeism (H_{1c}).

In further investigating the theorized worker demographics construct, I reviewed the Buchmueller and Valletta (1999) who concluded that married women

with spouses not covered by health insurance will often work longer hours than customarily desired to facilitate private health insurance for their families. These extended labor hours subject workers to increased workplace injury risk, resulting in sickness absenteeism and reduced productivity capability. As such, I suggested two hypotheses: worker marital status relates to sickness absenteeism (H_{1d}), which includes an itemized justification below; and (H_{2d}).

The hypothesis that worker marital status is related to sickness absenteeism is also supported by Kahneman and Tversky's (1979) prospect theory, which is a behavioral model demonstrating how individuals decide between risk-laden alternatives amidst uncertainty. The model explains how individuals evaluate the likelihood of losses or gains, positing that individuals reason or think based on the expected benefit or use relative to a reference point instead of absolutes.

Research indicates that education not only influences health insurance used by workers (Mueller et al., 1998) but also that health insurance coverage influences workplace outcomes (Mueller et al., 1998) due to research findings indicating that health insurance coverage influences health outcomes (Hahn & Flood, 1995; Sorlie et al., 1994) and health status influences productivity and absenteeism (Morieux & Tollman, 2014). Hence, it can be hypothesized that worker education will be correlated with sickness absenteeism due to the fact that highly educated workers are more likely to use private insurance coverage and experience better health.

The theory of demand for health insurance posits that workers purchase insurance due to the preference for investing smaller, more manageable monthly premiums in exchange for the relief from having to pay large medical bills in the case of illness. Hence, through this risk transfer, the benefit is perceived (Gerfin, 2019). As

individuals better understand this risk transfer and its benefits (through education), they may be more likely to invest in health insurance and thus experience less sickness absenteeism. With this, I hypothesized that worker education positively relates to sickness absenteeism (H_{1e}).

Penson et al. (2001) found that individuals characterized by low-income levels experienced higher mortality and illness rates than those of higher socioeconomic status, supporting the assumption that earnings (the characterizing component of socioeconomic status) relate to, or are correlated with, sickness absenteeism. Moreover, because workers of low-wage organizations are less likely to receive health insurance benefits (the adoption of which increases health outcomes), it can be posited that earnings relate to sickness absenteeism (Antonisse & Garfield, 2018). Furthermore, even workers in low wage companies who are offered health insurance most often are offered less coverage than workers in high wage organizations; hence employment itself does not indicate coverage, but income level and paying level of an organization does correlate with insurance coverage and level of coverage (Antonisse & Garfield, 2018). Thus, I hypothesized that worker income positively relates to sickness absenteeism (H_{1f}).

As described above, because Buchmueller and Valletta (1999) concluded that women with spouses not covered by health insurance are more likely to work longer hours than customary to allow for their families to have private health insurance. This indicates that these women may be reasoning about risks, losses, or potential gains relative to insurance coverage, and thus, the benefit that can be gained from the sacrifice of working longer hours. Hence, I hypothesized that worker marital status relates to worker productivity (H_{2d}).

The prospect theory may also be used to support the hypothesis that marital status relates to worker productivity in the sense that workers with spouses not covered are more likely to work longer hours to obtain the benefit of health insurance (Buchmueller & Valletta, 1999), while those who are married with spouses who already have health insurance may be less incentivized to work to obtain those benefits due to their spouse's coverage, based on the two-factor theory explaining motivation. The two-factor theory explaining motivation posits that decisions or actions are made based on perceived benefit or cost; hence, if the perceived benefit of increased productivity is minimized because there is less to be gained due to already having monetary support or insurance coverage from a spouse, the condition of marital status may relate to productivity (Buchmueller & Valletta, 1999; Herzberg, 1987; Kahneman & Tversky, 1979).

Low-income levels and lower levels of education significantly correlate with higher rates of illness (Penson et al., 2001). Because higher rates of illness are correlated with absenteeism (Morieux & Tollman, 2014), it can be hypothesized that income levels relate to sickness absenteeism. Although this negative influence of low-income levels on health outcomes and potentially on absenteeism may be mediated by insurance coverage (Penson et al., 2001), it is still posited that even those with insurance coverage but lower incomes (and likely less coverage) may be absent due to sickness more often than higher earners (Antonisse & Garfield, 2018). Similarly, higher incomes may motivate workers to work even when ill, as reasoned based on Herzberg's (1987) two-factor theory of motivation.

Additionally, Cummings and Kreiss (2008) argued that conditional workers receive fewer benefits and are young, female, Black or Hispanic, and earning lower wages than workers in traditional arrangements. They asserted that the shortage in

leave days may result in presenteeism due to worker fear of losing their job due to sickness absenteeism. Thus, I propose that work arrangement relates to sickness absenteeism (H_{3a}).

Regarding employment characteristics' association with sickness absenteeism, there is some empirical evidence linking industry and sickness absenteeism in a Finnish study. Specifically, Laaksonen et al. (2010) found that labor workers have almost three times more sickness absenteeism than administrative professionals. Thus, I propose that industry supersector relates to sickness absenteeism (H_{3c}).

Moreover, lower sickness absenteeism rates among workers under a temporary work arrangement may correlate to the labor market's precarious status. Growing evidence shows that there is a higher risk of work-related injury among contingent workers. Workers' productivity in these arrangements (e.g., self-employed, temporary workers), inhibited by the recounted elevated amounts of work-related musculoskeletal injuries, suffer more production losses than noncontingent workers do (Cummings & Kreiss, 2008). Hence, I suggested that work arrangement relates to worker productivity (H_{4a}).

Dizioli and Pinheiro (2016) posited that income levels, health insurance, and productivity correlate. In a California study, possessing sufficient health insurance appeared to be more successful in low-poverty than in high-poverty neighborhoods, whereas Medicare or private insurance did not seem any more valuable than obtaining Medicaid or remaining uninsured (Gorey et al., 2013). Antonisse and Garfield (2018), in their Kaiser Family Foundation (KFF) issue brief, pointed out that research suggests access to reasonably priced health insurance may assist workers in maintaining or managing their health and encourages individuals' capacity to attain

and sustain employment (productivity). Further research revealed that in 2017 just over half (53%) of U.S. firms offered ESI to their workers, and laborers in low-wage organizations were less likely to be offered the benefit than those who qualify for higher-wage company coverage. Incomes at or below a worker's state minimum wage produce ESI benefits for less than one-third of workers (Antonisse & Garfield, 2018).

Antonisse and Garfield (2018) reported that although workers use ESI when available to them, even if offered coverage, laborers in low-wage businesses are likely covered less by their firm. Lacking content may be because workers in these companies pay higher premiums than laborers in higher-wage corporations. The large population of uninsured workers in families with either a full-time (74%) or part-time (11%) work arrangement further highlights that employment does not always lead to health insurance (Antonisse & Garfield, 2018). Hence, work arrangements may affect sickness absenteeism which, in turn, may dampen productivity. Thus, I hypothesized that work arrangement relates to worker productivity (H_{4a}).

Sorlie et al. (1994) and Hahn and Flood (1995) posited that the typical health status of working adults with private health insurance vice those with public health coverage contrasts. They, too, diverge from the standard health condition of uninsured laboring adults. Comparatively, workers under the age of 65 with private health insurance coverage are healthier than those with no insurance(Hadley & Waidmann, 2006). Thus, I hypothesized that worker age positively relates to private health insurance (H_{5b}).

Furthermore, workers 65 and older are healthier than workers with Medicaid, suggesting that private health insurance affects worker sickness absenteeism and ultimately their productivity (Hahn & Flood, 1995; Institute of Medicine, 2002; Institute of Medicine (US) Committee on the Consequences of Uninsurance Board on

Health Care Services, 2003; Integrated Benefits Institute, 2018; Sorlie et al., 1994). In their Kaiser Family Foundation report, Garfield et al. (2019) argued that private health insurance influences whether and when workers receive vital medical care and their resultant health state. They suggested that for many workers (often uninsured), the expense of private health insurance and the medical care it pays for are often weighted against food, housing, transportation to work, and other essential needs such as housing (Garfield et al., 2019). Logically, these needs, if unattended, can lead to sickness and absenteeism. Thus, I hypothesized: worker income positively relates to private health insurance (H_{5f}); work schedule relates to private health insurance (H_{6b}); and national region relates to private health insurance (H_{6d}).

Also of significance, in March 2020, the National Compensation Survey reported:

> "Compared with 94% of union workers, only two-thirds of nonunion workers have health insurance from work. This statistic means those workers are more able to seek and afford the medical care they need. As we know, in the United States, medical treatment costs delay millions of Americans from getting treatment. No health insurance results in a lack of a regular source of care, and they will not go to the doctor. This predicament delays or completely blocks the ability to get the care and report the information needed to advance wellness and reduce disease spread."
>
> (Gould, 2020)

Moreover, when comparing the 22 countries ranked substantially in terms of human development and economics, the United States is the only country that does not have a paid sick leave mandate among its labor force (DeRigne et al., 2016). Therefore, I suggested that private health insurance positively relates to sickness absenteeism (H_7).

Furthermore, although there are very few reports on paid sick leave and its relationship to health behaviors, Gorey et al.'s (2013) findings indicate that both part-

and full-time workers lacking sick leave are more likely to attend work ill (presenteeism) than those workers with the absenteeism paid benefit. Hence, I posited private health insurance positively relates to worker productivity (H_8). This hypothesis is also indirectly supported by Dizioli and Pinheiro (2016) who concluded that productivity, income, and health insurance use correlate, and Gorey et al.'s (2013) findings that high poverty neighborhoods saw little value in private health insurance usage.

I have so far argued in hypotheses one through six that worker demographics and employment characteristics both relate to private health insurance and workplace outcomes of sickness absenteeism and productivity. I have also argued in hypotheses seven and eight that private insurance relates to workplace outcomes of sickness absenteeism and productivity.

Building on hypotheses one through eight, I further posit that private health insurance serves as a mediator that explains how worker demographics and employment characteristics relate to workplace outcomes of sickness absenteeism and productivity. For instance, older-aged workers with greater sickness absenteeism may be more likely to use private health insurance. Equally relevant, workers with higher income who yield greater productivity are more likely to have private health insurance (even more so likely, ESI). I argue that there is an increased dependency on and heightened interaction with healthcare with advancing age. This argument makes it reasonable to deduce that middle-aged to elderly (e.g., 46-64 years old) Americans have more significant health insurance (Vegda et al., 2009). Thus, I hypothesized that private health insurance mediates the relationship between age and sickness absenteeism (H_{9b}).

Prior research findings indicating that health insurance coverage influences health outcomes (Hahn & Flood, 1995; Sorlie et al., 1994) further support this subhypotheses series in that workers of higher SES are more likely to see, understand, and take advantage of the benefits of coverage than workers at or below the poverty level (Gerfin, 2019). Moreover, productivity, income, and health insurance use correlate (Dizioli & Pinheiro, 2016). Hence, I found than higher-earning groups (Gorey et al., 2013), suggesting that demographics and workplace outcomes are correlated and mediated by the use of health insurance. Mueller et al. (1998) suggested that education influences health usage, thereby indicating a mediated relationship between education as a component of demographics and workplace outcomes since insurance influences outcomes. Agency theory also supports these hypotheses and logic, explaining issues relating to relationships between business principals and agents (Bendickson et al., 2016). Principals often have different objectives or interests than agents, as can be seen in a case where workers of a low-paying organization or low socioeconomic status are interested in compensation and security, and principals are interested in workplace outcomes. In such a case, health insurance can mediate this relationship, bringing agents' motivation levels closer to principals' objectives. The use of insurance as a hygiene factor evidences the relevancy of Herzberg's (1987) theory. In contrast, resolving divergent goals between agents and principals using health insurance reveals the relevance of the agency theory.

In their study, Mueller et al. (1998) suggested that "education may positively influence utilization" (p. 600). They referred to health care utilization, which is commonly associated with health insurance at elevated levels. As discussed, I surmise that health insurance affects workplace outcomes indirectly; increasing will decrease

sickness absenteeism and better productivity. Furthermore, in many disease classifications, persons of low socioeconomic status (low income and education) tend to have higher mortality rates and thus preceding illnesses than those of higher socioeconomic status. Penson et al. (2001) found that the effect of SES on health outcomes may partially mediate through patients' health insurance status.

Thus, I hypothesized that private health insurance mediates the relationship between education and sickness absenteeism (H_{9e}) and that private health insurance mediates the relationship between income and sickness absenteeism (H_{9f}).

Additionally, it is rational to submit that industry laborers have more significant medical needs and higher private health insurance, especially ESI (Laaksonen, Piha, et al., 2010). Hence, I hypothesized that private health insurance mediates the relationship between industry supersector and sickness absenteeism (H_{9i}).

I built from the literature mentioned above. Research indicates that private health insurance correlates with improved workplace outcomes (Hahn & Flood, 1995; Sorlie et al., 1994) and reduced absenteeism (DeRigne et al., 2016). Moreover, research indicates that earnings correlate with sickness absenteeism (Antonisse & Garfield, 2018; Gould, 2020). Those with low earnings are often unable to afford the care they need to maintain good health and thus attend work productively (Gould, 2020). Hence, insurance coverage has the potential of mediating this relationship and allowing even low-income workers to attend work due to decreased experiences of illness or severe illness—especially as health outcomes of those with private insurance statistically exceed those with public or Medicaid coverage (Institute of Medicine, 2002; Integrated Benefits Institute, 2018).

The agency theory provides a philosophical rationale for this hypothesis as well, illustrating how principals of low-paying companies (due to the objectives of cost-savings and improved profit margins) may bridge the divide and resolve the goal discrepancies between company objectives and workers' attendance, the latter of which may otherwise be poor as a result of lacking health resources. In this way, agency theory (Bendickson et al., 2016) once again explains how health insurance can partially resolve the conflict between agents and principals.

Research supporting the previously stated hypotheses indicates that private health insurance influences workplace outcomes due to productivity gains, improved health, and minimized sickness absenteeism (DeRigne et al., 2016; Hahn & Flood, 1995; Rutledge, 2016; Sorlie et al., 1994). Literature also indicates that employment characteristics and demographics, such as income and education, influence workplace outcomes (Morieux & Tollman, 2014; Mueller et al., 1998). With more educated, high-earning SES workers correlating with more positive workplace outcomes and higher productivity. Thus, I postulate that private health insurance mediates the relationships between worker demographics' effects on workplace outcomes. The following hypotheses are put forth:

H_{10d} Private health insurance mediates the relationship between marital status and productivity.

H_{10e} Private health insurance mediates the relationship between education and productivity.

H_{10f} Private health insurance mediates the relationship between income and productivity.

The agency theory plays an enormous role in explaining, once again, how insurance use can bridge the gap between the risks workers face, which may inhibit

workers' motivation to achieve the goals of principals' and principals' objectives while also protecting worker health and safety. This assumption is especially logical when considering Herzberg's (1987) two-factor theory. Bohm (2012) and Dunn (2010) found positive correlations between health insurance and patient satisfaction, stress reduction, health outcomes, and insurance. Moreover, increased satisfaction is associated with more positive workplace outcomes (Morieux & Tollman, 2014).

Research indicates that work arrangements—specifically temporary and contiengent work—correlate with higher injury rates. Furthermore, productivity has been found to be inhibited in such situations due to increased work-related injuries, and temporary and contingent workers suffer higher production losses than noncontingent workers (Cummings & Kreiss, 2008). Thus, Cummings and Kreiss's (2008) research indicates that because the nature of work or work arrangements correlate with productivity as a result of increasingly poor health outcomes (Dizioli & Pinheiro, 2016), and because health insurance reduces poor health outcomes, private health insurance may mediate this relationship. Thus, I hypothesize that (H_{10g}) Private health insurance mediates the relationship between work arrangement and productivity.

Cummings and Kreiss (2008) found that contingency and temporary workers suffered increased risk and injury, which inhibited productivity, compared to noncontingency workers, indicating that schedule influences productivity as a result of this increased risk of injury. Hence, because health insurance decreases morbidity, injury, and illness statistically (Dizioli & Pinheiro, 2016), it is posited that private health insurance may mediate the relationship between work schedule and productivity. To say it another way, I hypothesize that (H_{10h}) Private health insurance mediates the relationship between work schedule and productivity.

Laaksonen et al. (2010) found significant correlations between workers of different industry sectors and workplace outcomes, including productivity as an outcome. Specifically, it was found that labor industry workers experienced nearly triple the rates of sickness absenteeism (which negatively influences productivity) than administrative industry workers. Thus, because private health insurance correlates with minimized sickness absenteeism (Penson et al., 2001), it can be hypothesized that health insurance also mediates this relationship between industry and productivity. Hence, this hypothesis is further supported by the agency theory and provides a partial resolution to blue-collar industries seeking to improve worker health and attendance rates. In saying that, I posit that (H_{10i}) Private health insurance mediates the relationship between industry supersector and productivity.

Just as the industry is related to SA and productivity, so too is the national region. Bankert et al. (2015) revealed that the economic costs of absenteeism range between $0.7 to $7 million, on average, among three employers. The national region more prominently distinguished these losses than the employer. This finding indicates that the national region may significantly influence productivity. Because health insurance also influences productivity due to increased motivation according to Herzberg's (1987) theory, and as a result of decreased SA, private health insurance may mediate the relationship between region and productivity. Thus, private health insurance mediates the relationship between national region and productivity (H_{10j}).

Chapter Summary

Chapter three described this study's research model and hypotheses. I submit a conceptual model as a visual representation of the framework I used to help understand the subject represented. I briefly discussed the variables and their constructs before issuing the synthesized hypotheses' logic. The rationale from more

than four decades of extant literature and studies throughout the last five years developed a synergy between the work and theories employed in this study. Next are the methodology and processes that make up this longitudinal quantitative work.

IV: METHODOLOGY

Currie and Madrian (1999) observed that "academic research has only recently substantiated that health is a consequential determinant of labor market outcomes" (p. 3363). They went on to say that "economic agents, however, have long recognized the importance of this relationship" (p. 3363). I ask, should economists make a more substantial effort to measure the relationship between health coverage and firms' outcomes? This chapter presents the methods and procedures employed to examine private health insurance's influence on workplace outcomes' worker demographics and employment characteristics. As previously discussed, Dizioli and Pinheiro (2016) found that income levels, worker health insurance, and productivity correlate.

Survey design

I used the Survey of Income and Program Participation (SIPP) from the United States Census Bureau (2020) to collect data regarding predictor variables. Since its inception in 1983, SIPP's defining characteristic has been the extensive longitudinal economic status information. SIPP is a four-year, continuous series of household panel surveys. The SIPP design is an ongoing national panel series with an interview sample size ranging from approximately 14,000 to 52,000 households. The panel duration spans from two and a half years to four years. The sample was a multistage-stratified illustration of the U.S. civilian noninstitutionalized population (United States Census Bureau, 2020).

SIPP is a multivariate data source covering various topics and providing data integration for distinct issues, forming a single integrated database. The Census contends that SIPP also provides data regarding outcomes. Specifically, I utilized the previously defined construct areas of the SIPP for respondent variable analysis. As attested to by the United States Census Bureau (2020), SIPP is a reputable instrument.

It collects and provides comprehensive information regarding workers' health insurance coverage, family background dynamics (marital status, education, income), and other related labor force factors. I selected specific items from each study year of the survey related to this study's predictor and outcome variables. SIPP item responses from panel years 2014-2018 underwent corresponding variable examinations related to this study.

Unit of Analysis and Sample

Taken from secondary survey data, the unit of measure was the individual worker. The representative sample of workers examined was from the most recent SIPP data publications. I restricted the sample to respondents ages 27 to 64, better approximating the prime working population and narrowing focus on those workers required to take up private health insurance on their means. I analyzed 1,997,557 observations and 119,233 categories. This sample represented those workers unable to shelter under parental private insurance coverage and who were ineligible for Medicaid and Medicare due to their ability, income, or age. The respondents were randomly selected and filtered by applicable study variables from the survey data.

Research design

I employed correlational research with a quantitative longitudinal design to describe and measure the relationships between worker demographics, employment characteristics, and workplace outcomes (Creswell, 2019). Specifically, this study investigated the relationship between labor force worker demographics such as marital status, income, education, employment traits such work arrangement and schedule, and workplace outcomes such as sickness absenteeism and worker productivity.

Because I numerically analyzed the data, and this study sought to evaluate the degree of correlation expressed numerically, a quantitative approach, or methodology, was most appropriate (Swanson & Chermack, 2013). According to the teachings of Swanson and Chermack (2013), quantitative methods are most relevant in instances in which research objectives seek to inform how much or to what degree questions of research can be numerically computed and measured. On the contrary, a qualitative study aims to reveal how and what research (Swanson & Chermack, 2013). For this reason, a quantitative methodology was most appropriate herein.

I analyzed four waves of 2014 panels and one from 2018. I measured each of the predictor and outcome variable's relationships incrementally with the data. The study had five objectives: (a) to investigate how workplace outcomes correlate with private health insurance, (b) to explore the interrelationships among factors of labor force workers and workplace outcomes, (c) to examine the worker demographics related to labor force workers using private health insurance, (d) to analyze archival unbalanced micro panel data through fixed effects regression, and (e) to discuss statistically significant observations of worker health insurance.

Measuring Process

In preparing the SIPP figures for analysis, in the STATA "Do file" format, I entered the voluminous longitudinal SIPP data sets as subsets of datasets. Then I appended the datasets and stripped and cleaned the variables. I then coded the variables within the context of their constructs and operationalizations. Next, I analyzed the sets of descriptive statistics. Finally, I ran cross-sectional models, followed by panel models testing the hypotheses. STATA produced output tables for all results.

Model, Tests, and Decisions

To estimate whether worker demographics and employment characteristics influence workplace outcomes, I employed a fixed effects (FE) model. Specifically, I included fixed effects at the month (previously MONTHCODE) and the individual levels (based on PNUM, SSUID, and ERESIDENCEID). Intuitively, I looked at the variation within an individual unit over time. The model can be specified as follows:

$$\textbf{Equation 1} \quad \boldsymbol{Y}_{it} = \boldsymbol{\alpha D}_{it} + \boldsymbol{\beta E}_{it} + \boldsymbol{\delta}_{\boldsymbol{i}} + \boldsymbol{\omega}_{t} + \boldsymbol{\epsilon}_{it}$$

where $\boldsymbol{Y}_{it}$ is a vector of outcome variables of individual i at month t—in this case, the workplace outcomes. The vector $\boldsymbol{D_{it}}$ represents the worker demographics and vector $\boldsymbol{E_{it}}$ the employment characteristics. The vectors $\boldsymbol{\delta_i}$ and $\boldsymbol{\omega}_t$ are the individual and month fixed effects, respectively. The model was estimated using robust standard errors $\boldsymbol{\epsilon}_{it}$. Although SIPP data also provide weights for waves 2, 3, and 4 in 2014, I conducted the models without these weights because I also included the year 2018, and there were no weights for that year. In observing the literature, when setting up the SIPP analysis, I acknowledged that weights may sometimes be significant for representative estimates because they are stratified and not purely random data. Moreover, SIPP habitually oversamples from high-poverty areas. The literature also observed that weights do not appreciably affect point estimates (Shaefer, 2015). Therefore, I deduced that it is unlikely that 2014 replicate weights would significantly influence the results.

Normality, Multicollinearity, and Heteroscedasticity

I first tested for the classical regression assumptions. To test normality, I used the Jarque and Bera (1987) test. Unfortunately, I rejected the null hypothesis of normality for both sickness absenteeism ($p = 0.000$) and productivity ($p = 0.000$). However, Jarque-Bera was very sensitive to sample size. The larger the sample, the

more a slight divergence from the normal distribution becomes statistically significant. Given that I had a large sample, I was likely to capture small deviance from the normal distribution that is unlikely to cause significant issues (Thadewald & Büning, 2007).

To test multicollinearity, I used the variance inflation factors (VIF) (Mansfield & Helms, 1982). Only age and income have a VIF higher than the commonly used threshold of 10 (Craney & Surles, 2002). However, the removal of each of the variables did not significantly influence the results. Therefore, I decided to keep both variables in the model.

To test for heteroscedasticity, I used the modified Wald test for groupwise heteroscedasticity (Baum, 2001). I rejected the null hypothesis of homoscedasticity for both sickness absenteeism ($p = 0.000$) and for productivity ($p = 0.000$). Therefore, I used robust standard errors to account for heteroscedasticity (Chesher & Austin, 1991).

Breusch-Pagan Lagrange Multiplier and Wu-Hausman Tests

Initially, I had to choose between a panel model and an OLS model. I conducted a Breusch and Pagan (1980) Lagrange multiplier (LM) test to make this choice. The LM test tests the null hypothesis that variances across individuals are zero. There is no panel effect, and a simple OLS model is appropriate. I found that the null hypothesis is rejected for both sickness absenteeism ($p = 0.000$) and for productivity ($p = 0.000$), indicating that a panel model is appropriate. Another choice that I had to make was between fixed effects and a random-effects panel model. For this purpose, I conducted a Hausman test. The Hausman (1978) test tests the null hypothesis that the unique errors do not correlate with the regressors, an assumption used in a random-effects model. I found a chi squared value of 620.76 ($p = 0.000$) for

sickness absenteeism and a chi squared value of 1,194.96 ($p = 0.000$) for productivity, rejecting the null hypothesis of a random effects model as a preferred model. Thus, I used a fixed effects model for the analyses.

Measurement Assumptions and Error

The attractive feature of a fixed effects model is that it controls for all time-invariant unobserved factors. If the underlying assumptions hold, the FE model identifies the worker demographics and employment characteristics' causal effect on workplace outcomes. These assumptions are as follows. Although the FE model controls all time-invariant unobserved factors, it does not control for unobserved factors that vary over time. Therefore, I assumed that there are no unobserved time-varying factors other than those included in the model that simultaneously influences worker demographics, employment characteristics, and workplace outcomes. This assumption is rather untenable given that I do not have data on all the possible time-varying characteristics. A second assumption is that there should be enough variation within an individual unit. This assumption is likely to be supported as the data include all 12 months for each wave.

Biases

Nonetheless, because I only consider the variation within an individual unit over time, it should be noted that measurement error highly influences an FE model. If measurement error occurs in the worker or employment characteristics, the coefficients are likely to be biased downwards (i.e., attenuation bias). The last assumption is that there should be no reverse causality. Thus, sickness absenteeism and worker productivity should not influence worker demographics and employment characteristics. Although this is likely to hold for demographic variables such as sex or race, workplace outcomes may influence some variables. For instance, if a worker

has high sickness absenteeism, this worker may choose a job with a regular work schedule instead of an irregular one, making the work schedule an endogenous variable. Given these caveats, I interpreted the causality of the results with caution.

Chapter Summary

Chapter four described this study's methodology—measuring process, unit of analysis and sample, operationalization of constructs, and validity (sampling units, selection, eligibility, and justification). This quantitative longitudinal study employed fixed effects regression analysis to evaluate the degree of statistical significance between worker demographics, employment characteristics, and workplace outcomes and utilized the Baron and Kenny (1986a) method to test private health insurance as a potential mediator.

This study's independent variables included age, sex, race, marital status, education, and income. The dependent variables included sickness absenteeism and worker productivity. I used private health insurance to explain the relationship between the independent variables and dependent variables. Chapter five of this dissertation discusses the analysis and findings of this study.

V: RESULTS

To conduct the statistical analysis, I uploaded the data into STATA Statistics/Data analysis Special Edition (Version 16) [64-bit], serial number: 401609330871 (StataCorp LLC, 2019). The data were cleaned and stripped for the variables. As discussed, this study's data were compiled by the United States Census Bureau and originated from the Survey of Income and Participation (SIPP). I used the four available waves from 2014 and the only data from 2018, wave one.

Descriptive Statistics

Descriptive statistics are in *Table 2.* The data contain slightly more male than female respondents. Most of the respondents were White. Latino respondents were the second most represented race (16.2%). About 62% of the respondents were married, and 18% were either separated, widowed, or divorced. About 45% of the respondents had a higher education degree, whereas a rather high share of 9% were high school dropouts. The average monthly income was 4,880 USD. The private service-providing sector with a regular work schedule represented the large majority of the panel respondents. Also, most respondents were in the Southeast. Moreover, about 23% were without private health insurance. The average number of days an illness or injury kept a person away from work for more than half of the day was 3.2 days, with a maximum of almost an entire year (351 days).

Table 2

Descriptive Statistics

	Mean	Std. Dev.	Min.	Max.
	(1)	(2)	(3)	(4)
Worker characteristics				
Sex (1=male)	0.520	0.500	0	1
Age	45.296	10.645	27	64
Race				
White	0.644	0.479	0	1
Black	0.120	0.325	0	1
Asian	0.050	0.217	0	1
Latino	0.162	0.368		
Other	0.024	0.154	0	1
Marital status				
Married	0.621	0.485	0	1
Separated	0.180	0.384	0	1
Single	0.200	0.399	0	1
Education				
Dropout	0.090	0.286	0	1
High school	0.444	0.497	0	1
Bachelor	0.327	0.469	0	1
Master	0.121	0.327	0	1
PhD	0.018	0.133	0	1
Income	4,880.213	6,462.626	0	518,825
Log Income	7.917	1.568	0	13.159
Employment characteristics				
Type employment				
Private	0.875	0.331	0	1
Self-employment	0.113	0.316	0	1
Other	0.013	0.113	0	1
Work schedule				
Regular	0.817	0.387	0	1
Difficult	0.071	0.257	0	1
Irregular	0.112	0.316	0	1
Industry				
Goods-producing	0.195	0.396	0	1
Service-providing	0.794	0.404	0	1
Public	0.011	0.103	0	1
Geography				
Southeast	0.357	0.479	0	1
Northeast	0.182	0.386	0	1
Midwest	0.238	0.426	0	1
west	0.223	0.416	0	1
Mediating variable				
Private insurance	0.775	0.417	0	1
Outcome				
Sickness Absenteeism	3.195	15.199	0	351
Worker productivity	1.153	0.373	0	2.829

In Table 3, I divided descriptive statistics by private health insurance. Some differences are noticeable. First, it appears that when considering respondents without private health insurance, a much larger majority was Black than when considering respondents with private health insurance. Specifically, there was about a 7.5 percentage point difference. Furthermore, a larger share of the respondents without private health insurance was separated or single, low educated, with lower earnings, and a difficult or irregular work schedule. Additionally, these respondents were more likely to be self-employed than respondents with private health insurance.

Table 3

Descriptive Statistics by Private Health Insurance

	No private health insurance	Private health insurance
	(1)	(2)
Worker characteristics		
Sex (1=male)	0.546	0.513
Age	42.880	45.996
Race		
White	0.459	0.698
Black	0.151	0.111
Asian	0.043	0.052
Latino	0.313	0.118
Other	0.034	0.022
Marital status		
Married	0.452	0.670
Separated	0.244	0.162
Single	0.304	0.168
Education		
Dropout	0.228	0.050
High school	0.537	0.417
Bachelor	0.192	0.366
Master	0.038	0.146
PhD	0.005	0.022
Income	2,663.420	5,522.056
Log Income	7.168	8.134
Employment characteristics		
Type employment		
Private	0.790	0.899
Self-employment	0.178	0.094
Other	0.032	0.007
Work schedule		
Regular	0.761	0.833
Difficult	0.083	0.068
Irregular	0.156	0.100
Industry		
Goods-producing	0.211	0.190
Service-providing	0.778	0.799
Public	0.010	0.011
Geography		
Southeast	0.393	0.347
Northeast	0.149	0.191
Midwest	0.196	0.250
west	0.262	0.212
Outcome		
Sickness Absenteeism	4.467	2.827
Worker productivity	1.053	1.181

Finally, *Table 3* gives a first glance at the relationship between private health insurance and the outcome variables. Namely, it appears that respondents without private health insurance are more likely to be ill and less productive than respondents with private health insurance. Note, however, that these are merely descriptive statistics. In the next section, I applied fixed-effects models that better captured the variation in outcomes.

Pairwise Correlation

Table 4 presents a correlation matrix of each worker's demographics, employment characteristics, and private health insurance. Specifically, the table displays pairwise correlation coefficients. The correlation coefficient on the diagonal is equal to 1 as variables are perfectly correlated with themselves. Overall, *Table 4* shows that variables are mostly weakly or moderately correlated. A notable correlation exists between income and education; namely, these variables show a relatively high positive correlation of 0.241. This table also confirms the conclusions obtained in *Table 3*. Specifically, private health insurance appears to be positively correlated with education and income, with correlations amounting to 0.293 and 0.257, respectively. Thus, it appears that people with private health insurance are more educated and have a higher income than people without private health insurance.

Table 4

Correlation Matrix

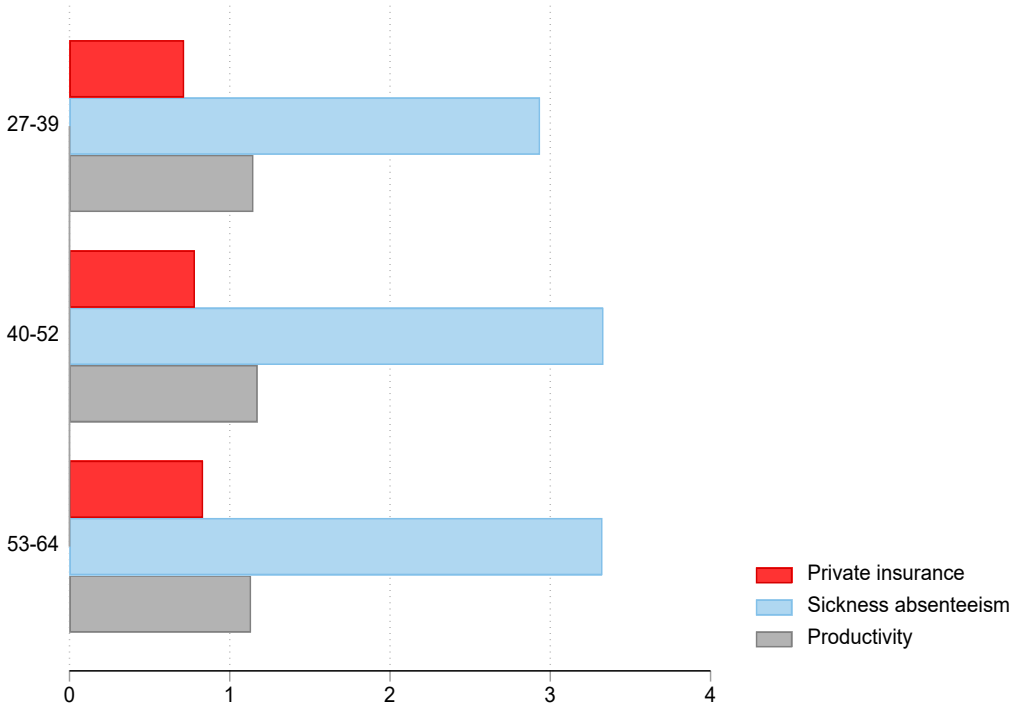
	Sex	Age	Race	Marital status	Education	Log income	Type employment	Work schedule	Industry	Geography	Private insurance
Sex	1										
Age	-0.018	1									
Race	0.008	-0.117	1								
Marital status	-0.035	-0.225	0.069	1							
Education	-0.082	-0.018	-0.212	-0.079	1						
Log Income	0.094	0.024	-0.100	-0.071	0.241	1					
Type employment	0.060	0.095	0.006	-0.026	-0.041	-0.303	1				
Work schedule	0.031	0.008	-0.026	0.034	-0.031	-0.119	0.183	1			
Industry	-0.260	-0.021	-0.005	0.038	0.156	-0.006	-0.046	0.041	1		
Geography	0.012	-0.015	0.105	0.009	0.022	0.018	0.014	0.005	0.006	1	
Private insurance	-0.028	0.122	-0.223	-0.184	0.293	0.257	-0.146	-0.082	0.022	-0.000	1

Changes with Demographics

I now dig deeper into how several demographic characteristics relate to private health insurance. *Figure 2* shows that private health insurance is by and large equally distributed among the age groups. Similarly, age does not appear to affect productivity. However, as expected, older workers appear to be absent more due to illness.

Figure 2

Changes With Age



It appears from *Figure 3* that workers in the lowest income category have a lower private health insurance than other workers. Moreover, these workers appear to be less productive and are much more likely to be absent due to illness than other workers. There appears to be a consistent relationship between income and sickness absenteeism: the less income a person has, the more likely they will be absent from work due to illness. Further, *Figure 4* shows that the more income a worker has, the

more likely theywill buy private health insurance compared to the employer paying for it. Finally, *Figure 5* indicates that the lowest earners are less likely to be insured overall (either privately or publicly). The more a worker earns, the more likely they will opt for a high deductible plan.

Figure 3

Changes With Income

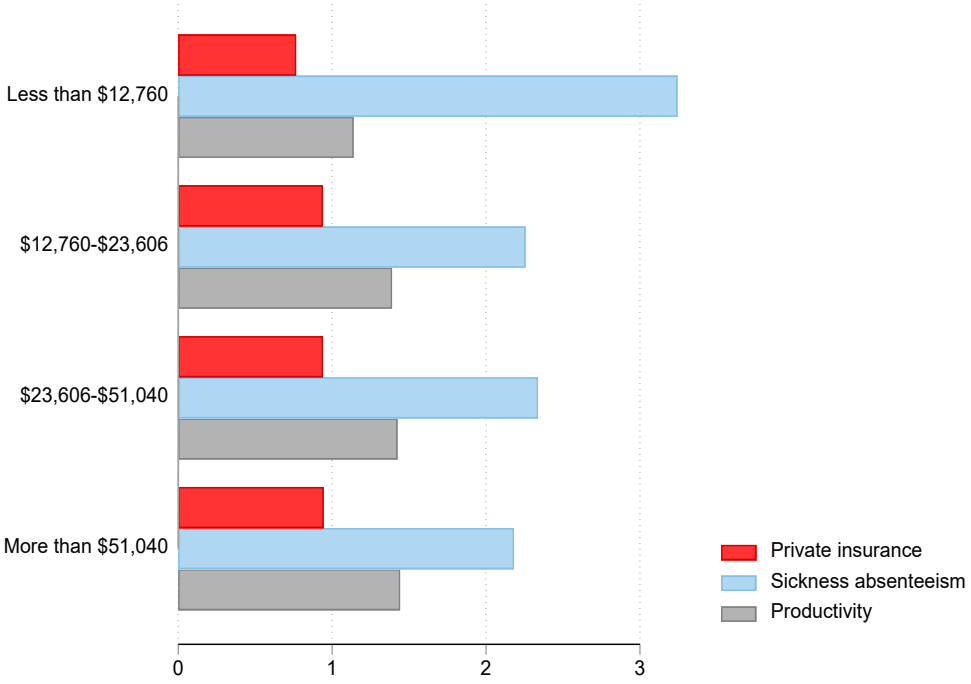
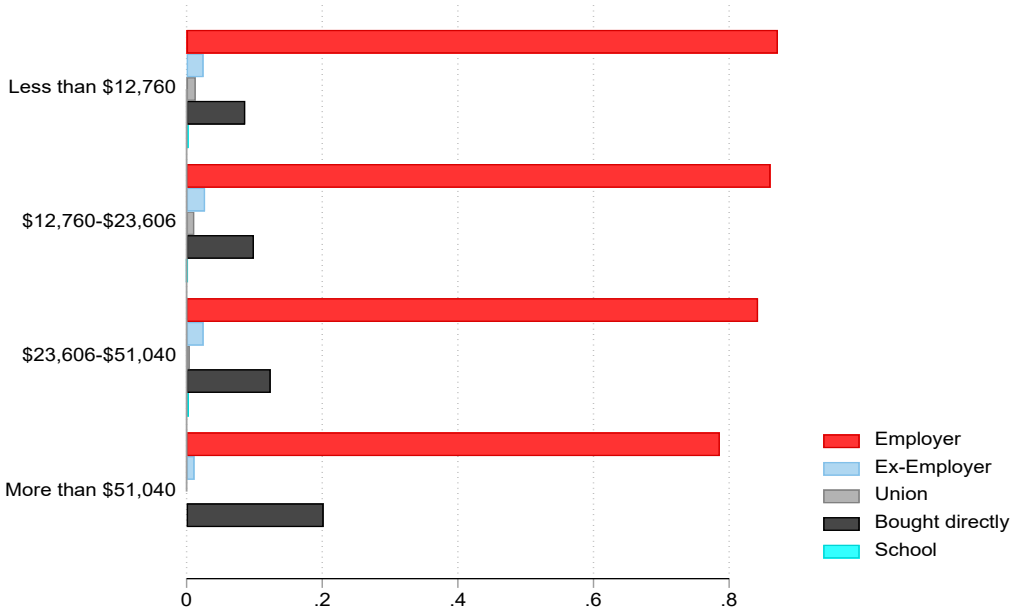


Figure 4

Sources of Private Health Insurance by Income



In *Figure 6*, I observed the evolution of person-level net worth over a worker's lifetime, separated by gender and private health insurance. It appears that males have a higher net worth than females, and workers with private health insurance have a higher net worth than workers without private health insurance. As a result, males with private health insurance have the highest net worth. Interestingly, males with private health insurance also show the steepest line, indicating that their net worth rises fastest with age. Moreover, females with private health insurance have a higher net worth than males without private health insurance.

Figure 5

Insured (Public or Private) and High Deductible Plan by Income

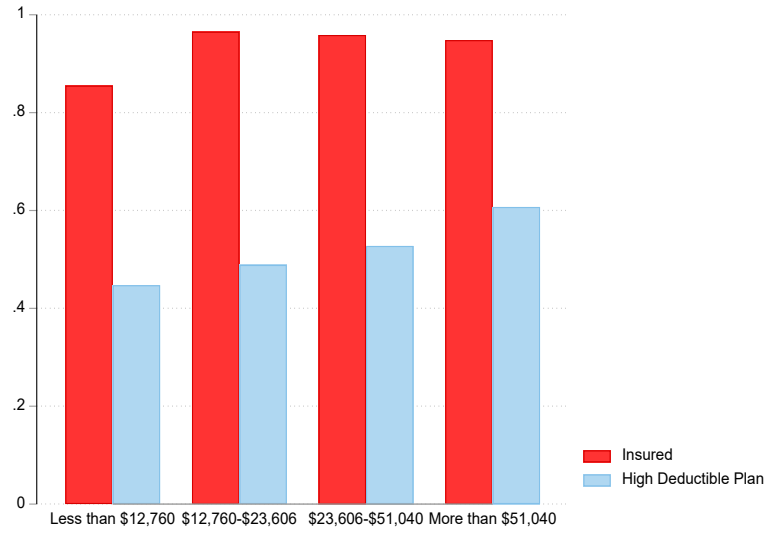
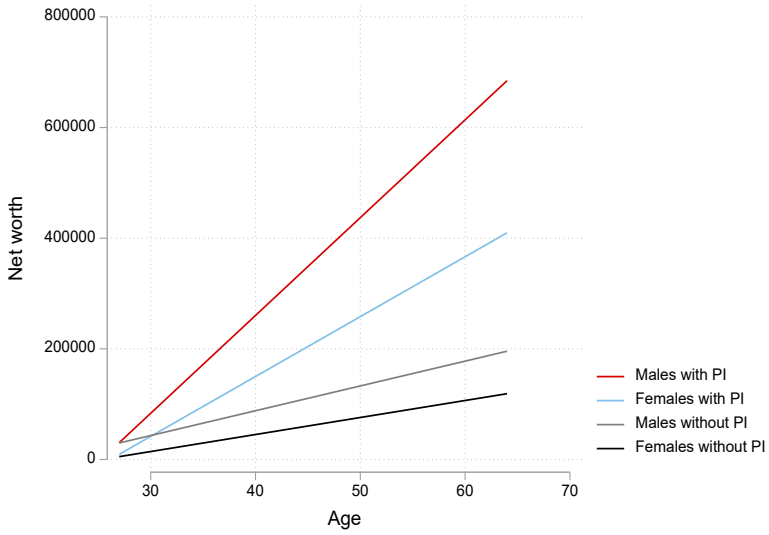


Figure 6

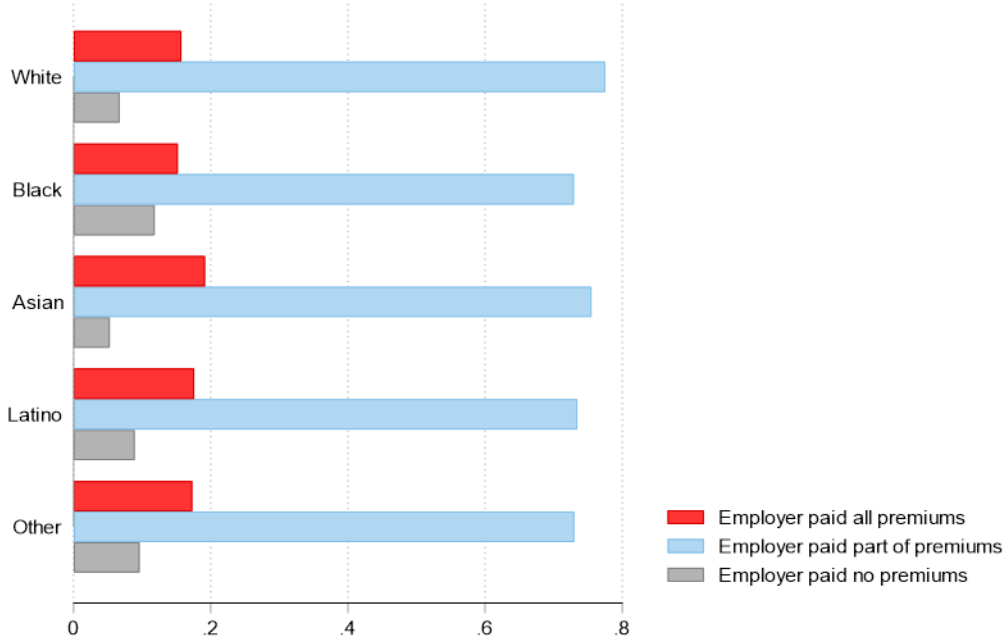
Net Worth by Sex, Age, and Private Health Insurance



As a last descriptive figure, *Figure 7* divides the share of premiums paid by the employer by race. It appears that Black workers are much more likely to have none of their premiums paid by the employer. In contrast, Asian workers are the most likely to have premiums paid by their employers.

Figure 7

Employer Premium Payments by Race



Influence of Predictors on Outcomes

Table 5 displays the models that test the first four hypotheses, namely, whether demographic characteristics and employment characteristics relate to workplace outcomes. It appears from Column 1 that I accept hypothesis 1: demographic characteristics relate to sickness absenteeism significantly. Specifically, H_{1a} is supported given that males are about two days less likely to stay at home due to an illness. H_{1b} is also accepted as younger workers are about 0.1 days more likely to stay at home due to an illness. Moreover, race significantly relates to sickness absenteeism, supporting H_{1c}. Workers from all races are more likely to stay at home due to an illness than White workers. Marital status also relates to sickness absenteeism, supporting H_{1d}. Although separated workers are less likely to be ill than married workers, the reverse is true for single workers.

Further, H_{1e} is statistically significant as high school dropouts are less likely to be ill than any other educational group. By contrast, income initially does not appear to relate to sickness absenteeism. However, once employment characteristics are included in column 3, workers with more income are less likely to call in sick. Therefore, H_{1f} is accepted.

In Column 2, we test the second hypothesis: demographic characteristics of marital status, education, and income relate to worker productivity. Worker productivity appears to rise with education and income, supporting hypotheses H2e and H2f. On the other hand, we do not accept hypothesis H2d, given that marital status does not relate to worker productivity.

In column 3 and column 4, I tested the third and the fourth hypotheses, namely whether employment characteristics relate to (3) sickness absenteeism and (4) worker productivity. I accepted both hypotheses in the series. Self-employed workers are less likely to call in sick and are more productive than privately employed workers. In contrast, the reverse is true for workers in the military or government. This supports H_{3a} and H_{4a}. H_{3b} and H_{4b} are accepted, given that workers with an irregular work schedule are significantly less likely to be ill, although they are significantly less productive than workers with a regular work schedule.

On the other hand, a difficult schedule does not substantially relate to sickness absenteeism. Although the relationship with worker productivity is significant, it is very close to zero. I also found that workers' industry and geography significantly influence workers' sickness absenteeism and productivity, supporting H_{3c} and H_{4c}. Namely, workers in the service-providing industry are less productive than workers in the goods-producing industry. Workers in industries other than the goods-producing industry are more likely to call in sick. Finally, I accepted H_{3d} and $H_{4d,}$ given that

workers from the Northeast and West are more likely to call in sick but are also more productive.

Table 5

The Influence of Worker and Employment Characteristics on Workplace Outcomes

	Absenteeism	Productivity	Absenteeism	Productivity
	(1)	(2)	(3)	(4)
Sex (ref: Male)	-2.193***	0.015***	-2.138***	0.014**
	(0.524)	(0.006)	(0.524)	(0.006)
Age	0.104***	-0.002***	0.103***	-0.002***
	(0.020)	(0.000)	(0.020)	(0.000)
Race (ref: White)				
Black	0.584*	-0.024*	0.515*	-0.023
	(0.306)	(0.014)	(0.307)	(0.014)
Asian	1.424***	-0.009	1.311***	-0.010
	(0.369)	(0.014)	(0.362)	(0.014)
Latino	0.809***	-0.011	0.760***	-0.010
	(0.200)	(0.013)	(0.200)	(0.012)
Other	5.018***	0.008	5.070***	0.009
	(0.978)	(0.011)	(0.979)	(0.012)
Marital status (ref: Married)				
Separated	-0.358**	-0.007**	-0.345**	-0.007**
	(0.163)	(0.003)	(0.162)	(0.003)
Single	0.963***	0.005*	0.980***	0.006*
	(0.162)	(0.003)	(0.162)	(0.003)
Education (ref: Dropout)				
High school	0.639***	-0.000	0.672***	-0.001
	(0.207)	(0.004)	(0.207)	(0.004)
Bachelor	0.445	0.010*	0.521	0.007
	(0.360)	(0.005)	(0.360)	(0.005)
Master	1.053***	0.028***	1.090***	0.026***
	(0.358)	(0.007)	(0.358)	(0.007)
PhD	1.612***	0.047***	1.643***	0.045***
	(0.380)	(0.013)	(0.380)	(0.013)
Log Income	-0.008	0.078***	-0.027*	0.079***
	(0.015)	(0.001)	(0.015)	(0.001)
Type employment (ref: Private)				
Self-employment			-1.343***	0.084***
			(0.185)	(0.005)
Other			2.723***	-0.075***
			(0.717)	(0.010)
Work schedule (ref: Regular)				
Difficult			-0.116	-0.009***
			(0.088)	(0.002)
Irregular			-0.492***	-0.013***
			(0.074)	(0.002)
Industry (ref: Goods-producing)				
Service-providing			-0.079	-0.015***
			(0.104)	(0.002)

Other			1.360***	-0.011
			(0.367)	(0.007)
Geography (ref: Southeast)				
Northeast			0.952***	0.800***
			(0.176)	(0.174)
Midwest			0.000	0.000
			(0.000)	(0.000)
West			34.054***	0.838***
			(0.694)	(0.226)
Individual fixed effects	yes	yes	yes	yes
Month fixed effects	yes	yes	yes	yes
N	1,125,085	1,125,085	1,125,085	1,125,085
Adj. R^2	0.719	0.747	0.719	0.747

Note. Standard errors are between parentheses. All statistical inferences are based on two-tailed t-tests. *$p < .05$; ** $p < .01$; *** $p < .001$.

Mediation Analysis

To estimate whether private health insurance mediates the relationship between worker demographics and employment characteristics on workplace outcomes, I used the Baron and Kenny (1986a) method. This method is the most used in mediation analysis, and it includes four steps. I discussed three initially. First, I ran the FE model specified in *Equation 1* by regressing workplace outcomes on worker demographics and employment characteristics (total effect). Then, I ran the FE model by regressing the mediator (private health insurance) on worker demographics and employment characteristics. Specifically, I estimated *Equation 2*:

$$\textbf{Equation 2} \quad \boldsymbol{H_{it} = \gamma D_{it} + \theta E_{it} + \delta_i + \omega_t + \varepsilon_{it}}$$

where $\boldsymbol{H_{it}}$ is a dummy variable, with a value of 1 if a respondent has obtained private insurance coverage and a value of 0 if a respondent does not have private insurance coverage. If private health insurance is a mediator, there should be a relationship between worker demographics and employment characteristics on the one hand and private health insurance on the other. In the last step, I ran the FE model by regressing

workplace outcomes on worker demographics and employment characteristics and the mediator, namely private health insurance (direct effect).

$$\textbf{Equation 3} \quad \boldsymbol{Y}_{it} = \boldsymbol{\pi D}_{it} + \boldsymbol{\varphi E}_{it} + \mu H_{\boldsymbol{it}} + \boldsymbol{\delta_i} + \boldsymbol{\omega}_t + \boldsymbol{\tau}_{it}$$

Suppose the model in *Equation 3* yielded a smaller coefficient of the worker demographics and employment characteristics than the model in *Equation 1*. In that case, I would conclude that private health insurance mediates the total effect. This method is not causal as worker demographics, and employment characteristics may be influencing private health insurance, making the mediator endogenous (post-treatment bias). One should keep this in mind when estimating the final steps.

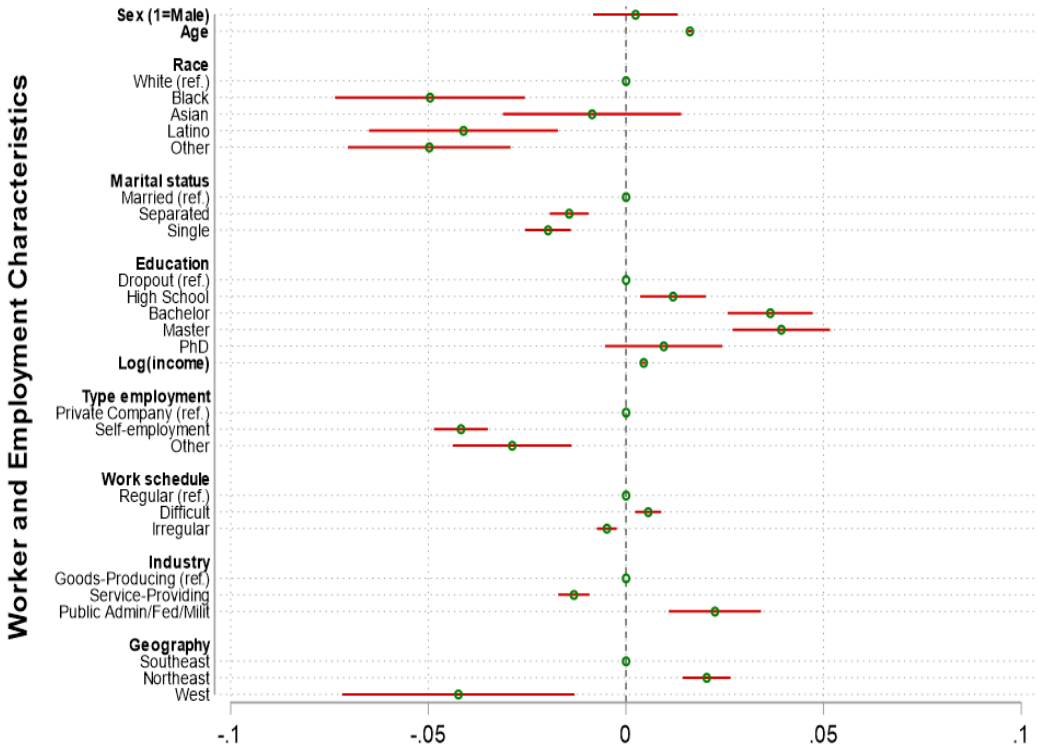
There are two additional steps needed to finalize the testing of the mediation effect of private health insurance. First, I tested *Equation 3*, namely the influence of worker demographics and employment characteristics on private health insurance. If private health insurance is a mediator, worker demographics and employment characteristics should influence private health insurance. The results in *Figure 8* suggest that this is indeed the case. Most of the coefficients are significantly different from zero, indicating that H_5 and H_6 are significant. Specifically, Black, Latino, and other ethnicities are less likely to have private health insurance, supporting hypothesis H_{5c}.

Moreover, separated and single workers are less likely to have private health insurance than married workers, indicating that H_{5d} is accepted. On the other hand, older workers and workers with higher education and a higher income are associated with a higher private health insurance. I rejected the null and accepted the alternatives—H_{5b}, H_{5e}, and H_{5f}. A worker's sex does not appear to influence private health insurance. Therefore, for hypothesis $H_{5a,}$ I cannot reject the null. Regarding employment characteristics, private company workers are most likely to get private health insurance, supporting H_{6a}.

The results on other employment characteristics are more mixed than the previous series of subhypotheses. Workers with a difficult work schedule are more likely to have private health insurance. In contrast, workers with an irregular work schedule are less likely to take private health insurance than workers with a regular work schedule. Thus, H_{6b} is accepted. H_{6c} is also accepted given that the industry supersector is also related to private health insurance. Workers in the service-providing industry are less likely to have private health insurance than workers in the goods-producing industry, whereas the reverse is true for workers in the public sector. Finally, workers in the West are less likely to have private health insurance, whereas workers from the Northeast are more likely to have private health insurance than workers in the Southeast. This indicates that hypothesis H_{6d} is accepted.

Figure 8

Coefficient FE Model



I present the final step to analyze private health insurance's mediation effect in *Table 6*. Specifically, I estimated *Equation 3* to test the influence of worker demographics and employment characteristics on workplace outcomes while controlling for private health insurance. It appears from column 1 and column 3 that private health insurance significantly relates to sickness absenteeism. Namely, workers with private health insurance are less likely to be ill, supporting H_7. Moreover, column 2 and column 4 show that private health insurance significantly relates to worker productivity, supporting H_8.

Table 6

Mediation Analysis of Private Health Insurance

	Absenteeism	Productivity	Absenteeism	Productivity
	(1)	(2)	(3)	(4)
Private health insurance	-0.153*	0.024***	-0.170*	0.024***
	(0.088)	(0.002)	(0.088)	(0.002)
Sex (ref: Male)	-2.192***	0.015***	-2.137***	0.014**
	(0.524)	(0.006)	(0.524)	(0.006)
Age	0.106***	-0.002***	0.106***	-0.002***
	(0.021)	(0.000)	(0.021)	(0.000)
Race (ref: White)				
Black	0.577*	-0.023*	0.507*	-0.022
	(0.307)	(0.014)	(0.307)	(0.014)
Asian	1.423***	-0.009	1.310***	-0.009
	(0.369)	(0.014)	(0.362)	(0.014)
Latino	0.803***	-0.010	0.753***	-0.009
	(0.200)	(0.013)	(0.200)	(0.012)
Other	5.010***	0.009	5.061***	0.011
	(0.978)	(0.011)	(0.979)	(0.012)
Marital status (ref: Married)				
Separated	-0.361**	-0.006**	-0.347**	-0.006**
	(0.163)	(0.003)	(0.162)	(0.003)
Single	0.960***	0.006*	0.977***	0.006**
	(0.163)	(0.003)	(0.162)	(0.003)
Education (ref: Dropout)				
High school	0.641***	-0.000	0.674***	-0.001
	(0.207)	(0.004)	(0.207)	(0.004)
Bachelor	0.450	0.009*	0.521	0.007
	(0.361)	(0.005)	(0.361)	(0.005)
Master	1.059***	0.027***	1.096***	0.025***
	(0.359)	(0.007)	(0.359)	(0.007)
PhD	1.613***	0.047***	1.645***	0.045***
	(0.380)	(0.013)	(0.380)	(0.013)

Log Income	-0.007	0.078***	-0.027*	0.079***
	(0.015)	(0.001)	(0.015)	(0.001)
Type employment (ref: Private)				
Self-employment			-1.350***	0.085***
			(0.185)	(0.005)
Other			2.718***	-0.075***
			(0.717)	(0.010)
Work schedule (ref: Regular)				
Difficult			-0.115	-0.009***
			(0.088)	(0.002)
Irregular			-0.493***	-0.013***
			(0.074)	(0.002)
Industry (ref: Goods-producing)				
Service-providing			-0.081	-0.014***
			(0.105)	(0.002)
Other			1.364***	-0.011
			(0.367)	(0.007)
Geography (ref: Southeast)				
Northeast			0.956***	0.800***
			(0.176)	(0.174)
Midwest			0.000	0.000
			(0.000)	(0.000)
West			34.047***	0.839***
			(0.694)	(0.226)
Individual fixed effects	yes	yes	yes	yes
Month fixed effects	yes	yes	yes	yes
N	1,125,085	1,125,085	1,125,085	1,125,085
Adj. R^2	0.719	0.747	0.719	0.747

Note. Standard errors are between parentheses. All statistical inferences are based on two-tailed t-tests. * $p < .05$; ** $p < .01$; *** $p < .001$.

In *Table A - 1* in the Appendix 1, I repeated the analyses with a more detailed private health insurance measure. I found that employer-related insurance is more beneficial for reducing sickness absenteeism and increasing productivity than either direct purchase insurance or Medigap insurance. Although interesting findings, these effects do not answer the last two hypotheses—whether private health insurance completely mediates the relationship between worker demographics and employment characteristics on workplace outcomes. To answer this question, one must look at the coefficients on worker demographics and employment characteristics in the presence of the private health insurance variable. Comparing these coefficients with the

coefficients in *Table 5* shows that private health insurance has not significantly affected the coefficients. In other words, most worker demographics and employment characteristics still significantly relate to sickness absenteeism and worker productivity, even in the presence of private health insurance.

Sobel Tests

To offer more insight into whether private health insurance is a mediator, I conducted a series of Sobel tests on all the worker demographics and employment characteristics. These tests determine whether the indirect effect is significant. I found that all variables show a high, significantly indirect effect. However, the direct effect is often also significant and generally larger than the indirect effect. Therefore, I can conclude that private health insurance is only a partial mediator for most variables. Thus, the last two series of hypotheses ($H_{9a\text{-}j}$, $H_{10d\text{-}j}$) are accepted. Specifically, private health insurance partially mediates the relationship between age on the one hand and sickness absenteeism on the other (Hypothesis H9b), race (Hypothesis H9c).

Additionally, private health insurance partially mediates the relationship between marital status (Hypotheses H9d and H10d) on the one hand and sickness absenteeism and productivity on the other, as well as education (Hypotheses H9e and H10e), income (Hypotheses H9f and H10f), work arrangement (Hypotheses H9g and H10g), work schedule (Hypotheses H9h and H10h), industry supersector (Hypotheses H9i and H10i), and national region (Hypotheses H9j and H10j). Note, however, that sex does not relate to private health insurance take-up. Therefore, private health insurance is not a mediator for the relationship between sex on the one hand and sickness absenteeism and productivity on the other. Thus, we cannot reject the null for hypotheses H9a.

Chapter Summary

This chapter provided a summary of the analyses and results. It is important to note that I am not an economist, nor an economic-focused academic per se, despite drawing upon the econometric formulae displayed in the study. This data and the analysis methods were closely directed and reviewed by a post-graduate research fellow and up-and-coming social economist at the oldest university in the English-speaking world. The methods employed formalize and legitimize the study findings. Next, I discuss the implications and limitations of the results in Chapter Six, the final chapter.

VI: DISCUSSION

Using data from the Survey of Income and Program Participation, I employed fixed effects models to estimate whether worker demographics and employment characteristics relate to workplace outcomes and whether private health insurance serves as a mediator in this relationship. The results indicate that both worker demographics and employment characteristics influence the number of days a person is ill and worker productivity. Moreover, workers with private health insurance are less likely to be ill and are more productive. I also found that private health insurance is a partial mediator in the relationship between worker demographics and employment characteristics in workplace outcomes. In sum, these results suggest that policymakers should ensure health insurance coverage for all workers to reduce their sickness absenteeism and increase their productivity. Not only is this beneficial for the workers themselves, but also the employers and society at large.

Implications of the Findings

Study results suggest that worker demographics and employment characteristics relate to the number of days a person is ill and worker productivity. Additionally, this study shows that workers or subordinates with private health insurance are less likely to be absent due to sickness and are more likely to be productive. In other words, private health insurance coverage partially mediates the relationship between worker demographics and employment characteristics in workplace outcomes of sickness absenteeism and worker productivity.

Based on the prospect theory, these results provide promising implications for industry, aiding leaders, managers, and corporate executives in determining potential outcomes of an otherwise uncertain or risky situation. Specifically, the results will help managers through the evaluation phase of deciding whether or not to institute

private insurance coverage for employees, based on the increased probability that insurance coverage will benefit the organization in decreased absenteeism and increased productivity. In other words, this study's evidence shows that benefits are more likely to outweigh the costs when implementing insurance coverage.

In this way, the results may also be framed within the context of the agency theory. The agency theory illuminates that leaders and subordinates can often have conflicting goals in situations involving risk. In the case of using health insurance coverage, this is characterized by different goals or values among leaders and subordinates, with subordinates desiring health insurance coverage for their benefit and leaders potentially refraining from providing that coverage due to the cost to the organization. However, the study results indicate that both leaders and subordinates could benefit from insurance use. In other words, insurance coverage increases productivity and benefits the health and wellbeing of employees. The study results will educate leaders and subordinates within the different industries on how their goals can align. This evidence indicates that private insurance coverage is beneficial to both parties. In this way, principals' and agents' goals and values may better align for more productive, efficient, and institutionally beneficial outcomes and implementations.

As already stated, the study results can also help provide educational material for organizations seeking to understand better how private insurance coverage can benefit the organization and employees at large. For example, disability insurance and paid family leave programs in California are currently essential social insurance sources for workers. In these cases, benefits exceed the state unemployment insurance program benefits (Gorey et al., 2013). However, there continues to be significant

inequality in the uptake of these programs. This lack of uptake is not clearly understood.

However, the evidence suggests that uptake is higher within corporations with higher earning premiums (Bana et al., 2018). In other words, the results of this present study indicate that uptake is actually beneficial and could thus be used to educate individuals within other organizations as to the potential benefits as a means to increase uptake. In this sense, our current results combined with future research suggested below may demystify the belief or conception among corporations that the costs of instituting private insurance coverage have little organizational benefit.

Finally, Dalton and Holland (2017) described and affirmed that when a corporation offers health insurance to workers, this offering increases the organization's risk of making payments when workers get sick. In other words, offering private health insurance to workers comes with the enormously costly risk of the organization having to compensate for significant medical expenses. These expenses may either be taken out of the firm's general assets (in this way, internalizing risk) or purchased as firm insurance which transfers that risk to the company. However, in both cases, the risk is taken in either ongoing costly insurance premium payments (and essentially subsidies to cost-to-patients) or the organizational cost of a one-time larger, lump-sum payment for unexpected expenses. Despite these risks, the current study herein suggests that considerable benefit is gained from coverage through increased productivity and decreased absenteeism.

Because literature indicates that productivity loss to chronic illness and health issues, including absenteeism, is one of the most significant financial costs incurred by organizations throughout the U.S., the study results suggest that the benefits of implementing private health insurance coverage for workers may well outweigh the

costs. This outcome is especially true because of a decrease in use of sick days, implying that potentially, as firms incentivize workers to keep up their health, they will be less likely to become seriously ill requiring more expensive treatment (Buchmueller, 1995; Dalton & Holland, 2017).

However, this speculation composes an area of future research in which actual quantitative savings in productivity resulting from implementing insurance compared to the costs of corporations' insurance expenditures may be examined. An additional area of future research may relate to workers' actual health profiles receiving private health insurance coverage rather than merely absenteeism or sick days. While illness may be influenced by various factors and observed in numerous ways, this study's results indicate that workers are less likely to take sick days due to having coverage. Whether or not this is due to a minor illness is not specified, but one can assume so based on the fact that sick leave is often the result of illness.

Another possibility is that illness may be addressed more quickly due to the access to services and care that individual workers with private health insurance have. In other words, workers may still get sick. However, they may get their issues resolved sooner due to access to care, rather than refraining from seeking medical treatment due to a lack of insurance coverage. In this way, private health insurance coverage still increases workers' wellbeing, presence, and productivity.

Limitations

At least five limitations are apparent in this study. First, as I operationalized it in this study, sickness absenteeism incorporates absence due to illness, injury, and preventive care and factors unrelated to worker demographics and employment characteristics. This factor may attenuate or confound sickness absenteeism's relation to worker demographics and employment characteristics. However, in the U.S., the

correlation between sickness absenteeism and various worker demographics and employment characteristics frequently appears strong. Second, the SIPP data were self-reported or submitted by a proxy respondent. Despite the brief 4-month SIPP recall period, these data are reasonably prone to multiple biases that affect self- and proxy-reported data, including recall and social desirability biases. Third, the 1-week measures of productivity used to yield the monthly estimates could have skewed (e.g., underestimated or overestimated) the actual throughput in such a way that it did not reflect in the 95% confidence intervals. Fourth, the SIPP data analyzed only accounts for full-time workers (>35hrs/wk). In contrast, the results may be unique among part-time workers or workers of varying arrangements.

Finally, fixed effects (FE) models treat random variables as if to be nonrandom or fixed. For instance, in regression analysis, "fixed effects" regression fixes (keeps continuous) median outcomes for whatever variable I predicted may affect the analysis results. A limitation of FE models is that they cannot control for variables that vary over time (e.g., income and employment arrangement). Analysts may consist of these variables in their research by incorporating dummy variables in place of space and time units. Nevertheless, one must be cautious of the prevalence of dummy variables. The more dummies introduced, the more the model "noise" is controlled for in the statistic. Plausibly, this may lead to over-dampening the model, thus reducing valuable and useless data (Beyer, 2002; Everitt & Skrondal, 2010; Glen, 2020; Kotz, 2006).

Conclusions

This study sought to understand to what degree private health insurance influences the effects of worker demographics and employment characteristics on workplace outcomes. Data from the survey of income and program participation, or

SIPP, informed the performance of fixed effects models, which I used to estimate whether worker demographics and employment characteristics relate to workplace outcomes and whether or not private health insurance serves as a mediator in this relationship. Results indicated that private health insurance coverage is a partial mediator in the relationship between worker demographics and employment characteristics, and workplace outcomes. Both independent variables of employment characteristics and private health insurance were related to the likelihood of sick days and worker productivity. Therefore, these findings suggest that policymakers ought to ensure health insurance coverage for all workers to minimize sick leave and absenteeism and as a means to increase productivity. Based on study results, I expected such actions to benefit workers and employees, society, and industry-at-large. In summary, the study's evidence indicates that workers with private health insurance are essentially less likely to be ill and more likely to be productive.

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APPENDICES

Appendix 1

Table A - 1: Mediation Analysis Using a More Detailed Private Health Insurance Variable

	Absenteeism	Productivity	Absenteeism	Productivity
	(1)	(2)	(3)	(4)
Private health insurance (ref: Employer-related				
Direct purchase	-0.533***	-0.010***	-0.477***	-0.012***
	(0.075)	(0.002)	(0.076)	(0.002)
Medigap	-1.213**	-0.039*	-1.220**	-0.040*
	(0.605)	(0.022)	(0.603)	(0.022)
Sex (ref: Male)	-2.193***	0.008	-2.157***	0.007
	(0.295)	(0.006)	(0.295)	(0.006)
Age	0.188***	-0.002***	0.188***	-0.002***
	(0.011)	(0.000)	(0.011)	(0.000)
Race (ref: White)				
Black	0.728***	-0.082***	0.706***	-0.082***
	(0.106)	(0.014)	(0.107)	(0.014)
Asian	0.428**	-0.036***	0.297	-0.035***
	(0.208)	(0.009)	(0.196)	(0.009)
Latino	1.210***	-0.052***	1.182***	-0.052***
	(0.202)	(0.011)	(0.200)	(0.011)
Other	1.988***	0.023**	2.074***	0.023**
	(0.210)	(0.009)	(0.207)	(0.009)
Marital status (ref: Married)				
Separated	-0.789***	0.001	-0.781***	0.001
	(0.177)	(0.003)	(0.177)	(0.003)
Single	0.658***	0.024***	0.666***	0.023***
	(0.168)	(0.004)	(0.168)	(0.004)
Education (ref: Dropout)				
High school	0.728***	0.007	0.748***	0.007
	(0.253)	(0.005)	(0.253)	(0.005)
Bachelor	0.768***	0.005	0.792***	0.004
	(0.287)	(0.006)	(0.287)	(0.006)
Master	0.796***	0.038***	0.817***	0.036***
	(0.307)	(0.008)	(0.307)	(0.008)
PhD	1.704***	0.068***	1.703***	0.067***
	(0.348)	(0.014)	(0.348)	(0.014)
Log Income	-0.082***	0.082***	-0.093***	0.083***
	(0.013)	(0.001)	(0.013)	(0.001)
Type employment (ref: Private)				
Self-employment			-0.945***	0.049***
			(0.154)	(0.006)
Other			-1.557***	-0.101***
			(0.261)	(0.014)
Work schedule (ref: Regular)				
Difficult			0.208**	-0.013***
			(0.093)	(0.002)
Irregular			-0.345***	-0.009***
			(0.069)	(0.002)
Industry (ref: Goods-producing)				
Service-providing			-0.017	-0.011***
			(0.107)	(0.003)
Other			0.269	-0.041***
			(0.371)	(0.008)
Geography (ref: Southeast)				
Northeast			-30.737***	-0.071
			(0.278)	(0.143)
Midwest			0.000	0.000
			(0.000)	(0.000)
west			0.000	0.000
			(0.000)	(0.000)
Individual fixed effects	yes	yes	yes	yes
Month fixed effects	yes	yes	yes	yes
N	872,472	872,472	872,472	872,472
Adj. R^2	0.748	0.760	0.748	0.760

Notes. Standard errors are between parentheses. All statistical inferences are based on two-tailed t-tests. * p < .05; ** p < .01; *** p < .001.

Appendix 2

LM test, *sickness absenteeism*

```
Breusch and Pagan Lagrangian multiplier test for random effects

        sicknessabsenteeism[ID,t] = Xb + u[ID] + e[ID,t]

        Estimated results:
                             |       Var     sd = sqrt(Var)
                    ---------+------------------------------
                    sickne~m |    231.0047       15.19884
                           e |     64.9244       8.057568
                           u |     257.363       16.04254

        Test:   Var(u) = 0
                                    chibar2(01) =  2.9e+06
                                Prob > chibar2 =   0.0000
```

LM test, *productivity*

```
Breusch and Pagan Lagrangian multiplier test for random effects

        productivity[ID,t] = Xb + u[ID] + e[ID,t]

        Estimated results:
                             |       Var     sd = sqrt(Var)
                    ---------+------------------------------
                    product~y |    .1394594       .3734426
                           e |    .0352919       .1878613
                           u |    .0951938       .3085349

        Test:   Var(u) = 0
                                    chibar2(01) =  5.0e+06
                                Prob > chibar2 =   0.0000
```

Appendix 3

Hausman test, *sickness absenteeism*

```
                    b = consistent under Ho and Ha; obtained from xtreg
     B = inconsistent under Ha, efficient under Ho; obtained from xtreg

Test:  Ho:  difference in coefficients not systematic

          chi2(22) = (b-B)'[(V_b-V_B)^(-1)](b-B)
                   =      620.76
        Prob>chi2 =      0.0000
```

Hausman test, *productivity*

```
                    b = consistent under Ho and Ha; obtained from xtreg
     B = inconsistent under Ha, efficient under Ho; obtained from xtreg

Test:  Ho:  difference in coefficients not systematic

          chi2(22) = (b-B)'[(V_b-V_B)^(-1)](b-B)
                   =     1194.96
        Prob>chi2 =      0.0000
        (V_b-V_B is not positive definite)
```

Appendix 4

Jarque-Bera test, *sickness absenteeism*

```
. jb residualssickness
Jarque-Bera normality test:  2.5e+08 Chi(2)      0
Jarque-Bera test for Ho: normality:
```

Jarque-Bera test, *productivity*

```
. jb residualsprod
Jarque-Bera normality test:   3744 Chi(2)      0
Jarque-Bera test for Ho: normality:
```

Variance Inflation Factors, ***sickness absenteeism***

Variable	VIF	1/VIF
month		
2	1.85	0.540130
3	1.86	0.538691
4	1.85	0.540442
5	1.85	0.541614
6	1.84	0.544874
7	1.83	0.547609
8	1.82	0.548488
9	1.82	0.550259
10	1.81	0.551090
11	1.81	0.553538
12	1.80	0.554785
sex	2.31	0.432060
age	16.22	0.061661
race		
2	1.24	0.806345
3	1.11	0.901471
4	1.41	0.707437
5	1.05	0.951598
maritalsta~s		
1	1.34	0.747439
2	1.41	0.710233
education		
1	5.88	0.170138
2	5.02	0.199070
3	2.67	0.374089
4	1.27	0.789375
logincome	22.55	0.044339
typeemploy~t		
2	1.31	0.761070
3	1.03	0.973367
workschedule		
1	1.10	0.908426
2	1.20	0.832821
industry		
1	5.42	0.184394
2	1.06	0.946405
geography		
1	1.33	0.753616
3	1.50	0.668795
Mean VIF	3.05	

Variance Inflation Factors, ***productivity***

Variable	VIF	1/VIF
month		
2	1.85	0.540130
3	1.86	0.538691
4	1.85	0.540442
5	1.85	0.541614
6	1.84	0.544874
7	1.83	0.547609
8	1.82	0.548488
9	1.82	0.550259
10	1.81	0.551090
11	1.81	0.553538
12	1.80	0.554785
sex	2.31	0.432060
age	16.22	0.061661
race		
2	1.24	0.806345
3	1.11	0.901471
4	1.41	0.707437
5	1.05	0.951598
maritalsta~s		
1	1.34	0.747439
2	1.41	0.710233
education		
1	5.88	0.170138
2	5.02	0.199070
3	2.67	0.374089
4	1.27	0.789375
logincome	22.55	0.044339
typeemploy~t		
2	1.31	0.761070
3	1.03	0.973367
workschedule		
1	1.10	0.908426
2	1.20	0.832821
industry		
1	5.42	0.184394
2	1.06	0.946405
geography		
1	1.33	0.753616
3	1.50	0.668795
Mean VIF	3.05	

We calculate VIF by regressing the predictor in question against all of the other predictors in our model. Given that predictors are the same, the VIFs are the same

Appendix 6

Modified Wald test, *sickness absenteeism*

```
Modified Wald test for groupwise heteroskedasticity
in fixed effect regression model

H0: sigma(i)^2 = sigma^2 for all i

chi2 (67252)  = 7.0e+41
Prob>chi2 =      0.0000
```

Modified Wald test, *productivity*

```
Modified Wald test for groupwise heteroskedasticity
in fixed effect regression model

H0: sigma(i)^2 = sigma^2 for all i

chi2 (67252)  = 9.5e+38
Prob>chi2 =      0.0000
```

VITA

SCOTT AARON PHILLIPS

EDUCATION

2001	Bachelor of Science, Exercise Science University of South Alabama, Mobile, Alabama
2006-2019	United States Navy Hospital Corpsman First Class (Retired)
2007	Global War on Terrorism Service Medal
2007	Apprenticeship, Hospital Corpsman Naval Hospital Corps School, Great Lakes, Illinois
2009	Navy and Marine Corps Achievement Medal
2009, 2011	Navy and Marine Corps Overseas Service Ribbon (2 citations)
2009, 2012, 2015	naval Good Conduct Service Medal (3 citations)
2012	Army Commendation Medal
2013	Master of Science, Health Care Management University of New Orleans, New Orleans, Louisiana
2014	Residency, Plans Operations Medical Intelligence Naval Medical Leader & Professional Development Command, Bethesda, Maryland
2015	Military Outstanding Volunteer Service Medal
2016	Fellowship, Graduate Health Administration Veterans Affairs Veterans Health Administration, Training Program, Miami, Florida
2017	Navy and Marine Corps Commendation Medal
2018	Juris Master, Banking Compliance Florida International University College of Law, Miami, Florida
2018	FIU Worlds Ahead Graduate
2018-2021	Doctoral Researcher College of Business, Florida International University, Miami, Florida Conducted applied research in Business Administration and Allied Health Science. Examined extant literature relevant to the labor force, health insurance, federal health systems, and health care management disparities.

CONFERENCE PRESENTATIONS

2017	Executive Administration Fellow, Chicago, IL “Beneficiary Travel Cost-Benefits Analysis” American College of Healthcare Executives National Congress.