Health Insurance and Relational Contracts in Small American Firms

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Abstract

This paper studies the provision of health insurance in small private American firms. Using unique data covering about 15,000 firms over the period 2006-2011, we find that health insurance provision is strongly associated with relational contracts, specifically with wage shielding. The sensitivity of average wages to local housing prices during the 2008 housing crisis is high for firms with no health insurance, but effectively muted for firms with health insurance (representing 22% of our firm sample). Consistent with relational contracts theory, we find that wage shielding is especially strong in industries where firm-specific training and worker task discretion are high. Using marginal income tax rates as an instrument for health insurance provision, we find that firms with health insurance have higher profits and sales per employee but grow more slowly. Our findings shed new light on the strategic tradeoffs associated with developing relational contracts in small firms, and inform contemporaneous policy debates on health insurance reform.

Keywords: health insurance, relational contracts, housing crisis, wage shielding, growth

JEL Classification: O31, O32, O16

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1. Introduction

Since World War II, in the absence of universal, government-provided health insurance coverage, employers have emerged as the primary providers of health insurance in the United States. Employers have taken advantage of tax benefits and economies of scale in administering health insurance benefits, as indicated by the fact that most large employers provide health insurance (Kaiser Family Foundation (KFF) Employer Benefits Survey, 2010). However, only 43% of firms with fewer than 50 employees provide health insurance to their employees (Small Business Administration (SBA), 2011; KFF, 2010). Although the conventional cost argument based on economies of scale explains the significant variation in health insurance provision rates between large and small firms (Chu and Trapnell, 2003; Feder and Whelan, 2008), it does not fully explicate the substantial variation among small firms, which is an issue relevant for both business strategy and public policy. In this paper, we show that the provision of health insurance is an important strategic decision in small firms as suggested by its strong association with relational contracts, and we uncover important performance tradeoffs that may partly explain why health insurance is offered by only a fraction of small firms.

Provision of health insurance can be an important strategic choice for firms for two main reasons. The first explanation emphasizes economic incentives associated with tax policies, economies of scale, and compensating wage differentials (Gruber and Madrian, 1994; Pauly, 1999; Decressin, Lane, McCue, and Stinson, 2005). The main concern in this literature is managing the institutional environment, and the decision to provide health insurance is primarily based on cost. Firms provide an optimal mix of health insurance benefits and wages that minimizes their cost and matches the labor market preferences (Rosen, 1986; Currie and Madrian, 1999; Finkelstein, 2002; Olson, 2002). The second stream of inquiry combines health insurance provision with other human resource management policies designed to increase employee commitment and motivation. According to this body of work, compensation and benefits structures target employee recruitment, retention, training, and motivation in order to develop sustainable employment relationships and thus encouraging investment in firm-specific knowledge and skills (Dore, 1973; Pfeffer, 1994; Huselid, 1995; Osterman, 1995; Koch and McGrath, 1996; Conner and Prahalad, 1996; Coff, 1997; Bloom et al., 2011). Both explanations predict advantages associated with provision of health insurance by small firms, but neither sufficiently explicates why some small firms provide health insurance to their workers, while others do not.

This paper makes three main contributions. First, understanding the role of firms in providing health insurance coverage to employees is key to the current policy debate on health care reform. Health insurance access is mostly employment based: 60% of individuals get their health insurance through an employer (DeNavas-Walt, Proctor, and Smith, 2008; KFF, 2011). The economic and social significance of employer-

provided health insurance policies is also staggering. Although the United States spent two and a half times the OECD average per capita ($8,233) and a larger share of its GDP (17.6%) on healthcare than any other country in 2010,[1] 18% of individuals under the age of 65 had no health insurance in 2011 (KFF, 2012). Of all the uninsured, three quarters are from working families and many of them are not offered coverage by their employers, thus underscoring the importance of employer-provided health insurance in an economy in which small businesses employ almost half of all workers (KFF, 2012).

Second, our study advances the understanding of firm heterogeneity in developing relational contracting capabilities by documenting their association with the provision of health insurance. Systematic empirical examination of relational contracting is challenging because implicit promises and informal agreements—by their very nature—are difficult to observe. This difficulty is especially present in small firms, for which the study of employment practices has been scarce and systematic data hard to obtain. By showing that health insurance provision is associated with wage shielding, which research has demonstrated to be strongly tied to relational contracts, our paper advances our understanding of the strategic nature of relational contracting. Although we do not make any causal claims about the role of health insurance in shaping relational contracting, we demonstrate a strong association between the two. Moreover, because wage shielding, our mechanism of relational contracts, is a central feature of internal labor markets (ILMs) (Doeringer and Piore, 1971; Baker, Gibbs and Holmstrom, 1994a, 1994b; Bertrand, 2004), we describe conditions, such as worker's task discretion and the importance of firm-specific training, under which ILMs are likely to emerge in small firms (Aldrich, 1999; Cardon and Stevens, 2004). Understanding the emergence of ILMs is especially important given their prominent role in shaping firm structure and conditioning firm choices (Penrose, 1959; Chandler, 1962).

Third, we document strategic tradeoffs associated with provision of health insurance: firms are more stable and profitable but grow more slowly. This tradeoff suggests relational contracting can constrain high-growth firms through binding implicit promises and obligations, and underscores conditions under which firms are more likely to adopt relational contracting rather than rely on external spot labor markets. These tradeoffs shed new light on the strategic nature of relational contracts and inform policy debate on mandating health insurance provision to employers. As such, our study intersects business strategy and public policy in a way to inform policymakers of policy-relevant strategic considerations.

Our data are from a leading provider of accounting and financial software for small and medium size firms. Small and medium-sized business owners and managers utilize this tool to organize and manage financial records by keeping track of bookkeeping, payroll, invoicing, taxes, and data analysis. The data include accounting details on all revenues and expenses incurred by the firm over the period 2006-2011, including comprehensive employment records. We have details on each employee's compensation

[1] http://www.oecd.org/unitedstates/BriefingNoteUSA2012.pdf, Accessed in March 2013

categorized by salary, bonus, and pension program. Importantly, we observe whether each employee made a pre-tax contribution to an employer-provided health insurance plan. Our data cover 15,331 firms and 38,987 observations. A median firm is young, was incorporated in 2006, employs eight people, and generates $619,000 in sales per year. About 22% of the firms (3,879 firms) provide health insurance in at least one year in our sample period. Of those firms, about 30% of the employees participate in employer-provided health insurance programs (a median of 25%).

We utilize this new firm-level data on health insurance provision in small firms to explore the link between health insurance and relational contracting, and to determine the association and effect of health insurance on firm outcomes. First, we exploit the drop in housing prices during the 2008 housing crisis to determine whether firms with health insurance provisions display the central feature of relational contracting—wage shielding—in response to negative shocks to the external labor market. We confirm that firms with health insurance benefits protected their employee wages during the crisis and did not cut back wages as much as firms without health insurance.

We investigate the relation between health insurance provision and various firm outcomes, first by exploring unconditional and conditional correlations between the two. We find that firms with greater labor productivity, higher profits, lower turnover, and slower growth are more likely to provide health insurance to their employees. Next, we use state-level marginal income tax rates as an instrument to determine the effects of health insurance provision on these firm outcomes. Tax rates serve as a good instrument for the health insurance, because tax advantages associated with employer-provided health insurance directly impact both employer propensity to provide health insurance and employee likelihood of utilizing the benefits (Finkelstein, 2002; Gruber and Lettau, 2004), while not being clearly correlated with firm performance. Tax-preferred treatment of employer-provided health insurance benefits make the provision of health insurance benefits more attractive when tax rates are high. The instrumental variables estimations establish patterns consistent with raw and conditional correlations: the effects of providing health insurance are positive for labor productivity, profits, and lower turnover, but negative for growth. These results underscore an important tradeoff associated with health insurance: between higher profits and slower growth.

Our findings highlight the importance of understanding firm strategy when debating health care policy reform. Specifically our findings point out that mandating health insurance provision would disproportionately influence high-growth firms, because such firms are currently less likely to provide health insurance. To determine the full effect of the reform, more work is needed to understand the causal relationships between health insurance, relational contracts, and firm outcomes.

2. Related literature

Since 1943, when an administrative tax rule by the IRS exempted employer contributions to employee health insurance premiums from employee income taxes in an effort to aid businesses in attracting scarce labor, employer-provided health insurance has become the primary way for individuals to obtain health insurance coverage (Thomasson, 2000). Today, more than half of all individuals in the United States are insured through their employers, only 5% purchase health insurance individually, and the balance comprises uninsured and those on public health insurance programs, including Medicare and Medicaid (KFF, 2012). Among the uninsured, 62% have at least one family member working full time and many of these uninsured workers are not offered health insurance through their employers (KFF, 2012). Understanding why some firms do not provide health insurance benefits in an economy traditionally dependent on employer-provided health insurance coverage is an important issue for social policy and firm strategy alike. From the public-policy standpoint, encouraging employers to offer health insurance coverage can aid in controlling increasing healthcare costs. As a firm policy, health insurance benefits can help firms attract and retain talent (Madrian, 1994; Way, 2002; Batt, 2002; Pfeffer, 2005). In this section, we review the role health insurance provision plays in employment relationships in the context of small firms, and discuss implications of strong employment relationships for firm outcomes.

2.1. Health insurance and relational contracts

From economists to psychologists, scholars have consistently emphasized, sometimes implicitly, relational contracting—informal agreements within organizations that govern the employment relationships and substitute formal contracts typical in external markets—as a central feature of employment relationships (Williamson et al., 1975; Macneil, 1985; Baker et al., 1994a, 1994b; Levin, 2003; Bertrand, 2004; Gibbons and Henderson, 2012). The main premise is that a workplace is a social environment organized by human beings with complex motivations, which formal contracts are not fully able to capture. The literature focuses on two main reasons for why relational contracting is an important component of employment relationships. First, in most jobs, linking individual effort to outcomes is challenging due to idiosyncrasies and interdependencies in tasks. Workers' agreement to accept direction from managers in return for certain obligations on the part of the employer—without formal contracts—is a more efficient way to manage the continued employment relationship (Simon, 1957; Williamson et al., 1975; Macneil, 1985; Levin, 2003). Second, managers can encourage cooperation and exertion of extra effort from employees by using implicit promises for future rewards, such as continued employment, promotions, and pay (Stinchcombe, 1965; Rousseau, 1989; Baker, Gibbons and Murphy, 1994). By making implicit agreements, employers can expect to get "an affirmative job attitude [that] includes the use of judgment, filling gaps, and taking

initiative" (Williamson et al., 1975, p. 266). These advantages are amplified for small firms, because most jobs in those firms are idiosyncratic and require a greater degree of employee adaptability, discretion, and multitasking (Stinchcombe, 1965; Aldrich, 1999). Therefore, the ability to make credible promises of stability and provide incentives to exert extra effort should matter more in small and nascent firms.

Making credible promises presents a daunting task for small firms, because relational contracts are enforced by the "shadow of the future": the more stable and predictable the future is, the more likely the informal agreements are deemed credible (Levin, 2003; Bertrand, 2004; Gibbons and Henderson, 2012; Powell, 2012). The fact that half of new businesses do not survive to their fifth year suggests that they operate under extreme adversity and uncertainty (SBA, 2012). By investing in health insurance benefits, small firms can embed these implicit promises in organizational processes. In what Dore (1973) calls "welfare corporatism," a set of organizational structures, practices, and processes are designed to communicate firm's obligations to long-term employment and responsibility for their employee well-being, and can result in high degree of employee commitment (Lincoln and Kalleberg, 1990, p. 257; 1996; Ichniowski and Shaw, 1999).[2] Likewise, small firm investment in the provision of health insurance can add credibility to its implicit promises and contribute to building stronger employment relationships.

Among various policies small firms can adopt to build and strengthen ties with its workers, provision of health insurance benefits is perhaps one of great significance for emphasizing continuity and longevity in the employment relationships. We propose that provision of health insurance can help mitigate unique challenges small firms face in building strong employment relationships, because investment in health insurance benefits is a substantial financial and strategic decision for a small firm that communicates its commitment to long-term employment relationships.[3] Setting up and maintaining health insurance benefits is a significant expense for small firms, because they are not able to take advantage of economies of scale, prices for health insurance are much higher for small firms due to these firms' lower buying power and riskier insurance pools, and because health insurance costs are considered more volatile and more difficult to control than any other compensation cost in small firms (Chu and Trapnell, 2003; Feder and Whelan, 2008; Lueck, 2010). Compared to health insurance, other benefits, such as work-life balance programs, allowances for child-care, and tuition assistance, are likely to be more under a firm's control

[2] Another related body of literature on corporate social responsibility (CSR) has investigated firms' responsibility to their workers from the standpoint of employee rights and industrial relations, which overlaps with concerns about human rights and ethics (Pearson, Seyfang and Jenkins, 2012). Strategic and performance benefits accruing to firms from socially responsible employment practices are thought to originate from attracting and retaining better employees, greater employee involvement, and increased employee satisfaction (see Orlitzky, Schmidt, and Rynes, 2003, for a review). Despite the growing body of work in this area, systematic empirical studies of CSR specifically in the context of small firms have been limited (Spence, 2007). Our study contributes to this literature by investigating a specific mechanism by which employer responsibility affects the employment relationship in small firms—development of relational contracting.

[3] It is important to note that the acceptance rate of coverage (the uptake rate) when employers offer their employees health insurance does not vary by firm size—in 2010, about 70% of employees were enrolled in employer-provided health insurance in small and large firms, suggesting employees of both small and large businesses equally value the provision of health insurance benefits (SBA, 2011).

and hence more flexible to adjust. High cost, while expected to explain a substantial part of the variation in the provision of health insurance among small employers, is not the only consideration for firms. In this paper we build on the idea that by making hard-to-reverse investments in health insurance benefits, small firms can communicate their continued commitment to the employment relationship. We show that the provision of health insurance in small firms is strongly associated with relational contracting, as evidenced by an implicit agreement to keep employee wages insulated from negative shocks in the external markets.

One of the key promises associated with strong relational contracting is wage shielding (Baker and Holmstrom, 1995; Bertrand, 2004). In contrast to new employees, whose entry wages are set by the market, existing employee wages are "shielded from the direct influences of competitive forces in the external market" (Doeringer and Piore, 1971, p. 2). Consistent with this notion, Baker, Gibbs, and Holmstrom (1994a, 1994b) study more than 20 years of personnel records and find that employee wages display strong "cohort effects" and follow a pattern different from new workers' wages.

This internal wage rigidity has been attributed to the degree of employee identification with their firms, consistent with the elements of relational contracting, such as employee morale, perceptions of fairness and worker productivity (Solow, 1979; Akerlof, 1982; Akerlof and Yellen, 1990): "A model that captures the essence of wage rigidity must take into account the capacity of employees to identify with their firm and to internalize its objectives. This calls for material, moral and symbolic reciprocation from company leadership" (Bewley, 1999, p. 1-2). Thus firms actively engaged in informal agreements with their workforce are likely to enforce informal wage-shielding promises as part of their commitment to their employees. Organizational identity literature, which has roots in psychology and sociology, and lately has made a strong presence in economics emphasizes the centrality of employee sentiment towards their firms in structuring incentives (see overview in Albert, Ashforth and Dutton, 2000; Akerlof and Kranton, 2005). In other words, employees who develop a strong sense of attachment to an organization act in the interests of the organization without having to be motivated to do so. Unlike relational contracting, with organizational identification, employee compliance does not rely on explicit or implicit promises–employees exert effort because they see themselves as an integral part of the organization and their interests align with those of their employers'. However, the emergent stages of developing shared organizational identity among employees are consistent with those of relational contracting as both rely on credible commitments to the continuity of employment relationships. Employees are likely to respond to various socialization routines and adopt organizational norms if they see a shared future with an organization. As such, provision of health insurance can communicate a firm's continued commitment to the employment relationship, especially in the context of new and small firms for which future is highly uncertain. Our study may inform the identity literature by suggesting a specific mechanism by which the process of organizational identification emerges. Our findings show that in small firms health insurance

and relational contracts go hand-in-hand, as indicated the separation of employee wages from negative shocks in the external environment. We turn next to discuss the consequences of relational contracts for firm outcomes.

2.2. Relational contracts and firm outcomes

Our understanding of how relational contracting capabilities vary across firms and their consequences to firm outcomes is limited. Public criticism directed at firms not investing in their employees and sweeping approval for firms that do have muted the discussion on tradeoffs firms face with each strategic decision. For instance, Sam's Club (Walmart) staunchly avoids providing its employees with health insurance benefits, while its competitor Costco views employment relationships differently: it pays on average 42% more in wages and offers the most generous health insurance benefits in the industry (Greenhouse, 2005; Cascio, 2006; Forbes, 2012). It is not obvious why such variation exists if one strategy should outperform the other. In this section, we attempt to single out important implications for firm performance resulting from relational contracting, by focusing on both benefits and costs associated with entering into implicit agreements with employees.

Investing in a sustainable employment relationship is an important strategic decision with significant implications for performance. The literature focuses on three main ways relational contracts can positively affect performance. First, informal contracts enforced by promises of future rewards can effectively link employee effort to firm outcomes, increasing the productivity and ability of a firm to decentralize and thereby grow in size (Baker, Gibbons, and Murphy, 2002; Levin, 2003; Bloom, Sadun, and Van Reenen, 2012). Strong relational contracts maintain incentive structures without costly contracts and allow firms to delegate authority and decentralize decision-making based on trust (Baker, Gibbons, and Murphy, 2002). Bloom et al. (2012) find that an average firm in high-trust environment was much larger in size than an average firm in low-trust environment, because higher levels of trust facilitated greater delegation of authority. Thus, improved ability to delegate authority increases decentralization and firm growth.

Second, research on high-commitment workplaces has predominantly emphasized the positive gains in performance from increased worker retention and motivation. For example, in a comparative empirical study, Ichniowski and Shaw (1999) find that U.S. plants that adopted the main elements of Japanese high-commitment employment practices have closed the significant productivity and quality gaps between the U.S. and Japanese plants, thus providing evidence for the effectiveness of employment relationships for firm performance and ruling out other factors, such as national culture. Akerlof and Kranton (2005) emphasize the importance of turning employees from being "outsiders" into viewing themselves as "insiders" by using identity-oriented incentive structures in order to elicit high degree of effort.

Third, credible informal promises of longer employment tenure and promotions can incentivize em-

ployees to make greater investments in firm-specific knowledge and skills. Because general human capital is easily transferrable between firms, the ability of the firm to motivate employees' investments in firm-specific knowledge and to retain these employees can be consequential for firm performance. Consistent with this idea, Groysberg, Lee, and Nanda (2008) find that higher productivity of "superstar" workers is largely attributable to firm-specific knowledge rather than individual talent and skill, and the performance of superstars declines after they leave their firms to work elsewhere. Also, Huckman and Pisano (2006) show that the performance of cardiac surgeons improves at hospitals where they accumulate more experience, suggesting the importance of firm-specific knowledge, such as familiarity with the surgical team, technology, and culture.

Although positive performance outcomes are obviously desirable, consideration of the tradeoffs associated with stronger relational contracting is also important. If investments in employer responsibility are persistently associated with better outcomes for firms, then why won't all firms invest in employment relationships? We argue that relational contracting in the workplace largely determines a firm's strategic policy about its future. After a social system of informal agreements develops within a firm over time, altering the commitments is much harder, and reneging on the promises may prove to be consequential. For instance, IBM was known for its strong commitment to long-term employment, but when it was forced to lay off workers in the early 1990s and change its employment policies, the action was viewed by employees as breaking the implicit promises of employment security, and resulted in significant workforce discontent and drop in morale (Mills and Friesen, 1996). Thus firms facing volatile futures may have difficulty adjusting if they are deeply entangled in informal agreements with their workforce. Further, employer investment in relational contracting capabilities increases the strategic value of a firm's future, as the shadow of the future is now a basis upon which the employment relationships are built. So, with an increase in the strategic value of the future, growth rate may decrease as firms takes on less risk. Thus, entering into relational contracting and encouraging commitment from employees might in turn enforce the organization's commitment to maintain the value of the future and thus keep its promises.

One explanation for the variation in relational contracting across firms is based on the differences in the ability of firms to establish credibility for their promises: because competitive rents serve as collateral for implicit promises, firms with good performance or potential for high growth are more likely to be able to develop relational contracts (Powell, 2012). Under this view, the direction of the association between performance and relational contracting capabilities points from performance to capabilities: better performing firms can form relational contracts easier because the value of their future is higher. In contrast, we examine the implications of relational contracting capabilities on firm outcomes and find that relational contracting is not associated with high-growth firms, and our results suggest firms that develop relational contracting capabilities grow more slowly than firms that do not utilize implicit promises. One

potential explanation is that, especially in the context of small firms, if the strategic focus on survival and growth are negatively correlated, increased productivity from relational contracting capabilities may not necessarily translate into high growth. To our knowledge, prior literature has not addressed this performance tradeoff we find in our analysis.

3. Data

Our data are from a market-leading small-business financial software. This software allows owners and managers of small and medium-sized businesses to organize and manage financial records by keeping track of bookkeeping, payroll, invoicing, taxes, and data analysis all in one tool. The data include accounting details on all expenses and revenues encountered by the firm for the period 2006-2011. A central piece of our analysis is employee records. For each firm, we have complete employment records for our sample years. We have information on each employee's compensations broken down by salary, bonus, and pension program. Importantly, we observe whether each employee made a pre-tax contribution to a health insurance plan. We use this information to determine whether a firm offers a health insurance plan to its employees.[4] In addition, from the expense file, we extract information on the firms' contributions to their employees' health insurance plans.

Our data cover 15,331 firms and 38,987 firm-year observations. Our main variable of interest is a dummy for health insurance. This dummy variable receives the value of 1 for firms in which at least one employee makes a pre-tax health plan contribution. We also compute the share of employees with health benefits of all employees employed by a firm in the same year. In our sample period, 3,879 firms offer health insurance in at least one year (25% of firms). About 30% of those firms' employees participate in these programs (a median of 25%). We supplement our firm-level data with state and industry information. Our main experiment is to exploit variation across states over time in housing prices to identify a differential response to the 2008 housing crisis by firms with and without health insurance programs. We use industry information to identify industry conditions under which development of relational contracting capabilities is likely to be more important.

3.1. Comparison of our data to national averages

We check the validity and representativeness of our data by comparing it the national averages for small firms in the U.S., by using the 2011 version of the Medical Expenditure Panel Survey-Insurance Component

[4] Other empirical studies that examine the provision of health insurance in firms have mostly utilized individual-level survey-based data. The most comprehensive firm-level data is from the U.S. Census Bureau employee-employer linked data matched to firm-level IRS form 5500, in which firms report health insurance and pension expenditures. The main shortcoming of the matched Census data is in the exclusion of most small firms (with under 100 employees) due to different reporting requirements (Decressin, McCue and Stinson, 2003). Our data focuses on small firms and details their spending and share of employees covered by health insurance in each firm.

(MEPS-IC) data. The median number of employees in our sample is 8, so we focus on survey data for firms with fewer than 10 employees. First, according to the MEPS data, the average share of firms with fewer than 10 employees that offer health insurance is 28.3% (MEPS-IC, 2011a), which is very close to 25% in our data. Next, compared to the survey's health insurance enrollment rate of 63.9% for firms with fewer than 10 employees (MEPS-IC, 2011b), the enrollment rate in our data is at 38.6%. The enrollment rate in our sample is lower, most likely because we are not counting firms with fewer than 3 employees and non-employer firms (i.e., sole proprietorships), in which owner-employees can purchase health insurance through their firms. By restricting our analysis to firms with more than 2 employees, we aim to capture the nature of employment relationships. Although the survey sample selection differs somewhat from our sample, the dynamics of share of firms with health insurance and number of employees enrolled in health benefits are consistent for firms with under 100 employees: while the share of firms that offer health insurance increases with firm size, the enrollment rate goes down with firm size (MEPS-IC, 2011a; 2011b).

The main advantage of our data compared to other firm-level data on employee health insurance provision is that it has firm-level information on each employee's wages and firm expenses over a period. We observe the amount of employee contributions into employee benefits and firm performance over time. Further, because our data records actual expenses, it has strong advantages over survey responses, which are typically used to assess health insurance provisions in small firms.

An important limitation of our data is its coverage of large firms. The financial software is predominantly used by small and medium-sized firms, thus the coverage of larger firms is likely not to be representative of the U.S. population of firms. As firms grow in size, they are likely to shift away from small business tools toward solutions designed for more large-scale complex and integrated systems. We check our results for robustness by excluding firms with more than 100 employees, as well as firms with more than 50 employees. Our results are not sensitive to excluding larger firms in our sample.

3.2. Main variables

Wages. Our main variable is firm-level average annual wages. In our data, the total compensation consists of salary paid, bonus pay, health insurance contributions, and pension benefits for each employee. Average wages is total annual compensation net health insurance contributions over the number of employees who received the pay. Wages range from under $5,000 to over $100,000, which suggests firms employ a mix of part-time hourly and full-time salaried workers. In our empirical analyses, we investigate whether the effects are different for part-time and full-time employees.

Housing price index. Housing prices represent a practical indicator of external economic conditions, especially in the context of our study. First, because housing costs represent the largest component

of employee personal expenditures, cross-region and time variation in housing costs should correlate positively with wages. Economic models predict that local housing prices and wage rates move in the same direction (Moretti, 2011). Second, the housing crisis triggered the 2008 economic recession: as inflated housing prices dropped, securities tied to U.S. real estate plummeted, thus causing a liquidity crisis, followed by an economic recession. Therefore, the 2008 drop in housing prices had strong mutually reinforcing effects on local economic conditions. Initially, rising interest rates made homes less affordable for homeowners, driving delinquency and foreclosure rates, which increasing unemployment resulting from the economic downturn later exacerbated. Local economic conditions and housing prices were strongly related during the 2008 housing crisis. For instance, Nevada is one of the states hit hardest by the housing crisis. As the local housing market collapsed, demand for new construction plummeted, contributing to increasing unemployment rates. Additionally, the economic recession stifled the state's tourism industry, pushing the unemployment rate from 4.2% in 2007 to over 14.9% by 2010.[5]

We utilize quarterly housing price index data from the Federal Housing Finance Agency (FHFA) at the metropolitan statistical area (MSA)[6] level between 2006 and 2009. The FHFA publishes housing price indices (HPI) for single-family, detached properties using data on repeat sales and refinancing obtained from the Federal Home Loan Mortgage Corporation (Freddie Mac) and the Federal National Mortgage Association (Fannie Mae) (Calhoun, 1996). We use housing price indices at the MSA level. The HPI measures average fluctuations in single-family home prices in a region by tracking repeat mortgage and refinance transactions on the same properties. The 2007 index ranges from 131.6 in Lafayette, Indiana, to 333.6 in Naples-Marco Island, Florida, with a mean index of 213.3. During the 2008 housing crisis, the average home prices across the United States decreased by 10% from 2007 to 2009. The 2008 index ranges from 131.7 in Lafayette, Indiana, to 307.8 in Ocean City, New Jersey, with a mean index of 188. Many regions suffered substantial losses in home values. For example, the home prices in Merced, California, one of the states hit hardest by the crisis, dropped by 37.5% and the index went from one of the highest in 2007 (270.5) to one of the lowest in 2008 (168.1).

Firm-specific training. Relational contracts should be substantially more consequential for firm performance in industries in which firm-specific training needs are greater, because in such industries, providing incentives for workers to specialize and acquire firm-specific skills is more valuable but also more difficult from a formal-incentives standpoint.

We use an industry-level measure that captures how much firm-specific knowledge a given industry

[5] Bureau of Labor Statistics (www.bls.gov) and CNN: http://money.cnn.com/2012/02/03/news/economy/Nevada_economy/index.htm, accessed in March 2013.

[6] MSAs are defined by the US Office for Management and Budget (http://www.whitehouse.gov/omb) for statistical purposes and consist of a large city and adjacent communities (combined population of over 250,000 people) with which there is a high degree of social and economic integration.

requires. This measure relies on the 2008 Bureau of Labor Statistics' National Longitudinal Survey of Youth (NLSY), which follows a panel of 12,000 individuals from 1979 to 2008 (Coff, 1999). The survey asks the respondents to specify the number of hours a week spent in employer-provided training for the purpose of maintaining or upgrading skills. The respondents' reported training hours are then aggregated to their employers' two-digit SIC industries. The measure ranks industries by the level of required employer-specific knowledge, which ranges from 0 to 50 hours per year.

Task discretion. Incentives tying effort to rewards are less effective in industries with greater employee task discretion, because observing and measuring effort is more difficult when tasks are less routine. Therefore, implicit promises and informal agreements should be more efficient in governing employment relations in industries with such discretion. Moreover, to the extent that health insurance is associated with higher worker motivation, we would expect a stronger tie between health insurance and relational contracts in industries where voluntary effort by workers is more important – as is likely to be the case when worker discretion is higher.

We follow Costinot et al. (2011) and rank industries according to their level of task discretion. We use data from the U.S. Department of Labor's Occupational Information Network (O*NET), and measure the level of task routineness by the extent to which the task involves "making decisions and solving problems." The exact formulation of industry task discretion is $Discretion$=1-$\sum$b^s (t) μ(t); where μ(t)= 1- $\sum_\tau \alpha$ (τ,t)$\frac{P(\tau)}{100}$; b^s(t) is the share of employment in six-digit occupation in an industry s; α (τ,t) is the employment share of six-digit occupations τ in task t; $\frac{P(\tau)}{100}$ is the score for "making decisions and solving problems" in occupation τ in O*NET. The final measure of industry-level task discretion ranges from 0 to 1, with 0 indicating the least discretion and 1 requiring the most worker discretion.

Labor turnover. In industries in which labor turnover is inherently higher, increased employee retention can cut adjustment costs associated with hiring and training employees, as well as reduce the incentives of employees and firms to make value-enhancing firm-specific investments. Relational contracts, by increasing employee commitment to the firm, can decrease turnover rates, with a positive impact on firm performance.

We create a measure of industry labor turnover by using the establishment-level employment data from the U.S. Bureau of Labor Statistics' Current Employment Statistics Survey between 1977-2003. We follow Autor et al. (2007) and Bozkaya and Kerr (2009) to construct a firm-level employee turnover rate equal to the average of the absolute change in a firm's annual employment divided by the average firm employment in those two years. We obtain the industry-level labor turnover rate by averaging the firm-level turnover rate within each three-digit SIC industry.

3.3. Descriptive statistics

Table 1 provides summary statistics for the main variables in our sample. The average firm generates $1.5 million in sales per year, with median sales at $619,000. The number of employees ranges from 3 to 467, with a median of eight employees in a firm. Employees earn about $16,000 (median), with the lowest and top 10th percentile wages at $6,032 and $43,335, respectively. Investment intensity, defined as expenditures on physical investment per dollar of sales generated, is quite skewed: a median firm spends less than a penny per dollar from sales on purchasing physical equipment, whereas the average expenditure is $3.4 per each dollar sales generated, suggesting physical investment as a lumpy expenditure. The average firm is eight years old, and median firm age is five.

[Insert Table 1 here]

Because the initial set-up and maintenance of providing health benefits can incur significant costs, we expect employment size to affect the decision to provide health insurance to employees: firms with a larger employee base can spread the fixed costs of administration over many employees. In Table 2, we show that the provision of health insurance increases with firm size, and there is large variation in health insurance provision within each firm size category. Splitting the sample by number of employees illustrates that for the firms with fewest employees (under 5), only 11.8% provide health insurance (column 1), and the share increases to 28.8% in firms with 20-29 employees (column 5), and to 50.8% in firms with 100 and more employees (column 9). In light of this substantial variation by employment size, in the preceding analysis, we ensure that employment variation does not drive our findings. To confirm this cost-spreading argument is not the primary driver of our results, we exploit the variation in the share of employees that get health insurance within the sample of firms that offer health insurance. On average, 30% of employees enroll on employer-provided health insurance (25% at the median). Moreover, we control for employment in all specifications, as well as check that the results continue to hold when we perform the estimation separately for the smaller and larger firms in our sample.

[Insert Table 2 here]

Table 3 presents the distribution of health insurance provision by main industries in our sample. Industries with the highest share of firms offering health insurance to their employees are Electronics and Information Technology (38%), Engineering (36.3%), and Professional Services (34.2%). Industries with the lowest share of firms offering health insurance include Restaurants and Food Service (12.7%), Laundry, Carpet, and Related Cleaning Services (14.4%), and Hotels (17.1%). Correspondingly, the share of employees enrolled in employer-provided health insurance is highest in the same industries in which

the larger share of firms offer health insurance (around 40%), and lowest in the industries in which fewer firms offer health insurance (range from 11% to 22.7%).

We explore within-industry variation in the provision of health insurance to rule out the possibility of our results demonstrating primarily cross-industry variation. The analysis of variance indicates that 97% of the variation in health insurance provision is within-industry. This means that firms facing similar conditions make different decisions about health insurance provision, underscoring the importance of firm strategy.

[Insert Table 3 here]

3.4. Health insurance and firm outcomes

Table 4 presents raw correlations between health insurance provision and firm characteristics. Here we are interested in exploring what type of firms offer health insurance, without making any causal statements on either effects or mechanisms. We examine the patterns of the share of firms offering health insurance to their employees by classifying firms by their level of labor productivity (measured by sales per employees), profitability (profits per employee), employment growth (change in total employment), employee turnover (the ratio between the sum of new and departing employees over lagged total number of employees), and investment intensity (physical investment expenditures over sales). We find that health insurance is more prevalent in firms with higher labor productivity: 27.4% of firms in the upper tertile of labor productivity distribution provide health insurance, in contrast to 14.6% of firms with low labor productivity (columns 2-4). We observe the same pattern with firm profitability: 30.6% of firms in the highest tertile of profitability distribution provide health insurance, and only 12.7% of firms with low profitability do so (columns 5-7).

Health insurance is more prevalent in stable firms: firms with lower employment growth (columns 8-10) and lower employee turnover (11-13) are more likely to provide health insurance to their employees. To the extent that health insurance provision is a way for firms to build relational contracts with their employees, health insurance benefits are more likely to occur in more stable environments in which employees are more certain about the firm's future and firms expect their employees to commit for longer periods of time. Effective relational contracting is likely in stable environments and can further reinforce stability, which we show in this study. Moreover, firms that spend a higher share of their sales revenue on physical investment are more likely to provide health insurance to their employees than firms in the lowest tertile of investment-intensity distribution (columns 14-16). This finding is consistent with the notion that health insurance provision may be associated with higher human capital, where physical capital and human resources are complements. The resulting higher marginal productivity of capital may boost physical investment.

Figure 1 plots the cumulative distributions of main outcome variables separately for firms with and without health insurance. For labor productivity and profits, the distributions for firms with health insurance stochastically dominate those for firms without health insurance, clearly indicating a higher likelihood of greater labor productivity and higher profits for firms with health insurance provision. For employee turnover, the distribution for firms without health insurance stochastically dominates that for firms with health insurance, suggesting higher turnover for firms without health insurance benefits. The relationship is less clear for the growth figure, which we explore further in the conditional correlations and instrumental variables analyses.

[Insert Figure 1 here]

In Table 4 lower two panels, we further break down the sample by number of employees to rule out firm-size effects (by median). Although large employment size would drive the propensity of firms to offer health insurance, because they are able to spread the costs over many employees, the correlations in column 1 indicate our results are not driven solely by size effects: the relationship between the higher likelihood of firms in offering health insurance and firm characteristics remains unchanged for small and larger firms.

[Insert Table 4 here]

4. Econometric results

4.1. Health insurance and wage shielding

In this section, we propose a direct test of relational contracting within firms by examining a specific mechanism—wage shielding. Wage shielding has traditionally been associated with relational contracts: employee wages are separated from external fluctuations in firms in which relational contracts are in force (Bertrand, 2004). Specifically, we test whether wages in firms with health insurance benefits have responded less to changes in local housing prices than firms with no health insurance.[7]

Table 5 presents the main estimation results for wage shielding. It examines the elasticity of worker wages to local housing prices. We find that on average, wages in firms with health insurance benefits are less sensitive to changes in housing prices, especially during the housing crisis year and in industries

[7] Prior to the housing crisis in 2008, we do not observe correlations between provision of health insurance and location of firms in areas hit hardest by the drop in housing prices. 20.5% of firms located in MSAs with largest decrease in housing prices provide health insurance, compared to 19.6% of firms located in other areas. The difference is not statistically significant with a p-value at 0.8332. The difference in health insurance provision remains insignificant when we compare firms located in states California and Florida (where largest drop in housing prices took place) to firms in other states. It is important to rule out the possibility of an association between the provision of health insurance prior to the housing crisis and regions that experienced largest decrease in housing prices, because such correlation can result in a biased and inconsistent estimator.

in which relational contracts are presumably more important (firm-specific training and worker task discretion are high). Columns 1-3 include regional fixed effects at the MSA level to exploit within-region variation to estimate how the wage-housing prices elasticity varies by firms with and without health insurance.[8] Column 1 shows the elasticity of wages with respect to local housing prices is 0.132 for firms with no health insurance, and -0.012 (statistically insignificant) for firms with health insurance during the complete sample period (2006 to 2009). Thus, interestingly, we find that wages of firms with no health insurance are strongly sensitive to housing prices only when these prices suffered a sharp decline leading to significant deterioration in the overall regional economy. By contrast, in the same period, firms that provide health insurance continued to insulate the wages of their workers.

Columns 2-3 break the sample period into pre-crisis (2006-2007) and post-crisis (2008-2009) years. As expected, we find the difference in the elasticity in housing prices between firms with and without health insurance is evident only during and post-crisis years. In the pre-crisis years (column 2), the coefficient estimate on the interaction term between health insurance and housing prices is -0.032 (not statistically significant), compared to an estimate of -0.193 (highly significant) in the post-crisis years (column 3). Columns 4-7 estimate our wage-shielding specification separately for each of the sample years. In these specifications, we exploit variation between regions and examine how the estimated difference in sensitivity of wages to housing prices between firms with and without health insurance varies over time (as indicated by comparing across columns 4-7). Similar to what we find in the within-region estimation, a striking difference in the elasticity of housing is present between firms with and without health insurance, but only in the crisis year 2008.[9] Based on the estimates from column 6, a 10% drop in housing prices is associated with a 34% drop in wages for firms with no health insurance, but with only a 14% drop for firms with health insurance.[10]

Figure 2 illustrates the wage-shielding effect by plotting the estimated sensitivity of wages to housing prices for each year in the analysis (columns 4-7). The graph shows a clear, large difference in wages between firms with and without health insurance provision in 2008, the year of the housing crisis.

[Insert Figure 2 here]

Column 8 further examines the differential sensitivity of wages to housing prices by showing how the size of the drop in housing prices in the crisis years translated to wages. We computed percentage drop in

[8] We check the robustness of our results by excluding observations for firms located in the state of Massachusetts or in the state of Hawaii in all our specifications. The 2005 state law in Massachusetts mandates employers with 10 or more employees to offer health insurance, and all employers in Hawaii have been required to provide health insurance since 1974. We exclude 535 observations for 226 firms and find no change in results.

[9] The results are driven primarily by younger firms (at or under median age of 5).

[10] To ensure our results are not driven by outliers, we exclude from the estimation sample observations for firms located in the MSAs which had the highest drop in housing prices (30-46%) during the crisis and find that the results remain robust. We dropped 123 firms (258 observations) in 7 different MSAs located in California and Florida.

housing prices by comparing 2008 prices with 2006 prices. We find similar results when using alternative periods to calculate price changes.[11] We find a strong relation between percentage drop in housing prices and wages. Moving from the hardest-hit region to the least affected region, we find wages for firms with no health insurance dropped by 25%, compared to only 5% for firms with health insurance.

Columns 9 and 10 address an important concern regarding the interpretation of our results. Wage adjustment costs are likely to vary with human capital. If wage adjustment costs are higher for high human capital firms, our wage-shielding results may be driven by differences in human capital intensity across firms. To test this concern, we collect data at the industry level on average number of education years (we do not have the same information at the firm level).[12]

We then estimate specification 8 separately for industries with low and high level of education (human capital). Splitting the sample in this way mitigates the concern that our wage-shielding results are driven by the comparison of low and high human capital industries. We find no significant wage-shielding effect for the low-human capital industries (Column 9), but a very large effect for the high-human capital industries (Column 10). Finding stronger results for high-human capital industries is consistent with relational contracts, accordingly non-contractual relationships should be more important where tasks are more complex and harder to observe, which are more likely in high human capital industries.

We perform an additional robustness check to ensure health insurance provision is not proxying for higher quality of labor. We exclude part-time and low-wage employees from our sample and repeat the analysis. We do not observe whether the employees are salaried or are paid on hourly basis. Instead we proxy part-time and hourly workers by their average hourly rate–workers with hourly wages at around the federal minimum wage are classified as hourly or part-time employees.[13] On average, firms without health insurance rely more on part-time employees than firms with health insurance: 46.5% of their workforce is comprised of part-time workers, while 33.4% of employees are part-time in firms with health insurance (the difference in means is significant at a p-value$<$0.000). This is consistent with the notion that it is more difficult to enter into relational contracts with part-time employees due to a more temporary nature of the employment relationship. All our results remain the same when excluding part-time and low-wage employees from our sample (not reported).

[Insert Table 5 here]

[11] The results are robust when restricting the sample to smaller firms (50 and fewer employees).

[12] Our data are from the 2008 publication of the Bureau of Labor Statistics National Longitudinal Survey of Youth (NLSY). Our measure of human capital is years of schooling, highest grade or year of regular school that have completed and received credit for, and was averaged by census code. It ranges from 1(1st grade) to 20 (8th year at college or more). Those who have completed and gotten credit from ungraded institutions were excluded.

[13] As of July 24, 2009, the federal minimum wage is \$7.25 per hour as established by the U.S. Department of Labor (http://www.dol.gov/whd/minimumwage.htm).

Table 6 examines how our results vary by industry characteristics and shows that the difference in housing-price elasticity between firms with and without health insurance is evident only in industries in which relational contracting is more likely to be important. Consistent with previously reported patterns, the notable differences are present only in post-crisis years in all specifications. In columns 1-4, we report results from models that break the sample into industries with high and low levels of firm-specific training needs. The difference in elasticity of wages to housing prices is lower for firms with health insurance in industries with high firm-specific training needs than in industries with lower training needs: the estimated coefficient on the health insurance dummy and housing index interaction for the high-training sample is -0.307 (highly significant) compared to -0.075 (insignificant) for the low-training sample (columns 2 and 4, respectively). Specifications in columns 5-8 examine wage elasticity in firms that operate in industries in which worker task discretion is high or low. The magnitude of the estimated coefficient on the health-housing index interaction is bigger in industries in which worker discretion is high (-0.214 in column 6) than in industries in which tasks are more routine (-0.119 in column 8), and both coefficients indicate lower wage elasticity to housing prices in firms with health insurance.

Next we examine wage elasticity in firms in industries in which labor turnover is inherently higher or lower (columns 9-12). We find a similar pattern: average wages in firms with health insurance in industries with higher labor turnover fluctuate less with the drop in housing prices compared to firms with health insurance in industries with lower labor turnover—the estimated coefficient on the health-housing index interaction is negative and significant in high labor turnover industries (column 10) and negative and insignificant in low labor turnover industries (column 12).

To illustrate industry patterns reflective of our main hypothesis, we explore the share of firms with health insurance according to the following industry characteristics: level of firm-specific training, degree of task discretion, and rate of labor turnover (not reported in the tables). We find that 24.6% of firms provide health insurance in industries in which employees spend more time (by median) in firm-specific training (Professional and Business Services and Retail Establishments), compared to 20.9% in industries with fewer employee training hours (Restaurants and Food Services and Beauty and Personal Services industries). When monitoring costs make the link between employee effort and specific outcomes more difficult, incentives apart from performance-based rewards become instrumental. Consistent with this notion, we find that in industries in which employee tasks require a greater degree of worker discretion in terms of problem solving and creativity (at median), 24.3% of firms provide health insurance (such as Professional and Business Services), and 19.4% of firms in industries with more routine tasks (such as Construction and Restaurants and Food Services) provide health insurance. Also, health insurance is substantially more prevalent in industries with high labor turnover (at median): 26% of firms (Professional and Business Service industries) provide health insurance, whereas only 19.2% of firms in lower-turnover

industries (such as Real Estate and Laundry, Carpet, and Related Cleaning Services) provide health insurance to their employees.

[Insert Table 6 here]

Figure 3 plots how wage shielding effects vary by industry characteristics. In the upper panel, we split the sample by high and low (median) levels of firm-specific training needed in an industry. In the lower panel, we break the sample by high and low (median) degree of task discretion in an industry. Consistent with the relational contracting view, the largest differences in wage sensitivity between firms with and without health insurance provision are evident in the year of the housing crisis in industries with high firm-specific training and high task discretion.

[Insert Figure 3 here]

Table 7 examines the robustness of our results to alternative compensation characteristics that are correlated with health insurance provision. We control for bonus pay and pension benefits, training expenditures, and the degree of wage dispersion in the firm by interacting each with the health insurance dummy. Bonus pay is a dummy that equals 1 if bonus pay constituted part of the employee compensation.

Firms with health insurance are more likely to pay bonuses as well: about 40% of firms without health insurance and 60% of firms with health insurance paid bonuses as part of their employee compensation. Pension is also a dummy variable that receives the value of 1 if a firm contributed to employee pension benefits. Although most firms do not have pension benefits (95.5%), a larger share of firms with health insurance also contribute to employee pension plans than the share of firms without health benefits: 10.6% compared to 2.8%, respectively. This difference is statistically highly significant (p-value$<$ 0.001).

Training expenditures are the share of annual expenses spent on employee training, such as on-the-job training programs and team-building activities.[14] 33.8% of the firms in our sample spent a non-zero amount on training. Of those firms that incurred training expenditures, 29.7% also provided health insurance, while 18.5% of firms that did not spend on employee training provided health insurance to their employees. The difference is statistically highly significant, with a p-value$<$0.001. This positive correlation between the provision of health insurance and training is consistent with the view that relational contracting is associated with greater investments in firm-specific knowledge. The average annual expenditures on training in firms with health insurance constitute 0.3% of their annual expenses, and 0.5% in firms without health insurance provisions. This difference is statistically significant, with a p-value$<$0.001.

[14] For each firm, we sorted through all expenses as reported by firms and identified training-related costs. Then, we calculated the total amount spent on training in each year to determine the share of annual expenses spent on training. The most common expense accounts we included in the training category are "Employee training", "Training", "Staff development", "Professional development" and "Continuing education".

Of those firms that incurred training costs, an average firm spent $7,724 a year (median at $1,191), and an average of $762 per employee ($123 at the median).

We calculate wage dispersion for each firm by dividing the within-firm standard deviation of employee wages by the total compensation. The nature of employment relationships may be suggestive through the degree of wage dispersion in a firm. Large differences in wages may indicate greater reliance on temporary low-wage labor with which employment arrangements are based mostly on spot market contracting. Also, smaller wage dispersion within a firm may be indicative of its efforts to maintain a sense of fairness among employees, which can constitute an implicit promise to provide equitable workplace. In our sample, firms without health insurance exhibit on average higher wage dispersion (0.094) than firms with health insurance (0.067); the difference is statistically significant at p-value<0.001.

Column 1 presents results from the estimation for the entire sample period of 2006-2008 and shows that the pattern remains robust—elasticity of wages to housing prices is lower for firms that offer health insurance than for firms that do not offer such benefits. Results reported in columns 2 and 3 confirm the pattern holds for post-crisis years as in the main specifications. Finally, in column 4, the specification is limited to firms that are active both before and after the crisis year, and the results continue to hold: the estimated coefficient on the health insurance dummy interacted with the housing index remains negative and significant.

We check the sensitivity of our results to outliers by excluding firms in the 95th or above percentile of firm age distribution (22 years or older), and by excluding smallest and largest firms by employment size (top and bottom 5% of the size distribution). The patterns remain robust.

[Insert Table 7 here]

Further, we investigate whether the relationship between health insurance and wage shielding is robust to layoffs and changes in workforce composition. Baicker and Chandra (2006) and Cutler and Madrian (1998) suggest that with rising fixed costs, such as health insurance, firms with health insurance will substitute hours worked for the number of workers employed, because it's easier to adjust marginal wages than fixed costs of health insurance per employee. That is, firms will lay off full-time workers and increase reliance on part-time employees who are not eligible for health insurance benefits. The net effect of these adjustments on firm average wages could be minimal. If the average wages remain stable in firms with health insurance due to relational contracting, then it should be due to increased hours for existing employees and decreased hiring rather than layoffs. Thus, we should observe lower rate of employee separations during the recession and lower rate of hiring of part-time and temporary employees in firms with health insurance where relational contracting matters more. In order to investigate this change in

workforce composition consistent with relational contracting, we examine changes in employment and separation of part-time employees in firms with health insurance.

We first examine whether the share of part-time employees varies across firms with health insurance in industries in which relational contracting matters more: industries with higher firm-specific training requirements and industries with more task discretion. Indeed, in industries with higher firm-specific training needs, we observe 27.0% of employees are part-time, compared with 38.1% of employees in industries with lower firm-specific training. The difference is even larger when comparing the share of part-time workers across industries with more and less task discretion: 27.0% versus 44.2%, respectively.

Next, we compare trends in hiring of part-time workers and separations of employees in firms with health insurance. Table 8 reports the results of comparison of means tests by provision of health insurance and industry characteristics. On average, as expected, firms with no health insurance hire a higher proportion of part-time employees than firms with health insurance (columns 1-5). In the year of the housing crisis, the share of workers hired that are part-time decreases in firms with health insurance (from 46.2% in 2006 to 44.0% in 2008), while in firms without health insurance larger proportion of new hires are part-time workers (from 53.7% in 2006 to 55.7% in 2008). These trends are especially prominent for firms in industries where relational contracting matters more: in industries with higher firm-specific training needs, the share of new hires that are part-time employees decreased from 42.2% in 2006 to 36.0% in 2008 for firms with health insurance, while firms without health insurance hired a larger share of part-time workers in 2008 (52.8%) than in 2006 (48.6%). Same patterns hold for firms in industries with higher task discretion. Overall, consistent with the relational contracting explanation, the trends indicate decreased hiring of part-time employees in firms with health insurance during the housing crisis.

Separation patterns of the workforce should exhibit lower rate of layoffs in firms with health insurance. Columns 6-10 report the differences in means for the share of employees who left their firms in 2006-2010 period. In 2006, 27.2 % of employees in firms with health insurance were longer working in their respective firms by 2007, compared to 29.2% of employees in firms without health insurance (column 6). The difference in means is not significant. However, in 2008, the difference in separations increased, due to firms with no health insurance letting go of larger proportion of their workforce (37.8% compared to 34.3% in firms with health insurance–column 8). The patterns are even stronger in industries with higher firm-specific training and greater task discretion. These trends indicate that while the housing crisis resulted in a general increase in downsizing, firms that do not provide health insurance led the increase.

Overall, the analysis of workforce composition dynamics suggests that consistent with relational contracting, firms that provide health insurance shield wages by managing their workforce composition–they hire fewer part-time workers and downsize less during economic downturns.

[Insert Table 8 here]

4.2. Health insurance and firm outcomes

4.2.1. Conditional correlations

We proceed by exploring the conditional relationship between health insurance and firm performance. Note that in this section we do not intend to establish a causal relation between the provision of health insurance and firm performance. Instead, our goal is to expose a robust relation between firm characteristics—productivity, profitability, growth, employee turnover, and investment in physical capital—and the provision of health insurance. Having documented these relations, we then proceed to examine causal relationships by utilizing an instrumental variables approach. Table 9 presents the main relationships in our data. We focus on labor productivity (sales per employee), profit (normalized by number of employees, for clarity of presentation), employment growth and turnover (the sum of new and departing employees over lagged total number of employees), and investment in physical capital. A clear pattern emerges. Firms with higher labor productivity, profits, and physical investment, but with lower employment growth and employee turnover, are more likely to provide health insurance.

Columns 1-3 present the relation between health insurance and labor productivity. Column 1 presents estimates from a pooled-OLS specification. Firms that offer health insurance generate on average 23% more sales per employee. In column 2, we control for firm fixed effects. This estimate drops substantially to 8% but remains significant. Column 3 exploits only between-firm variation to generate a labor-productivity differential of 23% between firms with and without health benefits.

Columns 4 to 6 present the same analysis for profits. The general pattern shows that although firms with health insurance are more profitable than firms with no health insurance, higher wages and between-firm variation are the primary drivers of this difference. Pooled-OLS estimates imply a 1.5% profit difference between firms with and without health insurance (column 4). This difference drops to 1.1% when controlling for firm fixed effects (column 5) and to about 2% in between-firm estimation (column 6). These results document a strong positive relation between health insurance and labor productivity, and a weaker relation between health insurance and profitability.

We proceed next to explore the relation between health insurance and employment growth and turnover. Columns 7-9 present the results for employment growth. The results indicate a strong negative relation between health insurance and growth. The coefficient estimates on health insurance are not very sensitive to the specific estimation method and imply growth rates for firms with health insurance. These growth rates are about 10% lower than the growth rates of firms with no health insurance. This result is central in our analysis because it shows the voluntary provision of health insurance is substantially less likely for high-growth firms. Columns 10-12 present the results for employee turnover—a key measure of

firm stability. Similar to the unconditional correlation from Table 3, we find substantially less turnover for health insurance firms.

Lastly, columns 13-15 examine the relation between health insurance provision and physical investment expenditures. The estimated coefficient on the health dummy variable in pooled OLS estimation is large and significant, indicating greater investment by firms that provide health insurance (Column 13). The estimates are smaller in within-firm and between-firm specifications but remain positive and significant (columns 14 and 15). Overall, these results suggest that firms that provide health insurance invest in physical capital at a rate that is close to 40% higher than firms that do not provide health insurance. This pattern has several possible explanations. Firms that provide health insurance typically attract workers with higher human capital. To the extent that physical capital and human capital are complements (better machines are more productive when better workers operate them), we would expect higher investment for such firms. Another explanation is that if firms providing health insurance are more constrained in their ability to grow, investing in physical capital may be a source of higher productivity and profitability (Garicano, Lelarge, and Van Reenen, 2012).[15]

[Insert Table 9 here]

We proceed next to estimate the non-parametric relationship between health insurance and firm outcomes. Table 10 presents the results. We estimate the relation between health insurance and the above five firm measures using a two-stage propensity-score-matching estimators. The estimation is cross-sectional for the last year firms appear in the sample. In the first stage, we estimate the likelihood that a firm offers health insurance. We control for employment, average wages, year of incorporation (the hiring year of the most tenured employee), and a complete set of state and industry dummies for three-digit SIC codes.

The non-parametric estimates are similar to those obtained from the parametric estimation. Differences between firms with and without health insurance provisions are significant in all specifications for the entire sample. Splitting the sample by median employment results in small and insignificant differences in the profit model (columns 5 and 6), consistent with weaker results for profit in the main results.

[Insert Table 10 here]

In addition to these analyses, we repeated all estimations (both parametric and non-parametric) with extreme changes in sales as a firm outcome to further gauge the differences in terms of stability between firms with and without health insurance. We defined an extreme drop in sales as a dummy equal to 1 if a

[15] We replicate all the estimations for a sample of smaller firms (with 50 or fewer employees) and find the same results.

firm experiences 30% or more decrease in sales. Similarly, an extreme increase in the sales dummy equals 1 if sales jump by 30% or more. We do not report the detailed results in a table.

We then check the sensitivity of our results to firm size and age outliers by excluding the smallest and largest firms by number of employees (top and bottom 5% of the employment size distribution) and oldest firms (top 5% of the firm age distribution) and find that our results remain robust in each case.

Overall, we find strong evidence that provision of health insurance is associated with a lower likelihood of an extreme drop or extreme increase in sales. This pattern is consistent with the main results—firms that provide health insurance to their employees are more stable in terms of employment, growth, and changes in sales than firms that do not provide health insurance. In the next section, we explore these relationships further to determine important performance implications of health insurance provision.

4.2.2. Instrumental variable estimation

We next proceed to investigate the causal relationship between health insurance provision and performance. Our approach here is to compare the performance outcomes of firms that provide health insurance with the performance outcomes of firms that do not provide health insurance but would have provided it if some exogenous conditions were changed. This comparison is known as a local average treatment effect (Imbens and Angrist, 1994).

Our instrument in this analysis is state-level marginal income tax rates. We use dollar-weighted marginal tax rates as calculated by the NBER's microeconomic TAXSIM model from individual-level data for a sample of U.S. taxpayers.[16] These annual state-level marginal tax rates capture the complexity of each state's tax rules and incorporate changes in tax laws in each year. The average marginal tax rate for the entire sample is 4.60% and the median is at 5.33%. There is substantial variation in tax rates across states. For example, in 2006, Tennessee's marginal rates was 0.26% and Oregon had one of the highest rates at 8.35%. The rates also change over time: by 2010, the marginal tax rates in Tennessee increased to 0.27% and to 8.70% in Oregon.

The United States tax code heavily subsidizes employer provision of health insurance by excluding the costs of employer-provided health insurance from individual taxable income. Employer-provided health insurance tax benefit is the biggest tax exclusion in the United States, which for example, in 2007 cost the Treasury an estimated $246 billion annually in foregone revenues from payroll and individual taxes, far exceeding federal spending on Medicaid (Joint Committee on Taxation, 2008). The tax subsidy of employer-provided health insurance lowers the price of a dollar of health insurance by the marginal tax rate faced by the worker. Put differently, the cost of a dollar's worth coverage of health insurance to

[16] For more information about NBER's TAXSIM, please see Feenberg and Coutts (1993). The data is accessible at: www.nber.org/taxsim

the worker is not one dollar, but one dollar minus the tax that he or she would pay on that dollar if it were received as wages instead. Thus, the greater the subsidy, the larger the expected increase in health insurance purchase and higher the propensity of firms to offer health insurance benefits.

Tax subsidy advantages of employer-sponsored health insurance over individually-purchased health insurance are further amplified in the following ways. First, because employer-provided health insurance premiums are deducted pre-tax, the taxable income for federal and state income taxes, Social Security, and Medicare taxes is reduced. Second, although individually purchased insurance costs can be deducted as itemized medical-expense deductions from adjusted gross income, it is a less advantageous alternative to direct adjustments through employer-provided health insurance premiums. Third, employers are often able to get lower premium rates with larger group risk pools than individuals seeking non-group health insurance. Finally, employers typically pay a portion of insurance premiums for employees, which makes enrolling in employer-provided health insurance policies more appealing than purchasing individually. Thus higher individual income tax rates imply an increased likelihood of purchasing employer-provided health insurance.

Tax advantages stemming from employer-provided health insurance significantly affect the propensity of firms to offer health insurance. Studies on the effects of tax subsidies on the firm decision to provide health insurance use the difference in marginal tax rates as the main source of variation and estimate the price elasticity of employer provision of health benefits. Royalty (2000) uses a cross-state variation in marginal tax rates to estimate the elasticity of firms' insurance offering at -0.6. Similarly, Gruber (2001) uses the Current Population Survey (CPS) to find the elasticity of firm offering health insurance with respect to taxes is -0.7. Both studies suggest that taxes are important determinant of the decision of firms to offer health insurance. Using data from Canada, Finkelstein (2002) finds that a reduction in tax subsidy to employer-provided health insurance decreased the employer provision of health insurance by 19%, which corresponds to elasticity of employer provision of health insurance with respect to the "tax price"[17] of -0.5. Importantly, she finds that the decrease in the provision of health insurance by employers is mainly driven by small firms: the reduction in health insurance provision by firms with less than 20 employees is 26% compared to only 7% reduction in firms with more than 500 employees. This result suggests that small firms are more sensitive to changes in tax subsidies to employer-provided health insurance than large firms. Similarly, Gruber and Lettau (2004) examine the sensitivity of employer provision of health insurance to variations in "tax price" of health insurance in the US and find that compared with large and medium-size firms, the elasticity of insurance offerings in small businesses (with fewer than 100 employees) is sizeable at -0.7. In particular, they find that much of the response to taxes

[17]The "tax price" is defined as the employee cost of one dollar in employer-provided health insurance premium in terms of foregone after-tax consumption. Due to tax exclusions, this price is typically less than one.

is in employer provision of health insurance, with relatively modest change in employee acceptance and enrollment in benefits.

In addition to the instrument being correlated with the variable it is instrumenting for (firm provision of health insurance), the instrumental variable approach requires the instrument to be uncorrelated with the dependent variable (firm performance). There is no evidence to suggest that state-level marginal income tax rates would correlate with firm performance. In our sample, the correlations between firm performance measures and marginal tax rates are negligible and insignificant. Thus the marginal income tax rate measure is a good instrument in our setting for the provision of health insurance by firms, because income taxes directly impact firm provision of health insurance benefits (especially in small firms) but do not systematically correlate with firm performance.

The instrumental variables approach estimates the average effect of health insurance provision on firm outcomes for the firms that provide health insurance because of tax advantages but would not have provided it otherwise. This subsample excludes those firms that would have provided health insurance regardless of variations in tax rates (always-takers) and those firms that are not able to due to some exogenous reasons–unavailability of insurance, for instance (never-takers)—regardless of their willingness to provide such benefits (Angrist, Imbens, and Rubin, 1996). In other words, the local average treatment effect is the average effect of health insurance provision on firm outcomes for those firms whose treatment status (provision of health insurance) can be changed by the tax rate. The estimated coefficient is the causal effect of the health insurance provision on the outcome variable, and can be interpreted as the ratio of the correlation of firm outcomes to the tax variable to the correlation of the health insurance provision dummy with the tax variable (Angrist and Pischke, 2008).

Table 11 presents the results of the instrumental variables estimation on various firm outcomes. Because our endogenous variable for health insurance provision is binary, we utilize Probit estimation in the first-stage model and maximum-likelihood estimation in the second-stage model for more precise estimation. For each specification, we report the estimated coefficients on the instrument from the first-stage model and show that all are positive and significant, indicating high correlation between the tax rate as an instrument and the health dummy as the endogenous variable. In the second stage, we control for firm size, average wages, state-level variables such as GDP per capita and population, and include industry and year fixed effects. The Wald test strongly rejects the null of the health-insurance-provision variable being exogenous.

Columns 1 and 2 report IV estimation results for labor productivity in pooled and within-firm estimations, respectively. The estimated coefficients on health dummy are positive and significant, suggesting about 37% more sales per employee in firms that provide health insurance. Next, we estimate the effect of health insurance provision on firm profits, and find positive and significant estimates on the health

indicator variable, with stronger effects in the between-firms specification (columns 3-4). Firms that provide health insurance generate over 3% more in profits than firms that do not provide health insurance benefits to their employees. Columns 5-8 present the negative and significant effects we find of health insurance on employment growth and turnover. Health insurance firms grow at a rate that is 20% lower than that of no-insurance firms. Health insurance firms have a similar lower rate of employee turnover.

As a robustness check, we estimate the same specifications on a sample without oldest firms (in the top 5% of the firm age distribution) and separately on a sample without smallest and largest firms by employment size (top and bottom 5% of the employment size distribution). All patterns remain unchanged.

[Insert Table 11 here]

The instrumental variables estimation confirms the patterns we uncovered in the raw and conditional correlations. We find strong evidence of positive outcomes associated with health insurance provision (as indicated by higher sales per employee and profits), but also substantially lower growth. The overall stability in firms with health insurance suggests the costs associated with relational contracting—informal promises seem to be binding and constraining to firm risk-taking capacity and flexibility for rapid adjustments. This finding can further inform the relational contracting theory on conditions under which making implicit promises may be suboptimal.

5. Conclusion

This paper studies the voluntary provision of health insurance in small, private American firms. Our main finding is that firms that invest in health insurance programs, representing 22% of the sample, are more likely to develop relational contracts with their employees as indicated by wage shielding. Using the 2008 housing crisis as an exogenous shock, we show that whereas firms with no health insurance provisions lowered wages by 25%, the average wages in firms with health insurance declined by only 5%.

We proceed to investigate the causal relation between health insurance and outcomes. Using state-level marginal income tax rates as our instrument, we find a significant effect of health insurance provision on firm outcomes. Although health insurance is associated with higher profits and sales per employees, it is also associated with lower growth and employee turnover. Our findings thus document an important tradeoff associated with relational contracts: they may lead to better performance in terms of profits and productivity, but at the same time dampen growth opportunities. Relational contracts are considered building blocks of informal structure in organizations that facilitate processes with greater efficiency, because they foster high commitment, trust, and flexibility. As such, the ability to form and maintain relational contracts is instrumental for developing organizational capabilities, because managerial practices

rely heavily on informal agreements and relational contracts (Gibbons and Henderson, 2012). Aside from the advantages such informal processes bring, choosing to invest in relational contracts has its costs as well—developing capabilities that rely heavily on relational contracts increases the obligation of firms to their employees, which can constrain the agility and flexibility of firm response to external threats and opportunities. These tradeoffs may explain conditions under which the strategic importance of relational contracts is more significant.

Our study sheds light on the emergence of internal labor markets (ILMs) in small firms, in which research suggests informal employment agreements develop (Doeringer and Piore, 1971). One of the key characteristics associated with ILMs is wage shielding: employee wages are insulated from external market fluctuations (Baker and Holmstrom, 1995). Thus, by stipulating conditions under which relational contracting is more likely to develop and by providing direct evidence of wage shielding, our paper highlights firm characteristics significant to the development of relational contracting and the emergence of ILMs in general.

Our study intersects firm strategy and public policy. Supporting small-business growth is one of the central issues occupying policymakers. President Barack Obama has repeatedly emphasized the role of small businesses as the "engine of the U.S. economy" due to their substantial presence in the domestic market: small firms employ about 50% of American workers and produce 46% of all private-sector output. Thus policies that affect the growth of firms can have a direct impact on the economy. Starting in 2014, the Patient Protection and Affordable Care Act (PPACA) will mandate employers with at least 50 workers to provide health insurance to their employees. Our findings suggest the regulation may disproportionately affect growth firms, and may alter the role of health insurance as an instrument for building employment relations in small firms. Our results also inform policy debate on potential extensions of the reform to include firms with under 50 employees, which currently employ 29% of the labor force.[18] To determine the full implications of the reform for firm outcomes, more work is needed to understand the causal mechanisms through which health insurance provision, relational contracts, and firm outcomes interact. This is clearly an exciting and important avenue for future research.

References

[1] Akerlof, G. A. 1982. Labor contracts as partial gift exchange. *Quarterly Journal of Economics*, 96: 543–569.

[2] Akerlof, G. A., R. Kranton. 2005. Identity and the economics of organizations. *Journal of Economic Perspectives*, 19(1): 9-32.

[3] Akerlof, G. A., J. Yellen. 1990. The fair wage-effort hypothesis and unemployment. *Quarterly Journal of Economics*, 105: 255–283.

[18] Bureau of Labor Statistics (www.bls.gov)

[4] Albert, S., B. E. Ashforth, J. E. Dutton. 2000. Organizational identity and identification: Charting new waters and building new bridges. *Academy of Management Review*, 25(1): 13-17.

[5] Aldrich, H. E. 1999. *Organizations evolving*. London, UK: Sage Publications.

[6] Angrist, J. D., G. W. Imbens, D. B. Rubin. 1996. Identification of causal effects using instrumental variables. *Journal of the American Statistical Association*, 91(434): 444-455.

[7] Angrist, J. D., J. S. Pischke. 2008. *Mostly harmless econometrics: An empiricist's companion*. Princeton, NJ: Princeton University Press.

[8] Autor, D. H., W. R. Kerr, A. D. Kugler. 2007. Does employment protection reduce productivity? Evidence from U.S. states. *Economic Journal*, 117(521): F189-F217.

[9] Baiker, K., A. Chandra. 2005. The consequences of the growth of health insurance premiums. *American Economic Review*, 95(2): 214-218.

[10] Baker, G., B. Holmstrom. 1995. Internal labor markets: Too many theories, too few facts. *American Economic Review*, 85(2): 255-259.

[11] Baker, G., M. Gibbs, B. Holmstrom. 1994a. The internal economics of the firm: Evidence from personnel data. *Quarterly Journal of Economics*, 109(4): 881-919.

[12] Baker, G., M. Gibbs, B. Holmstrom. 1994b. The wage policy of a firm. *Quarterly Journal of Economics*, 109(4): 921-955.

[13] Baker, G., R. Gibbons, K. J. Murphy. 1994. Subjective performance measures in optimal incentive contracts. *Quarterly Journal of Economics*, 109(439): 1125-1156.

[14] Baker, G., R. Gibbons, K. J. Murphy. 2002. Relational contracts and the theory of the firm. *Quarterly Journal of Economics*, 117(1): 39-84.

[15] Batt, R. 2002. Managing customer services: Human resource practices, quit rates, and sales growth. *Academy of Management Journal*, 45(3): 587-597.

[16] Bertrand, M. 2004. From the invisible handshake to the invisible hand? How import competition changes the employment relationship. *Journal of Labor Economics*, 22(4): 723-765.

[17] Bewley, T. 1999. *Why wages don't fall during a recession*. Cambridge, MA: Harvard University Press.

[18] Bloom, N., T. Kreschmer, J. van Reenen. 2011. Are family-friendly workplace practices a valuable firm resource? *Strategic Management Journal*, 32(4): 343-367.

[19] Bloom, N., R. Sadun, J. van Reenen. 2012. The organization of firms across countries. *Quarterly Journal of Economics*, 127(4): 1663-1705.

[20] Bozkaya, A., W. R. Kerr. 2009. Labor regulations and European venture capital. NBER Working Paper 15627.

[21] Calhoun, C. A. 1996. Housing price indexes: HPI technical description. Office of Federal Housing Enterprise Oversight.

[22] Cardon, M. S., C. E. Stevens. 2004. Managing human resources in small organizations: What do we know? *Human Resource Management Review*, 14(3): 295-323.

[23] Cascio, W. F. 2006. *Managing human resources: Productivity, quality of work life, profits* (7th ed.). Burr Ridge, IL: McGraw-Hill/Irwin.

[24] Chandler, A. D., Jr. 1962. *Strategy and structure: Chapters in the history of the American industrial enterprise*. Cambridge, MA: MIT Press.

[25] Chu, R. C., G. R. Trapnell. 2003. Study of the administrative costs and actuarial values of small health plans. U.S. Small Business Administration, Office of Advocacy.

[26] Coff, R. W. 1997. Human assets and management dilemmas: Coping with hazards on the road to resource-based theory. *Academy of Management Review*, 22(2): 374-402.

[27] Coff, R. W. 1999. How buyers cope with uncertainty when acquiring firms in knowledge-intensive industries: Caveat emptor. *Organization Science*, 10(2): 144-161.

[28] Conner, K. R., C. K. Prahalad. 1996. A resource-based theory of the firm: Knowledge versus opportunism. *Organization Science*, 7(5): 477-501.

[29] Costinot, A., L. Oldenski, J. Rauch. 2011. Adaptation and the boundary of multinational firms. *Review of Economics and Statistics*, 93(1): 298-308.

[30] Currie, J., B. C. Madrian. 1999. *Health, health insurance, and the labor market*. In Ashenfelter, O. and D. Card (Eds), Handbook of labor economics, Elsevier, Vol.3.

[31] Cutler, D.M., B. C. Madrian. 1998. Labor market responses to rising health insurance costs: Evidence on hours worked. *RAND Journal of Economics*, 29(3): 509-530.

[32] Decressin, A., J. Lane, K. McCue, M. H. Stinson. 2004. Employer-provided benefit plans, workforce composition and firm outcomes. LEHD Technical Paper No. TP-2003-06.

[33] Decressin, A., K. McCue, M. Stinson. 2003. Describing the Form 5500-Business Register Match. Longitudinal Employer-Household Dynamics (LEHD) Technical paper No. TP-2003-05. US Census Bureau. Retrieved from: http://lehd.did.census.gov/library/techpapers/tp-2003-05.pdf, accessed in March, 2013.

[34] DeNavas-Walt, C., B. D. Proctor, J. C. Smith. 2008. Income, poverty, and health insurance coverage in the United States: 2007. Retrieved from Current Population Survey: http://www.census.gov/prod/2008pubs/p60-235.pdf, accessed in March 2013.

[35] Doeringer, P. B., M. J. Piore. 1971. *Internal labour markets and manpower analysis*. Lexington, MA: D.C. Heath.

[36] Dore, R. P. 1973. *British factory - Japanese factory: The origins of national diversity in industrial relations, with a new afterword*. Los Angeles, CA: University of California Press.

[37] Feder, L., E. M. Whelan. 2008. Small businesses, large problems: Health care costs hit small employers. Center for American Progress, October 30. Retrieved from: http://www.americanprogress.org/issues/2008/10/small_business_brief.html.

[38] Feenberg, D., E. Coutts. 1993. An introduction to the TAXSIM model. *Journal of Policy Analysis and Management*, 12(1): 189-194.

[39] Finkelstein, A. 2002. The effect of tax subsidies to employer-provided supplementary health insurance: Evidence from Canada. *Journal of Public Economics*, 84: 305-339.

[40] Forbes. 2012. Walmart bails on Obamacare-sticks taxpayer with employee healthcare costs. Retrieved from: http://www.forbes.com/sites/rickungar/2012/12/09/walmart-bails-on-obamacare-sticks-taxpayers-with-employee-healthcare-costs/

[41] Garicano, L., C. Lelarge, J. Van Reenen. 2012. Firm size distortions and the productivity distribution: Evidence from France. Mimeographed paper, LSE/CEP/CREST, London and Paris.

[42] Gibbons, R., R. Henderson. 2012. Relational contracts and organizational capabilities. *Organization Science*, 23(5): 1350-1364.

[43] Greenhouse, S. 2005. How Costco became the anti-Wal-Mart. The New York Times. Retrieved from: http://www.nytimes.com/2005/07/17/business/yourmoney/17costco.html?pagewanted=all&_r=0

[44] Groysberg, B., L. E. Lee, A. Nanda. 2008. Can they take it with them? The portability of star knowledge workers' performance. *Management Science*, 54(7): 1213-1230.

[45] Gruber, J. 2001. The impact of the tax system on health insurance coverage. *International Journal of Health Care Finance and Economics*, 1(3/4): 293-304.

[46] Gruber, J., B. C. Madrian. 1994. Health insurance and job mobility: The effects of public policy on job-lock. *Industrial and Labor Relations Review*, 48(1): 86-102.

[47] Gruber, J., M. Lettau. 2004. How elastic is the firm's demand for health insurance? *Journal of Public Economics*, 88 (7): 1273-1293.

[48] Huckman, R. S., G. P. Pisano. 2006. The firm specificity of individual performance: Evidence from cardiac surgery. *Management Science*. 52(4): 473-488.

[49] Huselid, M. 1995. The impact of human resource management practices on turnover, productivity, and corporate financial performance. *Academy of Management Journal*, 38(3): 635-672.

[50] Ichniowski, C., K. Shaw. 1999. The effects of human resource management systems on economic performance: An international comparison of US and Japanese plants. *Management Science*, 45(5): 704-721.

[51] Imbens, G. W., J. D. Angrist. 1994. Identification and estimation of local average treatment effects. Econometrica: *Journal of the Econometric Society*, 62(2): 467-75.

[52] Joint Committee on Taxation, Tax Expenditures for Health Care, *JCX-66-08* (July 30, 2008).

[53] Kaiser Family Foundation and Health Research & Educational Trust. 2010. 2010 Kaiser/HRET Employer health benefits survey. Retrieved from: http://ehbs.kff.org, accessed in March 2013.

[54] Kaiser Family Foundation and Health Research & Educational Trust. 2011. 2011 Kaiser/HRET Employer health benefits survey. Retrieved from: http://ehbs.kff.org, accessed in March 2013.

[55] Kaiser Family Foundation and Health Research & Educational Trust. 2012. The uninsured: A primer key facts about Americans without health insurance. Retrieved from: http://www.kff.org/uninsured/upload/7451-08.pdf, accessed in March, 2013.

[56] Koch, M. J., R. G. McGrath. 1996. Improving labor productivity: Human resource management policies do matter. *Strategic Management Journal*, 17(5): 335-54.

[57] Levin, J. 2003. Relational incentive contracts. *American Economic Review*, 93(3): 835-857.

[58] Lincoln, J. R., A. L. Kalleberg. 1990. *Culture, control and commitment: A study of work organization and work attitudes in the United States and Japan*. New York, NY: Cambridge University Press.

[59] Lueck, S. 2010. States should structure insurance exchanges to minimize adverse selection. Center on Budget and Policy priorities. Retrieved from: http://www.cbpp.org/files/8-17-10health.pdf, accessed in February 2013.

[60] Macneil, I. R. 1985. Relational contract: What we do and what we do not know. *Wisconsin Law Review*, 3: 483-525.

[61] Madrian, B. C. 1994. Employment-based health insurance and job mobility: Is there evidence of job-lock? *Quarterly Journal of Economics*, 109(1): 27-51.

[62] Mathieu, J. E., D. M. Zajac. 1990. A review and meta-analysis of the antecedents, correlates, and consequences of organizational commitment. *Psychological bulletin*, 108(2): 171.

[63] Medical Expenditure Panel Survey-Insurance Component (MEPS-IC). 2011a. Table II.A.2. Percent of private-sector establishments that offer health insurance by firm size and State: United States, 2011. Agency for Healthcare Research and Quality, Center for Financing, Access and Cost Trends.

[64] Medical Expenditure Panel Survey-Insurance Component (MEPS-IC). 2011b. Table II.B.2.b. Percent of private-sector employees that are enrolled in health insurance at establishments that offer health insurance by firm size and State: United States, 2011. Agency for Healthcare Research and Quality, Center for Financing, Access and Cost Trends.

[65] Mills, D.Q., Friesen, G.B. 1996. *Broken promises: An unconventional view of what went wrong at IBM*. Boston, MA: Harvard Business School Press.

[66] Moretti, E. 2011. *Local labor markets*. In Ashenfelter, O. and D. Card (Eds), Handbook of labor economics, Elsevier, 4(B), Chapter 14: 1237-1313.

[67] Olson, C. A. 2002. Do workers accept lower wages in exchange for health benefits? *Journal of Labor Economics*, 20(S2): S91-S114.

[68] Orlitzky, M., F. L. Schmidt, S. L. Rynes. 2003. Corporate social and financial performance: A meta-analysis. *Organization Studies*, 24(3): 403-441.

[69] Osterman, P. 1995. Work/family programs and the employment relationship. *Administrative Science Quarterly*, 40: 681-700.

[70] Pauly, M. V. 1999. *Health benefits at work: An economic and political analysis of employment-based health insurance*. Ann Arbor, MI: University of Michigan Press.

[71] Pearson, R., G. Seyfang, R. Jenkins. 2012. *Corporate responsibility and labour rights: Codes of conduct in the global economy*. London, UK: Routledge.

[72] Penrose, E.T. 1959. *The theory of the growth of the firm*. New York, NY: John Wiley.

[73] Pfeffer, J. 1994. *Competitive advantage through people*. Boston, MA: Harvard Business School Press.

[74] Pfeffer, J. 2005. Producing sustainable competitive advantage through effective management of people. *Academy of Management Executive*, 19(4): 95-108.

[75] Powell, M. 2012. Productivity and credibility in industry equilibrium. Working paper.

[76] Rosen, S. 1986. *The Theory of Equalizing Differences*. In Ashenfelter, O. and R. Layard (Eds), Handbook of labor, Elsevier.

[77] Rousseau, D. M. 1989. Psychological and implied contracts in organizations. *Employee Responsibilities and Rights Journal*, 2(2): 121-139.

[78] Royalty, A. B. 2000. Tax preferences for fringe benefits and workers' eligibility for employer health insurance. *Journal of Public Economics*, 75(2): 209-227.

[79] Simon, H. A. 1957. *Models of man*. New York, NY: John Wiley.

[80] Small Business Administration (SBA), Office of Advocacy. 2011. Frequently asked questions. Retrieved from: http://www.sba.gov/sites/default/files/FAQ_Sept_2012.pdf, accessed in February 2013.

[81] Solow, R. M. 1979. Another possible source of wage stickiness. *Journal of Macroeconomics*, 1: 79–82.

[82] Spence, L. J. 2007. CSR and small business in a European policy context: The five "C"s of CSR and small business research agenda 2007. *Business and Society Review*, 112(4): 533-552.

[83] Stinchcombe, A. L. 1965. *Social structure and organizations*. In J. G. March (Ed.), Handbook of organizations. Chicago, IL: Rand McNally, 142-193.

[84] Thomasson, M. 2000. The importance of group coverage: How tax policy shaped U.S. health insurance. NBER Working Paper, No. 7543.

[85] Way, S. 2002. High performance work systems and intermediate indicators of firm performance within the U.S. small business sector. *Journal of Management*, 28(6): 765-785.

[86] Williamson, O. E., M. L. Wachter, J. E. Harris. 1975. Understanding the employment relation: The analysis of idiosyncratic exchange. *Bell Journal of Economics*, 6: 250-278.

[87] Williamson, I. O., D. M. Cable, H. E. Aldrich. 2002. *Smaller but not necessarily weaker: How small businesses can overcome barriers to recruitment*. In Katz, J. A., Theresa, M. W. (Eds.), Managing people in entrepreneurial organizations, Emerald Group Publishing Limited, Vol.5 Advances in entrepreneurship, firm emergence and growth, pp.83-106.

TABLE 1. SUMMARY STATISTICS FOR MAIN VARIABLES

Variable	Number of obs.	Number of firms	Mean	Std. Dev.	Distribution		
					10^{th}	50^{th}	90^{th}
Dummy for health insurance	38,987	15,391	0.223	0.416	0	0	1
Share of employees with health insurance	8,693	3,879	0.303	0.227	0.060	0.250	0.667
Sales per employee	38,987	15,391	112,531	121,428	15,360	69,197	279,101
Sales ($, '000)	38,987	15,391	1,479	26,796	141	619	2,749
Employees	38,987	15,391	15	20	3	8	31
Profits ($, '000)	38,987	15,391	238	327	43	148	503
Employment growth	24,755	20,348	0.074	0.472	-0.442	0	0.636
Employee turnover	24,755	20,348	0.335	0.246	0	0.333	0.667
Average wage	38,987	15,391	21,619	19,942	6,032	15,884	43,335
Investment intensity	38,987	15,391	3.408	555.3	0	0.005	0.046
Year of incorporation	38,987	15,391	2003	7.8	1994	2006	2008

Notes: This table presents summary statistics for the main variable used in the estimation. Employee turnover is the ratio between the sum of new and departing employees over lagged total number of employees. Investment intensity equals physical expenditures over sales.

TABLE 2. DISTRIBUTION OF HEALTH INSURANCE PROVISION BY FIRM SIZE

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	Number of employees								
	under 5	5-9	10-14	15-19	20-29	30-39	40-49	50-99	100 and more
% firms with health insurance	11.8	19.7	26.6	28.1	28.8	32.2	33.4	44.2	50.8
% employees with health insurance	46.4	35.9	29.3	26.8	24.2	20.0	19.7	15.5	10.3
Number of firms	9,323	13,103	5,687	3,180	3,105	1,577	821	1,322	419

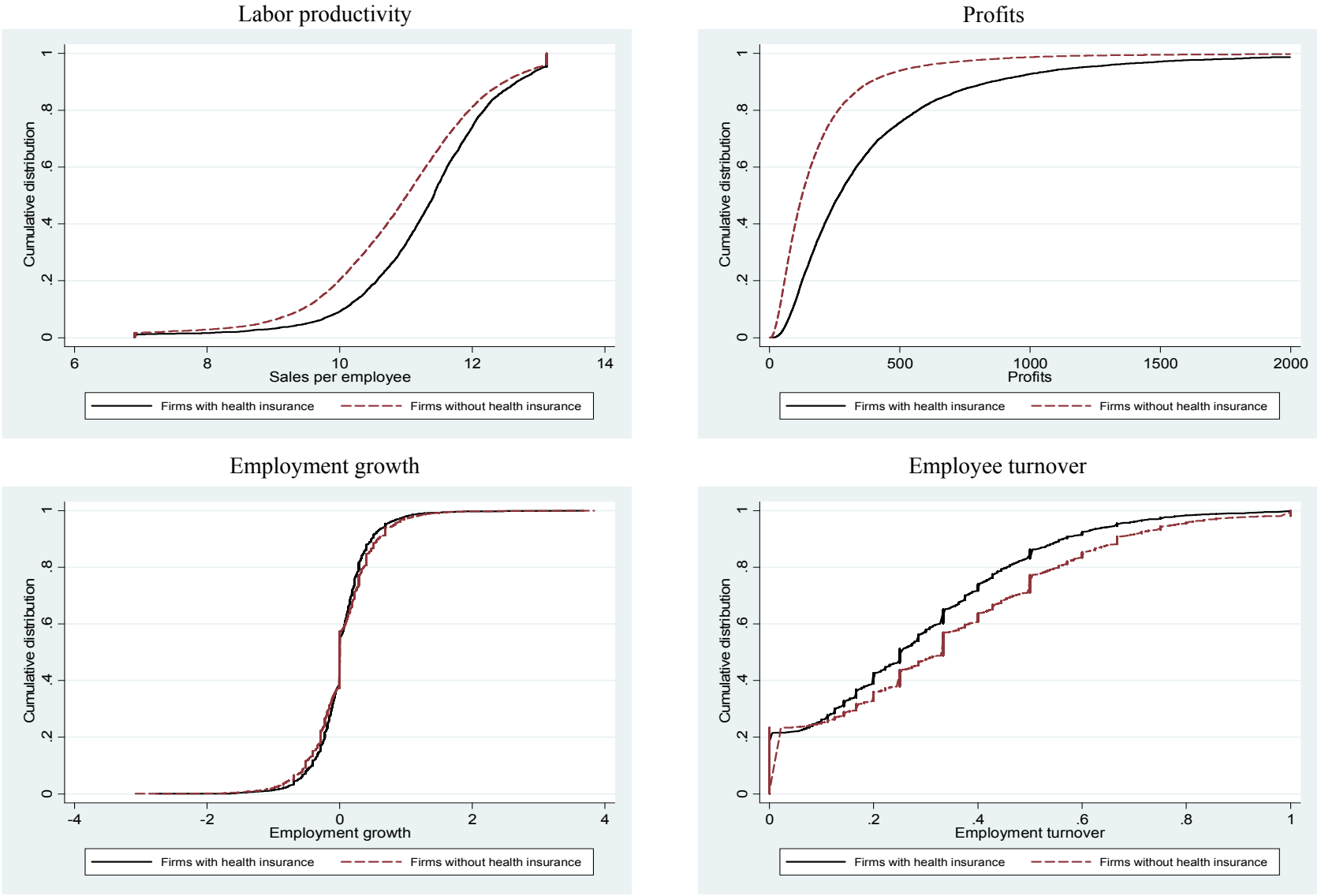
Notes: This table presents the distribution of health insurance provision and share of employees with health insurance by number of employees.

TABLE 3. DISTRIBUTION OF HEALTH INSURANCE PROVISION BY INDUSTRY

	Number of obs.	Number of firms	Average number of employees per firm	Average wage per employee	% firms with health insurance	% employees with health insurance
All Industries	38,987	15,391	15	21,619	22.3	30.3
Construction	4,082	1,649	11	23,196	19.1	30.7
Business Services	3,928	1,568	13	27,677	27.3	35.5
Restaurants and Food Service	3,663	1,451	28	8,776	12.7	11.0
Professional Services	3,445	1,431	11	36,831	34.2	37.6
Retail Establishments	3,283	1,247	13	15,001	16.3	25.6
Miscellaneous Other Services	3,132	1,206	17	18,758	20.7	28.5
Real Estate	1,521	603	10	22,510	18.3	32.2
Manufacturing	1,123	428	13	23,594	29.4	34.3
Hotels	1,015	383	21	12,850	17.1	16.8
Automotive Repair and Services	994	380	10	22,725	25.9	32.3
Electronics and Information Technology	953	384	10	45,861	38.0	42.6
Beauty and Personal Services	644	253	14	13,573	20.0	27.1
Laundry, Carpet, and Related Cleaning Services	487	189	14	14,038	14.4	22.7
Engineering	309	123	9	43,151	36.3	41.3

Notes: This table presents the distribution of health insurance provision by firms in different industries. Share of employees with health insurance is limited to firms that offer health insurance.

Figure 1. The unconditional relation between health insurance provision and firm outcomes (cumulative distributions)



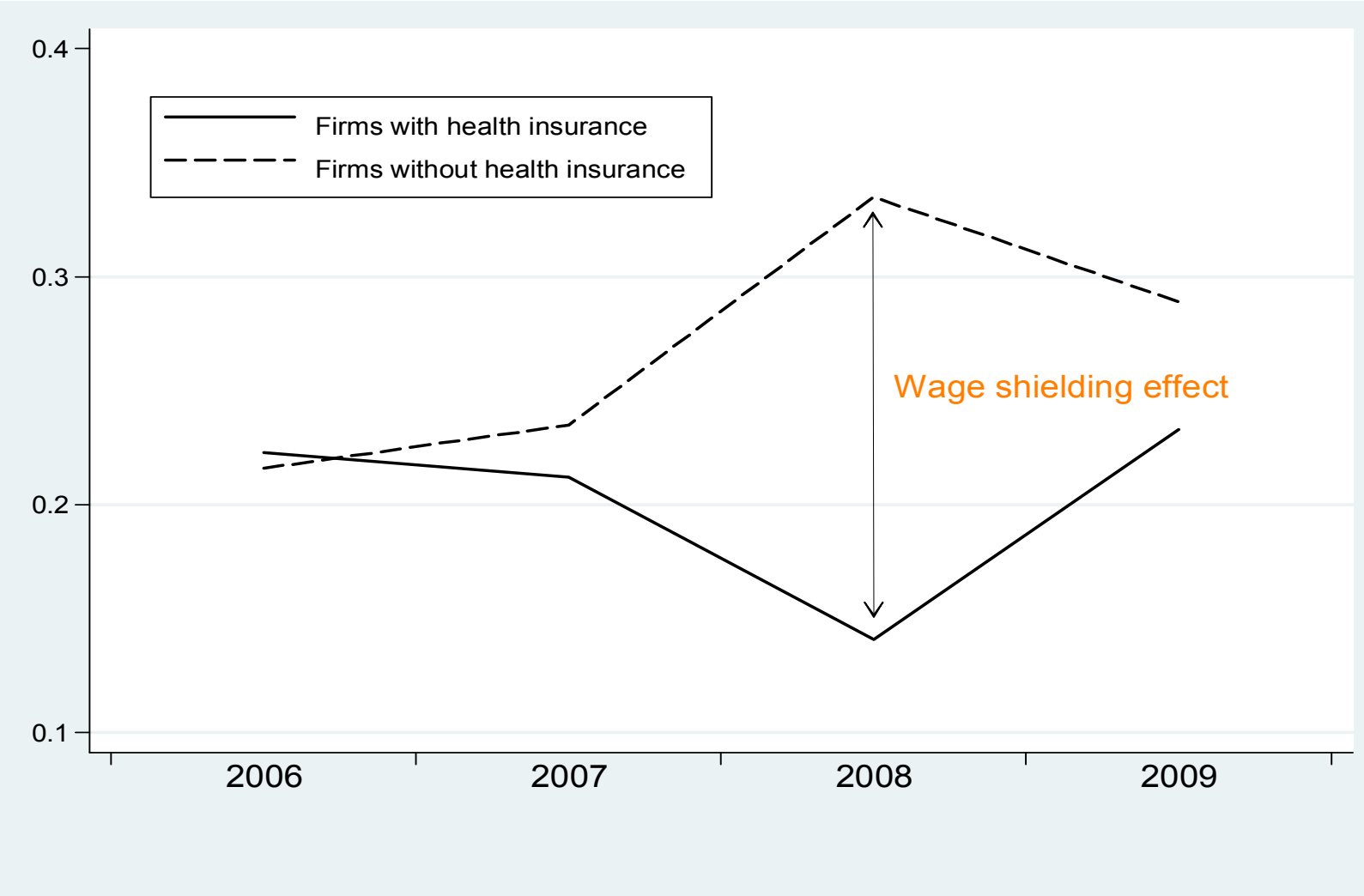
Notes: These graphs plot the cumulative distributions of labor productivity (sales per employee), profits ($, '000), employment growth and turnover for firms with and without health insurance provision. Employee turnover is the ratio between the sum of new and departing employees over lagged total number of employees.

TABLE 4. DISTRIBUTION OF HEALTH INSURANCE PROVISION BY FIRM CHARACTERISTICS

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)
	All firms	Labor productivity			Profit per employee			Employment growth			Employee turnover			Investment intensity		
		Low	Medium	High	Low	Medium	High	Low	Medium	High	Low	Medium	High	Low	Medium	High
All firms																
% firms with health insurance	22.3	14.6	24.9	27.4	12.7	23.6	30.6	23.9	26.0	21.9	26.4	26.8	18.6	18.9	25.8	22.2
% employees with health insurance	30.3	18.5	29.5	37.3	16.7	27.6	38.0	31.5	31.3	26.6	38.4	27.7	21.1	29.9	30.0	30.9
Number of employees below median:																
% firms with health insurance	15.9	7.0	15.2	20.8	5.6	14.5	22.6	17.7	18.1	15.6	20.4	17.0	10.8	13.0	17.3	15.5
% employees with health insurance	39.7	33.8	37.5	42.0	34.3	35.8	42.3	39.8	41.7	35.6	42.4	36.9	32.7	41.3	41.9	40.7
Number of employees above median:																
% firms with health insurance	29.5	18.5	37.3	42.2	17.0	33.4	48.6	31.7	34.9	27.2	41.7	35.7	22.7	24.5	32.0	29.5
% employees with health insurance	24.6	15.6	25.3	32.2	13.1	23.8	33.4	25.6	25.3	22.3	33.3	23.8	18.1	24.1	25.3	25.4

Notes: This table presents the distribution of health insurance provision and share of employees with health insurance by firm-level characteristics: labor productivity, profits, growth, employee turnover, and physical investment. Employee turnover is the ratio between the sum of new and departing employees over lagged total number of employees. Investment intensity is physical investment expenditures over sales.

Figure 2. Difference in sensitivity of wages to housing prices



Notes: This graph plots the estimated sensitivity of wages to housing prices for each year in the sample for firms with and without health insurance separately. The estimates correspond to results reported in columns 4 to 7 in Table 5. The largest difference in sensitivity is in the housing crisis year 2008.

TABLE 5. WAGE SHIELDING: HOW HEALTH BENEFITS MEDIATE THE EFFECT OF THE 2008 HOUSING CRISIS ON WAGES

Dependent variable: ln(*Average wage*)										
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
VARIABLES	2006-2009	Pre-2008	Post-2008	2006	2007	2008	2009	Post-2008		
								Industry human capital		
								All	Low	High
Dummy for Health Insurance	1.104**	0.491	1.370**	0.236	0.452	1.375**	0.638	0.358**	0.285**	0.427**
	(0.379)	(0.558)	(0.456)	(0.825)	(0.563)	(0.538)	(0.542)	(0.014)	(0.021)	(0.022)
Dummy for Health Insurance × ln(*Housing index*)	-0.144*	-0.032	-0.193**	0.008	-0.024	-0.195*	-0.056			
	(0.072)	(0.104)	(0.087)	(0.154)	(0.105)	(0.102)	(0.104)			
Dummy for Health Insurance × *% drop in housing prices*								0.288*	0.127	0.391*
								(0.125)	(0.159)	(0.171)
ln(*Housing index*)	0.132**	-0.069	0.153**	0.216**	0.235**	0.335**	0.289**			
	(0.060)	(0.319)	(0.097)	(0.069)	(0.049)	(0.054)	(0.055)			
% drop in housing prices								-0.355**	-0.201**	-0.506**
								(0.066)	(0.079)	(0.104)
ln(*Employment*)	-0.197**	-0.206**	-0.193**	-0.217**	-0.216**	-0.201**	-0.192**	-0.198**	-0.157**	-0.239**
	(0.008)	(0.013)	(0.008)	(0.020)	(0.013)	(0.010)	(0.009)	(0.008)	(0.011)	(0.012)
MSA fixed effects	Yes	Yes	Yes	No	No	No	No	No	No	No
Three-digit SIC dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	21,323	5,911	15,412	1,756	4,155	6.644	8,768	15,412	5,558	9,854
Number of firms	9,899	4,218	9,601	1,756	4,155	6.644	8,768	9,601	4,862	4,739
R-squared	0.39	0.41	0.39	0.36	0.35	0.35	0.35	0.35	0.41	0.37

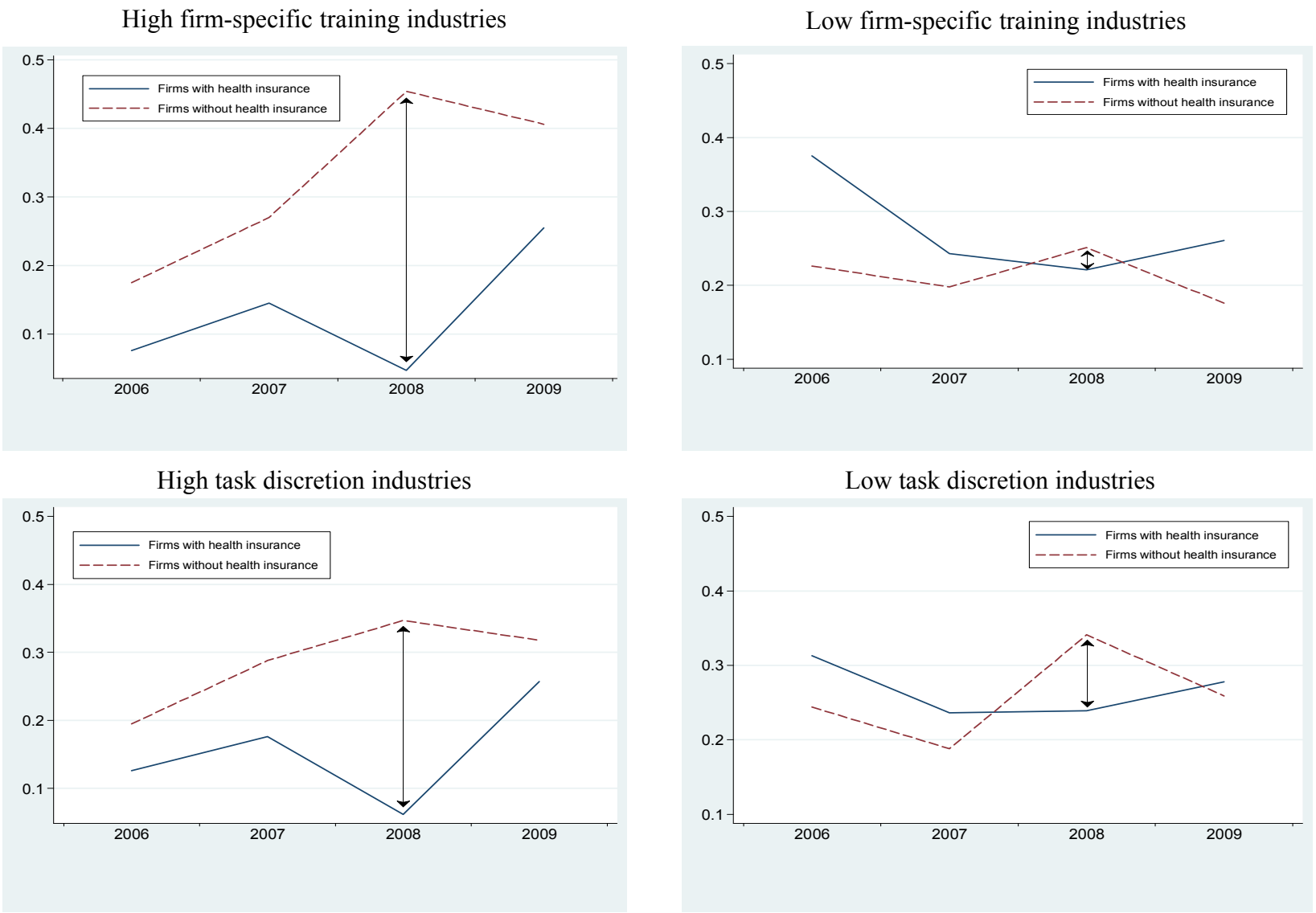
Note: This table examines how the effect of the 2008 housing crisis on wages is mediated by the provision of health benefits. Unit of observation is firm-year. ln(Employment) is a natural log of number of employees. Columns 9 and 10 split the sample by industry median value of number of education years. Standard errors (in parentheses) are clustered by firms. ** p<0.01, * p<0.05.

TABLE 6. HETEROGENEITY OF THE 2008 HOUSING CRISIS BY INDUSTRY CHARACTERISTICS

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
	Dependent variable: ln(*Average wage*)											
Industry characteristics:	Firm-specific training				Task discretion				Labor turnover			
	High		Low		High		Low		High		Low	
VARIABLES	Pre-2008	Post-2008	Pre-2008	Post-2008	Pre-2008	Post-2008	Pre-2008	Post-2008	Pre-2008	Post-2008	Pre-2008	Post-2008
Dummy for Health Insurance	1.232	2.044**	0.022	0.654	0.717	1.500*	0.175	0.956	0.748	2.021**	0.871	1.478*
	(0.856)	(0.686)	(0.399)	(0.648)	(0.784)	(0.654)	(0.881)	(0.674)	(0.870)	(0.698)	(0.792)	(0.642)
Dummy for Health Insurance × ln(*Housing index*)	-0.420	-0.307**	0.026	-0.075	-0.077	-0.214*	0.031	-0.119*	-0.078	-0.313*	-0.110	-0.221
	(0.550)	(0.131)	(0.152)	(0.123)	(0.146)	(0.124)	(0.164)	(0.128)	(0.163)	(0.133)	(0.147)	(0.122)
ln(*Housing index*)	-0.420	0.082	0.022	0.100	-0.018	0.216	0.180	-0.017	0.428	0.112	-0.227	0.205
	(0.550)	(0.149)	(0.399)	(0.139)	(0.481)	(0.135)	(0.042)	(0.144)	(0.497)	(0.151)	(0.385)	(0.130)
ln(*Employment*)	-0.251**	-0.246**	-0.162**	-0.137**	-0.252**	-0.232**	-0.181**	-0.161**	-0.246**	-0.245**	-0.180**	-0.155**
	(0.021)	(0.013)	(0.019)	(0.012)	(0.020)	(0.013)	(0.018)	(0.011)	(0.021)	(0.013)	(0.017)	(0.011)
MSA fixed-effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Three-digit SIC dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	2,682	7,026	2,876	7,372	2,942	7,629	2,845	7,367	2,567	6,920	3,190	8,022
Number of firms	1,944	4,355	2,021	4,634	2,117	4,764	2,010	4,580	1,850	4,310	2,258	4,997
R-squared	0.41	0.39	0.47	0.42	0.38	0.36	0.44	0.38	0.45	0.40	0.44	0.40

Note: This table examines the heterogeneity of the 2008 housing crisis by industry characteristics. Industries are split by the median values of industry firm-specific training, task discretion, and labor turnover. Unit of observation is firm-year. ln(Employment) is a natural log of number of employees. Standard errors (in parentheses) are clustered by firms. ** p<0.01, * p<0.05.

Figure 3. Wage shielding effects by industry characteristics



Notes: These graphs plot how wage shielding varies by the following industry characteristics: level of firm-specific training (by median) and degree of task discretion (by median). The largest difference in sensitivity is in the housing crisis year 2008 and in industries with high firm-specific training and high degree of task discretion. The size of the wage shielding effect in 2008 is illustrated by a vertical line in each graph.

TABLE 7. ROBUSTNESS CHECK FOR BONUS PAY AND WAGE DISPERSION

Dependent variable: ln(*Average wage*)				
	(1)	(2)	(3)	(4)
VARIABLES	2006-2009	Pre-2008	Post-2008	Firms active pre- and post-2008
Dummy for Health Insurance × ln(*Housing index*)	-0.156**	-0.0480	-0.209**	-0.231**
	(0.073)	(0.106)	(0.088)	(0.099)
Dummy for Bonus Pay × ln(*Housing index*)	0.013	0.088	-0.006	0.064
	(0.058)	(0.080)	(0.076)	(0.076)
Dummy for Pension × ln(*Housing index*)	0.315*	0.176	0.369*	0.333
	(0.147)	(0.219)	(0.160)	(0.216)
Training × ln(*Housing index*)	0.519	1.064	0.009	-2.647
	(1.651)	(2.143)	(1.857)	(1.665)
Wage Dispersion × ln(*Housing index*)	0.135	0.187	-0.135	0.113
	(0.423)	(0.584)	(0.538)	(0.572)
Dummy for Health Insurance	1.129**	0.536	1.410**	1.496**
	(0.384)	(0.567)	(0.460)	(0.526)
Dummy for Bonus Pay	0.004	-0.402	0.108	-0.272
	(0.307)	(0.426)	(0.397)	(0.401)
Dummy for Pension	-1.204	-0.494	-1.477	-1.326
	(0.774)	(1.172)	(0.838)	(1.140)
Training	-3.683	-6.670	-1.058	12.676
	(8.626)	(11.246)	(9.703)	(8.610)
Wage Dispersion	-0.625	-0.730	0.716	-0.549
	(2.235)	(3.123)	(2.828)	(3.039)
ln(*Housing index*)	0.099	-0.031	0.147	0.044
	(0.075)	(0.327)	(0.111)	(0.084)
ln(*Employment*)	-0.204**	-0.204**	-0.205**	-0.227**
	(0.010)	(0.016)	(0.010)	(0.015)
MSA fixed effects	Yes	Yes	Yes	Yes
Three-digit SIC dummies	Yes	Yes	Yes	Yes
Year dummies	Yes	Yes	Yes	Yes
Observations	21,323	5,911	15,412	11,201
Number of firms	9,899	4,218	9,601	3,328
R-squared	0.40	0.42	0.41	0.48

Note: This table examines the robustness of the health-housing-crisis relation to alternative wage structures that may be correlated with the provision of health insurance and average wage. Dummy for bonus pay receives the value of 1 for observations for which part of total employee compensations took the form of bonus pay. Dummy for pension receives the value of 1 for observations for which firms spent on pension benefits. Training is a share of expenses spent on employee training. Wage dispersion divided the within-firm standard-deviation of employee wages by total compensation. Unit of observation is firm-year. ln(Employment) is a natural log of number of employees. Standard errors (in parentheses) are clustered by firms. ** $p<0.01$, * $p<0.05$.

TABLE 8. COMPARISON OF MEANS: WORKFORCE COMPOSITION AND HEALTH INSURANCE PROVISION

		(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
		Share of new hires that are part-time employees					Share of employees laid off				
	N	2006	2007	2008	2009	2010	2006	2007	2008	2009	2010
All											
Firms with health insurance	7,076	46.2	45.3	44.0	44.8	50.3	27.2	29.2	28.4	25.7	28.2
Firms without health insurance	24,347	53.7	55.3	55.7	57.3	63.2	29.2	31.1	31.5	28.4	28.9
Difference in means		-7.4**	-10.0**	-11.7**	-12.5**	-12.9**	-2.0	-1.9*	-3.1**	-2.7**	-0.07
By industry characteristics:											
Industries with high firm-specific training											
Firms with health insurance	3,374	42.2	38.6	36.0	38.1	40.5	24.0	27.5	28.2	26.1	28.8
Firms without health insurance	10,246	48.6	51.9	52.8	53.1	58.2	28.0	29.3	31.1	29.3	28.9
Difference in means		-6.4*	-13.3**	-16.8**	-15.0**	-17.7**	-4.0*	-1.8	-2.9**	-3.1**	-0.1
Industries with low firm-specific training											
Firms with health insurance	3,265	47.8	49.8	49.6	49.2	58.1	29.6	32.6	31.1	28.9	28.9
Firms without health insurance	12,125	56.6	56.9	57.0	59.7	66.5	29.7	33.1	34.0	30.8	28.6
Difference in means		-8.6**	-7.0**	-7.4**	-10.5**	-8.3**	-0.1	-0.5	-2.9**	-1.9*	0.3
Industries with high task discretion											
Firms with health insurance	4,387	41.1	39.1	36.2	37.0	41.5	25.7	28.7	28.4	26.8	28.8
Firms without health insurance	13,483	47.1	49.5	49.8	49.8	55.9	27.8	28.7	31.0	29.2	28.9
Difference in means		-6.0*	-10.4**	-13.6**	-12.8**	-14.4**	-2.1	0.0	-2.6**	-2.4**	-0.1
Industries with low task discretion											
Firms with health insurance	2,502	53.5	54.8	56.6	57.3	63.5	29.4	32.9	32.7	29.6	28.8
Firms without health insurance	10,140	61.8	62.5	62.8	66.0	71.9	31.3	36.0	35.7	32.1	28.6
Difference in means		-8.3*	-7.7**	-6.2**	-8.7**	-8.4**	-1.9	-3.1*	-3.0**	-2.4*	0.2

Notes: This table presents the comparison of means results for the share of new hires that are part-time employees and share of employees who got laid off in 2006-2010 year. Share of new part-time hires is the proportion of employees hired that year who are classified as part-time. Part-time workers are employees who earn at around the federal minimum wage rate, as established by the U.S. Department of Labor. Share of laid off employees is the percentage of all employees who no longer work for the firm in the following year. We exclude 2011 from the analysis because it is the last year we observe firms and their employees, and not all employees have complete termination date. High and low levels of industry firm-specific training and task discretion are split by their respective median values. The * indicates the different in means is significant at $p<0.05$ and ** is significant at $p<0.01$.

TABLE 9. THE RELATION BETWEEN HEALTH INSURANCE PROVISION AND FIRM OUTCOMES

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)
Dependent variable:	ln(*Sales* /*Employees*)			ln(*Profits*)			*Employment growth*			*Employee turnover*			ln*(Physical Investment)*		
VARIABLES	Pooled	Within-firms	Between-firms	Pooled	Within-firms	Between-firms	Pooled	Within-firms	Between-firms	Pooled	Within-firms	Between-firms	Pooled	Within-firms	Between-firms
Dummy for Health Insurance	0.209**	0.080**	0.207**	0.015**	0.011**	0.018**	-0.085**	-0.115**	-0.100**	-0.058**	-0.049**	-0.064**	0.467**	0.216**	0.395**
	(0.016)	(0.022)	(0.019)	(0.002)	(0.003)	(0.002)	(0.007)	(0.031)	(0.010)	(0.004)	(0.012)	(0.005)	(0.071)	(0.080)	(0.075)
ln(*Employment*)	-0.227**	-0.369**	-0.219**	0.176**	0.158**	0.172**	0.143**	0.807	0.150**	0.088**	0.245**	0.089**			
	(0.008)	(0.017)	(0.011)	(0.002)	(0.003)	(0.002)	(0.004)	(0.025)	(0.006)	(0.002)	(0.009)	(0.003)			
ln(Sales)													0.777**	0.688**	0.805**
													(0.026)	(0.042)	(0.026)
ln(*Average wage*)	0.710**	0.320**	0.735**	0.143**	0.149**	0.136**	0.010*	-0.071	0.014*	-0.071**	-0.045**	-0.068**	0.278**	0.036	0.265**
	(0.011)	(0.020)	(0.013)	(0.002)	(0.003)	(0.002)	(0.005)	(0.031)	(0.007)	(0.003)	(0.013)	(0.003)	(0.046)	(0.062)	(0.051)
Firm fixed-effects	No	Yes	No	No	Yes	No	No	Yes	No	No	Yes	No	No	Yes	No
Three-digit SIC dummies	Yes	-	Yes	Yes	-	Yes	Yes	-	Yes	Yes	-	Yes	Yes	-	Yes
Year dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	38,730	38,730	15,254	38,730	38,730	15,254	24,596	24,596	12,500	24,596	24,596	12,500	38,730	38,730	15,254
Number of firms	15,362	15,362	15,254	15,362	15,362	15,254	12,560	12,560	12,500	12,560	12,560	12,500	15,362	15,362	15,254
R-squared	0.42	0.90	0.38	0.78	0.96	0.77	0.09	0.71	0.11	0.21	0.79	0.20	0.13	0.87	0.15

Note: This table presents the relationship between health benefits and labor productivity, profits, employment growth, employee turnover, and investments in physical capital. Unit of observation is firm-year. ln(Employment) is a natural log of number of employees and ln(Sales) is a natural log of annual firm sales. Standard errors (in parentheses) are clustered by firms. ** p<0.01, * p<0.05.

TABLE 10. NON-PARAMETRIC PROPENSITY SCORE-MATCHING ESTIMATION

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)
Dependent variable:	*Sales /Employees*			ln(*Profit*)			*Employment growth* (%)			*Employee turnover*			ln*(Physical investment)*		
		Employment			Employment			Employment			Employment			Employment	
	All firms	Below median	Above median	All firms	Below median	Above median	All firms	Below median	Above median	All firms	Below median	Above median	All firms	Below median	Above median
Difference between health and no-health insurance	7,676**	15,800**	6,679*	9.8*	-0.6	2.6	-7.9**	-7.9**	-8.4**	-4.5**	-4.3**	-5.4**	0.511**	0.371**	0.549**
	(2.77)	(3.69)	(2.07)	(2.05)	(0.19)	(0.36)	(7.15)	(5.35)	(5.11)	(7.82)	(5.68)	(7.10)	(5.89)	(3.10)	(4.37)
Number treated	3,371	1,381	1,989	3,371	1,381	1,989	2,876	1,176	1,699	2,876	1,176	1,699	3,371	1,381	1,989
Dependent variable (first-stage probit): Dummy for health insurance															
ln(*Employment*)	0.517**	0.674**	0.531**	0.517**	0.674**	0.531**	0.519**	0.668**	0.530**	0.519**	0.668**	0.530**	0.517**	0.674**	0.531**
	(0.016)	(0.054)	(0.030)	(0.016)	(0.054)	(0.030)	(0.018)	(0.059)	(0.037)	(0.018)	(0.059)	(0.037)	(0.016)	(0.054)	(0.030)
ln(*Average wage*)	0.568**	0.452**	0.729**	0.568**	0.452**	0.729**	0.570**	0.462**	0.730**	0.570**	0.462**	0.730**	0.568**	0.452**	0.729**
	(0.022)	(0.029)	(0.034)	(0.022)	(0.029)	(0.034)	(0.024)	(0.031)	(0.037)	(0.024)	(0.031)	(0.037)	(0.022)	(0.029)	(0.034)
ln(*Age*)	-0.016**	-0.013**	-0.019**	-0.016**	-0.013**	-0.019**	-0.015**	0.009**	-0.018**	-0.015**	0.009**	-0.018**	-0.016**	-0.013**	-0.019**
	(0.002)	(0.003)	(0.002)	(0.002)	(0.003)	(0.002)	(0.002)	(0.003)	(0.003)	(0.002)	(0.003)	(0.003)	(0.002)	(0.003)	(0.002)
State dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Three-digit SIC dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Number of firms	14,987	8,140	6,788	14,987	8,140	6,788	12,327	6,714	5,561	12,327	6,714	5,561	14,978	8,140	6,788

Notes: This table reports the results of non-parametric propensity score-matching estimation of the relation between health benefits and labor productivity, profit, employment growth, turnover and physical investment. The estimation is cross-sectional for the most recent year a firm appears in the sample. The dependent variable in the first stage is a dummy variable for firms with health benefits. The balance test on covariates shows very small (less than 5%) and insignificant bias after matching. Absolute values of t-stats are in the parentheses for average treatment effect results, and standard errors are reported in parentheses for the first-stage results. ** significant at 1%; * significant at 5%.

TABLE 11. INSTRUMENTAL VARIABLES ESTIMATION OF RELATION BETWEEN HEALTH INSURANCE PROVISION AND FIRM OUTCOMES

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Dependent variable:	ln(*Sales /Employees*)		*ln(Profits)*		*Employment growth*		*Employee turnover*	
	Pooled	Between-firms	Pooled	Between-firms	Pooled	Between-firms	Pooled	Between-firms
Dummy for Health Insurance	0.367**	0.389**	0.029**	0.035**	-0.172**	-0.225**	-0.202**	-0.163**
	(0.041)	(0.048)	(0.003)	(0.003)	(0.049)	(0.068)	(0.014)	(0.016)
ln(*Employment*)	-0.163**	-0.171**	0.142**	0.140**	-0.206**	-0.197**	-0.016**	-0.013**
	(0.009)	(0.011)	(0.002)	(0.003)	(0.005)	(0.006)	(0.002)	(0.003)
ln(*Average wage*)	0.772**	0.747**	0.128**	0.123**	-0.090**	-0.076**	-0.102**	-0.095**
	(0.013)	(0.015)	(0.002)	(0.002)	(0.005)	(0.007)	(0.003)	(0.004)
ln(*GDP per capita*)	0.026	0.044	0.016**	0.018**	0.050*	0.054*	0.038**	0.046**
	(0.054)	(0.057)	(0.006)	(0.007)	(0.021)	(0.027)	(0.014)	(0.015)
ln(*State population*)	0.008	0.009	0.003**	0.003*	0.005	0.005	-0.007**	-0.005*
	(0.009)	(0.010)	(0.001)	(0.001)	(0.003)	(0.005)	(0.002)	(0.002)
Three-digit SIC dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Sample average	11.06	10.99	0.193	0.183	0.075	0.032	0.334	0.311
Observations	24,554	12,483	24,554	12,483	24,554	12,483	24,554	12,483
Number of firms	12,543	12,483	12,543	12,483	12,543	12,483	12,543	12,483
IV first-stage estimates and tests of exogeneity:								
Marginal income tax rates	0.044**	0.034**	0.042**	0.036**	0.049**	0.037**	0.059**	0.043**
	(0.011)	(0.011)	(0.011)	(0.011)	(0.011)	(0.010)	(0.010)	(0.010)
Wald test $\chi^2(1)$	39.61**	31.82**	5.80*	3.86*	33.77**	19.66**	247.43**	125.80**

Note: This table presents results from the treatment effects instrumental variable models examining the relationship between health benefits and labor productivity, profits, employment growth, and employee turnover. Provision of health insurance is instrumented by the level of the marginal income tax rates for each state and year. For all models, the first-stage coefficients are positive and significant, and the Wald test of independent equations strongly rejects the null of exogeneity. Unit of observation is firm-year. Standard errors (in parentheses) are clustered by firms. ** p<0.01, * p<0.05.