

THE IMPACT OF THE HEALTH INSURANCE MARKET ON SMALL FIRM EMPLOYMENT

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ABSTRACT

Small firms that offer health insurance to their employees may face variable premiums if they hire employees with high expected health costs. To avoid expensive premium variability, small firms may attempt to maintain a workforce with low expected health costs. This results in employment distortions. I examine the magnitude of these employment distortions using the 1987 National Medical Expenditure Survey and the 1996 Medical Expenditure Panel Survey. Based on the underwriting behavior of insurance companies in 1988, I classify medical conditions into three categories: conditions that led to denial of coverage; conditions that led to exclusion restrictions; and, conditions that led to higher premiums. In 1987, I find that insured small firms were less likely to employ workers with families that had conditions that led to higher premiums than insured large firms. However, in 1996, possibly due to the passage of small group health insurance reforms that restrict insurers' ability to exclude or deny coverage, insured small firms were less likely to employ workers with denial conditions compared to insured large firms. These results suggest that the pattern of employment distortions in insured small firms is consistent with the evolving small group health insurance market.

INTRODUCTION

The difficulties that small firms face in obtaining and maintaining health insurance for their employees have been widely documented (Brown, Hamilton, and Medoff, 1990; McLaughlin, 1992; Fronstin and Helman, 2000). Only 40 percent of firms with fewer than 10 employees offer health insurance compared to 97 percent of firms with 50 or more employees (AHRQ, 2000). This low proportion has been attributed, in part, to the high administrative cost of health insurance for small firms, the low demand for insurance among workers in these firms, and the unwillingness of insurers to take on small firm risks (McLaughlin, 1992; Fronstin and Helman, 2000; Monheit and Vistnes, 1999).

Kanika Kapur works with RAND, Santa Monica, California, kapur@rand.org. The author thanks Joseph Altonji, Paul Devereux, David Dranove, Bruce Meyer, and participants in the Northwestern University Labor/Public Economics Workshop for helpful comments. This project is supported by grant number R03 HS09333 from the Agency for Health Care Policy and Research.

In recent decades, small firms that provide health insurance to their employees were in a precarious position. Their premiums were calculated yearly, based on the expected value of their health care utilization. Hence, a single high cost employee could lead to a substantial surcharge on the premiums for the firm (Zellers, McLaughlin, and Frick, 1992). In a survey of small employers that did not offer health insurance, 75 percent claimed that an important reason for not offering insurance was high premium variability (Morrisey, Jensen, and Morlock, 1994). Concerns about these problems with the small group health insurance market fueled the passage of numerous state small group health insurance reforms in the 1990s that implemented premium rating reforms and restrictions on pre-existing condition exclusions. While a few states have implemented premium rating reform that has severely restricted small group insurers' ability to use health status to set premiums, in most states, these reforms have been more moderate.

Assuming that firms are unable to perfectly tailor individual wages to health insurance costs, unexpectedly high premiums may impose large costs on small firms. Paying high premiums, possibly financed by borrowing at high interest rates, may increase the risk of bankruptcy. If small firms choose not to pay high premiums, and instead drop insurance coverage, they renege on the implicit compensation contract with workers. Faced with this predicament, small firms may choose to prevent expensive premium variability by maintaining a work force that has a low expected utilization of health care services. Thus, the link between employment and health insurance in small firms may result in a welfare loss if it prevents individuals with high expected health costs from being employed in small firm jobs in which they may have high match specific productivity.

Employers may obtain information about employees' medical conditions in several ways. Before the passage of the 1990 Americans with Disabilities Act (ADA), half of all employers conducted pre-employment medical examinations (OTA, 1988). Most small group employers required the completion of a family health questionnaire for insurance coverage (Zellers et al., 1992; Cutler 1992). While ADA now restricts employer inquiries on employee health, it does not apply to firms with under 15 employees. In addition, employer compliance with the ADA may be hindered because its stipulations about pre-employment health inquiries are vague. Medical inquiries are allowed if they pertain to the applicant's ability to perform the job. In addition, medical information is explicitly allowed in the use of medical underwriting for insurance (Epstein, 1996). The media continues to report cases where employers easily obtain employee medical records (Rubin, 1998), or employees have been laid-off because of high health costs (O'Connor, 1996), or employee premiums have been adjusted to reflect the employee's claims experience (Kolata, 1992).

In this article, I use the 1987 National Medical Expenditure Survey (NMES) and the 1996 Medical Expenditure Panel Survey (MEPS) to examine the magnitude of employment distortions in small firms that offer health insurance. The NMES and the MEPS are nationally representative surveys sponsored by the Agency for Health Care Research and Quality (AHRQ) that contain information on health and employment.¹

¹ While the MEPS and the NMES are not identical, a number of key questions in these surveys are similar. Notable differences are discussed in this article.

Since the NMES was conducted before state health insurance reform while the MEPS was conducted after the passage of most reforms, using these two data sets provides an indication of the change in employment distortions in small firms over time. However, the evidence of a change over time is merely suggestive, since the analysis is based on data measured at only two points in time.

This article is organized in seven sections. The following section describes the small group health insurance market before small group health insurance reform. The next section describes small group health insurance reform and the ADA. The subsequent section contains a literature review. The theoretical motivation is laid out in "Theoretical Motivation." The data are described in the following section. The econometric framework for testing employment distortions is laid out in "Econometric Framework: Employment Distortions" and the subsequent section discusses specification checks and extensions. The final section concludes.

THE SMALL GROUP HEALTH INSURANCE MARKET: BEFORE SMALL GROUP HEALTH INSURANCE REFORM

Before the passage of small group health insurance reforms, the health insurance industry generally marketed experience rated policies to all firms, regardless of size. Experience rating refers to the process of setting premiums based on the anticipated costs of a group.

The process used by insurance companies to set experience rated premiums differs substantially between large and small firms. For large firms, the expected cost is largely based on medical claims in the previous period. Claims provide a reasonably good approximation of the distribution of risk in a large firm, since random variations in claims are likely to be diversified internally. However, for small firms, claims do not provide a good approximation of the risk profile. This is due to the fact that random variations in expenses are unlikely to be diversified internally. Hence, before small group health insurance reforms, small firms tended to be individually underwritten (Zellers, McLaughlin, and Frick, 1992). Underwriting is the process by which an insurer determines whether or not and on what basis it will accept an application for insurance. Individual underwriting in a small group implies that individual group members are required to provide a statement of health and evidence of insurability. Two-thirds of firms with less than ten employees reported that medical questionnaires were required before purchase of insurance compared with half of firms of all sizes (Cutler, 1994). Zellers et al. (1992) report that all small group policies in their survey required a health questionnaire. The practice of underwriting of each individual within a small group was most common for groups under the size of 25. Most small group insurers classified medical conditions into categories for which they would deny coverage, use exclusion waivers, or require higher premiums.

A DESCRIPTION OF SMALL GROUP HEALTH INSURANCE AND OTHER REFORMS

Since 1987, virtually all states have passed small group health insurance reform. Table A1 has information on the number of states that have passed small group health insurance reforms. Although the extent and approach of the reforms vary from state to state, they contain broadly similar elements. These elements include:

Portability and Pre-existing Condition Limitation Reforms

Health plans often impose waiting periods for coverage. These waiting periods may pertain to all coverage or coverage for pre-existing health conditions. In some instances, health plans permanently exclude coverage for specific health conditions. State reforms limit the length of time for which pre-existing health conditions can be excluded from coverage. Most states limit the waiting period for coverage for pre-existing conditions to a maximum of 12 months, and allow only conditions present in the past 6 months to be defined as pre-existing.

Portability reforms ensure that an individual who is covered by health insurance on a previous job does not face any new pre-existing condition exclusions or waiting periods as a result of changing jobs. Note that portability reforms do not place any restrictions on either premiums charged by insurance companies to small firms or premium contributions that firms charge workers. Portability and pre-existing condition limitation laws have been enacted at the same time in most states.

Pre-existing condition exclusion limitations are reinforced by the Health Insurance Portability and Accountability Act (HIPAA).² In essence, these laws virtually remove small group insurers' ability to exclude coverage for certain conditions or to deny coverage in small firm policies. Therefore, today, charging higher premiums, subject to the state's premium rating reforms, may be small group insurers' only available underwriting option.

Rating Reforms

State reforms have placed restrictions on the factors that can be used to set health insurance premiums, and/or limited the rate variations to specified ranges. Most states' premium rating reform follows the rate-banding approach that limits insurers to a set number of classes for which they can charge separate rates. The reform restricts the variation in premiums that the insurer can charge to firms within each of these classes and restricts the variation allowed between business classes. Most states allow nine business classes, about 15-30 percent premium variation within and between classes, although these numbers vary somewhat from state to state. About 10 states have implemented adjusted community rating where the use of claims experience and health factors in setting premiums has been restricted. The use of factors such as group size, family type, age, and other demographic variables to set premiums is generally allowable.

It is plausible that these restrictions on premiums may have limited premium variability in small firms. In addition, these reforms may succeed in reducing premiums for the sick. However, since claims experience can be used to define classes in the rate-banding approach, in practice, in most states, premiums still do vary substantially due to claims experience and the health characteristics of the insured (GAO, 1995; Hall, 1999).

² HIPAA became effective in July 1997; and therefore, was not in effect during the period of these data.

Guaranteed Issue and Guaranteed Renewal Reforms

Every state that has passed small group insurance reform, except Georgia, has included guaranteed renewal reform in its package. This reform requires insurers to renew coverage for all groups, except in cases of nonpayment of premium or fraud. Guaranteed issue legislation, on the other hand, is excluded from the reform packages of eight states that have passed guaranteed renewal laws. Some guaranteed access legislation requires a guarantee only with respect to one or two specific benefits plans, while others require all insurance products to comply with the legislation. Guaranteed access ensures that insurers are unable to circumvent rating reform by insuring only low cost firms.

The effect of the small group health insurance reforms on small firm employment may be muted by the fact that most small employers are unaware of small group health insurance reform. In particular, only 20 percent of small employers realized that the new rating reforms spread the costs of insuring sick workers across a large pool of workers, and only 35 percent understood that there were limits on what insurers could charge employers with sick workers (Fronstin and Helman, 2000).

Another legislative change, enacted between the NMES and the MEPS, is the Americans with Disabilities Act (ADA). This is a federal law that became effective in July 1992 for firms with more than 25 employees and in July 1994 for firms with more than 15 employees. ADA prohibits employment discrimination against individuals with disabilities or individuals with relationships to individuals with disabilities; however, ADA does not prohibit the practice of underwriting or charging higher premiums for individuals with family health conditions. Two studies on the effects of ADA (Acemoglu and Angrist (2001); DeLeire (2000)) both find that ADA has reduced employment of disabled workers, especially in mid-sized firms. These results suggest that ADA may narrow the difference between small and mid-sized or large firms in the employment of workers with adverse family health conditions.

LITERATURE REVIEW

The first literature that is relevant to this article examines several issues that relate to small firms and health insurance. Cutler (1994) finds evidence that small firms are subject to a higher degree of premium variability than large firms. Moreover, small firms with young workers, high turnover or low wages tend to have the highest premium variability. The possibility of employment screening as a result of the incentives created by the small group health insurance market has been previously noted in the literature (Aaron and Bosworth, 1994; Madrian, 1994). Monheit and Vistnes (1994) find that the risk selection practices of insurers segment the small-group market so that only persons who are favorable health risks obtain employment related insurance. They find that the employees and dependents with coverage from small firm policies are in better health than those with nongroup policies (when firm coverage was not available) or those who had no coverage. While these results may indicate the presence of employment distortions due to health insurance, it is also possible that we may see these results if individuals in good jobs that offer health insurance are in better health than those who are not offered health insurance. Olson (1993) finds that individuals who say that they are in bad health are far less likely to have health insurance in industries that have a high proportion of small firms than in industries with

a high proportion of large firms. Although not focused on small firms, Buchmueller (1995) finds that men in worse health are less likely to be insured.

Another relevant literature examines the impact of health insurance costs on wages and employment. There is evidence to suggest that rising health insurance costs have led to firms increasing hours worked by employees rather than employing more workers (Cutler and Madrian, 1998). Other works show that the wages and the hiring probability of certain groups are sensitive to health insurance costs (Gruber, 1995; Sheiner, 1995; Scott, Berger, and Garen, 1995; Olson, 2002). However, some recent works has failed to find robust estimates of the expected relationship between wages and health insurance (Jensen and Morrissey, 2001; Levy and Feldman, 2001; Simon, 2001). Monheit and Vistnes (1999) provide evidence that worker preferences play a role as well, showing that workers with low preferences for health insurance sort into firms that do not offer health insurance.

Research on the impact of state small group health insurance reform generally has shown a small or no effect on small firms' propensity to offer health insurance or on employees' insurance coverage (Sloan and Conover, 1998; Jensen and Morrissey, 1996; Zuckerman and Rajan, 1999; Monheit and Schone, 1998; Buchmueller and DiNardo, 2002; Hall, 1999). However, a few studies do find modest effects of the reforms on insurance (Uccello, 1996; Hing and Jensen, 1999; Simon, 1999; Buchmueller and Jensen, 1997). Two existing studies examine the labor market effects of small group health insurance reform and find small or no effects; however, neither of these studies has access to detailed family health data (Kaestner and Simon, 2002; Kapur, 2003).

On the whole, there is some evidence that firms and workers respond to health insurance costs. This article adds to this literature by examining the impact of specific underwriting practices in the small group health insurance market on small firm employment. In addition, by examining data at two points in time, we are able to provide suggestive evidence on whether employment changes over time are consistent with changes in the small group health insurance market.

THEORETICAL MOTIVATION

There are several reasons that the health insurance market may distort employment decisions in small firms. This section discusses several mechanisms that rely on differences in firm organizational structure, costs, and size to explain why small firms may employ fewer sick individuals than large firms. Appendix B presents a formal model of employment distortion based on the first mechanism.

First, the health insurance market may lead to employment distortions in small firms by creating premium variability. Due to their size, if small firms hire randomly from an available pool of workers they will face a more variable health insurance premium bill than larger firms that are better able to diversify health insurance premium costs internally. Assuming that firms are unable to fully pass on the premium bill to workers, unexpectedly high premiums may be expensive for firms since they may have to borrow to finance the high premiums. To avoid the cost of high health insurance premiums, small firms may choose to screen out workers that are likely to have high health insurance premiums.

Second, small firms may have a lower cost of screening out sick employees. In small firms, decision-making is more likely to be centralized, possibly with a single individual—the entrepreneur—making all employment decisions. In contrast, in large firms, employment decisions are more likely to be decentralized. Hence, in small firms it is relatively easy for the entrepreneur to screen out an individual with high expected health costs. Moreover, most small firms are required to provide data on the family health status of potential employees to their health insurance companies (U.S. Congress, 1988). This implies that the information required for employment screening is readily available to small firms. Therefore, the centralized decision-making in small firms and the availability of health data to small firm entrepreneurs may lower their cost of screening. As a result, individuals with high expected health costs are more likely to be screened out of small firms than large firms.

Third, it is possible that the administrative cost of charging each employee his or her health insurance cost may be large. As a result, firms may elect to charge each employee the average health insurance cost of the employee pool. If the search costs of finding a new job are higher than the extra share of health insurance costs, healthy workers will not quit. This pooling strategy implies that large firms can spread the high health insurance costs of one worker over their entire employee pool. However, small firms are unlikely to be able to successfully employ this strategy, since the high health insurance costs are spread over a much smaller number of workers. As a result, small firms may be compelled to charge each employee his or her own health insurance costs, or to screen out high cost employees.

Fourth, small firms are likely to have higher health insurance costs than large firms. Specifically, administrative costs decrease dramatically with firm size. Administrative costs are about 40 percent of claims paid in very small firms (under 5 employees), while they are only 5.5 percent of claims paid in the largest (10,000 or more employees) firms (Helms, Gauthier, and Campion, 1992). A worker with high health costs may be more expensive to insure in a small firm due to the fact that the administrative costs of processing claims is relatively larger for small firms than for large firms.

A firm can use several mechanisms to screen out high cost employees. For example, a firm may screen during the hiring process after eliciting medical information using a family health questionnaire or pre-employment medical tests. Since ADA does not apply to firms that employ fewer than 15 workers, pre-employment screening is still viable for smaller firms. A firm may also screen by laying-off high cost employees after discovering high claims experience (see, for example, O'Connor, 1996). Alternatively, a firm may screen by raising health insurance premiums or manipulating wages and hence, inducing high cost employees to quit.³ Each of these mechanisms imply that employees in small firms that offer health insurance will have lower expected health costs than employees in large firms that offer health insurance. This article presents results for employment distortions on the stock of employees. The results for the sample of new hires, and for quits and layoffs are briefly discussed.

All the mechanisms described above are based on insured small firms screening out high cost workers, rather than high cost workers choosing not to work in insured

³ For an example of higher health costs resulting in increased premiums, see Kolata (1992).

small firms. In a market-clearing model with fully adjusting wages, it is impossible to distinguish between a demand (firm-based) and a supply side (worker-based) effect. However, if we assume that wages are somewhat rigid, then the distinction between demand and supply side effects becomes meaningful. In the section "Specification Checks and Extensions," the relative importance of supply side and demand side mechanisms is explored. We compare the magnitude of lay-off and quit distortions. If lay-off distortions are found to dominate quit distortions, this would provide evidence for a firm side effect. We also empirically check if wages for insured sick small firm employees are lower than wages for insured sick large firm employees. If it is assumed that sick workers employed in insured small firms are no more productive than sick workers employed in insured large firms, then similar wages by firm size would again suggest a more important role for a firm side effect.

DATA

1987 National Medical Expenditure Survey

The first data set to be used in this study is the 1987 National Medical Expenditure Survey (NMES) conducted by the Agency for Health Care Research and Quality (AHRQ). The survey contains detailed information, from approximately 14,000 households, on health insurance, medical conditions, medical care utilization, and expenditure in 1987. These data were collected from the households in a series of four interviews over the year. Information regarding demographic characteristics, family relationships, income, disability, and employment were also gathered. The only available measure of firm size for the full sample is the respondent's report of the number of employees at his/her location of employment.⁴ A small firm is described as one with fewer than 25 employees in the respondent's location of employment. This classification is used since the practice of individual underwriting is common for this category of small firms.⁵

The NMES data do not have information on whether or not an individual is offered health insurance by his/her employer. The data set contains information on whether or not an individual is a primary holder of an employer provided with a health insurance plan. However, the Health Insurance Plan Supplement (HIPS) to the NMES does contain data on whether or not insurance is offered. Unfortunately, the sample sizes in the HIPS are small; therefore, we use the HIPS only to carry out specification checks on the robustness of the results presented using only the NMES.

⁴ Total firm size data are available in the Health Insurance Plan Supplement (HIPS) to the NMES for approximately 60 percent of the sample that has employer provided health insurance on the last job. Using this sample depletes the number of small firm observations considerably. Therefore, instead, the models use a variable in the NMES that indicates whether or not the firm has multiple locations in a specification check.

⁵ The models are reestimated after defining a small firm as one with fewer than 10 employees. The results are stronger with this variable in the NMES data, but more imprecise results in the MEPS data. Results reported use fewer than 25 employees since this classification is widely used in the literature and supported by the OTA survey. It would be useful to reestimate the results in this article using an under-50 definition of small firms, since most small group reforms use this definition; however, the NMES does not provide this breakdown of firm size. Using the under-50 definition in the MEPS yields smaller distortions than the under-25 definition, as would be expected, since medical underwriting is most extensive for the smallest firms.

1996 Medical Expenditure Panel Survey

The second data set to be used in this study is the 1996 MEPS that is cosponsored by AHRQ and the National Center for Health Statistics. Data elements of interest for this study are similar in the two surveys. However, it is important to compare the results from the two surveys cautiously since data collection and reporting may have changed over time. MEPS contains data from approximately 10,500 households. The major advantage of using MEPS data is that it contains a variable that indicates whether an individual was offered employer-provided health insurance. Therefore, estimates using the MEPS data can compare the family health status of small firm employees in firms that offer health insurance to large firm employees in firms that offer health insurance. Furthermore, it is possible to check the importance of using offer health insurance versus hold health insurance employing the MEPS data and, thus, determine the probable degree of bias for the NMES estimates.

Unfortunately, the public use data for the MEPS and the NMES do not contain information on state of residence; therefore, it is not possible to examine how changes over time relate to specific state small group health insurance reforms using state-time variation in the data. The section "Specification Checks and Extensions" reports the results of an extension to the main empirical work that uses regional variation in the state laws to examine the impact of state laws.

For the purposes of this study, both data sets are restricted to civilian individuals who are between the ages of 18 and 64, are employed at some point during the year, and are not self-employed. The sample is restricted to full-time workers, because worker demand for health insurance and commitment to the labor force may be systematically different for part-time workers.⁶ Small firms that offer health insurance may be expected to screen all employees during the hiring process, not just those that hold health insurance. Therefore, to minimize the number of individuals who were offered health insurance in the NMES insurance nonholder sample, the subsample that does not hold insurance, but is covered by a family member's policy, is dropped.⁷ The means and other sample characteristics are in Tables 1 and 2.

Construction of Sickness Variables

Several variables are used to proxy for the expected health cost of a worker.⁸ To construct these variables, the Office of Technological Assessment's (1988) survey of

⁶ Workers covered by Medicaid may also have different preferences for health insurance than the rest of the sample. Only 3% of workers in the NMES and MEPS samples were covered by Medicaid. The results are robust to dropping these workers from the estimation.

⁷ The results are substantively similar if we include this subsample in the analysis. Reestimating the models in the article including only the household head provides similar but somewhat less precise results.

⁸ Only individuals who had one or more disability periods (where a disability period includes a full or partial day of reduced activity) or utilized health care services (including prescribed medicines or medical goods) reported the detailed medical condition data that is used to construct the medical variables in this study. In a specification check, I have supplemented these medical conditions with self-reported medical condition data that are less detailed, but not necessarily attached to a disability period or health care utilization. The results are robust to this specification check.

TABLE 1
Means in National Medical Expenditure Survey (1987)

	Large Firm HI Held	Small Firm HI Held	Large Firm No HI Held	Small Firm No HI Held
<i>Demographic Variables</i>				
Age	38.61 (0.16)	37.11 (0.27)	34.13 (0.34)	32.95 (0.32)
Married	0.63 (0.01)	0.61 (0.01)	0.46 (0.01)	0.42 (0.01)
Female	0.43 (0.01)	0.39 (0.01)	0.46 (0.01)	0.4 (0.01)
Black	0.23 (0.01)	0.15 (0.01)	0.31 (0.01)	0.21 (0.01)
Family size	2.57 (0.02)	2.54 (0.03)	2.46 (0.04)	2.36 (0.04)
Schooling	13.2 (0.04)	13.03 (0.06)	11.84 (0.08)	11.49 (0.07)
<i>Health Variables</i>				
Higher premium conditions	0.16 (0.01)	0.12 (0.01)	0.11 (0.01)	0.09 (0.01)
Exclusion conditions	0.21 (0.01)	0.18 (0.01)	0.15 (0.01)	0.12 (0.01)
Denial conditions	0.12 (0.01)	0.1 (0.01)	0.09 (0.01)	0.09 (0.01)
<i>Job Variables</i>				
Wage	10.63 (0.09)	9.41 (0.19)	7.82 (0.17)	6.52 (0.13)
Union	0.26 (0.01)	0.12 (0.01)	0.23 (0.01)	0.06 (0.01)
<i>Selected Occupation Indicators</i>				
Managerial occupation	0.32 (0.01)	0.29 (0.01)	0.12 (0.01)	0.11 (0.01)
Clerical occupation	0.17 (0.01)	0.15 (0.01)	0.11 (0.01)	0.08 (0.01)
Craftsman	0.1 (0.004)	0.13 (0.01)	0.08 (0.01)	0.14 (0.01)
Service worker	0.07 (0.004)	0.08 (0.01)	0.14 (0.01)	0.16 (0.01)
Laborer	0.03 (0.003)	0.03 (0.004)	0.06 (0.01)	0.07 (0.01)
<i>Selected Industry Indicators</i>				
Manufacturing/construction	0.33 (0.01)	0.24 (0.01)	0.26 (0.01)	0.26 (0.01)
Sales	0.09 (0.004)	0.19 (0.01)	0.16 (0.01)	0.22 (0.01)
Professional services	0.2 (0.01)	0.16 (0.01)	0.13 (0.01)	0.08 (0.01)
Public administration	0.07 (0.004)	0.07 (0.01)	0.04 (0.01)	0.02 (0.004)
N	5158	1725	1174	1342

Note: Small firm is defined as a firm that employs fewer than 25 individuals. Standard errors are in parentheses.

TABLE 2
Means in Medical Expenditure Panel Survey (1996)

	Large Firm HI Offer	Small Firm HI Offer	Large Firm No HI Offer	Small Firm No HI Offer
<i>Demographic Variables</i>				
Age	40.27 (0.17)	39.87 (0.31)	33.43 (0.51)	35.46 (0.44)
Married	0.67 (0.01)	0.64 (0.01)	0.5 (0.02)	0.54 (0.02)
Female	0.46 (0.01)	0.46 (0.01)	0.42 (0.02)	0.38 (0.02)
Black	0.14 (0.01)	0.11 (0.01)	0.16 (0.02)	0.09 (0.01)
Family size	2.86 (0.02)	2.83 (0.04)	3.24 (0.09)	3.23 (0.07)
Schooling	13.38 (0.04)	13.09 (0.07)	11.32 (0.16)	11.48 (0.11)
<i>Health Variables</i>				
Higher premium conditions	0.34 (0.01)	0.32 (0.02)	0.30 (0.03)	0.32 (0.03)
Exclusion conditions	0.39 (0.01)	0.36 (0.02)	0.28 (0.03)	0.27 (0.02)
Denial conditions	0.16 (0.01)	0.13 (0.01)	0.15 (0.02)	0.17 (0.02)
<i>Job Variables</i>				
Wage	16.09 (0.61)	12.92 (0.21)	8.96 (0.32)	8.88 (0.27)
Union	0.21 (0.01)	0.12 (0.01)	0.09 (0.01)	0.02 (0.01)
<i>Selected Occupation Indicators</i>				
Managerial occupation	0.37 (0.01)	0.32 (0.01)	0.15 (0.02)	0.18 (0.01)
Clerical occupation	0.18 (0.01)	0.17 (0.01)	0.13 (0.02)	0.08 (0.01)
Craftsman	0.12 (0.01)	0.14 (0.01)	0.09 (0.01)	0.17 (0.01)
Service worker	0.1 (0.005)	0.09 (0.01)	0.19 (0.02)	0.19 (0.02)
Laborer	0.03 (0.003)	0.03 (0.005)	0.08 (0.01)	0.07 (0.01)
<i>Selected Industry Indicators</i>				
Manufacturing/construction	0.34 (0.01)	0.26 (0.01)	0.44 (0.02)	0.37 (0.02)
Sales	0.12 (0.01)	0.21 (0.01)	0.17 (0.02)	0.28 (0.02)
Professional services	0.25 (0.01)	0.23 (0.01)	0.14 (0.02)	0.13 (0.01)
Public administration	0.09 (0.005)	0.08 (0.01)	0.02 (0.01)	0.01 (0.004)
<i>N</i>	3737	1169	412	684

Note: Small firm is defined as a firm that employs fewer than 25 individuals. Standard errors are in parentheses.

individual and small group insurers is used.⁹ The Office of Technological Assessment (OTA) surveyed a sample of commercial insurance carriers, Blue Cross/Blue Shield plans and Health Maintenance Organizations in 1987 to obtain information about the underwriting practices in the health insurance market. Since most individual underwriting is done in the market for individual health insurance, the OTA survey was targeted to those firms that sell individual policies. While the OTA survey targets leaders in the individual health insurance industry, 68 percent of the respondents also provide small group health insurance. In general, once a medical condition is identified, underwriting practices are quite similar across insurers. Furthermore, underwriting in the small group health insurance market closely resembles individual underwriting, especially for small firms that hire fewer than 10 individuals. Hence, the data obtained from this survey should be quite representative of small group underwriting practices.

The OTA survey asks insurers to provide three lists of medical conditions. The first is a list of uninsurable medical conditions. These are diagnoses for which coverage will not be offered. Most insurers deny any applicant whose expected cost exceeds three times the average for his sex and age. Examples of denial conditions are leukemia and cirrhosis of the liver. The second is a list of medical conditions requiring temporary or permanent exclusion waivers. Exclusion waivers may temporarily or permanently exclude a medical condition from coverage. The exclusion may be for a specific condition, such as gallstones, or an entire organ system, such as reproductive disorders. Permanent waivers usually exclude from coverage chronic conditions that are moderately costly and without life-threatening implications. Temporary waivers generally involve acute conditions that are short term in nature, such as fractures. The third is a list of conditions requiring a rated or higher premium. A rated premium has an added surcharge that is required by insurers to cover the additional risk associated with certain medical conditions. Rated premiums usually range from 125 to 200 percent of the standard premium, although some insurers will use higher ratings. Examples of higher premium conditions are asthma and glaucoma.

The OTA classifies 45 common conditions into three categories: those that required a higher premium; an exclusion waiver; or a denial of coverage (Table A2).¹⁰ The classification provided in the table can be thought of as describing the underwriting behavior of a representative insurance company in 1987. Using the OTA classification, three measures of medical conditions are constructed for each individual.¹¹ The first is the number of medical conditions that a person suffers from that would lead to denial of coverage. The second is the number of medical conditions that the person has that would lead to exclusion waivers. The third is the number of medical conditions that the person has that would lead to higher premiums. Since an individual's higher premium condition is unlikely to have an effect on the probability of small firm employment if

⁹ Cooper and Monheit (1993) use similar health variable classifications in their work on job-lock. The author thanks them for their help in coding these measures.

¹⁰ In 1987, approximately three-quarters of the small group applicants were offered standard coverage. Substandard coverage is offered to approximately 15 percent of applicants. About 5 percent get a higher premium and approximately 10 percent get an exclusion waiver. Eight percent of the applicants are denied coverage.

¹¹ Note that each condition code in the data maps to only one of these condition categories.

the same individual also has a denial condition, a hierarchical structure is imposed on the medical condition categories. Specifically, if an individual has a denial condition, then higher premium and exclusion conditions are recoded as zero.¹² An aggregate measure of denial, exclusion, and higher premium conditions is formed by adding the number of each of these types of conditions within each family. This family based measure is preferable to an individual based measure since the health conditions of the entire family are relevant for obtaining family health insurance.¹³

One might expect the impact of these medical conditions, even within their three underwriting categories, to differ by their expected cost. To weight medical conditions by their expected cost, three predicted cost measures for denial, exclusion, and higher premium conditions are constructed. I estimate a family level regression, with the logarithm of family health expenses as the dependent variable and the 45 OTA family medical conditions and several family level controls as explanatory variables.¹⁴ Using these estimates, three predicted log expenditure measures due to the 15 denial conditions, the 15 exclusion conditions and the 15 higher premium conditions are constructed. Each of these measures is labeled denial condition expenses, exclusion condition expenses, and higher premium condition expenses, respectively.

While the theory suggests that the classification of medical conditions into denial, exclusion, and higher premium categories is useful, especially for the 1987 NMES data, the author also construct two aggregate variables. If family medical conditions have a similar effect on employment regardless of the underwriting behavior of insurers then these measures are appropriate. The first measure is "sick" which is the total number of family conditions. The second measure is total sickness expenses.

¹² The results from an alternative specification that does not impose a hierarchical structure on condition categories provides slightly smaller point estimates with the same pattern of statistical significance.

¹³ In families with dependents, where only one spouse is offered coverage, 8 percent of all families do not select family coverage. In families with dependents, where both spouses are offered coverage, 32 percent of families select two family policies, in 49 percent the husband picks a family policy (Schur and Taylor, 1991).

¹⁴ The following regression is estimated:

$$\log(\text{total family medical expenses}) = \alpha + \beta * \text{Medical Conditions} + \delta * Z + \varepsilon.$$

The vector Medical Conditions contains the 45 aggregate family medical conditions listed in the appendix. The vector Z contains the following family level controls: size of family, 8 region dummies, an SMSA indicator. In addition, a set of controls describing the characteristics of the sampled individual are also included. These being: experience, age, sex, black, and schooling. Ideally, this measure of health status should be independent of insurance status. Although moral hazard implies that the insured may have higher expenses than the uninsured, estimates from Newhouse (1993) and Manning and Marquis (1996) suggest that moral hazard is small. As a specification check, the medical condition index is estimated using a switching regression model with a first stage health insurance status equation and a second stage family medical expenses equation with a selection correction term. A drawback to this approach is that there are no exclusion restrictions in the first stage equation; hence the identification of the medical expenses equation rests solely on functional form. It is found that accounting for health insurance selection has little effect on the coefficients.

ECONOMETRIC FRAMEWORK: EMPLOYMENT DISTORTIONS

In this section, the magnitude of small firm employment distortions due to employer provided health insurance is estimated. As premium variability is expensive for small firms, individuals with high expected health costs are less likely to be employed in small firms that offer health insurance. Such individuals are more likely to be employed in large firms that offer health insurance, since large firm premiums are relatively stable. In addition, firms that do not offer health insurance, irrespective of firm size, do not have an insurance based reason to screen out high health cost individuals or lower monetary compensation for these individuals. All else being equal, the health status of employees in small firms with health insurance should be better than that of employees in all other firms. However, there are observable and unobservable differences in the job quality and worker demographics between these groups of workers.

The estimate for employment distortions is most likely to be consistent if employees in small firms with health insurance are compared to a group that has similar observable job and demographic characteristics. The means presented in Tables 1 and 2 show the characteristics of employees in four groups: those employed in small firm with health insurance; large firms with health insurance; small firms without health insurance; and large firms without health insurance. For most demographic and job characteristics, employees in small firms with health insurance are more similar to employees in large firms with health insurance than to employees without health insurance. However, there are statistically significant differences in job and demographic attributes between insured small firm workers and insured large firm workers.¹⁵ The model estimation controls for these differences.

Ideally, to obtain an estimate of employment distortions, one would like to compare small firms that offer health insurance with large firms that offer health insurance. However, as noted in "Data," the core NMES data set only has information on whether an individual is the primary holder of an employer-provided health insurance plan. Therefore, the empirical work for the NMES uses this measure. In a specification check at the end of this section, the sensitivity of the results is checked by using the HIPS data that contain information on health insurance offering. The MEPS contains a variable that captures if an individual was offered employment based health insurance; therefore, the MEPS analysis is more straightforward.

Table 1 presents the means for the 1987 NMES. In this table, comparing the subsample of individuals in insured large firms (Column 1) to the subsample of individuals in insured small firms (Column 2), the row on higher premium conditions shows that 12 percent of the sample of insured small firm employees have higher premium conditions compared to 16 percent of insured large firm employees—a statistically

¹⁵ One concern is that health may be important due to the physical demands of the job. As a check, I restricted the sample to married individuals and used the health of the family, excluding the sampled individual. The analysis throughout the article was reestimated using this new proxy for expected health costs. The results for the NMES show a similar pattern as those reported in the article. The results for the MEPS become a little smaller and imprecise; however, these estimates fall within the confidence intervals of the main estimates reported in the article.

significant difference. Insured small firm workers also have fewer exclusion and denial conditions. While the proportion of employees with family higher premium conditions is greater in insured small firms than in uninsured firms, we do not directly compare these categories since these firms may not be comparable with regard to the physical demands of the job.¹⁶

Table 2 presents means for the 1996 MEPS data. In this table, comparing the subsample of individuals in insured large firms (column 1) to the subsample of individuals in insured small firms (Column 2), shows that, statistically speaking, denial conditions are significantly lower in small firms that offer health insurance than in large firms that offer health insurance. Note that the means for all health conditions for all subsamples are higher in the MEPS than in the NMES. This difference is most likely due to differences in the surveys—MEPS includes self-reported conditions in the condition code variable whereas NMES only includes conditions that are associated with health utilization, work loss or reduction, missed school, etc.¹⁷

Next, one has to determine if these differences in means are robust to control variables in the NMES and MEPS. A multinomial logit model with a four-level dependent variable is estimated. For the NMES data, the four levels of the dependent variable (Y_i) are: small firm worker and holds health insurance; large firm worker and holds health insurance; small firm worker and does not hold health insurance; and large firm worker and does not hold health insurance

$$\Pr(Y_i = j) = f(\alpha_j + \beta_j^* HC_i + Z_i' \gamma_j).$$

The matrix Z consists of control variables. HC denotes the expected health costs.¹⁸ Demographic controls are schooling, sex, age, age squared, marital status, a dummy for black and family size. Controls for job characteristics are wage, union, 12 industry dummies and 11 occupation dummies.¹⁹ Region dummies are also included. Estimates from the multinomial logit model were used to compare the effect of HC on insured small firm employment to insured large firm employment by reporting relative risk ratios (RRR) for insured small firm employment with insured large firm employment as the base category. As discussed earlier, this strategy enables us to compare groups that are comparable in demographic and job characteristics. The RRR based on β , the coefficient of interest, is the effect of the expected health cost of a worker on the

¹⁶ When the sample is restricted to new hires, insured small firm new hires have substantially lower higher premium family conditions compared to all other categories of new hires.

¹⁷ To ascertain if the results are robust to this difference in the surveys, the models were estimated after including a set of broadly defined self reported diagnoses in the NMES. MEPS models were also estimated after restricting diagnoses to those associated with health utilization, work or school loss (for comparability with the NMES). The results were robust to both these checks.

¹⁸ To reduce the possible endogeneity of medical conditions with respect to policy quality and job change in 1987, models were re-estimated using health measures which only included conditions discovered before 1987. I find no qualitative change in the results.

¹⁹ As job characteristics may be endogenous to the employment categories measured in the dependent variables, all models were reestimated without these controls and gave a similar pattern of results.

probability that he or she is employed in an insured small firm relative to an insured large firm. This RRR is expected to be less than 1 and significant if individuals with high expected health costs are less likely to be employed at small firms with health insurance.

The multinomial logit model treats both small firm employment and health insurance as endogenous variables that are jointly incorporated into the four-level dependent variable. A Hausman test shows that assumption of the Independence of Irrelevant Alternatives cannot be rejected in this application. The standard errors were corrected for clustering within family.

Even if employees in small firms with health insurance are found to have lower expected health costs than those in large firms with health insurance, this result could be attributed to all small firms being less likely to employ sick workers. For example, if small firms have only a single worker experienced in a certain task, absenteeism due to sickness could be a bigger problem for a small firm. Hence, small firms may prefer to employ healthier workers. Therefore, there is a concern that the health status of a worker may have an effect on the probability of being employed in a small firm, irrespective of health insurance. The effect of health on the probability of being in a small firm with health insurance was compared with the effect of health on the probability of being in a small firm without health insurance using estimates from the multinomial logit model. It is important to note that the uninsured are quite dissimilar from the insured; therefore, the uninsured were not formally used as a control group.²⁰ These results are presented simply to show that the RRR is not significantly less than 1 for all small firms.

As small group insurers at the time of the 1987 NMES classified conditions into three distinct groups: denial; exclusion; and higher premium conditions; and each treated very differently, small firms subject to this classification should respond differently to workers with different types of conditions. If a condition falls into the permanent exclusion waiver category or the denial category, it will not contribute to higher premium costs and, hence, there is no incentive for the firm to screen out a worker with denial conditions or exclusion conditions. However, a higher premium condition is covered by an insurance company and leads to an increase in premiums. Hence, this type of condition is the most likely to lead to a worker being screened out. The presence of these three categories of medical conditions provides a unique opportunity to identify the impact of small firm insurance distortions from other influences related to family sickness.

Table 3 presents the results from the multinomial logit model, in which a small firm is defined as employing fewer than 25 individuals, and the variables higher premium conditions, exclusion conditions and denial conditions are proxies for expected health costs. The first and second columns of Table 3 contain results from the 1987 NMES. The first column contains the RRRs for insured small firm workers relative to the base category of insured large firm workers whereas the second column contains the RRRs for small firm workers who do not hold health insurance relative to the base category

²⁰ While it is possible to restrict the sample to married individuals and use the group with spouse health insurance as a control group, the sample of small firm workers becomes quite small using this method.

TABLE 3

Employment Distortions—the Effect of Health on the Probability of Being Employed in a Small Firm vs. a Large Firm (Relative Risk Ratios From Multinomial Logit Models, Standard Errors in Parentheses)

Data Set	NMES 1987		MEPS 1996	
	Insurance Held	Insurance not Held	Insurance Offered	Insurance not Offered
Sample				
Higher premium conditions	0.805** (0.062)	0.930 (0.100)	0.954 (0.054)	1.043 (0.104)
Exclusion conditions	0.893 (0.059)	0.909 (0.085)	0.913 (0.048)	0.860 (0.097)
Denial conditions	0.881 (0.079)	0.992 (0.134)	0.775** (0.074)	0.948 (0.143)
Schooling	0.970 (0.015)	0.952* (0.019)	0.990 (0.018)	1.021 (0.027)
Female	0.806** (0.055)	0.810* (0.083)	0.903 (0.073)	0.896 (0.132)
Married	0.888 (0.073)	0.843 (0.096)	0.897 (0.079)	0.973 (0.148)
Age	0.999 (0.009)	1.022 (0.012)	0.967 (0.024)	0.965 (0.039)
Age squared	1.000 (0.001)	1.000 (0.001)	1.001 (0.001)	1.001 (0.001)
Black	0.660** (0.056)	0.608** (0.064)	0.808 (0.091)	0.503** (0.107)
Family size	1.022 (0.028)	0.999 (0.036)	1.036 (0.03)	1.057 (0.046)
Log wage	0.974* (0.011)	0.991 (0.018)	0.539** (0.049)	0.902 (0.085)
Union	0.476** (0.042)	0.242** (0.034)	0.554** (0.061)	0.228** (0.081)
N	6883	2516	4906	1096

Note: Industry dummies, occupation dummies, and region dummies are included in the estimation. Standard errors are adjusted for clustering within family. * denotes significance at the 5% level; ** denotes significance at the 1% level.

of large firm workers who do not hold health insurance. Significance tests for RRRs test the difference of the RRR from 1.²¹

The results in Column 1 show that individuals with higher premium family conditions are significantly less likely to be employed in insured small firms. For higher premium conditions in Column 1, the relative risk of being an insured small firm worker relative to an insured large firm worker is 81 percent as a result of a higher premium condition. There is no evidence that such an effect exists for exclusion and denial conditions. This

²¹ The relative risk ratio for insured small firm employment relative to insured large firm employment for higher premium conditions measures the effect of a one-unit increase in higher premium conditions on $\text{Prob}(\text{Insured Small Firm Worker})/\text{Prob}(\text{Insured Large Firm Worker})$.

evidence is consistent with the hypothesis that small firms offering health insurance in 1987 had a stronger reason to screen out workers with higher premium conditions than workers with denial or exclusion conditions.

The RRRs in the second column compare insurance nonholder small firm workers to the base category of insurance nonholder large firm workers. These results are presented for comparison with the results for insured workers, in order to show that a significant employment distortion for higher premium conditions is not a characteristic of all small firms.

The results in columns 3 and 4 are from the 1996 MEPS. The specification in these columns is virtually identical to the specification in columns 1 and 2. The only difference between the specifications is that the MEPS four-level dependent variable is based on employer health insurance being offered to the worker rather than employer provided health insurance being held by the worker since the variable measuring health insurance offer is available in the MEPS. The results in Column 3 show that individuals with denial family conditions are significantly less likely to be employed in small firms that offer health insurance—the effect is equivalent to a 78 percent relative risk of being employed in a small firm that offers health insurance relative to a large firm that offers health insurance. The effect for individuals with higher premium and exclusion family health conditions is negative, but statistically insignificant. The results in Column 4 show that the significant denial condition employment distortion does not exist in small firms that do not offer health insurance.

In Table 4, the results from using three other sets of health measures to proxy for expected health costs are reported. These proxies for expected health costs are the predicted expenses due to higher premium, exclusion and denial conditions, family sickness, and sickness expenses. The multinomial logit models for NMES and MEPS are reestimated with these three sets of health variables. RRRs of only the health variables from each multinomial logit model are reported here. The results using the predicted expenses due to higher premium, exclusion and denial conditions mirror those in Table 3.

In summary, as denial and exclusion condition expenses are unlikely to be covered by small firm health insurance in 1987, small firms are not expected to screen out workers with these expenses. However, in 1996, denial conditions constitute the most expensive category of family conditions covered by health insurance, especially if premium rating reforms are weak. Therefore, as expected, in 1996, denial conditions represent the largest employment distortion. However, this pattern over time is suggestive rather than conclusive because it is based on only two time points.

SPECIFICATION CHECKS AND EXTENSIONS

Several specification checks on the results reported in the previous section were conducted. The results from these specification checks are not reported in the tables, but are available on request.

Effect of Small Group Health Insurance Reform

Theoretically, portability reforms may increase insured small firms screening of individuals with denial conditions in their families. Before small group health insurance

TABLE 4

Employment Distortions with Alternative Health Variables—the Effect of Health on the Probability of Being Employed in a Small Firm vs. a Large Firm (Relative Risk Ratios From Multinomial Logit Models With Alternative Health Variables, Standard Errors in Parentheses)

Data Set	NMES 1987		MEPS 1996	
	Insurance Held	Insurance not Held	Insurance Offered	Insurance not Offered
<i>Health Variables</i>				
Higher premium condition	0.714**	0.930	0.883	1.019
Expenses	(0.093)	(0.179)	(0.1)	(0.202)
Exclusion condition	0.861	0.794	0.845	0.746
Expenses	(0.111)	(0.146)	(0.098)	(0.174)
Denial condition	0.91	0.968	0.746*	0.865
Expenses	(0.092)	(0.145)	(0.088)	(0.169)
Family Sickness	0.914*	0.934	0.934*	0.972
	(0.033)	(0.055)	(0.028)	(0.053)
Sickness expenses	0.892*	0.876	0.840*	0.934
	(0.052)	(0.080)	(0.059)	(0.115)

Note: The models in Table 4 are reestimated three times, with three different sets of health variables—higher, exclusion, and denial condition expenses; family sickness; and sickness expenses. Only the relative risk ratios for the health variables are reported here.

Industry dummies, occupation dummies, and region dummies are included in the estimation. Standard errors are adjusted for clustering within family. * denotes significance at the 5 percent level; ** denotes significance at the 1 percent level.

reforms were implemented, individuals with denial conditions were routinely denied coverage, and therefore, these individuals did not affect health insurance premiums for small firms. However, after the passage of reforms, individuals with these conditions are covered, leading to potentially higher premiums. Portability reforms may also lead to insured small firms screening out individuals with exclusion family conditions, as these conditions were excluded for some or all of the life of the health insurance policy before the reforms. Portability reforms are not expected to affect higher premium conditions as these were covered by health insurance even before the reforms. Although portability reforms may increase employer screening for denial and exclusion conditions, the effect of these reforms on workers' preference for insured small firm employment is ambiguous. The worker response depends on workers' valuation of the additional health benefit relative to the cost in terms of reduced wages and/or higher health insurance premiums.

Rating reforms that regulate premium variability and use of health factors in setting premiums can be expected to reduce the higher premiums associated with all condition categories. However, rating reforms in most states were quite weak, suggesting that this effect is unlikely to be large (General Accounting Office, 1995). In summary, the theoretical effect of these reform packages on the employment distortions for

individuals with denial and exclusion conditions is ambiguous, because the expected effects of portability and rating reforms on firm screening work in opposite directions. However, for individuals with family higher premium conditions, we may expect an increase in insured small firm employment.

In order to directly explore the impact of the state small group health insurance reforms on employment distortions, the multinomial logit models were reestimated after including an interaction of the region variable in the MEPS data with the proportion of the population in the region covered by a small group health insurance reform package in 1996. Region dummies are also included in this model. The region variable takes on four values: Northeast; Midwest; West; and South. The proportion of the population covered by a law in 1996 in each of these four regions is 0.77, 0.84, 0.95, and 0.84 respectively. Relative risk ratios for the interaction of the law with the health variables are very imprecise. The interactions with denial and exclusion conditions suggest that the laws reduce the probability that an individual with these family conditions is employed in an insured small firm. This effect is consistent with the interpretation that the effect of portability and pre-existing condition reforms on firm screening outweighs the effect of the premium rating laws. However, these results are statistically insignificant, probably due to the lack of variation in the law variable, and the high correlation between the laws and the interaction of laws with family health.

Health Insurance Offer *versus* Holding

This specification check determines the sensitivity of the results to the use of the variables—holds employer provided health insurance, rather than offered employer provided health insurance in the NMES data on the sample that holds health insurance. Employment distortions for the sample that holds health insurance were found to be similar to the distortions for the sample that was offered health insurance. As noted by Cooper and Schone (1997), a higher proportion of employees turned down health insurance in 1996 than in 1987, suggesting that the bias from using the sample of holders should be smaller in 1987 than in 1996. This suggests that the bias in the NMES results due to the use of hold rather than offer health insurance is small. In an alternative strategy, the NMES equations were reestimated after supplementing the sample of employees who hold health insurance with employees that were offered health insurance, but turned it down. This supplement sample was identified using data from the HIPS. Note that the existing sample was supplemented with HIPS data, rather than the sample being restricted to those observations for which HIPS data was available, to maintain adequate cell sizes for estimation.²² After reestimating the NMES equations, the results were found to be quite similar.

Plant Size and Multiple Locations

The variable “small firm” in this estimation is based on plant size in the NMES and the MEPS. Since health insurance decisions are mostly made at the firm level, it is

²² The match rate for HIPS and NMES data, after accounting for missing variables, is only 51 percent.

preferable to use firm size in this estimation rather than plant size.²³ While the HIPS data do have firm size, the sample size of nonmissing small firm employees is relatively small. Therefore, using a variable on whether or not the worker's firm has multiple locations, the models were reestimated after the sample was restricted to single-location firms. The coefficient estimates on the pertinent health variables are found to increase in absolute value, but are less precisely estimated due to the smaller sample size. Thus, the qualitative findings reported in this section are robust to the restriction of the sample to single location firms.

Hiring Distortions and Separation Distortions

Workers with high health costs are relatively more costly for insured small firms. Therefore, workers with high health costs may be less likely to be new hires in insured small firms and more likely to separate or be laid-off from insured small firms. There is evidence for hiring distortions in both the NMES and the MEPS. Since a firm's decision to offer health insurance precedes the hiring decision, this analysis provides support that the estimates in Table 3 measure employment distortions rather than a firm's decision to offer health insurance based on the health of its employees. There is also evidence that workers with higher premium conditions are more likely to be laid-off in the NMES. In the interest of brevity and as the sample size for the new hire estimation is small, only results for the stock of employment are reported in this article.

Supply Side *versus* Demand Side

Whereas the empirical results in this article are broadly consistent with the theoretical framework based on small firms screening workers with higher premium conditions, these results are also consistent with a number of other frameworks, some of which were discussed in "Theoretical Motivation." An intriguing question is whether these employment distortions are driven by firms screening out sick workers (a demand side effect), or by sick workers choosing not to work in small firms (a supply side effect). Determining if employment distortions are due to the demand or the supply side is especially relevant for designing policy. For example, if employment distortions result from firms screening out sick workers, extending the Americans with Disabilities Act to smaller firms may prevent firms from screening out sick workers. Alternatively, implementing health insurance premium regulation that reduces the cost of insuring a sick worker in a small firm may reduce the incentives for firms to screen out workers with high health costs. However, if the employment distortions initiate from the worker, improving policy quality in small firms for workers with higher premium conditions, or reducing the cost of these policies to these workers may be effective in reducing employment distortions.²⁴

²³ Data from the 1993 Robert Wood Johnson Foundation survey of establishments show that in approximately 20 or more percent of plants, health insurance decisions are made at that location rather than at the firm level. I thank Susan Marquis for these data.

²⁴ A specification check was carried out to determine the empirical importance of one possible supply-side story—that workers with high family health costs seek employment in large firms with health insurance rather than small firms with health insurance as large firms have

One empirical result for the 1987 NMES that suggests firms may be responsible for employment distortions is that individuals with higher premium family conditions who are employed in insured small firms are more likely to be laid off, but these individuals are no more likely to quit (results not reported in tables). These results indicate that wages for individuals with higher premium conditions do not fully adjust downward; therefore, insured small firms lay off these individuals.

Another empirical result that suggests that firm screening may be responsible for employment distortions is the fact that in 1987 distortions are present for higher premium conditions, but not for the more expensive and severe exclusion and denial conditions. If worker sorting were important, one would expect sick workers in all three condition categories to be more likely to be in insured large firms. In 1996, when all categories were added to firm health insurance costs, we saw the strongest effect for denial family conditions—the most expensive category of health conditions.

Lastly, wages for insured sick small firm employees were compared to wages for insured sick large firm employees. No statistically significant difference was found in these wages in either the NMES or the MEPS. If we assume that sick workers employed in insured small firms are no more productive than sick workers employed in insured large firms, then this result suggests that wages do not fully adjust to compensate for health costs for insured sick workers in small firms.

While these three pieces of evidence suggest that firm screening may be partly responsible for the employment distortions measured in this article, this evidence is suggestive, not conclusive.

CONCLUSION

This article determines if the structure of the health insurance market leads to distortions in small firm employment. The empirical analysis uses data from 1987 and 1996 to estimate employment distortions at two points in time.

Based on the underwriting behavior of small group insurers in 1987, medical conditions were classified as those leading to outright denial of coverage, conditions leading to exclusion restrictions, and conditions leading to higher premiums. Theory suggests that because premium variability is costly, small firms may screen out or reduce the monetary compensation for individuals with high expected health costs, resulting in employment distortions in small firms. In 1987, conditions that have the

more generous coverage than small ones. Individuals with higher premium family conditions are no more likely to have better policies in the data. These results, which are available upon request, are consistent with those of Cameron and Trivedi (1991). They found that health risk, conditional on age and sex, played a very small role in choice of policy. Income was found to be the strongest factor in the choice of policy. This evidence suggests that policy quality may not be a sufficient alternative theoretical motivation for the empirical findings in this article.

highest expected costs fall into the higher premium category, because conditions in the denial and exclusion categories are unlikely to be covered by insurance. However, by 1996, the situation has changed. Almost all states have implemented small group health insurance reform. This reform, implemented during the 1990s, has restricted insurers from excluding medical conditions or denying coverage. Small group health insurance reform has also aimed at reducing premium variations and limiting the use of health status in setting premiums, but this reform has been weak in most states. Therefore, in 1996, all condition categories most likely result in higher expected health costs.

The estimation results show the existence of employment distortions in 1987 and 1996. Empirical evidence on layoffs, wages, and the pattern of distortions suggests that firm screening is likely to be responsible for the employment distortions. However, this evidence is suggestive, not conclusive. The employment distortions are consistent with the changes in the small group health insurance market; however, the strength of this finding should be tempered by the fact that this analysis is based on two points in time. In 1987, there were significant small firm employment distortions for workers with families that have conditions that lead to higher premiums. However, no pattern of employment distortions was found in small firms for workers who have families with conditions leading to denial of coverage or exclusion restrictions, as these conditions do not add to their medical claims. In 1996, denial family conditions, which is the most expensive category of conditions covered by insurance, is associated with the largest employment distortion in insured small firms. These results suggest that the pattern of employment distortions in small firms that offer health insurance is consistent with the evolving small group health insurance market. Employment distortions appear to have persisted in small firms, despite the wide implementation of small group health insurance reforms.

APPENDIX A

TABLE A1

A Frequency Table of State Small Group Health Insurance Reforms by the Year Reform Was Enacted

Year	1991	1992	1993	1994	1995	1996
Guaranteed issue	12	6	10	5	2	
Portability	7	8	13	10	3	2
Rating reform	15	8	12	6	5	

Note: There are 49 states. Hawaii is excluded since it has a universal health insurance system. If states change their rating laws during this period, they are represented twice in this table.

TABLE A2

Risk Classification by Health Insurers: Common Conditions Requiring a Higher Premium, Exclusion Waiver, or Denial

Higher Premium	Exclusion Waiver	Denial
Asthma (mild to moderate)	Cataract	AIDS
Back strain (disk disorder)	Gallstones	Ulcerative colitis
Hypertension (controlled)	Fibroid tumor (uterus)	Cirrhosis of liver
Arthritis	Hernia (hiatal/inguinal)	Diabetes mellitus
Gout	Migraine headaches	Leukemia
Obesity	Pelvic inflammatory disease	Schizophrenia
Psychoneurosis (mild)	Chronic otitis media (recent)	Hypertension (uncontrolled)
Kidney stones	Spine/back disorders	Emphysema
Alcoholism/drug use (nondependent)	Hemorrhoids	Stroke
Heart murmur	Knee impairment	Angina (severe)
Peptic ulcer	Asthma (severe)	Coronary artery disease
Colitis	Varicose veins	Epilepsy
Glaucoma	Sinusitis, chronic, or severe fractures	Lupus
	Allergies	Alcohol dependence/ drug dependence

Source: Office of Technological Assessment (1988).

APPENDIX B

A simple framework is presented here to show that small firms that offer health insurance may be less likely to employ workers with high health costs due to premium variability. This framework is based on the first mechanism for employment distortions discussed in "Theoretical Motivation." This mechanism is emphasized because anecdotal evidence suggests that premium variability is a major source of employment distortions (Committee on Employer-Based Health Benefits, 1993; Morrissey et al., 1994). It is assumed there are two populations of workers. Wages are rigid and the health insurance premium for the first population is k . For simplicity, it is assumed that $k = 0$. The health insurance premium for the second population is h_i , where $h_i \sim N(\mu, \sigma^2)$ for the population. Here, h_i is observable to the insurance company. It is also observable to the firm if it pays a screening cost, s . Firm size is denoted by n , where $\underline{n}$ is the smallest firm size and N is the largest firm. It is assumed that if a firm chooses not to screen, it draws a proportion α of workers from population two and the rest of its workers from the zero cost population one. If a firm does not screen its workers, its profit is

$$\pi_{ns} = n \left[p - w - \frac{\sum_{i=1}^{\alpha n} h_i}{n} - l \left(\frac{\sum_{i=1}^{\alpha n} h_i}{n} > C \right) \left(r \left(\frac{\sum_{i=1}^{\alpha n} h_i}{n} - C \right) \right) \right],$$

where π_{ns} is the profit from not screening workers, n the number of workers hired, w the wage, p the value of the output produced by each worker, and h_i the health

insurance premium charged for the worker i . If the firm's health insurance premiums exceed the threshold C , the firm has to borrow at interest rate r to pay the amount by which the premiums exceed this threshold. This is incorporated in the profit function by using the indicator function, I . If a firm screens, it can perfectly observe the premium; hence it will choose only to hire workers from the population with no health insurance premium. The profit of the firm that screens is

$$\pi_s = n[p - w - s],$$

where s is the cost of screening per worker. If the firm screens, it only hires workers with zero expected health costs. Hence there is a zero probability of exceeding C .

Let x be a random variable that is normally distributed with a distribution function F . Let y be a normally distributed random variable, such that $E(y) = E(x)$ and $\text{var}(y) > \text{var}(x)$. For any concave function U , $E(U(x)) > E(U(y))$ (Tobin, 1965; Rothschild and Stiglitz, 1970). Note that the profit per worker from not screening $\frac{\pi_{ns}}{n}$ is concave in $\frac{\sum_{i=1}^n h_i}{n}$. Furthermore, $\frac{\sum_{i=1}^n h_i}{n} \sim N(\alpha\mu, \frac{\alpha\sigma^2}{n})$, which implies that as n increases, the variance of the mean premium cost falls. Therefore, an increase in the variance of the mean premium cost reduces $E(\frac{\pi_{ns}}{n})$.

The profit per worker from screening, $E(\frac{\pi_s}{n})$, does not depend on firm size. Furthermore, from the discussion above, it is seen that $E(\frac{\pi_{ns}}{n})$ increases as n increases. Assuming that $E(\pi_{ns}/N) > E(\pi_s/N)$ and $E(\pi_{ns}/n) < E(\pi_s/n)$, or in other words, that the $E(\pi_{ns}/n)$ function does not lie fully above or below the $E(\frac{\pi_{ns}}{n})$ function, we obtain the result that smaller firms are more likely to screen out sick workers than larger firms.

As the firm size, n , is exogenous, and multiplies the profit per worker, the maximization of profit per worker is equivalent to the maximization of total profit. Intuitively, as firm size increases, the firm's premiums become less variable; therefore, the firm is less likely to incur interest costs by exceeding its available liquid capital. Hence, the incentive to screen out high cost workers falls as firm size increases. As a result, smaller firms are more likely to screen out high cost workers than larger firms. Formally, the following condition determines if a firm chooses to screen workers. A firm will screen if $E(\pi_{ns}/n) < E(\pi_s/n)$. Expanding this condition, we have that the firm will screen if

$$s < \alpha\mu + r \left[(1 - \Phi(z)) \left(\alpha\mu - C + \frac{\sigma\phi(z)\sqrt{\alpha/n}}{1 - \Phi(z)} \right) \right] \quad \text{where } z = \frac{C - \alpha\mu}{\sigma\sqrt{\alpha/n}}.$$

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