Dynamic Inefficiencies in Employment-Based Health Insurance: Theory and Evidence*

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Abstract

We investigate how the employment-based health insurance system in the U.S. affects individuals' life-cycle health-care decisions. We take the viewpoint that health is a form of human capital that affects workers' productivities on the job, and derive implications of employees' turnover on the incentives to undertake health investment. Our model suggests that employee turnovers lead to dynamic inefficiencies in health investment, and particularly, it suggests that employment-based health insurance system in the U.S. might lead to an inefficient low level of individual health during individuals' working ages. Moreover, we show that under-investment in health is positively related to the turnover rate of the workers' industry and increases medical expenditure in retirement.

We provide empirical evidence for the predictions of the model using two data sets, the Medical Expenditure Panel Survey (MEPS) and the Health and Retirement Study (HRS). In MEPS, we find that employers in industries with high turnover rates are much less likely to offer health insurance to their workers. When employers offer health insurance, the contracts have higher deductibles and employers' contribution to the insurance premium is lower in high turnover industries. Moreover, workers in high turnover industries have lower medical expenditure and undertake less preventive care. In HRS, instead we find that individuals who were employed in high turnover industries have higher medical expenditure when retired. The magnitude of our estimates suggests significant degree of intertemporal inefficiencies in health investment in the U.S. as a result of the employment-based health insurance system. We also evaluate and cast doubt on alternative explanations.

JEL Classification Numbers: D84, D91, I12

1 Introduction

The United States is unique among industrialized nations in that it lacks a national health insurance system.[1] The U.S. health insurance system is a mixture of private and public insurances with the private insurance playing a much more dominant role than the rest of the industrialized world. More specifically, in the U.S. most of the working age populations obtain health insurance coverage through their employers, while elderly individuals aged 65 or over are almost uniformly enrolled in Medicare.[2, 3]

In this paper, we investigate how the employment-based health insurance system in the U.S. affects individuals' life-cycle health-care decisions. We take the viewpoint that health is a *general* form of human capital that affects workers' productivities on the job, and derive implications of employees' turnover on the incentives to undertake health investment. Our model suggests that employee turnovers lead to dynamic inefficiencies in health investment, and particularly, it suggests that employment-based health insurance system in the U.S. might lead to an inefficient low level of individual health investment during individuals' working ages. The economic mechanism we explore is closely related to Acemoglu and Pischke (1998, 1999), and it is best explained if we imagine that workers and firms separate at an exogenous rate. Frictional labor markets imply that if a worker-firm pair separates in the future with some positive probability, the pair will not be able to capture the entire surplus generated by their current health investment. Moreover, the higher is the industry turnover, the more likely is the surplus loss. As a result, the firm/worker pair in industries with higher turnover rates has lower incentives to invest in health. This simple comparative statics prediction can be extended to allow for endogenous turnover rates. When industries differ in the skills used by their workers, industries with more specific skills have endogenously lower turnover rates, and thus workers' health investment is higher.

The model also shows that the level of employers' contribution to workers' health investment is higher in lower turnover industries. The reason is that lower worker turnover implies that firms will be able to obtain higher expected profits in periods after the health investment is made, thus ex ante firm competition for workers will lead the firms to pay for a larger share of the workers' health investment. Moreover, a simple extension of the model where we introduce a

[1]Among 30 OECD countries, Mexico, Turkey and the United States are the only countries without universal or near universal health insurance coverage.

[2]According to the estimates of Kaiser Commission and the Urban Institute, in 2003, 62% of non-elderly Americans received private employer-sponsored insurance, 5% purchased insurance on the private non-group (individual) market; 15% were enrolled in public insurance programs (mainly Medicaid), and 18% were uninsured (see Hoffman and Holahan, 2005).

[3]The employment-based health insurance system originated as a firm response to the World War II era wage control and labor shortage, and was maintained over time due to powerful political forces representing the medical profession (see Campion 1986 or Richmond and Fein 2005 for historical accounts of the employment based health insurance system).

"retirement" period subsequent to the working career shows an interesting *intertemporal reversal* of the ranking of the medical expenditures: individuals who worked in lower turnover industries have *higher* medical expenditure *when working*, but *lower* medical expenditure *when retired*. This latter prediction suggests that employment-based health insurance system in the U.S. might lead to inefficient patterns of health expenditures during individuals' life-cycle. Indeed, the U.S. health expenditure accounts for about 17 percent of its GDP in 2005, while in UK health expenditures account for about 8 percent of its GDP. More importantly, the share of health expenditures by retirees in UK is much lower than that in the U.S. (see Davis et. al 2007).

We provide extensive empirical evidence consistent with the predictions of the model using two datasets, the Medical Expenditure Panel Survey (MEPS) and the Health and Retirement Study (HRS). We deal with the potential reverse causality of health insurance on job turnover rates using two empirical strategies. The first empirical strategy, presented in the main text, follows naturally from our model with endogenous turnover: we use an exogenous measure of the importance of specific skills in each *industry* constructed from a variable called Specific Vocational Preparation (SVP) for each *occupation* in the Dictionary of Occupation Titles (DOT) collected by the Department of Labor.[4] In Appendix C we also provide very similar results from an alternative empirical strategy where we use turnover rates in corresponding U.K. industries as instruments. Using these empirical strategies, in MEPS we find that individuals currently working in industries with higher turnover rates are much less likely to be offered health insurance; conditional on being offered health insurance, the contracts offered to workers in higher turnover industries are less comprehensive (higher deductibles), but employees' premia are higher and employers pay a lower share of total insurance premia. Moreover, workers in higher turnover industries spend less in health care and are less likely to undertake preventive care. As predicted by the model, we also find that health care expenditure differences when working have predicted consequences on health expenditures in retirement. Using the 2002 wave of HRS, we find that the retirees' medical expenditure is higher for workers whose industry of longest tenure prior to retirement has higher turnover rates.

The magnitudes of some of our results deserve special mention. During the working years, individuals working in industries where skills are one standard deviation more specific have *higher* medical expenditure by about $100 per year.[5] For individuals over 65 years old, individuals whose

[4] The average SVP score we constructed for each industray is called *ASVP*. See Section 4.3 for details about how industry ASVP is constructed from SVPs of the occupations. The ASVP we constructed range from a low of 3.017 in 3-digit industry 722 (Business and Repair Services: Services to Dwellings and Other Buildings) to a high of 6.949 in 3-digit industry 893 (Professional and Related Services: Miscellaneous Professional and Related Services).

[5] In our data, ASVP scores among 3-digit industries have a mean of about 5.2 with a standard deviation of about 0.83. As an example, 3-digit industry 500 (Wholesale Trade: Motor Vehicles and Equipment) has an ASVP score of about 5.1; 3-digit industry 701 (Finance, Insurance and Real Estate: Savings Institution, including Credit Union) has an ASVP score of 5.85, about one standard deviation above that of industry 500. The industry 592 (Retail Trade: Variety Stores) has an ASVP score of 4.2, about one standard deviation lower than that of industry 500.

job with longest tenure was in industries whose ASVPs are one standard-deviation higher have *lower* medical expenditure by about $850 per year. Using these estimates, we can perform the very rough back-of-the-envelope calculation to compare the life-time medical expenditures of two workers whose only difference is the industry in which they work. Suppose both individuals work about 50 years in the same industries and then are retired for 15 years before dying, but the first individual works in an industry whose ASVP is one standard-deviation higher than the second one. According to our estimates, during the working years the first worker' cumulative health expenditure is on average $5,000 higher than the health expenditure of the second worker. During the retirement years, the first worker's health expenditure is instead more than $12,000 lower than the second individual's. The total difference is around $7,000, which is a rather large difference. This rough calculation suggests that every additional dollar of health expenditure during working years may lead to about 2.5 dollars of savings in retirement!

The above calculation is clearly rough as it did not incorporate discounting, did not make adjustment for differences in life qualities and life expectancies for the two individuals, nonetheless it suggests that in the typical life of U.S. individuals, too much of their health expenditures are allocated toward their retirement ages. This observation, of course, is not new;[6] what is new is that our paper provides a causal link between the unique employment-based health insurance system in the U.S. and this relatively well-known empirical observation. Our finding that an additional dollar of health expenditure during one's working ages can translate into more than two dollars of health expenditure savings during retirement suggests that it is possible to reduce the total health care expenditures in the U.S. without hurting Americans' health, if one could find a way to internalize the dynamic externalities intrinsic in health care investment.

The remainder of the paper is structured as follows. Section 2 reviews the literature; Section 3 provides a simple theoretical framework and derive its testable implications; Section 4 describes the data sets we use in our empirical analysis; Section 5 describes our empirical framework; Section 6 describes our results from the MEPS data about currently active workers; Section 7 presents collaborating evidence from retirees in the HRS; Section 8 presents falsification results using U.K. data; Section 9 discusses alternative hypotheses; and finally Section 10 concludes. Appendix A contains the proof of Proposition 1; Appendix B provides information about the SVP variable; and Appendix C contains empirical results from an alternative empirical strategy using the turnover rates in corresponding industries in U.K.

[6]For example, see Davis et al. (2007), for the observation that preventive care expenditures in the U.S. were too low relative to those in other OECD countries.

2 Related literature

First and foremost, our paper is related to the vast literature on the general and specific human capital investments. The connection to this literature is immediate because we consider health as a form of general human capital.[7] The classical theory of human capital developed by Becker (1962, 1964) distinguishes between investments in general-usage and specific human capital based on the transferability of the acquired skills when a worker switches firms. To the extent that healthy workers are more productive in all firms, health investment is quite plausibly a form of general investment (see Grossman 2000).

One of the most celebrated results in the classical theory of human capital is that in a frictionless and competitive labor market, workers capture all the returns to their general human capital investment; thus, investment in general human capital will be efficient and the investment will be solely paid for by the workers as the employers obtain no return from paying for investment in these skills.[8] An important theoretical literature, largely due to Acemoglu and Pischke (1998, 1999), attempts to explain the empirical phenomenon that firms seem to pay for general training of their employers, which is inconsistent with the predictions of the classical human capital theory.[9] They show that when labor market frictions lead to "wage compression," then firms may pay for investments in the general skills of their employers.[10, 11] The compression in the wage structure transforms the "technologically" general skills into *de facto* "specific" skills, thus providing firms with incentives to invest in their workers' general skills. Even though Acemoglu and Pischke's theoretical models also yield testable predictions about the *level* of total general human capital investment, this literature has almost exclusively focused on the issue of why firms *share* the cost of general training.

Taking the view that health is a form of general human capital, our paper can also be considered as an empirical analysis of how firms and workers invest in general human capital. In fact, we believe that health expenditure is particularly suited to study how firms and workers jointly determine the *level* of general human capital investment. The reason is that health expenditure is typically well

[7]The economics literature of health as human capital starts with Grossman (1972). See Grossman (2000) for a comprehensive survey.

[8]In contrast, employers will share the returns and the cost of investment in firm-specific skills with their employees. See, for example, Hashimoto (1981) for an analysis of the determination of how specific human capital investment will be shared by the worker and the employer.

[9]However, recent papers by Balmaceda (2005) and Kessler and Lülfesmann (2006) showed that under some surplus sharing rules the specific and general human capital will endogenously interact so that even the labor market is competitive, the employer may choose to contribute to workers' general training.

[10]Acemoglu and Pischke (1998, 1999) consider many potential forms of market frictions, including search friction, asymmetric information, complementarity between general and specific skills, etc.

[11]More explicitly, in Acemoglu and Pischke (1998, 1999), the wage structure is compressed if the difference between a worker's productivity in his current firm and his outside wage option is an increasing function of his level of general human capital.

recorded, as most health investment is provided by third-party medical professionals with well-documented charges. In contrast, for almost all other investments in general human capital, it is quite difficult to obtain a quantitative measure of total costs and each party's contribution; in these situations, it is often the case that only firms' general training expenditures may be recorded while worker's contribution to general investment is typically unobserved.

Second, this paper is related to the literature on the dynamic inefficiency in the insurance market (Hendel and Lizzeri 2003, Crocker and Moran 2003 and Finkelstein, McGarry and Sufi 2005). The nature of dynamic inefficiency in that literature differs from ours. It refers to the inefficiency arising when short-term insurance contracts do not offer consumers the coverage of the risk of a change in their risk type as a result of their inability to commit to long-term insurance contracts.[12]

To some extent, the dynamic inefficiency in our analysis is also related to the inability of workers to commit to long-term employment with the firm. In this literature, our paper is closer to Crocker and Moran (2003), who argue that workers in industries with higher specific-skill requirement are more committed to their firms and thus they should be provided with higher quantity of *insurance*. Our empirical analysis borrows the measurement of industry-specific skills from Crocker and Moran (2003), so it is important to highlight the differences between our paper and their paper. First, the focus is different: our paper focuses on health investment and health consumption, while their paper focuses purely on insurance. Second, their theory is silent about many aspects that we investigate empirically. In particular, our model makes clear predictions about how firms and workers share health expenditure, and our empirical analysis confirms the theoretical predictions. Third, we specifically investigate characteristics of health care plans that are more directly related to *consumption* of medical care, such as the deductible. Forth, we find that workers in low turnover industries have a lower variance of medical expenditure,[13] which is in contrast to their idea that pooling equilibria are more likely in low turnover industries. Fifth, we find that workers in low turnover industries are healthier, as predicted by our model of consumption and in contrast to their model of insurance. We will come back to these different implications in Section 9 when we discuss alternative hypotheses.

Third, our paper is related to the literature on the interactions between public and private insurance. For example, Brown and Finkelstein (2004) studied the interaction of the public Medicaid program with the private market for long-term care insurance. Their estimate suggest that the incomplete provision of long term care in Medicaid has a large crowding-out effect on the demand for long term care insurance in the private market. While their paper considers the *contemporaneous* interaction between the public and private insurance for long term care in terms of insurance takeup decisions, the interaction we consider is *intertemporal* and it is about health investment

[12]Diamond (1992) mentioned that the lack of long-term health insurance is an important market failure. Cochrane (1995) showed that time consistent health insurance contracts *with severance payments* can fully insure consumers with the reclassification risk with a string of short term contracts (see also Pauly, Kunreuther and Hirth 1995).

[13]See subsection 6.3 for the empirical finding.

behavior instead of insurance takeup.

More generally, our paper provides a strong link between the institutional features of the U.S. health care market, the incentives to invest in health it generates, and health outcomes. As in Grossman's (1972) seminal contribution and a number of more recent papers (Murphy and Topel 2005, Hall and Jones 2007), our paper focuses on the consumption/investment aspect of health care plans versus the insurance aspect. Standard contracts bundle regular medical care (i.e. care for frequent and common treatment) with pure insurance (i.e. protection against low probability and high cost events).[14] However, in contrast to these papers, our paper delves deeper into the incentives generated by the institutional arrangements that govern health care, especially employer-provided health insurance and the interaction between private and public insurance.

Fourth, our paper is related to the literature on health insurance and "job locks." A large literature, for example, Madrian (1994), Gruber and Madrian (1994, 1997) and summarized in Gruber and Madrian (2002), examine how employer-provided health insurance may lead workers to keep jobs they would rather leave for fear of losing insurance coverage for preexisting conditions. For example, Madrian (1994) estimates the extent of job-lock using a difference-in-difference approach, i.e., the job mobility differential between those with high and low expected medical expenses should be greater for those with employer-provided health insurance than those for whose job do not include insurance. Our paper, to some extent, could be thought of as an investigation on the firms' decisions to provide health insurance, and health care in general, to their employees. In Section 9, we also provide some preliminary attempt to distinguish the "job lock" hypothesis from the mechanisms we explore in this paper.

We would also like to note that in a related paper, Herring (2006) argued that the free-riding problem between private insurers because of enrollee's turnover may reduce insurer incentives to provide socially-optimal levels of preventive care. Using data from the Community Tracking Study's Household Survey and a market-level measures of employment-induced insurer turnover, he found that turnover has a significantly negative effect on the utilization of preventive services and no effect on the utilization of acute services. While closely related, our identification strategy differs from Herring's. Herring relies on the market-level differences in turnover rates; and ours rely on the cross-industry differences in turnover rates resulting from the differences in the importance of specific skills in their production functions. Also related, Cebul et. al (2007) provided evidence that higher insurance turnover will lead to under-investment in health, using data from the Community Tracking Study and from the administrative records of an insurance company. Our paper differs from theirs in that we focus on labor market turnover while they focus on the turnover in the

[14] The recent introduction of health savings account (HSA) in part breaks the link between consumption and insurance. HSAs are tax-favored savings accounts that can be used to pay for medical expenditures, combined with high-deductible health insurance plans. According to the U.S. Department of the Treasury (`http://www.ustreas.gov/offices/public-affairs/hsa/`), in the year 2005 already 3.2 million individuals were covered by HSA type insurance, and the figure is projected to be 25 to 30 million people in the year 2010 .

insurance carriers.

3 A Simple Theoretical Framework

In this section we present a simple model of health care consumption. The model draws heavily from Acemoglu and Pischke (1999) frictional labor market. The goal of the model is to capture in the simplest way the effect of worker's turnover on health investment incentives. We start by making the simplest assumptions to capture the externality we described in the Introduction, and we then gradually enrich the framework to allow for more realistic features of the labor market.

3.1 Environment

There are two periods with no discounting. Health is a form of general human capital and thus is an input in the production function of the worker. We assume that health is the only input in the production function $f(h)$, where $f(\cdot)$ is assumed to be increasing, differentiable and concave. All workers are risk neutral, are endowed with an initial stock of health h_1 and can, in the first period, invest m_1 in health at a unit cost p. Health evolves according to

$$h_2 = k(h_1, m_1)$$

where k is the health function, which we assume to be continuous and increasing in the stock of health h_1 and in the investment in health m_1, i.e. $\partial k/\partial h_1 > 0$ and $\partial k/\partial m_1 > 0$.

In the second period, the firm and the worker may receive, with probability $q \in (0,1)$, an adverse shock that will for sure end their relationship, in which event the worker gets an outside wage of $v(h_2)$ and the firm gets a surplus of zero; with the remaining probability $1-q$, they can continue their productive relationship in which event the worker must decide whether to stay with the firm at wage $w_2(h_2)$, to be endogenously determined, or to quit and obtains an outside wage of $v(h_2)$, which is assumed to be exogenous. It is important to note that, if the worker decides to leave her current firm (either due to exogenous end of their productive relationship, or due to quitting), her productivity at other firms remain $f(h_2)$ to reflect our assumption that health is a form of general human capital; however she is able to receive a wage $v(h_2)$ from other firms, reflecting the labor market frictions.[15] Of course, it is natural to assume that $v(h_2) < f(h_2)$, but the more important assumption is $v'(\cdot) < f'(\cdot)$, which Acemoglu and Pischke (1999) termed *wage compression* assumption.[16]

[15] See Acemoglu and Pischke (1999) for a variety of mechanisms that can lead to a wedge between $f(h_2)$, the worker's productivity, and $v(h_2)$, her wage, at other firms.

[16] The wage compression assumption is needed for the result below that equilibrium health investment is suboptimal relative to the first best (see Section 3.2 below).

We follow Acemoglu and Pischke (1999) *full-competition regime,* where firms compete in the first period by offering a pair of wage and medical consumption $\{w_1, m_1\}$ to workers, and in equilibrium they make zero profits.

3.2 Equilibrium

To begin, note that if the worker and the current firm are not exogenously separated, they have a surplus $f(h_2) - v(h_2)$ to share from continuing the employment relationship relative to separating, where $f(h_2)$ and $v(h_2)$ are respectively the total surpluses from continuing and from separating. We assume that the surplus is divided according to the Nash Bargaining solution where $\beta \in (0,1)$ represents the worker's bargaining power, the wage $w_2(h_2)$ that the worker obtains if he/she does not quit will be:

$$w_2(h_2) = (1-\beta)\, v(h_2) + \beta f(h_2).$$

Thus, the firm's expected profit in period two is:

$$\begin{aligned} \pi_2(h_2) &= (1-q)\left[f(h_2) - w_2(h_2)\right] \\ &= (1-q)(1-\beta)\left[f(h_2) - v(h_2)\right]; \end{aligned}$$

and that in the first period is:

$$\pi_1(h_1) = f(h_1) - w_1 - pm_1,$$

where w_1 is the worker's first period wage and m_1 is the worker's first period medical expenditure, both to be determined in equilibrium.

The sum of profits for the firm in the two periods (recall the no-discounting assumption for simplicity) is thus:

$$\Pi = \pi_1(h_1) + \pi_2(h_2) = f(h_1) - w_1 - pm_1 + (1-q)(1-\beta)\left[f(h_2) - v(h_2)\right]. \tag{1}$$

Ex ante competition among firms for workers will entail that the firm chooses m_1 and w_1 to maximize Π above subject to the constraint that workers receive as much utility as that offered by other firms U, i.e.,

$$w_1 + (1-q)\left[(1-\beta)\, v(h_2) + \beta f(h_2)\right] + qv(h_2) \geq U, \tag{2}$$

where competition among firms for the worker ensures that the utility level U is high enough such that in equilibrium $\Pi = \pi_1(h_1) + \pi_2(h_2) = 0$.

Now, from (2), we have that in equilibrium

$$w_1 = U - \left\{(1-q)\left[(1-\beta)\, v(h_2) + \beta f(h_2)\right] + qv(h_2)\right\}. \tag{3}$$

Substituting (3) into (1) and maximizing over m_1,we know that the equilibrium level of medical expenditure m_1^* must solve the following first order condition:

$$\left[qv'\left(k\left(h_1, m_1^*\right)\right) + (1-q) f'\left(k\left(h_1, m_1^*\right)\right)\right] \frac{\partial k}{\partial m_1} = p. \tag{4}$$

Once m_1^* is determined, the equilibrium wage w_1^* can be obtained from the zero profit condition for the firm, i.e.,

$$w_1^* = f\left(h_1\right) - pm_1^* + (1-q)(1-\beta)\left[f\left(k\left(h_1, m_1^*\right)\right) - v\left(k\left(h_1, m_1^*\right)\right)\right]. \tag{5}$$

Equations (4) and (5) show the key features of the model. First, equation (4) shows that, unless there is never separation ($q = 0$), investment in health is socially inefficient. To see this, note that the efficient level of health investment, denoted by $\hat{m}_1$,must solve

$$f'\left(k\left(h_1, \hat{m}_1\right)\right) \frac{\partial k}{\partial m_1} = p \tag{6}$$

which equates the marginal social benefit of medical expenditure $f'\left(k\left(h_1, \hat{m}_1\right)\right) \partial k / \partial m_1$ to its marginal cost p. Note that the social benefit from health investment is determined by the worker's productivity $f\left(h_2\right)$ which is independent of the employer of the worker, reflecting the nature of health as a form of general capital. Because of the wage compression assumption that $v'(\cdot) < f'(\cdot)$, comparison of (4) and (6) reveals that equilibrium health investment m_1^* is, investment is lower than the socially efficient level $\hat{m}_1$.

Second, equation (5) shows that the employer and the worker share medical expenditure m_1^*. In the competitive and frictionless labor market model with no frictions (Becker 1962, 1964), we have $f(\cdot) = v(\cdot)$, thus $m_1^* = \hat{m}_1$ and the first period wage adjusts to $w_1^* = f\left(h_1\right) - pm_1^*$, i.e., the worker pays the full cost of the investment in health. The reason is, of course, that in a competitive labor market, the worker earns the full return of investment in health in the form of a higher future wage, and thus the worker pays the full cost of this investment in the form of a lower first period wage. In contrast in a frictional labor market where $v(\cdot) < f(\cdot)$, the employer earns in the future a fraction of the return of the current investment in health of the worker, and thus the employer must share the cost of worker' current investment by paying a salary higher than $f\left(h_1\right) - pm_1^*$. Thus, $w_1^* - \left[f\left(h_1\right) - pm_1^*\right]$ measures the amount of worker's health expenditure paid by the employer. (Of course, $f\left(h_1\right) - w_1^*$ is the worker's contribution to the health expenditure.)

Proposition 1 below highlights the key comparative statics of this simple model that we use in the empirical analysis. Its proof is provided in Appendix A.

Proposition 1 *A decrease in the (exogenous) turnover rate q will:*

(i) increase equilibrium health expenditure m_1^*;

(ii) increase the amount of health expenditure paid by the employer $w_1^* - \left[f\left(h_1\right) - pm_1^*\right]$.

3.3 Specific Capital and Endogenous Turnover

In the model of the previous subsection, the turnover probability q was exogenously fixed. Obviously in many real cases employees decide to leave employers and thus turnover is endogenously determined. We now consider a simple extension of the previous framework that incorporates endogenous turnover. The main new mechanism is the introduction of firm-specific human capital. This extension is particularly important for us because a measure of industry-specific human capital provided by the Department of Labor is the main variable that we use to proxy for industry turnover rates in our empirical analysis.[17]

We assume that there is a continuum of industries and industries differ in the importance of specific capital. In industry i the production function of a worker is

$$y_i = f\left(h, s_i\right)$$

where s_i are skills specific to industry i: a worker moving to a different industry can transfer only a fraction $(1-i)$ of his skills s_i, so that a higher indexed industry i has more specific skills. For simplicity, assume that the level of skills s_i is acquired during the first period that the employee spends with the employer via a learning mechanism as in Jovanovic (1979), and that the level s_i is equal across all industries.[18]

To have endogenous turnover in the model, we assume that in the second period the worker can approach another firm at no cost. The new firm and the worker draw a match specific productivity shock ϵ from the distribution $G(\epsilon)$. Production in the new firm y_2^n is equal to

$$y_2^n = f\left(h_2, (1-i)\, s_i\right) + \epsilon$$

In the new firm, the worker and the employer divide the surplus according to the Nash bargaining solution, so that at the new firm the worker gets salary

$$w_2^n\left(y_2^n, y_2^o\right) = (1-\beta)\, w_2^o\left(y_2^o, y_2^n\right) + \beta y_2^n \tag{7}$$

where $w_2^o\left(y_2^o, y_2^n\right)$ and $y_2^o = f\left(h_2, s_i\right)$ are the wage and the production in the old firm. Similarly, at the old firm he gets wage

$$w_2^o\left(y_2^o, y_2^n\right) = (1-\beta)\, w_2^n\left(y_2^n, y_2^o\right) + \beta y_2^o \tag{8}$$

[17] Related models where specific capital and turnover rates are endogenously modelled can be found in Chang and Wang (1995, 1996). They focus on the role of asymmetric information where current employers are assumed to know more about workers' productivity than potential employers.

[18] In an earlier version of the paper, we have analyzed a model in which specific skills s_i are endogenously accumulated at some cost, controlled by the employer in order to affect the worker's turnover rate. All results go through under the assumption that the complementarities between general and specific skills differ by industries according to the importance of specific skills in the production functions. Details are available from the authors upon request.

Solving the system of equations (7) and (8), we obtain

$$\begin{aligned} w_2^n(y_2^n, y_2^o) &= \frac{(1-\beta)\, y_2^o + y_2^n}{2-\beta} \\ w_2^o(y_2^o, y_2^n) &= \frac{(1-\beta)\, y_2^n + y_2^o}{2-\beta} \end{aligned}$$

The probability that the worker leaves the old firm in the second period is

$$\Pr\left(w_2^n(y_2^n, y_2^o) \geq w_2^o(y_2^o, y_2^n)\right) = \Pr\left(y_2^n \geq y_2^o\right) = 1 - G\left(f(h_2, s_i) - f(h_2, (1-i)\, s_i)\right)$$

which is decreasing in i. Thus, the introduction of firm specific human capital makes turnover endogenous. Together with our results in the previous subsection, we conclude that industries with more specific skills (higher i) have (endogenously) lower turnover rate and higher health investment.

3.4 Dynamics of Health Expenditure

In order to understand how health investment early in life affects health expenditure at older ages, we now assume that there is also a third period in which the individual is retired. In the third period, the utility of the individual depends on domestic production and the production function is $d(h_3)$, with $d'(\cdot) > 0$ and $d''(\cdot) < 0$. Assume now that health evolves according to

$$h_t = k(h_{t-1}, m_{t-1})$$

with the additional assumption that current health is a concave function of past health $\partial^2 h_t / \partial h_{t-1}^2 < 0$. Assume also that the individual bears the full cost of second period medical expenditure m_2.[19]

In this scenario, it is easy to show that the lower the medical expenditure m_1 is in the first period, the higher is expenditure m_2 in the second period. Thus, combining the relationship between m_1 and m_2 derived here with the relationship between firm specific capital and medical expenditure m_1, we should expect that workers in industries with more specific human capital should have a higher medical expenditure during the early career, but a lower medical expenditure latter in life.

3.5 Summary of Empirical Implications

We believe the model highlights in a simple and realistic way the interactions between general and specific human capital in modern labor markets. To summarize, our model makes the following predictions:

1. Employers pay a higher amount of workers' health expenditure in lower turnover industries (industries with more specific human capital);

[19] We could intriduce a Government that pays for medical expenditure in the third period as in Medicare and finances expenditure through taxation. If taxes were non-distortionary and there were no moral hazard, the allocation would be identical to the allocation considered here.

2. Individuals that are employed in lower turnover industries (industries with more specific human capital) have higher health expenditure when working;

3. Individuals that were employed in lower turnover industries have lower health expenditure when retired.

3.6 Discussion of Modelling Assumptions

We made a set of simplifying assumptions in our model in order to present the basic economic mechanism that we test in our empirical analysis. The model could be extended to incorporate many additional features at a cost of complication. For example, we abstracted away from risk aversion to focus on health care consumption (instead of insurance), which also led us to assume a deterministic health production function. It is worth emphasizing that we can relax these restrictions as long as we continue to assume frictional labor market.

The key assumption of frictional labor market is itself a reduced form assumption that can result from many different underlying mechanisms. For example, it could be arise from search frictions (it takes time to be matched with a new employer); it could result from asymmetric information regarding workers' true productivity; and it could be due to institutional restrictions on hiring and firing.[20]

4 Data

The goal of the empirical analysis is to measure the impact of job attachment on health insurance coverage, health status and use of medical care services at different points in an individual's life to document the dynamic externality predicted by our model.

We use three distinct sources of data in our empirical analysis. We obtain data on health insurance coverage, health status and use of medical care services for employed individuals from the Medical Expenditure Panel Survey (MEPS), and for retired individuals from the Health Retirement Survey (HRS). We further construct a proxy measure of current (for employed individuals) and past (for retired individuals) job attachment at the 3-digit industry level using from the 1991 Dictionary of Occupational Titles (DOT) following the procedure outlined by Crocker and Moran (2003) described below. We then match this proxy to each worker' 3-digit industry in the MEPS to investigate how *current* job attachment affects current health care consumption for employed individuals, and to the 3-digit industry of the longest reported job in the HRS to investigate how *past* job attachment affects current health care consumption for retired individuals.

[20] See Acemoglu and Pischke (1998) for elaborations on these potential mechanisms that can give rise to labor market frictions.

We now describe each dataset used. Since both MEPS and HRS are large, publicly available datasets, we only describe them briefly here and refer to their respective websites[21] for a more thorough description.

4.1 MEPS

MEPS is a set of large-scale surveys of families and individuals, their medical providers, and employers across the United States. It is conducted to provide nationally representative estimates of health care use, expenditures, sources of payment, and insurance coverage for the U.S. civilian non-institutionalized population.

MEPS has two major components: the Household Component (HC) and the Insurance Component (IC). HC is a household survey. It provides data from individual households and their members, which is supplemented by data from their medical providers. HC collects detailed information for each person in the household on demographic characteristics, health conditions, health status, use of medical services, charges and source of payments, access to care, satisfaction with care, health insurance coverage, income, and employment. The data report the 3-digit codes of industry and occupation of the individual.[22]

IC is an establishment survey. It collects information on the employer's health plan offerings. There are two distinct samples fielded in the MEPS IC survey: the List sample and the Link sample. These samples are designed to address different survey goals, but the two have been combined to make data collection more efficient. The List sample is an independently drawn, nationwide sample of establishments and state/local governments. The List sample is *not* linked to the MEPS-HC survey. The Link sample is a sample of employers that are identified by respondents in the HC as their main employer and source of their health insurance. Employers of MEPS HC jobholders are contacted and are asked about health plan offerings, premia, employee contributions to premia and other plan details for their establishment as a whole. This information is then linked to data collected in HC for the jobholder to provide a more complete picture of the jobholder's health plan options. The health plan questions are asked for each offered plan, up to a maximum of four.[23] We use in our analysis the IC Link sample only, since we can link it to the HC and thus to employee's characteristics and employee's consumption of medical care. It is important to note here that the IC Link is a selected sample, i.e. we observe plan characteristics only for those firms that offer health plans to their employees. In the sequel, for simplicity we will refer to the IC Link sample as the IC.

In our analysis we use MEPS data from the 1998 survey.

[21]The MEPS is available at `http://www.meps.ahrq.gov`. The HRS is available at `http://hrsonline.isr.umich.edu`.

[22]The 3-digit codes and the IC are restricted from public access.

[23]Most companies do not offer more than four plans.

4.2 HRS

The HRS began as a panel survey of a nationally representative sample of people aged 51 to 61 in 1992, including their spouses, with oversamples of blacks, Hispanics and residents of Florida. This original cohort (wave 1) has been re-interviewed every other year since then. In 1998 the sample was supplemented with both older and younger cohorts. A total of 6 waves are available.

The HRS is thus particularly well-suited to a study of health expenditure of retired individuals. It contains detailed information about current and past health status of respondents, along with rich data on their job history, and information about economic and demographic variables, including education, income, and wealth. Starting from wave 3, the survey asks questions about total medical expenditures. In some waves, a continuous value is reported, while in other waves a series of unfolding bracket questions are asked. Based on these brackets (and some additional variables), the RAND Corporation imputes a continuous value of total medical expenditure in each waves, and this is the dependent variable that we use in our empirical analysis.

The HRS also asks questions on the employment history of the individual. A respondent is asked about past jobs retrospectively at his/her first interview. From these questions, we can reconstruct the years of tenure at the longest reported job and, most importantly for our purposes, the 3-digit industry codes of the longest tenure job.[24]

We use HRS data from the 2002 wave only, which was the last wave available when we started this project. The main reason to use the last HRS wave is that individuals are older, which allows us to investigate more thoroughly the long-term dynamics of health expenditure.

4.3 DOT

To proxy for job attachment, we use a measure from the DOT of the training specificity required in various occupations. The variable, known as "Specific Vocational Preparation" (SVP) is defined as "the amount of time required to learn the techniques, acquire information, and develop the facility needed for average performance in a specific job-worker situation" (U.S. Department of Labor 1991) and is based on the nine categories of vocational preparation. Appendix B describes in more details these categories.

We construct a proxy for worker-level job attachment by imputing an SVP value to each individual either in the MEPS or in the HRS. We follow the procedure described by Crocker and Moran (2003). Basically, the procedure follows these two steps:

1. The SVP varies by occupation as defined by the DOT and the DOT provides a finer occupational classification than the Census, so there were often multiple SVP values associated

[24] We actually use the longest tenure job and its associated industry code exactly as constructed by the RAND corporation.

with each Census occupation code. To impute a unique SVP value to each Census occupation code, we took a simple average of the SVP values associated with each Census occupation.

   In summary, the first step generates a measure of job attachment at the 3-digit Census *occupation* level from the DOT occupation classification.

2. In order to construct a measure of job attachment at the firm level, we compute the average SVP value in each worker's industry, labelled ASVP, by averaging the SVP values by industry for all employed persons in the 1990 Census Public Use Microdata Sample (PUMS) (5% sample). Since the industry codes in the MEPS and in the HRS are at the three-digit level, representing some 240 distinct industries, we believe that ASVP is likely to provide a good measure of the average amount of job attachment present in individual firms.

   In summary, the second step generates a measure of job attachment at the 3-digit Census *industry* level from measure of job attachment at the 3-digit Census *occupation* level generated in the first step averaging the SVP by occupation in each industry, where the average is taken using the 5% sample from the Census.

High values of ASVP indicate high levels of industry-specific human capital. Crocker and Moran (2003) show that a higher *industry* ASVP value is a strong predictor of longer job tenure at the *firm* level, and of higher initial wage but slower wage growth, exactly as theories of specific human capital predict. Industries with the three lowest value of ASVP are "Services to dwellings" (industry code 722), "Services to private households" (industry code 761) and "Taxicab service" (industry code 402), all industries where common intuition suggests that specific human capital is not important. Industries with the highest value of ASVP are "Legal services" (industry code 841), "Engineering, architectural, and surveying services" (industry code 882) and "Miscellaneous professional and related services" (industry code 892), and again common intuition suggests that specific human capital is rather important in these latter industries.

A final justification for our using *industry* instead of *occupation* as the basis of our analysis is that most employers, when they provide health insurance benefits to their employees, often offer the same menu of plans to all of their workers, irrespective of their occupation. As such, it is the turnover rates of all the occupations in their firms that will impact the employers' decision about what benefits to be included in their health insurance offerings.[25]

4.4 Summary Statistics

Table 1 provides summary statistics for the main variables of the MEPS sample and of the HRS sample, respectively.

[25] In principle, the Employee Retirement Income Security Act of 1974 (ERISA) and its various amendments, did not preclude the employers from providing different menus of health insurance benefits to different set of workers. But firms do not do so because of concerns about equal treatment lawsuits.

[Table 1 About Here]

Table 1 shows that the workers in MEPS 1998 data averaged about 33.4 years, while those in HRS 2002 averaged about 73.4 years; 51.6% of those in MEPS 1998 and 41% of those in HRS 2002 are male. In 1998 dollars, workers in MEPS 1998 spent about 2,025 dollars in medical expenditures, while retirees in HRS 2002 spent about 8,903 dollars. About 64% of workers in MEPS 1998 were offered health insurance from their employers.

4.5 An Illustrative Comparison: Clerical Workers

Before proceeding to more formal tests of our hypotheses, in this subsection we present a simple illustrative comparison. In particular, we compare the level of medical expenditure of one occupation, clerical workers, across two one-digit industries – professional services and manufacturing – that have big differences in our proxy for job attachment ASVP. More specifically, the average ASVP across 3-digit industries contained in the one-digit industry "professional services" is 5.9, while it is 4.9 for "manufacturing."

[Table 2 About Here]

Table 2 simply compares the average medical expenditures for clerical workers during working (in MEPS) and during retirement in the two industries (professional services v.s. manufacturing). The comparison reveals that clerical workers in professional services have higher medical expenditure while working, but lower medical expenditure when retired. Both differences are statistically as well as economically significant. In MEPS 1998 data, clerical workers working in industries coded as " Professional Services" spent about 1,662 dollars in medical expenditures, in contrast to 1,193 dollars for clerical workers working in industries coded as "Manufacturing." The two averages are different from zero at a significance level of 3.9%. This ranking is reversed for clerical workers during retirement: in HRS 2002, we find that clerical workers who worked primarily in industries coded as "Professional Services" spent about 6,273 dollars, less than 8,777 dollars spent by those who worked form "manufacturing." The difference is significant at 6.3%.

While this evidence is clearly not conclusive, these numbers seem to uncover patterns consistent with our hypotheses. The next section develops more sophisticated empirical strategies to test them.

5 Empirical Framework

We investigate employers' offer and employees' consumption of medical care by analyzing several characteristics of employees' health insurance contract and utilization of health care.

The basic analysis in based on the following regression

$$y_i = \alpha \text{ASVP}_i + \beta X_i + \epsilon_i \tag{9}$$

where y_i is one of the several outcomes considered for individual i and X_i is a large set of control variables. ASVP_i is the key variable of interest. It is the Average Specific Vocational Preparation in the industry where individual i is currently working for currently employed workers or where individual i spent the longest time working prior to retirement (for retirees). The coefficient of ASVP_i, α, measures the average effect of our proxy for job attachment on the outcome y_i, after controlling for a large number of factors included in the vector X_i.[26]

Our dependent variables y_i include several characteristics of the health care/insurance contract offered by the employers, several measures of consumptions of medical services by the individuals and several measures of health status using the MEPS data and the HRS data. In particular, we use the MEPS data to analyze: 1) Offer of health care and health insurance. In particular, we investigate whether the employer of individual i offers health insurance; 2) for employers that offer health insurance, the characteristics of the contract, such as premium, fraction of the premium paid by the firm, deductible, coinsurance rate; 2) consumption of medical care, such as annual medical expenditure and annual medical charges (see later for the precise difference between the two); 4) consumption of preventive care and screening test. We include in the set X_i a large number of controls that might affect employers' offers of plans and employees' choice among them. We include employee's age (also squared and cubed), education, size of the family, sex, annual income, race, dummies for whether the individual lives in an MSA, dummies for different Census regions, and employer's total number of employees.

We later use HRS data to investigate retirees' consumption of medical care (annual medical expenditure). Ideally, we would like to include in the set of control variables X_i exactly the same variables we used in our analysis of MEPS data. However, since the datasets are different, this is not possible as some variables are coded differently, or are simply not reported. In our analysis of retirees' expenditure on HRS data we thus control for individual's age, education, sex, wealth, race and marital status.

6 Results on Employees and Employers

6.1 Offer of Insurance and Health Care

The simplest and most immediate test of our model is to investigate employers' offer of medical care/insurance. In Table 3 we present the result of a probit regression where the dependent variable is equal to 1 if individual i is offered health insurance by the employer of his current main job.

[Table 3 About Here]

[26] In particular, we include firm size in all of our regression in light of the well-known fact that small private employers in the U.S. are less likely to offer health insurance to their employers (see Ellis and Ma 2005 for these facts and an explanation.)

As predicted by the model, Table 3 shows that the coefficient of AVSP is positive and significant. Individuals working in industries with lower turnover - as proxied by a high ASVP value - are more likely to be offered health insurance by their employers. The magnitude of the coefficient is also quite remarkable: a one unit change in ASVP (equal to 1.2 standard deviations) increases the probability of being offered health insurance by 5.8 percentage points, a rather large effect. This translates into a 9% increase in the employee's likelihood of receiving insurance, since the fraction of employees that receive insurance in the sample is 64%.

6.2 Characteristics of the Health Plans

The MEPS IC includes detailed data on characteristics of the health plans that employers offer to their employees, such as whether there is a deductible, the amount of the deductible, the fraction of the total premium paid by the employer, and the premium paid by the employee. We now investigate how employees' turnover, as proxied by ASVP, affects plan's characteristics. In each regression, one observation is a single plan, so for each individual there might be multiple plans. Moreover, as we mentioned in the description of the MEPS data in Subsection 4.1, the IC sample is a selected sample and all regressions are not corrected for sample selection.[27]

`[Table 4 About Here]`

Table 4 reports the results of our regressions. We investigate in Column (1) whether the policy has a deductible or not using a Probit regression; in Column (2) the amount of the deductible using an ordered probit regression to take into account the bunching of deductible at a small number of multiples of hundred dollars; in Column (3) the fraction of the total premium paid by the firm using a Tobit regression to take into account censoring at zero dollars (policy entirely paid by the employee);[28] in Column (4) employee' annual contribution (the cost of the contract to the employee) using a Tobit regression to take into account the censoring at zero dollars.

By and large, Table 4 shows that lower industry turnover–as proxied by higher ASVP–is associated more generous health insurance contracts that are not more costly for the employees.[29] Individuals in lower turnover industries are offered contracts that are less likely to have a deductible or with lower overall individual deductible, but they pay a lower fraction of the total premium, and they do not pay a higher level of premia for their coverage.

The magnitudes of the coefficients have also important economic significance. The probit regression in Column (1) shows that a unit increase in ASVP decreases the probability that the policy

[27]Sample selection should actually strengthen our results, since the unobservables that lead firms to offer a health plan should be positively correlated with the unobservables that lead firms to offer more generous health plans. Nonetheless, we are currently working on correcting the regressions for sample selection.

[28]The fraction paid by the firm could in principle be right-censored at 1 too. However, in the sample there is no contract for which the firm pays 100% of the total premium.

[29]One potentially interesting question is how employees characteristics are priced in the health insurance market.

has a deductible by 5.5 percentage points. In the sample, 42% of contracts have a deductible, so a 5.5 points reduction means that a unit increase of ASVP decreases the likelihood that the contract has a deductible by 13%. Similarly, the coefficient of ASVP in Column (2) suggests that a unit increase in ASVP on average decreases by around $100. However, the dependent variable in Column (2) has a lot of missing observations. The sample size drops from 11563 observations in Column (1) to 2327 observations in Column (2), and this sample size drop suggests caution in interpreting the results of the regression in Column (2).

Similarly, the results reported in Column (3) imply that a one unit increase in ASVP increases the share of the total premium paid by the firm by 2.5 percentage points, which is 3.5% of the average premium paid by the firm.

Overall, the evidence reported in this subsection indicates that employees working in lower turnover industries receive more comprehensive medical coverage, but do not pay more, in line with the predictions of our model.

6.3 Medical Expenditure

The findings of the previous subsection show that employees working in lower turnover industries pay less, but receive more comprehensive medical coverage. In this subsection we investigate if more generous coverage indeed corresponds to higher medical expenditure. In particular, Proposition (1) of our simple model suggests that workers with higher job attachment should have more incentives to invest in health. Thus, we investigate whether employees' annual medical expenditure is systematically correlated to our proxy for their job attachment ASVP.

In Tables 5a and 5b we present the results of several regressions that investigates employees' consumption of health care using the MEPS HC data. In Column (1) and (3) of Table 5a the dependent variable is total health care charges, while in Column (2) and (4) of Table 5a the dependent variable is total health care expenditure. Table 5b is constructed similarly, but uses instead the log of health care charges and the log of health care expenditures. The difference between charges and expenditures is that charges represent the sum of all fully established charges for care received and usually does not reflect actual payments made for services, which can be substantially lower due to factors such as negotiated discounts, bad debt, and free care. Instead, expenditures refer to what is paid for health care services.

`[Tables 5a and 5b About Here]`

In Columns (1) and (2) we consider all individuals currently working, while in Columns (3) and (4) we only consider individuals that are currently working and have obtained health insurance through their job.[30] Since the dependent variables are censored at zero expenditures and zero

[30]This includes also a small number of people that have obtained insurance from a union. The regressions in Column (3) and (4) are not corrected for selection.

charges, we employ Tobit regressions.[31]

Tables 5a and 5b show that individuals working in lower turnover industries have higher charges and higher expenditures. This is true unconditionally, as Columns (1) and (2) show, but also conditional on receiving health insurance through their job, as Columns (3) and (4) show. The coefficients reported in Column 4 of Table 5a imply that a unit increase in ASVP increases annual medical expenditure by around $113 dollars, or about 6% of the average medical expenditure, a rather large effect. The coefficient of ASVP reported in Column 4 of Table 5b is much bigger: it would imply that a unit increase in ASVP increases annual medical expenditure by about 15%. The difference between the two coefficients indicates that individuals in low turnover industries have higher average medical expenditure and also lower variance of medical expenditure,[32] which is at odds with theories that suggest that a higher job attachment makes pooling health insurance contracts more feasible (e.g., Crocker and Moran 2003).

6.4 Doctor Visits

The regressions of tables 5a and 5b show that individuals with higher job attachment have higher medical expenditure. This could arise for two reasons: 1) they receive higher *quality* care; 2) they receive higher *quantity* of care. Our simple model had no quality differences, and we believe it is important to separate these two alternative scenarios. It will also prove particularly useful when in section 8 we compare medical care in the U.S. and the UK: in countries with national health systems like the UK it is often difficult to have data on individual medical expenditure since individuals do not pay for most medical care obtained; instead *quantities* of medical services received are often well recorded.

Table 6 reports the coefficients of negative binomial regressions that investigate the number medical provider visits.[33] In columns (1) and (2) the dependent variable is the total number of annual office-based visits; in columns (3) and (4) the dependent variable is the number of such visits to physicians.[34]

The table clearly shows that individuals working in lower turnover industries visit a doctor more frequently. This is true unconditionally, as columns (1) and (3) show, and also conditional on receiving health insurance, as columns (2) and (4) show. The magnitudes of the coefficients imply

[31] Results using Powell's Censored Least Absolute Deviation (CLAD) are very similar and not reported.

[32] This is an immediate implication of Jensen's inequality. The reason is that the log transformation of the dependent variable changes the properties of the error term in a non-trivial way. See also Santos Silva and Tenreyro (2006).

[33] Medical provider visits consist of encounters that took place primarily in office-based settings and clinics. Care provided in other settings such as a hospital, nursing home, or a person's home are not included in this category.

[34] Total number of office visits is the sum of visits to physicians and nonphysicians. MEPS classifies the following categories as nonphysicians: chiropractors, midwives, nurses and nurse practitioners, optometrists, podiatrists, physician's assistants, physical therapists, occupational therapists, psychologists, social workers, technicians, and receptionists/clerks/secretaries.

that a unit increase in ASVP is associated with a four percent increase in the number of annual doctor visits, a considerable magnitude.

[Table 6 About Here]

6.5 Preventive Care

One of the most important components of health care is preventive care, which includes medical decisions such as vaccinations, clinical preventive services delivered during periodic health examinations and private heal lifestyle decisions such as regular exercises and non-smoking. Preventive care expenditure is by nature a forward-looking health investment (see Kenkel 2000 for an overview of economic issues related to preventive care). Our model links the health investment individuals make early in life to their later health outcomes. Early health investment reduces later health expenditure, and we believe this simple mechanism could potentially have big welfare effect. Medical research has demonstrated that certain types of treatments, such as preventive care and screening tests are critical in helping people live healthier lives. MEPS HC asks several questions about the consumption of different screening tests, and in this subsection we investigate whether consumption of these preventive care varies systematically with our proxy for job attachment ASVP.

In line with the recommendations of the Guide to Clinical Preventive Services (2006), we investigate whether individuals have received the following screening tests: pap smear for women aged 18 and over; mammogram for women aged 40 and over; breast exam for women aged 35 and over; cholesterol check for men aged 35 and over and women aged 40 and over. All the answers are recorded in discrete categories that report how long ago the individual was tested. The categories are: 1) Less than 1 year ago; 2) Between 1 and 2 years ago; 3) Between 2 and 5 years ago; 4) More than years ago but not never; 5) Never.

[Tables 7a and 7b About Here]

Tables 7a reports the results of ordered probit regressions that investigate the probability of having received the tests. Table 7b reports the results of probit regressions where the dependent variable is equal to 1 if the individual has received the test within the last 2 years, and 0 otherwise. Columns (1) to (4) of Table 7a and 7b report results for all individuals that meet the gender and age restrictions, while Columns (5) to (8) report results only for those individuals that meet the gender and age restriction that have obtained health insurance through their job.

Tables 7a and 7b show that individuals in lower turnover industries are unconditionally more likely to receive screening tests. All coefficients of ASVP in Table 7a are negative and significantly different from zero. The point estimates of the coefficients are generally similar between the Columns (1)-(4) and Columns (5)-(8). The significance of the coefficients decreases slightly, but for all tests they remain significantly different from zero at the 10% level, providing strong support for our hypothesis. The coefficients reported in Table 7b show similar results, although now the coefficient of ASVP in the mammogram probit equation of Column (6) becomes insignificant. Moreover, the results of the probit regressions of Table 7b mean that a unit increase in ASVP increases the probability that the individual has received the Pap Smear test by 2.2%, the Mammogram by 3.2%, the Breast Exam by 3.3% and the Cholesterol Check by 2.5%, and these magnitudes are very similar for individuals with and without insurance.

6.6 Health Status of Workers

MEPS also allows us to investigate individuals' health outcomes. We think this is particular important in the context of our theoretical framework, since in our simple model individuals make health expenditure to improve their health status. Thus, studying health outcomes allows us to establish a direct link between the previously documented health expenditure and health status, corroborating the investment role of medical care.

MEPS HC reports a categorical indicator of self-reported health status, with 1 indicating "Excellent,", 2 for "Very Good", 3 for "Good", 4 for "Fair" and 5 for "Poor." Hence, we investigate how industry ASVP is related to self-reported health using an ordered Probit regression. Table 8 reports the results. The coefficient of ASVP is negative and statistically significant, indicating that workers in higher ASVP industries have better self-reported health, as predicted by our model.

`[Table 8 About Here]`

7 Results on Retirees

7.1 Medical Expenditure

We now investigate the long term consequences of lower investment in health during the working career. More specifically, we investigate empirically if lower health investments during the working years lead to higher health expenditure during retirement using the HRS data. From a policy perspective, we believe it is particularly important to understand if lower expenditure early in life affects government health expenditure through Medicare and other public insurance programs.

In Tables 9 we present the results of regressions that investigates retirees' consumption of health care using the HRS data. The sample considered in column (1) includes all individuals covered by Medicare, while Column (2) includes all individuals covered by any government health insurance. As the table shows, results across the two specifications are pretty similar.

`[Table 9 About Here]`

Table 9 shows that medical expenditure of the elderly is higher for individuals that were working in high turnover industries, as predicted by our model. In particular, the value of the estimated coefficients shows that an increase of one standard deviation of industry ASVP is on average associated with an 800 dollars increase of retirees' medical expenditure per year.[35]

Overall, we believe the magnitudes of the differences in expenditure are substantial. Moreover, based on this analysis on retirees' expenditure and the previous analysis on workers' expenditure, we can perform the very rough back of the envelope calculation of comparing the lifetime expenditures of two workers A and B whose only difference is the industry in which they work. Suppose both individuals work about 50 years always in the same industries and then are retired for 15 years before dying, but individual A works in an industry in which skills are one standard deviation more specific than the industry where individual B works. As Table 5a shows, during the working years, individual A has annual medical expenditure about $100 *higher* than individual B. Instead, when retired, Table 9 shows that individual A has annual medical expenditure about $800 *lower* than individual B. Thus, according to our estimates, during the working years individual A's cumulative health expenditure is on average $5000 higher than the health expenditure of individual B. During the retirement years, individual A's health expenditure is instead $12,000 lower than the individual B's. The total difference is around $7000. Obviously, this is a very rough calculation that neglects many important factors, such as switch across industries. Moreover, it comes from two cross sectional datasets and not from a very long panel. In addition, on one side it neglects discounting, but on the other side it also neglects that the price of medical care has been rising more than the interest rate. Furthermore, it neglects any effect of early health investment on mortality, and on-the-job productivity (due both to sick-day productivity loss and earlier retirement due to poor health). Nonetheless, we believe it describes in a very simple way the externality we have in mind and its magnitude in the data.[36]

In addition, unreported quantile regressions show that the lower medical expenditure of retirees that worked in high ASVP industries is achieved by reducing the upper tail of medical expenditures. In particular, even a simple comparison of the distribution of medical expenditure of below- and above-median ASVP show a much fatter right-tail for individuals that were working in high ASVP industries. We believe this is a particularly interesting results, as it is well known that a small fraction of people account for a very large fraction of total medical expenditure.

7.2 Health Status of Retirees

We also investigate retirees' health status. In MEPS we found that individuals with higher medical expenditure have better self reported health. Our model suggests that in HRS individuals with lower medical expenditure should have better self reported health status.

HRS reports a categorical indicator of self-reported health status, with 1 indicating "Excellent,", 2 for "Very Good", 3 for "Good", 4 for "Fair" and 5 for "Poor." Hence, we investigate how past-

[35]The p-values of the coefficients of ASVP are .057 and .060, respectively.

[36]In fact, we believe that this is a serious underestimate of the real benefits of early health investment.

industry ASVP is related to self-reported health using an ordered Probit regression. Table 10 reports the results. The coefficient of ASVP is negative and statistically significant, indicating that retirees that worked in higher ASVP industries have better self-reported health, as predicted by our model.

[Table 10 About Here]

8 Falsification Tests

In this Section, we present several falsification tests in order to show that the relationship between health expenditure, health outcome and industry turnover rates we documented above for the U.S. is related to its unique employment-based health insurance system. In particular, countries with a national health system should not exhibit the same patterns that we documented for the U.S.. To this end, we use data from the UK–a country that has a national health system (supplemented by additional private health insurance)–to perform several falsification tests.

In the first falsification test, we examine whether a similar relationship between medical expenditure and ASVP we documented in Tables 5a and 5b for U.S. workers holds for UK workers. Since most individuals in the UK receive medical care from the National Health System, we should not expect the medical expenditure of UK workers to have the same relationship with our proxy for job attachment ASVP.[37] We thus use the 1998 UK Family Expenditure Survey (UK FES) to examine this issue.

Performing this falsification test using the UK FES is not ideal for a number of reasons. First, UK FES and U.S. MEPS have different survey questionnaires that limit our ability to perform a more thorough comparison. In particular, UK FES does not report an individual's education, which we have found to be an important predictor of medical expenditure. Instead, UK FES reports a variable called "Social Class", which we take to be the closest substitute to education. Moreover, other variables are coded differently: for example the variable "Size of the firm" is a simple dichotomous variable that reports whether the employer has 25 or more workers. But probably the more troubling issue is that UK FES reports only private medical expenditure and not the medical care obtain through the National Health System. With all these caveats in mind, nonetheless it is interesting to see that Table 11 shows that in UK, medical expenditure does not have a statistically significant relationship with the corresponding industry ASVP.

[Table 11 About Here]

The previous caveats suggest that the comparison of medical expenditure between the U.S. and the UK might be flawed. A more effective way to compare medical care may be to compare

[37] It is important to note that ASVP is calculated on U.S. data. Nonetheless, in unreported regression we find that it is significant predictor of job tenure of UK workers, as we found for U.S. workers.

the *quantity* of services consumed by individuals. To this end, we perform a second falsification replicating the analysis of doctor visits for U.S. individuals that we did in table 6 with UK data. Again, we do not expect the number of doctor visits of UK workers to have the same relationship with our proxy for job attachment ASVP. To perform the test we use the 1997 wave of British Household Panel Survey (BHPS), a dataset that reports detailed informations on health-related issues of a sample of UK individuals.[38] Table 12 reports the results of negative binomial regressions where the dependent variable is the number of annual doctor visits. As expected, table 12 shows that in the UK there is no statistical difference between individuals with high and low job attachment ASVP in the frequency with which they visit a doctor, in contrast to the evidence for U.S..

[Table 12 About Here]

The third falsification test investigates the relationship between health status and industry ASVP for UK workers. As in the previous falsification test, we should not expect health status of UK workers to have the same relationship with our proxy for job attachment ASVP as in the U.S., since the UK has a National Health System and the mechanism of our model should not apply. We use again the 1997 wave of BHPS to perform the test. As in MEPS, BHPS records individuals' self-reported health status, classified in 5 categories, with 1 indicating "Excellent", 2 for "Good", 3 for "Fair", 4 for "Poor" and 5 for "Very Poor." Table 13 presents the results of our ordered probit regression. The coefficient of ASVP is negative, but it is not statistically different from zero. This is in sharp contrast to what we found using U.S. data and provides additional evidence of the relevance of the mechanism identified by our model.

[Table 13 About Here]

9 Alternative Hypotheses and Selection

In this Section, we discuss a number of alternative hypotheses. Most of these alternative hypotheses consider some form of selection (based on different unobservables) that might drive the observed correlations between job attachment on one side, and health plan offers and medical expenditure on the other side. However, we show that several features of the data are inconsistent with the idea that these selection mechanisms are the main driving force of observed correlations.

Are "good" employers in high ASVP industries, and "bad" employers in low ASVP industries? The *first* potential concern we address is that in principle the observed correlation between job attachment and health plan offers could simply be due to the fact that there are

[38] We use the 1997 wave since it reports UKSIC92 industry codes, while most other waves use a different industry classification system. UKSIC92 allows us to construct an easier crosswalk with US Census Industry Codes.

some employers who offer all benefits to their workers (good employers), and these employers are in high ASVP industries. Thus, we use the MEPS IC to investigate whether the relationship we found between an industry's ASVP (proxy for exogenous turnover tendency) and the offering of health plan (Table 3), as well as the characteristics of health plans (Table 4) also shows up in other components of a typical employee benefits package.

MEPS IC asks whether employers offer benefits such as paid vacations, sick leaves, life insurance, disability insurance, pension plan, medical savings account, flexible spending account, and cafeteria plans. Hence, we investigate whether job attachment–as proxied by ASVP–affects employers' offer of these other benefits. This is particularly important for our hypothesis that turnover rates are related to health expenditures because of dynamic externalities. To find that other employee benefits that are presumably not subject to dynamic externalities are indeed unrelated to industry ASVP will provide support for our hypothesis against alternative explanations.

Unfortunately, a number of these benefits have many missing observations, and in some cases (medical savings account, flexible spending account, and cafeteria plans) the missing observations were too many for the estimates to be reliable. In Table 14, we report the coefficients of Probit regressions that investigate whether job attachment, as proxied by ASVP, affects employers' offering of paid vacations, sick leaves, life insurance, disability insurance, and pension plans. All these regressions are corrected to take into account the sample selection criteria, i.e. we observe a firm in MEPS IC if the firm offers health insurance and has been sampled.

Table 14 shows that in most of the Probit regressions the industry ASVP does not have a statistically significant effect. Interestingly, benefits that are less likely to be related to long-term human capital (paid vacations and pension plan) have an insignificant relationship with ASVP. This is in contrast with our findings in Tables 3 and 4, where ASVP has an economically and statistically significant relationship with employers' health plan offering and the characteristics of health plans. Similarly, the benefit that is most similar to health insurance - disability insurance - has instead a positive and significant coefficient, providing additional support for our hypotheses. The coefficient on ASVP in the life insurance regression might seem a little bit at odds with our explanation, as there is no obvious connection between life insurance and long term human capital. However, probably offering health insurance decreases the cost of offering life insurance, and this might easily rationalize the positive correlation between ASVP and life insurance offering.[39]

`[Table 14 About Here]`

Is health more important in industries that have also higher job attachment? The *second* potential concern we address is that in principle the observed correlation between job attachment and health plan offers and expenditures could simply be due to the fact that health is

[39] Interestingly, Crocker and Moran (2003) find no relationship bewteen ASVP and life insurance offerig using the NMES 1987.

more important in industries that have also higher job attachment. To address this issue, we again turn to the DOT data, as their report, along with the SVP we previously used, a variable called *Strength* defined as follows: "The Physical Demands Strength Rating reflects the estimated overall strength requirement of the job ... It represents the strength requirements which are considered to be important for average, successful work performance."

Obviously, strength is not the same as health. But it is plausible that in occupations and industries where strength is important, health is also particularly important, as a non-healthy worker generally loses at least part of his strength. Thus, if the observed correlations between job attachment and health expenditures were due to the fact that health is more important in industries in which job attachment is high, then we should expect strength and job attachment to be positively correlated.

However, it turns out that SVP and Strength are negatively correlated ($\rho = -.225$) at the occupational level (the DOT data). They are even more negatively correlated at the industry level ($\rho = -.592$), when we thus average occupations within each industry according to the occupation and industry codes reported in the 5% sample form the Census. We thus conclude that is not plausible that the observed correlations can be explained because health is more important in industries that have higher job attachment.

Do high turnover industries have flatter wage profiles, thus attract more myopic due to their higher initial wages? A *third* potential explanation has to do with different wage profiles by industry. It might be that in high turnover industries wage profiles are flatter (higher wages earlier, but with slower wage growth over time) and more myopic people go into these industries, attracted by the higher initial wage. These people are likely to have a different intertemporal discount, i.e. value today much more than tomorrow. This would explain why their health expenditure is lower and employers offer them less health care.

However, this explanation is in sharp contrast with current theories of human capital, and also with our simple model. *General* human capital *steepens* wage-tenure profiles because workers must pay, in the form of lower wages, for any training that is general and thus transferable across employers. Early in the career, workers receive investment in human capital and lower wages. When human capital begins to increase productivity later in the career, workers have higher earnings. Because general human capital is transferable, firms must pay workers their full marginal product in the post-investment period. Conversely, any type of *specific* human capital *flattens* wage-tenure profiles because the firm makes a specific investment, but recoups its investment later once the workers are locked in. Indeed, this is exactly what our model predicts.

High turnover industries have lower scores of ASVP, thus specific human capital is less important and general human capital is more important in such industries. As a result, theoretically we should have expected high turnover industries to have steeper, not flatter (as needed for this alternative explanation), wage profiles.

Empirically, Crocker and Moran (2003) exactly confirm these predictions of human capital theories. In their wage regression (see Table 2 of their paper) they find that the coefficient ASVP is positive, the coefficient on the interaction between ASVP and "Job Tenure" is negative, while the coefficient on the interaction between ASVP and "Years of Education" is positive, after controlling for a number of worker demographics and firm characteristics, indicating that returns to tenure is higher in lower ASVP (thus high turnover) industries. We thus conclude that workers' myopia cannot explain our findings.

Could it be a pure wealth effect? A *forth* potential alternative explanation is a pure wealth effect. If wages are higher in low turnover industries, then a simple wealth effect might explain why health expenditure is higher in low turnover industries. Indeed, in a recent paper Hall and Jones (2006) argue that the growth of health spending in the past half century is a rational response to the growth of income per person. According to their model, health spending is a superior good with an income elasticity well above one.

Clearly, our explanation and Hall and Jones' are not mutually exclusive. Hall and Jones focus on the growth of expenditure in the last 20 years, while we focus on the intertemporal profile of expenditure. However, we believe that the wealth effect cannot fully explain a number of our cross-sectional results. First, all our regressions on MEPS data include individuals' current income and the best proxy for permanent income, i.e. education. Moreover, in the regressions using HRS data we find exactly the opposite: in Table 9, the coefficient of the (log of) total asset is negative, suggesting that wealthier retired individuals spend less in health.

In summary, we believe that the wealth effect cannot explain the intertemporal patterns in health expenditure that we document in our analysis.

What about job lock and commitment? As we briefly mentioned in the introduction, there is a large established literature showing that employment-based health insurance provides inefficiently low separation between mismatched workers and firms. To take this job lock hypothesis to a dynamic setting, we would expect to see that industries with high ASVP, because they are more likely to offer health insurance (as we show in Table 3) and more likely to offer better health insurance contracts (as we show in Table 4) should be more attractive to workers with worse health: after all, healthy workers benefit less from generous health insurance. In a steady state, then job lock dynamics should lead to a negative relationship between workers' health and ASVP. Instead, Table 8 showed us that the opposite is true. The coefficient of ASVP is negative and statistically significant, indicating that workers in higher ASVP industries have better self-reported health. This shows that job lock can not be the only mechanism at work to explain our previously documented relationship between industry ASVP and medical expenditure (in Table 5a and 5b).

Moreover, a similar argument reveals the negative relationship between ASVP and health status is also inconsistent with a steady state extension of the model in Crocker and Moran (2003). They argue that impediments to worker mobility such as specific skills serve to mitigate the attrition of all individuals from employer sponsored insurance pool. Nonetheless, in their model the healthier workers are still more likely to switch job. Thus, even starting with an identical pool, we should expect over time low turnover industries to be populated by less healthy individuals.

10 Conclusion

In this paper we investigated how the employment-based health insurance system in the U.S. affects individuals' life-cycle health-care decisions. We take the viewpoint that health is a form of human capital that affects workers' productivities on the job, and derive implications of employees' turnover on the incentives to undertake health investment. Our model suggests that employee turnovers lead to dynamic inefficiencies in health investment, and particularly, it suggests that employment-based health insurance system in the U.S. might lead to an inefficient low level of individual health during individuals' working ages. Moreover, we show that under-investment in health is positively related to the turnover rate of the workers' industry and increases medical expenditure in retirement.

We present a model that makes this process explicit and then investigate its empirical relevance using data from the Medical Expenditure Panel Survey and the Health and Retirement Survey. We document a large number of empirical patterns all consistent with our hypotheses. Moreover, the magnitude of our estimates suggests significant degree of intertemporal inefficiencies in health investment in the U.S. as a result of the employment-based health insurance system. A very rough back of the envelope calculation suggests that on average every additional dollar of health expenditure during working years may lead to about 2.5 dollars of savings in retirement. While such calculations are necessarily rough, it does suggest potential channels to help solve the crisis of ever-rising health care costs in the U.S.

Finally, the results in this paper provide a strong link between the institutional features of the U.S. health care market, the incentives to invest in health it generates, and health outcomes. We believe that the interaction between private and public provision of medical care in the U.S. might be particularly subject to the dynamic externality we consider. Indeed, a striking manifestation of the intertemporal interactions between private employment-based health insurance system and the public Medicare is shown in Figure 1, taken from Hagist and Kotlikoff (2005). Figure 1 graphs the ratio of the per capita health expenditures of different age groups relative to that of the 50-64 age group for 10 OECD countries, including the U.S. While the per capita health care expenditure is higher for the 65-69 age group than for the 50-64 age group, that ratio is much higher in the U.S. (5.1) than all the other nine OECD countries (where Canada has the second highest ratio at 2.45). Specifically, the timing of the interaction between private health insurance and Medicare implies that health investment not made prior to age 65 generates health costs that increase Medicare's expenditures. Moreover, it seems plausible to suspect that Medicare availability at age 65 leads individuals to delay more costly health expenditure after they turn 65.[40] We believe these are first order policy issues and we hope that our paper spurs further research on these important topics.

[Figure 1 About Here]

A Proof of Proposition 1:

Proof. The Proof follows easily from the equilibrium equations (4) and (5). To show (i), write (4) as:

$$\lambda\left(m_1^*, q\right) = \left[qv'\left(k\left(h_1, m_1^*\right)\right) + (1-q)\, f'\left(k\left(h_1, m_1^*\right)\right)\right] \frac{\partial k}{\partial m_1} - p = 0.$$

Using the implicit function theorem, we have:

$$\frac{\partial m_1^*}{\partial q} = -\frac{\partial \lambda\left(m_1^*, q\right)/\partial q}{\partial \lambda\left(m_1^*, q\right)/\partial m_1^*}.$$

Since

$$\frac{\partial \lambda\left(m_1^*, q\right)}{\partial q} = -\left[f'\left(k\left(h_1, m_1^*\right)\right) - v'\left(k\left(h_1, m_1^*\right)\right)\right] \frac{\partial k}{\partial m_1} < 0$$

where the inequality follows from the wage compression assumption $f' > v'$; and

$$\begin{aligned} \frac{\partial \lambda\left(m_1^*, q\right)}{\partial m_1^*} &= \left[qv''\left(k\left(h_1, m_1^*\right)\right) + (1-q)\, f''\left(k\left(h_1, m_1^*\right)\right)\right] \left(\frac{\partial k}{\partial m_1}\right)^2 \\ &\quad + \left[qv'\left(k\left(h_1, m_1^*\right)\right) + (1-q)\, f'\left(k\left(h_1, m_1^*\right)\right)\right] \frac{\partial^2 k}{\partial m_1^2} < 0 \end{aligned}$$

for the second order condition to hold, we have:

$$\frac{\partial m_1^*}{\partial q} < 0.$$

To show (ii), from equation (5), the amount $w_1^* - \left(f\left(h_1\right) - pm_1^*\right)$ is equal to:

$$w_1^* - f\left(h_1\right) + pm_1^* = (1-q)(1-\beta)\left[f\left(k\left(h_1, m_1^*\right)\right) - v\left(k\left(h_1, m_1^*\right)\right)\right].$$

Thus,

$$\begin{aligned} \frac{\partial\left(w_1^* - f\left(h_1\right) + pm_1^*\right)}{\partial q} &= -(1-\beta)\left[f\left(k\left(h_1, m_1^*\right)\right) - v\left(k\left(h_1, m_1^*\right)\right)\right] \\ &+ (1-q)(1-\beta)\left[f'\left(k\left(h_1, m_1^*\right)\right) - v'\left(k\left(h_1, m_1^*\right)\right)\right] \frac{\partial k}{\partial m_1} \frac{\partial m_1^*}{\partial q} < 0 \end{aligned}$$

which concludes the Proof. ∎

[40] Card, Dobkin and Maestas (2005) document a discrete increase in the use of health care corresponding to the onset of Medicare eligibility at age 65.

B Specific Vocational Preparation (SVP)

This appendix provides some background information from DOL about the variable "Specific Vocational Preparation" in the DOT data:

"Specific Vocational Preparation is defined as the amount of lapsed time required by a typical worker to learn the techniques, acquire the information, and develop the facility needed for average performance in a specific job-worker situation. This training may be acquired in a school, work, military, institutional, or vocational environment. It does not include the orientation time required of a fully qualified worker to become accustomed to the special conditions of any new job. Specific vocational training includes: vocational education, apprenticeship training, in-plant training, on-the-job training, and essential experience in other jobs. Specific vocational training includes training given in any of the following circumstances: (a). Vocational education (high school; commercial or shop training; technical school; art school; and that part of college training which is organized around a specific vocational objective); (b). Apprenticeship training (for apprenticeable jobs only); (c). In-plant training (organized classroom study provided by an employer); (d). On-the-job training (serving as learner or trainee on the job under the instruction of a qualified worker); (e). Essential experience in other jobs (serving in less responsible jobs which lead to the higher grade job or serving in other jobs which qualify).

The following is an explanation of the various levels of specific vocational preparation (Note: The levels of this scale are mutually exclusive and do not overlap):

Time Requirement	Numerical Value
Short demonstration only	1
Anything beyond short demonstration up to and including 1 month	2
Over 1 month up to and including 3 months	3
Over 3 months up to and including 6 months	4
Over 6 months up to and including 1 year	5
Over 1 year up to and including 2 years	6
Over 2 years up to and including 4 years	7
Over 4 years up to and including 10 years	8
Over 10 years	9

C An Alternative Empirical Strategy

To check the robustness of our results, in this appendix we present results from an alternative instrumental variable empirical strategy to deal with the endogeneity problem (or reverse causality) between worker turnover and health insurance offering (as employees might be more likely to leave jobs that do not offer health insurance).

To correct for this reverse causality concern, we employ instruments that shifts the job tenure of the individual independently of the health insurance contract offered to him. More specifically, we use as an instrument for the current job tenure of individual i of age a working in the 3-digit industry j the average tenure of the individuals of age a in the same 3-digit industry j in the UK, calculated from the 1997 UK Labour Force Survey. The idea is that reverse causality is not a concern in the UK, since there is a National Health System. Thus, average industry turnover in the UK precisely captures only the average job attachment in each industry.

[Table 15 About Here]

We do not report the results for all regressions, for sake of space we only report in Table 15 the results of the most important regressions of our analysis. Column (1) reports whether health insurance is offered, and Column (2) reports the fraction of the premium paid by the employer. Table 15 shows that jobs with longer tenures are associated with more coverage and employers pay a higher fraction of the health plan premium, as our model predicts.

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Table 1: Descriptive Statistics for MEPS 1998 and HRS 2002

Variable	Mean	Std. Dev.
Panel A: MEPS 1998		
ASVP	5.1909	0.8315
Age	33.3507	22.5347
Years of Education	8.9978	6.8170
Male	0.5160	0.4997
Income	16,694.700	23,717.210
Size of Family	3.5613	1.8267
Union Membership	0.0532	0.2244
Less than 99 Employees	0.2623	0.4399
Between 100 and 199 Employees	0.0241	0.1535
Between 200 and 299 Employees	0.0371	0.1891
Between 300 and 399 Employees	0.0126	0.1117
Between 400 and 499 Employees	0.0043	0.0653
More than 500 Employees	0.0644	0.2455
Health Insurance Offered	0.6401	0.4800
Total Medical Charges	3,066.272	13,113.020
Total Medical Expenditure	2,025.265	7,002.384
Panel B: HRS 2002		
ASVP	5.234	0.819
Age	73.390	5.440
Years of Education	12.060	3.306
Male	0.410	0.490
Total Assets	333,571.000	890,713.000
Size of Family	1.996	0.928
Total Medical Expenditure	8,903.093	24,995.410

Notes: Total Assets and Total Medical Expenditure have been deflated to correspond to 1998 dollars. Number of Observations vary by variable.

Table 2: Medical Expenditures of Clerical Workers in Two Industries During Working and Retirement: An Illustration

	MEPS	HRS
Professional Services	1661.635 (154.918)	6272.633 (577.831)
Manufacturing	1192.775 (148.055)	8776.815 (1971.792)
p-value of difference	0.0391	0.0631

Notes: Standard errors in parentheses. Clerical workers are 1990 Census occupation codes 303 to 389. Professional services are 1990 Census industry codes 812 to 893. Manufacturing are 1990 Census industry codes 100 to 392.

Table 3: Offer of Health Insurance: Probit Regression Results

Independent Variable	Health Insurance Offered
ASVP	0.16339
	(0.04324)***
Age	0.2188
	(0.03434)***
Age Squared	-0.00372
	(0.00077)***
Age Cubed	0.00002
	(0.00001)***
Years of Education	0.04144
	(0.00932)***
Male	0.12086
	(0.06018)**
Income/10,000	0.09865
	(0.01158)***
Size of Family	-0.03958
	(0.01067)***
Union Membership	0.88743
	(0.07811)***
Less than 99 Employees	-0.01718
	(0.08362)
Between 100 and 199 Employees	0.79621
	(0.09983)***
Between 200 and 299 Employees	0.69355
	(0.09081)***
Between 300 and 399 Employees	0.72526
	(0.10892)***
Between 400 and 499 Employees	0.96619
	(0.22075)***
More than 500 Employees	0.87389
	(0.09616)***
Constant	-2.07818
	(0.33163)***
Number of Observations	9297
Log-Likelihood	-4683.7197

Notes: Standard errors clustered at the industry level in brackets. *, **, and *** respectively denote significance at 10%, 5% and 1%. Coefficients for Race, Census region and MSA resident dummies not shown. The omitted category for the firm size is "Number of employees missing."

Table 4: Characteristics of Insurance Contracts: Tobit Regression Results

Independent Variable	Is There a Deductible? Probit (1)	Deductible Amount* Ordered (2)	Firm Contribution (Fraction) Tobit (3)	Employee Contribution (Amount) Tobit (4)
ASVP	-0.14129	-0.10249	0.02629	-15.39527
	(0.04103)***	(0.04095)**	(0.01128)**	(14.85113)
Age	0.02510	-0.04030	0.00326	2.57347
	(0.02188)	(0.02897)	(0.00487)	(3.99571)
Age Squared	-0.00071	0.00082	-0.00005	-0.07080
	(0.00046)	(0.00062)	(0.00010)	(0.08129)
Age Cubed	0.00001	-0.00001	0.00000	0.00062
	(0.00000)*	(0.00000)	(0.00000)	(0.00053)
Years of Education	-0.02335	-0.01659	0.00247	-0.27678
	(0.01032)**	(0.01108)	(0.00163)	(1.58152)
Male	0.02297	0.01331	-0.00819	9.90805
	(0.03933)	(0.04966)	(0.00776)	(7.05445)
Income/10,000	-0.00445	-0.00613	0.00055	1.21198
	(0.00909)	(0.01241)	(0.00121)	(1.15559)
Size of Family	-0.00420	-0.04881	0.00240	0.54174
	(0.01763)	(0.01860)***	(0.00235)	(2.32306)
Union Membership	-0.18349	-0.15894	0.02678	-11.69372
	(0.06971)***	(0.08401)*	(0.01428)*	(10.73299)
Less than 99 Employees	0.27343	0.57315	0.00109	-129.45443
	(0.07043)***	(0.08576)***	(0.01739)	(6.12141)***
Between 100 and 199 Employees	0.25128	0.43993	0.02656	-133.48621
	(0.07164)***	(0.09620)***	(0.02153)	(10.98681)***
Between 200 and 299 Employees	0.37674	0.37992	0.00787	-141.84885
	(0.11212)***	(0.11204)***	(0.03818)	(16.38131)***
Between 300 and 399 Employees	0.16274	0.23170	0.03073	-179.84318
	(0.13161)	(0.18527)	(0.03412)	(23.62398)***
Between 400 and 499 Employees	0.30957	0.40486	0.02887	-157.18063
	(0.11171)***	(0.11325)***	(0.03555)	(26.67827)***
More than 500 Employees	0.16671	0.02320	0.06585	-407.56992
	(0.19320)	(0.23780)	(0.04364)	(22.25667)***
Constant	0.54458		0.51811	117.62787
	(0.42228)		(0.10167)***	(93.42151)
Observations	11563	2327	9674	12613
Log-Likelihood	-7517.2710	-3930.2832	3685.0676	-80952.0828

Notes: Standard errors clustered at the industry level in brackets. *, **, and *** respectively denote significance at 10%, 5% and 1%. The insurance contracts used in this analysis are single coverage contracts. Coefficients for Race, Census region and MSA resident dummies not shown. The omitted category for the firm size is "Number of employees missing." The ancillary cutoff parameter estimates are not reported for the ordered Probit regression.

Table 5a: Medical Expenditures and Charges: Tobit Regression in Levels

	Total Charges	Total Expenditures	Total Charges	Total Expenditures
Sample	All Individuals	All Individuals	Individuals who Receive Insurance From their Jobs	Individuals who Receive Insurance From their Jobs
	(1)	(2)	(3)	(4)
ASVP	402.86234	199.83139	334.05588	188.73237
	(163.72470)**	(92.18805)**	(157.23528)**	(76.19198)**
Age	-271.79518	-135.48200	-240.28805	-147.79864
	(151.40625)*	(72.54693)*	(164.05060)	(81.49398)*
Age Squared	7.24145	3.78860	5.92131	3.97654
	(3.49528)**	(1.67349)**	(3.91441)	(1.97240)**
Age Cubed	-0.03754	-0.01831	-0.02772	-0.02027
	(0.02427)	(0.01175)	(0.02832)	(0.01448)
Years of Education	105.68769	74.50786	34.63838	50.19430
	(65.44683)	(27.85408)***	(40.41011)	(23.37723)**
Male	-2,236.79216	-1,257.70676	-1,561.66237	-1,020.45045
	(320.75747)***	(148.41494)***	(214.90330)***	(127.40069)***
Income/10,000	-75.63153	-38.30580	-53.93869	-51.06326
	(51.76807)	(21.39773)*	(44.61004)	(22.28929)**
Size of Family	-448.88454	-239.44413	-290.47720	-177.02758
	(96.53232)***	(36.88887)***	(82.55606)***	(39.43289)***
Union Membership	867.95029	511.95508	302.65145	278.60094
	(360.75249)**	(178.63679)***	(285.20660)	(163.75836)*
Less than 99 Employees	-902.96722	-688.08760	-272.36730	-342.55725
	(310.32398)***	(155.57165)***	(299.51692)	(166.99841)**
Between 100 and 199 Employees	-680.74278	-536.71890	-216.35632	-397.54820
	(476.78389)	(231.39089)**	(452.33145)	(254.29040)
Between 200 and 299 Employees	-301.19075	-168.39342	-17.50772	-116.45070
	(501.10916)	(283.66786)	(495.29392)	(305.15153)
Between 300 and 399 Employees	-579.53327	-355.67272	-436.40978	-300.46188
	(485.22562)	(256.45317)	(411.47193)	(260.58614)
Between 400 and 499 Employees	-171.24158	5.22617	190.34569	115.13357
	(682.72355)	(490.41116)	(697.06543)	(526.40492)
More than 500 Employees	-443.15328	-237.74508	-82.04443	-112.12249
	(344.95752)	(194.90131)	(329.28907)	(214.80182)
Constant	11,495.29641	6,152.90327	5,955.50903	4,628.64135
	(4,514.72536)**	(2,149.86559)***	(4,177.97321)	(3,130.27433)
Observations	13459	13459	9828	9828
Log-Likelihood	-116965.85	-111399.90	-88697.89	-84918.46

Notes: Standard errors clustered at the industry level in brackets. *, **, and *** respectively denote significance at 10%, 5% and 1%. The insurance contracts used in this analysis are single coverage contracts. Coefficients for Race, Census region and MSA resident dummies not shown. The omitted category for the firm size is "Number of employees missing."

Table 5b: Log of Medical Expenditures and Charges: Tobit Regression in Logs

	Log of Total Charges	**Log of Total Expenditures**	**Log of Total Charges**	**Log of Total Expenditures**
Sample	All Individuals	All Individuals	Individuals who Receive Insurance From their Jobs	Individuals who Receive Insurance From their Jobs
	(1)	(2)	(3)	(4)
ASVP	0.21412	0.21522	0.19165	0.16800
	(0.06722)***	(0.06273)***	(0.04375)***	(0.03703)***
Age	-0.23511	-0.23645	-0.22596	-0.22798
	(0.05341)***	(0.05283)***	(0.04525)***	(0.04325)***
Age Squared	0.00567	0.00604	0.00542	0.00577
	(0.00111)***	(0.00111)***	(0.00099)***	(0.00095)***
Age Cubed	-0.00003	-0.00004	-0.00003	-0.00004
	(0.00001)***	(0.00001)***	(0.00001)***	(0.00001)***
Years of Education	0.14029	0.13214	0.10636	0.10023
	(0.02219)***	(0.01997)***	(0.01357)***	(0.01278)***
Male	-1.68989	-1.62577	-1.40969	-1.36234
	(0.11797)***	(0.11278)***	(0.06842)***	(0.06182)***
Income/10,000	0.04295	0.03977	0.02772	0.01927
	(0.01299)***	(0.01231)***	(0.01247)**	(0.01172)
Size of Family	-0.19642	-0.19084	-0.16839	-0.16956
	(0.02427)***	(0.02278)***	(0.02684)***	(0.02511)***
Union Membership	0.44034	0.42629	0.22718	0.21320
	(0.11650)***	(0.10581)***	(0.11390)**	(0.09943)**
Less than 99 Employees	-0.17489	-0.13629	-0.03276	0.03817
	(0.07816)**	(0.07241)*	(0.08174)	(0.07322)
Between 100 and 199 Employees	0.16299	0.20360	0.11096	0.11207
	(0.16909)	(0.14554)	(0.15460)	(0.13570)
Between 200 and 299 Employees	0.15217	0.20165	-0.02015	0.03480
	(0.15256)	(0.14361)	(0.14673)	(0.13744)
Between 300 and 399 Employees	0.31465	0.37519	0.12603	0.24860
	(0.21303)	(0.17740)**	(0.17180)	(0.14736)*
Between 400 and 499 Employees	0.47266	0.49288	0.37047	0.37664
	(0.33446)	(0.31746)	(0.33088)	(0.32386)
More than 500 Employees	0.26114	0.33936	0.14525	0.22057
	(0.11397)**	(0.10326)***	(0.11113)	(0.10193)**
Constant	3.29260	3.41453	3.64367	4.02803
	(0.74005)***	(0.72993)***	(0.85175)***	(0.78619)***
Observations	13459	13459	9828	9828
Log-Likelihood	-31585.46	-31164.45	-23042.71	-22629.08

Notes: Standard errors clustered at the industry level in brackets. *, **, and *** respectively denote significance at 10%, 5% and 1%. The insurance contracts used in this analysis are single coverage contracts. Coefficients for Race, Census region and MSA resident dummies not shown. The omitted category for the firm size is "Number of employees missing."

Table 6: Workers in High ASVP Industries have more frequent visits to the doctor

Negative Binomial Regression Results. Dependent Variable is "Number of Office Based Visits" and "Number of Visits to Physicians"

	Office Visits		Visits to Physicians	
	All Individuals	Individuals who Receive Insurance From their Jobs	All Individuals	Individuals who Receive Insurance From their Jobs
	(1)	(2)	(3)	(4)
ASVP	0.04638	0.05119	0.05297	0.05797
	(0.02678)*	(0.02511)**	(0.02162)**	(0.02043)**
Age	-0.00507	-0.01882	-0.02824	-0.03120
	(0.02258)	(0.02120)	(0.01586)*	(0.01781)*
Age Squared	0.00076	0.00089	0.00120	0.00111
	(0.00047)	(0.00045)**	(0.00034)***	(0.00038)***
Age Cubed	-6.64e-06	-6.56e-06	-8.63e-06	-7.17e-06
	(3.02e-06)**	(2.99e-06)**	(2.22e-06)***	(2.59e-06)***
Years of Education	0.03922	0.03573	0.02593	0.01773
	(0.00841)***	(0.00821)***	(0.00930)***	(0.00789)***
Male	-0.59335	-0.61817	-0.62162	-0.60956
	(0.04334)***	(0.03797)***	(0.03775)***	(0.03302)***
Income	-0.01120	-0.00475	-0.01925	-0.01452
	(0.00812)	(0.00795)	(0.00599)***	(0.00597)***
Size of Family	-0.070539	-0.05069	-0.04282	-0.02767
	(0.01953)***	(0.01583)***	(0.01627)***	(0.01439)***
Union Membership	0.24440	0.23933	0.23146	0.21155
	(0.07734)***	(0.08180)***	(0.05331)***	(0.05747)***
Less than 99 Employees	-0.29328	-0.19278	-0.24752	-0.15143
	(0.055815)***	(0.06006)***	(0.03914)***	(0.04324)***
Between 100 and 199 Employees	-0.36110	-0.30220	-0.22653	-0.17195
	(0.07687)***	(0.07834)***	(0.05860)***	(0.06325)***
Between 200 and 299 Employees	-0.31207	-0.27535	-0.17751	-0.13081
	(0.09045)***	(0.09450)***	(0.08319)**	(0.08699)**
Between 300 and 399 Employees	-0.27448	-0.22585	-0.16847	-0.10973
	(0.10347)***	(0.09899)**	(0.07398)**	(0.07185)**
Between 400 and 499 Employees	0.17926	0.22589	0.15404	0.19189
	(0.16068)	(0.16638)	(0.14082)	(0.14579)
More than 500 Employees	-0.19461	-0.16121	-0.15222	-0.07422
	(0.09043)**	(0.08652)*	(0.06180)**	(0.06725)**
Census Region andn MSA Dummy	Yes	Yes	Yes	Yes
Race Dummy	Yes	Yes	Yes	Yes
Observations	13459	9828	13459	9828
Log-Likelihood	-32451.928	-24677.91	-28649.66	-21705.396

Notes: Standard errors clustered at the industry level in brackets. *, **, and *** respectively denote significance at 10%, 5% and 1%. Coefficients for included dummies are not shown. The omitted category for the firm size is "Number of employees missing."

Table 7a: Consumption of Preventive Care: Ordered Probit Regression Result

Independent Variable	Pap Smear (1)	Mammo-gram (2)	Breast Exam (3)	Cholesterol Check (4)	Pap Smear (5)	Mammo-gram (6)	Breast Exam (7)	Cholesterol Check (8)
	Panel A: All Individuals				**Panel B:** Individuals Who Received Insurance from Their Jobs			
ASVP	-0.08494	-0.08474	-0.12781	-0.06516	-0.05747	-0.06216	-0.11267	-0.05740
	(0.01744)***	(0.03269)***	(0.02439)***	(0.03292)**	(0.01984)***	(0.03660)*	(0.02641)***	(0.03305)*
Age	-0.10428	-0.21967	0.12584	-0.09311	-0.14554	-0.33603	0.01438	-0.11411
	(0.01913)***	(0.12083)*	(0.07391)*	(0.06216)	(0.02214)***	(0.13629)**	(0.09681)	(0.07364)
Age Squared	0.00195	0.00232	-0.00264	0.00039	0.00268	0.00418	-0.00070	0.00075
	(0.00040)***	(0.00202)	(0.00131)**	(0.00110)	(0.00046)***	(0.00230)*	(0.00171)	(0.00132)
Age Cubed	-0.00001	-0.00001	0.00002	0.00000	-0.00001	-0.00002	0.00001	0.00000
	(0.00000)***	(0.00001)	(0.00001)**	(0.00001)	(0.00000)***	(0.00001)	(0.00001)	(0.00001)
Years of Education	-0.02726	-0.03947	-0.03950	-0.04934	-0.03055	-0.03130	-0.03240	-0.04405
	(0.00612)***	(0.00894)***	(0.00874)***	(0.00835)***	(0.00830)***	(0.01149)***	(0.00993)***	(0.00943)***
Income/10,000	-0.02793	-0.02544	-0.02151	-0.01285	-0.02068	-0.01913	-0.01519	-0.00758
	(0.00842)***	(0.00980)***	(0.00993)**	(0.00638)**	(0.00865)**	(0.01007)*	(0.00845)*	(0.00664)
Size of Family	0.02515	0.00063	0.01203	-0.00595	0.03140	0.00653	0.00964	-0.01487
	(0.01054)**	(0.01573)	(0.01452)	(0.01013)	(0.01329)**	(0.02093)	(0.01844)	(0.01280)
Union Membership	-0.08576	-0.06107	-0.14461	-0.10510	-0.04007	-0.00520	-0.11955	-0.05548
	(0.04868)*	(0.05666)	(0.05636)**	(0.05327)**	(0.05261)	(0.05855)	(0.05880)**	(0.05305)
Less than 99 Employees	-0.04083	0.01039	-0.00001	0.13686	-0.02558	0.06854	0.05473	0.10495
	(0.03280)	(0.04778)	(0.04827)	(0.04216)***	(0.04950)	(0.06716)	(0.07267)	(0.05769)*
Between 100 and 199 Employees	-0.15298	-0.17367	-0.16623	-0.00415	-0.13648	0.04007	-0.01272	0.02964
	(0.09916)	(0.12013)	(0.10164)	(0.09804)	(0.11074)	(0.12237)	(0.10995)	(0.10701)
Between 200 and 299 Employees	-0.06131	-0.11425	-0.04161	-0.01812	0.00275	0.03357	0.12095	0.02876
	(0.06871)	(0.09416)	(0.08531)	(0.06650)	(0.08594)	(0.12038)	(0.12584)	(0.07950)
Between 300 and 399 Employees	0.09028	-0.00436	0.21538	-0.04928	0.18586	0.13892	0.39117	0.02332
	(0.08811)	(0.14820)	(0.11844)*	(0.13587)	(0.08361)**	(0.14986)	(0.11680)***	(0.14763)
Between 400 and 499 Employees	-0.10732	0.16172	0.17034	0.01634	-0.01236	0.37090	0.37183	0.06790
	(0.15031)	(0.22191)	(0.19371)	(0.12846)	(0.16284)	(0.24383)	(0.21996)*	(0.13083)
More than 500 Employees	-0.08219	-0.11263	-0.05739	-0.10180	-0.04800	0.00630	0.04416	-0.05964
	(0.04860)*	(0.07367)	(0.06165)	(0.06707)	(0.06270)	(0.08840)	(0.08432)	(0.07909)
Ancillary Parameters:								
Between 1 and 2 years	-2.38367	-7.38447	0.74591	-4.05689	-3.06164	-9.51533	-1.40171	-4.54037
	(0.30378)***	(2.39540)***	(1.33276)	(1.16021)***	(0.32629)***	(2.69865)***	(1.74548)	(1.35057)***
Between 2 and 5 years	-1.87629	-6.90608	1.25689	-3.63906	-2.53821	-9.00412	-0.84266	-4.09130
	(0.30653)***	(2.39998)***	(1.33493)	(1.15848)***	(0.33018)***	(2.70442)***	(1.74739)	(1.34963)***
More than 5 years, but not never	-1.53871	-6.64861	1.57564	-3.37982	-2.18997	-8.72787	-0.47762	-3.80078
	(0.30807)***	(2.40258)***	(1.33410)	(1.15808)***	(0.32917)***	(2.70508)***	(1.74707)	(1.35016)***
Never	-1.03525	-6.40158	2.07900	-3.13856	-1.70657	-8.49245	0.01943	-3.56156
	(0.31278)***	(2.40323)***	(1.33954)	(1.15987)***	(0.33527)***	(2.70388)***	(1.74697)	(1.35035)***
Observations	6301	3279	4079	6336	4637	2522	3142	4918
Log-Likelihood	-6981.7798	-3990.5204	-4132.4245	-7252.2133	-4712.6727	-2883.4563	-2831.2117	-5549.7398

Notes: Standard errors clustered at the industry level in brackets. *, **, and *** respectively denote significance at 10%, 5% and 1%. The insurance contracts used in this analysis are single coverage contracts. Coefficients for Race, Census region and MSA resident dummies not shown. The omitted category for the firm size is "Number of employees missing." **The base category for the order probits is that the care was received this year.**

Estimation samples also vary because of age restrictions. For pap smear, women older than 18 are included. For mammogram, women older than 40. For breast exam, women older than 35. For cholesterol check, men older than 35 and women older than 45.

Table 7b: Consumption of Preventive Care: Did You Receive the Following Care in the Last Two Years?

Independent Variable	Pap Smear	Mammo-gram	Breast Exam	Cholesterol Check	Pap Smear	Mammo-gram	Breast Exam	Cholesterol Check
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Panel A: All Individuals				**Panel B:** Individuals Who Received Insurance from Their Jobs			
ASVP	0.07990	0.09709	0.13444	0.07731	0.04714	0.06078	0.10513	0.06266
	(0.02131)***	(0.03719)***	(0.02921)***	(0.03373)**	(0.02833)*	(0.04413)	(0.03243)***	(0.03329)*
Age	0.08199	0.12967	-0.10198	0.06507	0.13412	0.31242	0.02786	0.06245
	(0.02309)***	(0.16642)	(0.09440)	(0.07245)	(0.02562)***	(0.18820)*	(0.13056)	(0.08783)
Age Squared	-0.00164	-0.00106	0.00214	0.00011	-0.00253	-0.00405	-0.00006	0.00014
	(0.00049)***	(0.00279)	(0.00165)	(0.00128)	(0.00056)***	(0.00319)	(0.00228)	(0.00157)
Age Cubed	0.00001	0.00000	-0.00001	-0.00000	0.00001	0.00002	-0.00000	-0.00000
	(0.00000)***	(0.00002)	(0.00001)	(0.00001)	(0.00000)***	(0.00002)	(0.00001)	(0.00001)
Years of Education	0.03140	0.03366	0.04148	0.05107	0.03925	0.03144	0.03826	0.04469
	(0.00723)***	(0.00949)***	(0.00956)***	(0.00883)***	(0.01058)***	(0.01468)**	(0.01471)***	(0.00997)***
Income/10,000	0.03419	0.02168	0.01805	0.01091	0.02281	0.01101	0.01420	0.00611
	(0.01098)***	(0.01137)*	(0.01266)	(0.00819)	(0.00939)**	(0.01201)	(0.01043)	(0.00790)
Size of Family	-0.01815	0.00410	-0.00427	0.00877	-0.01856	0.00026	0.01385	0.01809
	(0.01326)	(0.01706)	(0.01672)	(0.01123)	(0.01657)	(0.02286)	(0.02143)	(0.01396)
Union Membership	0.07271	0.09780	0.13680	0.09838	0.01677	0.03799	0.11110	0.03654
	(0.08225)	(0.09647)	(0.10010)	(0.06372)	(0.09464)	(0.09421)	(0.11757)	(0.06441)
Less than 99 Employees	0.00317	0.00112	0.00270	-0.11425	-0.01895	-0.08110	-0.07778	-0.08688
	(0.03789)	(0.05580)	(0.05232)	(0.04653)**	(0.05961)	(0.07728)	(0.09044)	(0.07148)
Between 100 and 199 Employees	0.11757	0.26619	0.32454	0.06093	0.07150	0.01471	0.10019	0.00260
	(0.10641)	(0.13801)*	(0.11911)***	(0.11820)	(0.10965)	(0.14227)	(0.12688)	(0.12982)
Between 200 and 299 Employees	0.02429	0.12864	0.10487	0.06673	-0.05615	-0.07273	-0.10076	0.01062
	(0.08577)	(0.13089)	(0.12603)	(0.07917)	(0.10172)	(0.16086)	(0.16724)	(0.09306)
Between 300 and 399 Employees	-0.11910	0.13516	-0.10377	0.02960	-0.22652	-0.00761	-0.27858	-0.04557
	(0.13478)	(0.17783)	(0.16382)	(0.14692)	(0.13392)*	(0.19048)	(0.17494)	(0.16188)
Between 400 and 499 Employees	0.12352	-0.31786	-0.10725	0.24030	0.04500	-0.51448	-0.29221	0.10520
	(0.20253)	(0.27725)	(0.24256)	(0.15850)	(0.22243)	(0.30749)*	(0.28560)	(0.16580)
More than 500 Employees	0.18978	0.21939	0.26513	0.17060	0.14546	0.04646	0.14987	0.10160
	(0.06486)***	(0.08312)***	(0.09226)***	(0.06735)**	(0.08369)*	(0.11233)	(0.12329)	(0.08206)
Constant	-1.72677	-5.07163	0.68240	-3.28449	-2.53218	-8.42762	-1.78865	-3.18759
	(0.35076)***	(3.26613)	(1.73883)	(1.36371)**	(0.36515)***	(3.67126)**	(2.42888)	(1.64153)*
Observations	6300	3279	4079	6335	4636	2522	3142	4917
Log-Likelihood	-3040.9760	-1825.2546	-1779.4284	-3362.9079	-1997.3605	-1287.9160	-1161.6997	-2542.1149

Notes: Standard errors clustered at the industry level in brackets. *, **, and *** respectively denote significance at 10%, 5% and 1%. The insurance contracts used in this analysis are single coverage contracts. Coefficients for Race, Census region and MSA resident dummies not shown. The omitted category for the firm size is "Number of employees missing."

Estimation samples also vary because of age restrictions. For pap smear, women older than 18 are included. For mammogram, women older than 40. For breast exam, women older than 35. For cholesterol check, men older than 35 and women older than 45.

Table 8: Workers in High ASVP Industries are Healthier

Ordered Probit Regression Results: Dependent Variable is "Perceived Health Status 1: Excellent; 2: Very Good; 3: Good; 4: Fair; 5 Poor"

	(1)	(2)	(3)
ASVP	-0.03271	-0.03755	-0.03175
	(0.01302)**	(0.01612)**	(0.01344)**
Age	0.07939	0.08209	0.08154
	(0.01338)***	(0.01321)***	(0.01343)***
Age Squared	-0.00107	-0.00111	-0.0011
	(0.00030)***	(0.00029)***	(0.00030)***
Years of Education	-0.05837	-0.05862	-0.05831
	(0.00504)***	(0.00510)***	(0.00518)***
Male	-0.08505	-0.05913	-0.06733
	(0.02176)***	(0.02594)**	(0.02456)***
Income	-0.03895	-0.03552	-0.03604
	(0.00531)***	(0.00506)***	(0.00507)***
Size of Family	-0.03687	-0.03579	-0.03595
	(0.00580)***	(0.00594)***	(0.00591)***
Union Membership	0.07077	0.06605	0.07146
	(0.03494)**	(0.03666)*	(0.03551)**
Less than 99 Employees	-0.29144	-0.14999	-0.15255
	(0.02739)***	(0.05644)***	(0.05560)***
Between 100 and 199 Employees	-0.31575	-0.17416	-0.18303
	(0.04830)***	(0.06304)***	(0.06244)***
Between 200 and 299 Employees	-0.28835	-0.14779	-0.15429
	(0.04357)***	(0.06042)**	(0.05988)***
Between 300 and 399 Employees	-0.20223	-0.06001	-0.07177
	(0.06125)***	-0.07542	-0.07482
Between 400 and 499 Employees	-0.28727	-0.14517	-0.1549
	(0.11655)**	-0.13342	-0.13324
More than 500 Employees	-0.29125	-0.14939	-0.15962
	(0.03596)***	(0.05901)**	(0.05897)***
Census Region andn MSA Dummy	Yes	Yes	Yes
Race Dummy	Yes	Yes	Yes
Industry Dummy	No	Yes	No
Occupation Dummy	No	Yes	Yes
Observations	13210	13210	13210
Log-Likelihood	-17649.9684	-17628.3978	-17636.1593

Notes: Standard errors clustered at the industry level in brackets. *, **, and *** respectively denote significance at 10%, 5% and 1%. Coefficients for included dummies are not shown. The omitted category for the firm size is "Number of employees missing."

Table 9: Retirees' Medical Expenditures: Results from HRS

	(1)	(2)
Variables	**Individuals with Medicare**	**Individuals with Any Public Insurance**
ASVP	-1,041.72794	-1,012.48467
	(537.41019)*	(537.30310)*
Age	22,630.14872	19,889.19336
	(23,840.71792)	(23,446.61267)
Age Squared	-303.24658	-268.25879
	(312.59471)	(307.41429)
Age Cubed	1.36288	1.21570
	(0.00000)	(1.34007)
Years of Education	132.20731	132.08439
	(125.75570)	(125.91594)
Total Assets / 100000	-56.60577	-56.22011
	(21.63801)***	(21.74032)***
Size of Family	-113.32028	-100.34990
	(350.21474)	(350.89955)
Married	-892.55923	-839.94987
	(792.28733)	(791.27733)
Constant	-5.53856e+05	-4.83250e+05
	(603939.37405)	(594065.49128)
Observations	5562	5583
Log-Likelihood	-63248.9775	-63512.1965

Notes: Robust standard errors in parentheses. *, **, and *** respectively denote significance at 10%, 5% and 1%. Standard errors clustered at the industry level in brackets. Coefficients for Race and Census region dummies not shown.

Table 10: Retirees Who Used to Work in High ASVP Industries are Healthier in HRS

Ordered Probit Regression Results: Independent Variable is "Perceived Health Status 1: Excellent; 2: Very Good; 3: Good; 4: Fair; 5 Poor"

Variables	(1) Perceived Health Status	(2) Perceived Health Status
ASVP	-0.04600	-0.04446
	(0.01952)**	(0.01996)**
Age	0.11743	0.04611
	(0.50940)	(0.51536)
Age Squared	-0.00141	-0.00050
	(0.00652)	(0.00660)
Age Cubed	0.00001	0.00000
	(0.00003)	(0.00003)
Years of Education	-0.06952	-0.06938
	(0.00554)***	(0.00560)***
Total Assets / 100000	-0.01329	-0.01339
	(0.00364)***	(0.00368)***
Size of Family	0.03159	0.03386
	(0.01383)**	(0.01369)**
Married	-0.17670	-0.17766
	(0.03646)***	(0.03651)***
Observations	6698	6730
Log-Likelihood	-9552.3180	-9610.0625

Notes: Robust standard errors in parantheses. Standard errors clustered at the industry level in brackets. *, **, and *** respectively denote significance at 10%, 5% and 1%. Coefficients for Race Census region and MSA resident dummies are not shown.

Table 11: Falsification Result from the Medical Expenditure in the UK Family Expenditure Survey (1998)

Variables	(1) Medical Expenditure	(2) Log of Medical Expenditure
ASVP	0.59649	0.02497
	(0.48782)	(0.03358)
Age	0.61244	0.0612
	(0.21954)***	(0.01787)***
Age Squared	-0.0045	-0.00041
	(0.00232)*	(0.00020)**
Male	-3.00104	-0.32991
	(0.90821)***	(0.09291)***
Size of Family	0.19965	0.02238
	(0.08023)**	(0.00717)***
Less than 24 Employees	-1.15973	-0.15392
	(0.74773)	(0.07000)**
More than 25 Employees	-0.44423	-0.12627
	(0.74136)	(0.06105)**
Constant	-37.7553	-3.41363
	(10.46437)***	(0.75958)***
Observations	4709	4709
Log-Likelihood	-10980.9652	-5749.1985

Notes: Standard errors clustered at the industry level in brackets. Coefficients for Income Brackets, social status, marital status and Geographic region dummies are not shown. *, **, *** respectively represent significance at 10%, 5% and 1%.

Table 12: UK Workers in High ASVP Industries do not visit more frequently the doctor

Negative Binomial Regression Results: Dependent Variable is "Number of Annual Doctor Visits"

ASVP	-0.00682
	(0.03098)
Age	-0.05985
	(0.03305)
Age Squared	0.00110
	(0.00080)
Age Cubed	-0.00001
	(0.00001)
Years of Education	0.00004
	(0.00801)
Male	-0.50192
	(0.03205)**
Household Income	-0.00000
	(0.00000)**
Size of Family	-0.00661
	(0.01272)
Union Membership	0.10975
	(0.04433)*
Region Dummies	Yes
Race Dummy	Yes
Observations	4926
Log-Likelihood	-6553.5784

Notes: Standard errors clustered at the industry level in brackets. *, **, and *** respectively denote significance at 10%, 5% and 1%. Coefficients for included dummies are not shown.

Table 13: UK Workers in High ASVP Industries are not Healthier

Ordered Probit Regression Results: dependent Variable is "Perceived Health Status 1: Excellent; 2: Good; 3: Fair; 4 Poor; 5 Very Poor"

ASVP	-0.03546
	(0.02782)
Age	-0.00613
	(0.00816)
Age Squared	0.00009
	(0.00010)
Years of Education	-0.02987
	(0.00919)**
Male	-0.12875
	(0.03450)**
Income	-0.00000
	(0.00000)**
Size of Family	0.01340
	(0.01564)
Union Membership	0.05228
	(0.04668)
Region Dummies	Yes
Race Dummy	Yes
Observations	4928
Log-Likelihood	-5716.1545

Notes: Standard errors clustered at the industry level in brackets. *, **, and *** respectively denote significance at 10%, 5% and 1%. Coefficients for included dummies are not shown.

Table 14: Other Employee Benefit Offerings in MEPS

Probit Regression Results

	(1)	(2)	(3)	(4)	(5)
Variables	Life Insurance	Pension Plan	Sick Leave	Disability	Vacation
ASVP	0.35213	-0.06336	0.21182	0.41561	0.14193
	(0.13250)***	(0.15360)	(0.17455)	(0.18731)**	(0.16749)
Age	-0.08706	-0.17460	-0.24775	0.00769	-0.20727
	(0.08399)	(0.08103)**	(0.08567)***	(0.09384)	(0.15502)
Age Squared	0.00274	0.00298	0.00430	0.00122	0.00382
	(0.00181)	(0.00159)*	(0.00184)**	(0.00175)	(0.00312)
Age Cubed	-0.00003	-0.00002	-0.00002	-0.00002	-0.00002
	(0.00001)**	(0.00001)	(0.00001)	(0.00001)**	(0.00002)
Years of Education	0.04886	0.00147	0.01054	0.09754	-0.00524
	(0.04098)	(0.02854)	(0.03726)	(0.03121)***	(0.02431)
Male	-0.15022	-0.12107	-0.25860	-0.24551	-0.19523
	(0.11967)	(0.10606)	(0.11467)**	(0.08354)***	(0.15979)
Income	0.08967	-0.01774	0.00669	0.03041	0.05745
	(0.03889)**	(0.02834)	(0.02961)	(0.02976)	(0.04485)
Size of family	-0.03495	-0.08632	0.01750	-0.02179	-0.10559
	(0.03564)	(0.03574)**	(0.03561)	(0.02524)	(0.04449)**
Union Membership	1.56273	0.46016	0.48483	1.38822	0.11702
	(0.41522)***	(0.47026)	(0.51792)	(0.42264)***	(0.45522)
More than 300 Employees	-1.48855	3.38571	2.75075	-2.93518	0.50453
	(1.46520)	(1.44716)**	(1.67166)*	(1.21478)**	(0.75777)
Observations	2266	2251	2250	2001	2474
Log-Likelihood	-255.0180	-316.0122	-315.0138	-856.6905	-106.2078

Notes: Standard errors clustered at the industry level in brackets. *, **, and *** respectively denote significance at 10%, 5% and 1%. Coefficients for Race, Census region, MSA resident dummies and Constant term not shown.

Table 15: Offer of Health Insurance and Health Insurance Characteristics: IV Estimates

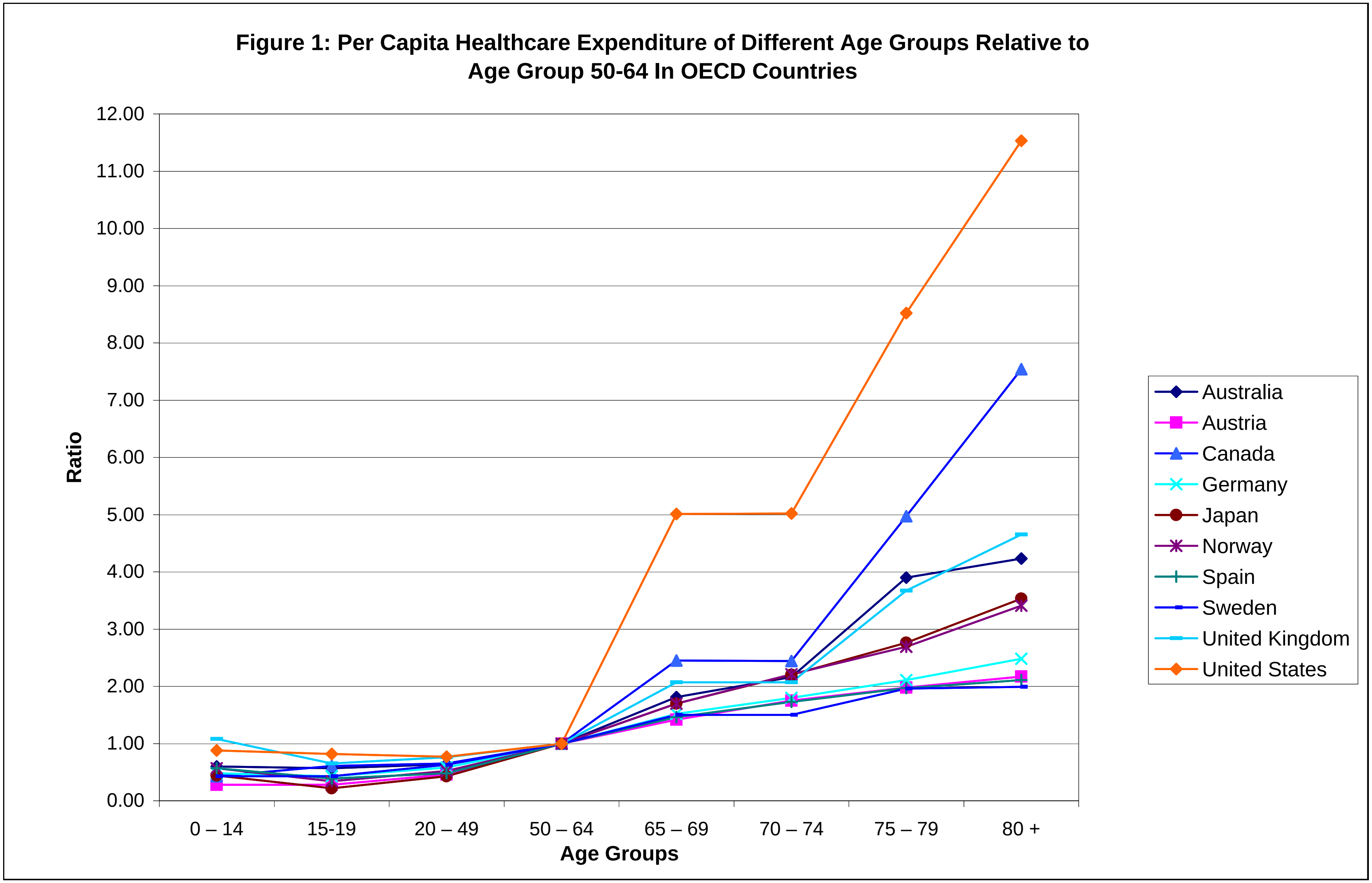
Panel A: First Stage Regression Results

	(1)
First Step Regression	Log of Job Tenure
Log of Job Tenure in the UK	.1643331***
	(.0262123)
Age	.0278089***
	(.0020594)
Years of Education	-.0029129
	(.004664)
Male	-0.05402
	(0.03894)
Income/10,000	.0579141***
	(.0050035)
Size of Family	.0343403***
	(.0052959)
Union Membership	0.01667
	(0.13270)
Between 100 and 199 Employees	-0.25958***
	(0.09178)
Between 200 and 299 Employees	-0.15619**
	(0.07173)
Between 300 and 399 Employees	-0.01491
	(0.08284)
Between 400 and 499 Employees	-0.22033
	(0.14962)
More than 500 Employees	-0.18837***
	(0.04558)
Constant	-0.33198
	(0.19377)
Observations	6712
Log-Likelihood	-11623.11

Panel B: Second Stage Regression Results

	Offer of Insurance	**Fraction Paid by Firm**
Second Step Regression	Probit	Tobit
	(1)	(2)
Log of Job Tenure	1.255888***	0.16125***
	(.03736)	(0.04822)
Age	-0.03956***	-0.00578***
	(0.00251)	(0.00179)
Years of Education	0.03519***	0.00982***
	(0.00757)	(0.00309)
Male	-0.05402	-0.02344**
	(0.03894)	(0.00990)
Income/10,000	-0.175	-0.00450
	(0.0135)	(XXX)
Size of Family	-0.05673***	0.00254
	(0.00768)	(0.00237)
Union Membership	0.01667	-0.00636
	(0.13270)	(0.01804)
Between 100 and 199 Employees	-0.25958***	-0.18269*
	(0.09178)	(0.10188)
Between 200 and 299 Employees	-0.15619**	-0.06412
	(0.07173)	(0.08548)
Between 300 and 399 Employees	-0.01491	0.20008*
	(0.08284)	(0.11683)
Between 400 and 499 Employees	-0.22033	0.15220
	(0.14962)	(0.19127)
More than 500 Employees	-0.18837***	-0.07397
	(0.04558)	(0.05996)
Constant	-0.33198	0.47207***
	(0.19377)	(0.06292)
Observations	6712	3348
Log-Likelihood	-11623.11	933.9305

Notes : Standard errors clustered at the industry level in brackets. *, **, and *** respectively denote significance at 10%, 5% and 1%. Coefficients for Race, Census region and MSA resident dummies not shown.



Source: Hagist and Kotlikoff (2005) Table 2. See their paper for the original sources of their data.