Quality and Employers' Choice of Health Plans

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Abstract

We seek to understand the relationship between employer decisions regarding which health plans firms choose to offer to their employees and the performance of those plans. We measure performance using data from the Health Plan Employer Data Information Set (HEDIS) and the Consumer Assessment of Health Plan Survey (CAHPS). We use a unique data set that lists the Health Maintenance Organizations (HMOs) available to, and offered by, large employers across markets in the year 2000, and examine the relationship between plan offerings, performance measures and other plan characteristics. We estimate two sets of specifications that differ in whether they model plan choice as a function of absolute plan performance or plan performance relative to competitors. We find that employers are more likely to offer plans with strong absolute and relative HEDIS and CAHPS performance measures. Our results are consistent with the view that large employers are responsive to the interests of their employees.

1. Introduction

More than 90% of privately insured individuals obtain their health insurance from their employer or as dependents of a family member with employer-sponsored health insurance (Employee Benefit Research Institute 2000). The employer-based health insurance system provides several benefits, most notably the ability to mitigate the adverse selection problem inherent in insurance by pooling the health risks across employees of a company. The system also enjoys institutional advantages such as the exemption of premiums from income taxes.

Although potentially welfare-improving, the employer-based health insurance system is only efficient to the extent that employers choose appropriate health insurance coverage for their workers. Employers generally limit the set of health plans that employees can choose. Indeed, about 40% of workers are offered only one plan (McLaughlin 1999, Rice et al. 2002).

In a world with complete information and competitive labor markets, one might expect employers to act as agents for their employees when choosing which set of health plans to offer. This would allow them to maximize worker utility for any given level of compensation. Wages would adjust to reflect the cost of benefits. If the employers offered an inefficient benefit package, total compensation would need to rise to meet worker's reservation utility. Thus, we would expect employers to choose a menu of health plans that reflects the preferences of their employees in terms of price and quality.

While price and coverage benefits for health plans are generally contractible and observable, the quality of care is often not. This is particularly true for managed care plans as these plans influence the health care that their enrollees receive through the choice of physician networks and payment incentives. Although a series of studies suggest that at the margin, employees respond to health plan performance information (Scanlon et al. 2002, Wedig and Tai-

Seale 2002, Beaulieu 2002), studies find that many consumers in the market for health insurance are not fully informed about plan performance (Hibbard and Jewett 1996, Jewett and Hibbard 1996.) If information about plan performance is partly unobservable to employees, then employers may have an incentive to provide cheaper, and lower quality, health plans than would be desired by their employees if they were perfectly informed. Employers may also have the incentive to offer lower performing plans in order to discourage individuals who may expect to incur high health care costs from seeking employment at the firm.

The purpose of this paper is to shed some light on the relationship between health plan performance and the employer offerings of health plans. In particular, we seek to understand the association between the plan offerings of large employers, the price of health plans, and observable measures of performance. A finding that employers offer plans with better performance scores suggests that employers may be internalizing the preferences of their employees and refutes critiques that employers only care about low premiums. We focus on large employers because they are likely to be better informed about health plan performance and thus more likely to be responsive to such data. Moreover, given the evidence that workers in large firms earn more than other workers (Brown and Medoff 1989) we might expect large employers to disproportionately choose high quality plans.

Our analysis makes use of a unique data set that provides HMO health plan offerings by MSA for several large employers for the year 2000. We combine these data with several other data sources that provide plan price, observable plan performance measures and plan availability by MSA. To our knowledge, this study is the first to systematically use data on employer plan offerings to examine the relationship between health plan choices of large employers and plan performance measures.

Our data on plan performance are based on measures from the Health Plan Employer Data Information Set (HEDIS) and the Consumer Assessment of Health Plan Survey (CAHPS), reported by the National Committee on Quality Assurance (NCQA). These measures are the most commonly accepted systems for measuring plan quality. Many of the measures of performance contained in HEDIS were developed in the early 1990s by a coalition of health plans and employers. They include data largely obtained from administrative records, such as availability of primary care providers, utilization of preventive/screening services (e.g. immunization and cancer screening rates), and utilization of services thought to be appropriate in specific clinical situations (e.g. prescription of ß-blockers following a heart attack or eye exams for diabetics). In contrast, CAHPS measures performance from the enrollee perspective based on surveys of health plan enrollees. Typically survey responses are aggregated into index scores of performance along key dimensions such as "getting needed care" or "how doctors communicate."

It is important to note that quality is multi-dimensional and very difficult to measure, and that these measures are imperfect indicators of quality at best. Nevertheless, these measures are generally considered the best available proxies for health plan quality and are predominant as tools for quality measurement. For example, the HEDIS and CAHPS measures are the foundation of most health plan report cards and also are the primary standardized set of output measures that plans use to demonstrate quality to individual and group purchasers. Moreover, the NCQA requires plans to report HEDIS and CAHPS measures in order to achieve accreditation and many employers such as General Motors also require them from plans with which they contract.

The literature examining the relationship between plan performance and choice focuses on individual behavior. Cross sectional analysis relating enrollment decisions to plan performance does not find a strong relationship between the administrative HEDIS measures of

performance and enrollment, even when information on performance was provided to employees (Chernew and Scanlon 1998).[1] Given the lack of correlation between employee choices and HEDIS measures, it is informative to understand the relationship between large employer plan *offerings* and performance measures.

There is some survey information about the factors that employers report as influencing their choice of plans. In an American Management Association survey of more than 1,100 benefits managers, the cost to the company was ranked the most important of six factors. In a KPMG 1997 survey, only 40% of employers rated NCQA accreditation as either very or somewhat important; 95% regarded price of plan or speed and accuracy of claims payment as very or somewhat important (Health Benefits 1997).

Our analysis examines how the likelihood of an employer offering an available health plan in an MSA depends on plan performance and price measures. One significant complication is that employers in our data set often offer more than one plan, implying that standard multinomial choice models (e.g. multinomial logit) cannot be used. Thus, we estimate the plan offer decision with binomial logit choice models, treating each offer decision as a separate outcome. We include employer-MSA fixed effects in many specifications. For these specifications, the coefficients on plan attributes are identified based on relative plan performance; for the other specifications, it is absolute performance that matters.

These specifications both reveal similar results. In particular, we find that the employers are more likely to offer plans with higher CAHPS and HEDIS ratings, suggesting that employers

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[1]Longitudinal studies designed to explicitly measure the impact of report cards on employee plan choices do find an effect of performance information on plan choice by employees (Scanlon et al. 2002, Chernew et al., 2001). These findings are consistent with evidence that shows a statistically significant, though sometime quantitatively small, impact of report cards on choice of medical care providers (Mukamel and Mushlin 1998, Dranove et al. 2002, Mennemeyer et al. 1997).

are responsive to the concerns of enrollees, as reflected by their survey responses. Additionally, employers also choose cheaper plans, all else being equal.

To understand whether large employers are systematically different from other purchasers of health insurance, we also estimate the relationship between health plan performance and MSA-level health plan market share. This analysis will capture behavior of small and medium firms as well. Although the magnitudes are not directly comparable to our large firm analysis, because they capture the enrollment decisions as well as offer decisions, we find qualitatively similar results to those from the analysis of employer plan offerings. Specifically, plans with better performance scores have greater market shares.

The remainder of this paper is divided as follows. Section 2 provides the model and methods. Section 3 discusses the data and Section 4 the results. Section 5 provides a discussion and conclusion.

2. Model and Methods

Ideally, we would like to test whether the set of health plans that employers choose to offer represents the preferences of their employees or alternately, whether a lack of information distorts the market. As we do not have a direct method of conducting such a test, we instead examine the relationship between health plan performance measures and plan offering. If employers disproportionately choose high quality plans, this suggests that employers are responding to employee preferences, although we cannot determine if they are responding optimally. A lack of correlation between the measures of performance and plan offering is harder to interpret. It may reflect factors such as ignorance on the part of employers or employees,

skepticism of the performance measures, or a desire for cheaper plans by employers or employees.

Importantly, we will not interpret a finding of a relationship between ratings and plan offerings as indicative of whether employers are reacting to the plan performance measures directly. Although many large employers request performance measures from plans, it is not clear that employers are aware of the actual scores, and some of the measures are not even available to employers. Thus, we will take such a finding to be indicative of the equilibrium relationship between plan performance and offering.

We envision a profit maximizing model of the employer choice of health plan, for an employer e with a group of employees in MSA m. The employer is faced with a set of HMO health plans, $j \in 1, \ldots, J$, that are in the MSA. The employer can choose to offer any subset of the available plans to its employees, and will presumably charge the employees some price for each plan, partly through lower wages. The analysis is made conceptually difficult by the fact that employers can, and do, choose to offer more than one HMO to their employees. We account for this by allowing employers to choose the subset of plans that maximizes profits over the set of all possible health plan combinations.

Most generally, the subset of plans that is offered will be a function of the traits of all of the plans in the market. It is beyond the scope of this paper to estimate this fully general choice model. Instead, we model the choice of each plan as a function of the characteristics of that plan and of the employer/MSA. This is likely to be a reasonable approximation of the actual

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determinants of health plan offering except when the correlation of choices across plans is important.[2]

We estimate the plan offering decision using a binomial logit choice model. We include two sets of specifications. One set controls for employer and MSA characteristics by including fixed effects for employer/MSA combinations. The other set does not control for employer or MSA characteristics. For the fixed effects specifications, any relationship between plan traits and the number of plans offered will be completely captured by the fixed effects and will not identify the coefficients of interest. Thus, the coefficients of interest are identified exclusively by whether plans that have a *relatively* higher value of a characteristic are more likely to be in the set of plans offered by an employer. This implies that the fixed effects estimation will find a negative price coefficient if employers tend to offer the cheaper plans within a market, all else being equal, but not if employers in markets with all cheap plans tend to offer more plans.[3]

To formalize, let offer_{emj} be a 0-1 indicator variable for whether employer e in MSA m offers plan j. Our fixed effects specification is:

$$(1) \qquad \Pr\left(\text{offer}_{emj}=1\right)=\frac{\exp\left(\alpha_{em}+x_{emj}\beta\right)}{1+\exp\left(\alpha_{em}+x_{emj}\beta\right)}.$$

In (1), the x variables represent plan characteristics, such as ratings and price information, while the β's are the coefficients of interest. The α's are the employer/MSA fixed effects.

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[2]As an example, correlated choices would occur if employers offer a high-quality, expensive plan and a low-quality, inexpensive plan, in order to span the preferences of diverse employees.
[3]Another implication is that the offering decisions of an employer that offers all or no plans in an MSA will solely affect the fixed effect for that employer/MSA, and not the parameters of interest. One employer offered no HMOs in

Our specification without fixed effects is:

$$(2) \qquad \Pr\left(\text{offer}_{emj} = 1\right) = \frac{\exp\left(x_{emj}\beta\right)}{1+\exp\left(x_{emj}\beta\right)}.$$

Note that (2) differs from (1) only in the exclusion of the α fixed effects.

We estimate our specifications based on (2) using maximum likelihood. Define $\widehat{\text{offer}}_{emj}\left(\beta, x_{emj}\right)$ to be the random variable that indicates plan offering as a function of parameters and exogenous data based on (2).[4] As is standard in the literature, the log likelihood function is:

$$(3) \qquad \ln L\left(\beta, x\right) = \sum_{e,m,j} \ln \Pr\left(\text{offer}_{emj} = \widehat{\text{offer}}\left(\beta, x_{emj}\right)\right).$$

Define $\widetilde{\text{offer}}_{emj}\left(\alpha_{em}, \beta, x_{emj}\right)$ to be the corresponding function to $\widehat{\text{offer}}_{emj}\left(\beta, x_{emj}\right)$ for the fixed effects model based on (1). While it is possible to write the likelihood function for (1) in an analogous manner to (3), it is not feasible to estimate (1) with maximum likelihood, because each employer/MSA fixed effect is a separate parameter.

Instead, we estimate the fixed effects specification using the conditional maximum likelihood estimator proposed by Chamberlain (1980). The estimator maximizes

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the four MSAs in which it operated that are in our final sample, but did offer HMOs in MSAs that we excluded because of missing data.

[4] Note that $\widehat{\text{offer}}_{emj}\left(\beta, x_{emj}\right)$ is the random variable that indicates the probability of offering conditional on parameters, while offer_{emj} is the is the actual offering decision in the data set.

$$(4) \qquad \ln CL\left(\beta, x\right) \equiv \sum_{e,m,j} \ln \Pr\left(\text{offer}_{emj} = \widetilde{\text{offer}}\left(\alpha_{emj}, \beta, x_{emj}\right) \middle| \sum_{k=1}^{J} \text{offer}_{emk} \right),$$

which is the probability of plan offering conditional on the number of plans offered by the employer/MSA. Chamberlain (1980) shows that the estimator based on (4) is consistent (though not efficient) and that the α fixed effects drop out of (4), making it a function solely of (β, x) that is feasible to compute.

We report robust standard errors for all of our estimates that we compute using bootstrap techniques. For the fixed effects specifications based on (1), we allow for clustering at the employer/MSA level (consistent with the fixed effects), while the specifications based on (2) allow for clustering at the plan/MSA level. The bootstrapped standard errors provide a method for evaluating the power of our estimates that controls for the fact that there may be dependence of observations within the unit of clustering.

Our specifications are based only on plan traits and employer/MSA fixed effects. Ideally we would model employer plan choice as a function of employer and employee traits, in order to understand how these different traits affect health plan choice. However, we do not have any data on the characteristics of employees, such as age or gender, which would allow us to identify the impact of alternate employee characteristics on plan offerings.

3. Data

We combine several sources of data. These include data on employer health plan offerings, health plan availability and market share by MSA, health plan performance measures,

health plan prices and other health plan characteristics. We discuss each of these data sources in turn and then discuss our strategies for dealing with missing data.

3.1 Employer choice of health plan

The primary data for this project come from survey responses for a sample of large employers, conducted by The MEDSTAT Group. Employers were asked to indicate the HMO plans they offered in the year 2000, by region (e.g., north Texas or eastern Pennsylvania), based on a census of HMO plans and operating regions provided by InterStudy. Medstat asked 44 employers to participate in the survey. Of these 44, 12 explicitly declined to participate and 17 provided data for inclusion in this paper. Firms that participated range in size from about 10,000 to 225,000 U.S. employees, with an average size of about 65,000.[5] By focusing on large firms, this work explores the segment of the market most likely to be responsive to plan performance. Our sample consists of 1 firm in oil and gas extraction and mining, 5 in manufacturing of durable goods, 3 in manufacturing of nondurable goods, 3 in transportation, communications and utilities, none in retail trade, 2 in finance, insurance and real estate, 2 in services and 1 in government.

We believe that the primary determinants of response to the survey are the workload of the individuals in the benefits office and the strength of the personal relationship between these individuals and the account representatives from Medstat. The Medstat account managers also state that some of the employers have blanket policies of non-participation in research studies. The 27 nonparticipating firms are similar in observable ways to the firms in our sample. They range in size from 3,000 to 191,000 U.S. employees with an average firm size (~61,000) that was

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[5] Firm size data are based on estimates from Medstat.

not statistically different from that of participating firms (p=.83). Industry representation for nonparticipating firms was also not statistically different (p=.95).

Medstat reports each employer's plan offerings in each MSA as well as the choice set in each MSA. The choice set in an MSA is the set of plans that operate in that MSA, as reported by the InterStudy census.

The InterStudy census overstates the number of plans available in an MSA for several reasons. First, some plans serve only selected populations (e.g. Medicaid). We delete from the choice set all HMOs that had no commercial enrollment.

Second, the InterStudy census lists some plans as serving certain MSAs when in fact they only effectively serve nearby MSAs. For example, there is a plan that InterStudy lists as serving almost all of the Tennessee MSAs, the enrollees of which are almost all in Memphis and Nashville. This plan seems not to have the effective capacity to serve enrollees from other MSAs, but may have a few who commute across MSAs. Finally, some plans are part of national firms (e.g. Aetna, Cigna, Prudential). Multiple plans from these firms may be listed within a single MSA even if the MSA is primarily served by one such plan. To eliminate these erroneous plan choices from the choice set, we delete all plans with less than 5% share of the HMO market in an MSA from that MSAs choice set. We computed each plan's share of the HMO market in each MSA from the InterStudy data.

3.2 Health plan performance data

Our measures of plan performance are based on the HEDIS and CAHPS data, as provided by the NCQA. We had access to the measures for all plans that submitted data to NCQA. To match the enrollment data, we use data from the 2000 NCQA reports. These data measure

performance in 1999, and are from the first year in which the NCQA required plans to hire third party firms to audit the data.

We base our HEDIS measure of performance on four administrative HEDIS measures: the childhood immunization rate for measles, mumps and rubella (MMR), the mammography screening rate, the continuity rate for primary care physicians[6] and the percentage of primary care physicians that were board certified. We chose these measures because they are potentially relevant to employees and have relatively few missing values.

We base our CAHPS measure of performance on six CAHPS indices: getting needed care, getting care quickly, how doctors communicate, courteous office staff, customer service, and claims processing. Each represents an aggregation of responses for several CAHPS questions. The CAHPS measures of plan performance were highly correlated with one another. Regressions of each CAHPS measure on the others yield R^2's of about .70.

To simplify the presentation and analysis, we aggregate both types of performance measures. We standardize the HEDIS measures by dividing each measure by its standard deviation and then summing. Because the CAHPS measures are all loosely on the same scale, we aggregated by summing the scores on each domain.

The unit of observation for the report cards is an NCQA plan identifier. This does not correspond exactly to the InterStudy plan identifier, which is the unit of observation at which Medstat reports the plan offering data. We merged the report card data with the Medstat plan offering data at the plan/MSA level. In cases where multiple NCQA plans correspond to one InterStudy plan in an MSA we used the mean ratings across NCQA observations.[7]

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[6] This is the negative of the turnover rate. By phrasing it in this way, a higher value of any of the measures is better.
[7] For cases where the NCQA data is missing for some, but not all, of the multiple NCQA plans, we used the mean over non-missing observations.

3.3 Price and other plan attributes

Our ideal price measure is the menu of prices that each firm would be quoted for a standardized coverage package.[8] This menu would likely depend on the characteristics of the firm's employees and negotiations between the firm and plans. It should include prices for both plans that the firm offers and for those that it does not offer.

Our actual price measure is the premium charged by the Federal Employees Health Benefit Plan (FEHBP) to federal government employees. We use the sum of employee and government costs for the low benefit single coverage option. These premiums represent a similar benefit package and, likely, a relatively homogeneous workforce. They will differ from our ideal measures of price to the extent that there are differences in the health plan negotiation processes between large commercial employers and the federal government. Moreover, as FEHBP premiums are only available for plans offered by the federal government, the use of this variable results in missing premium data, a point we return to below.

The federal government is often quoted one premium per insurer within a geographic region, such as a state, as is likely true for many other large employers. When we lacked more detailed data, we assumed the premium for each plan was the same across all MSAs served by the plan. Because of differences in coding between InterStudy and FEHBP plan codes, we matched the FEHBP data to the base data at the plan/MSA level.

We include several other basic plan attributes in the model. Specifically, we include plan age, tax status, the percentage of plan enrollment in Medicaid and Medicare, model type and whether the plan was part of a national chain or affiliated with Blue Cross and Blue Shield (we

code national affiliation and BCBS affiliation as mutually exclusive). Because there are some extreme values for plan age, we coded age using four dummies (2 years old or less, 3 to 5 years old, 5 to 10 years old, and older than 10 years). As only the dummy for age greater than 10 years turned out to be a significant predictor of offering in most specifications, we include only the dummy for this age category to conserve on parameters. Model type is challenging to code because many plans report that their model type as mixed. We code plan type based on the fraction of providers in each of three models, group/staff, network, and IPA. Some mixed model plans do not report these fractions. We include a dummy variable for these plans.

3.4 Missing data

One important issue is missing price and ratings data. In the MSAs where our employers operated, we had 514 plans from the InterStudy census (used to define the set of plans an employer could offer). In 2000, FEHBP provided 288 price quotes of which 228 were for plans in MSAs where our employers operated. Because of differences in plan coding, these 228 FEHBP records translated into 218 plans in our sample (which was based on InterStudy census plan definitions). The 296 plans without FEHBP information are generally plans that do not participate in the FEHBP program.

Correspondingly, in 2000, the NCQA collected 384 ratings submissions of which 328 were for plans in MSAs where our employers operated. These 328 HEDIS records translated into 294 plans in our InterStudy-based sample. The 220 InterStudy plans without HEDIS data are likely mostly from plans that did not respond to NCQA requests for data. Many of the plans that replied to NCQA did not provide information on all the HEDIS and CAHPS categories that we

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[8] If relative prices are a function of the benefit package, we would ideally observe prices from each insurer for each

used. Of the 328 NCQA records that we use, 306 provided the CAHPS data,[9] while 277 provided all the administrative HEDIS data.

We do not drop plans with missing price or ratings information from our analysis because of the sample selection bias that this might cause, particularly for the fixed-effects specifications which are identified based on relative performance. Instead, we include these plans as well as dummy variables that indicate missing price, CAHPS and HEDIS information.

Because of the problems in identifying parameters from markets with substantial missing data, we restrict our base sample to markets without a large fraction of plans with missing price or ratings information. We keep markets with 6 or more plans if at least 4 plans have valid CAHPS and FEHBP data, and keep markets with 5 or fewer plans if at least 60% of the plans have valid CAHPS and FEHBP data.[10] We also report results from more inclusive specifications where only 3 out of 6 or more plans need valid data. In our base sample, we have observations on 177 plans in 105 MSAs with an average of about 8.1 employers and 4.0 plans in each MSA and a total of 3667 plan/MSA/employer observations. The fraction of missing data from our base sample is much smaller than for the data as a whole: 20.4% of observations are missing FEHBP data, 18.9% are missing CAHPS data, and 22.6% are missing some administrative HEDIS data.

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benefit package.

[9] We found that plans either provided all or none of the CAHPS data.

[10] Plans that were dropped from the analysis because of the missing data criteria had similar price and performance values (to the extent that these variables were not missing), relative to plans kept in the analysis. However, the plans that were dropped were systematically newer and more likely to be for-profit. The dropped observations had a slightly higher percentage of enrollees in network or IPA products and had similar profiles regarding national ownership status, BCBS affiliation, and share of Medicaid and Medicare enrollees.

4. Results

There is considerable variation in the offering decisions across large employers. On average employers offered about 21% of plans in their choice set. Of the 855 employer/MSA combinations in our base sample, 22 (consisting of 6 employers over 13 markets) offered all the available HMOs. About half of the employer/MSAs offered no plans. This was more often the case in MSAs with fewer than 4 plans than for MSAs with 5 or more plans. Every employer had some MSAs in which it did not offer any HMOs. One employer did not offer any plans in any of the markets in our analysis. The employer that offered the most choice offered, on average, about 40% of the plans in the HMOs in which it operates.

There is also considerable variation in which plans are offered. Of the 425 plan/MSA combinations in our sample, 4 (consisting of 2 plans over 4 markets) were offered by every employer in the MSA. About one third of the plans in markets with at least 5 employers were not offered by any of the employers in our survey.

The means of explanatory variables, taken over all plan/employer/MSA combinations in the base sample, are reported in Table 1, disaggregated by whether the plan was offered or not.[11] These statistics do not provide a consistent picture of the relationship between plan performance and offering. There is no statistical difference in the mean sum of the CAHPS measures. The pattern of results for individual CAHPS measures is mixed. The plans that are not offered perform better on 4 of the 6 domains. The offered plans perform better on the other domains, customer service and claims processing. For the administrative HEDIS variables, the aggregate

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[11]The fixed effects specifications do not use all of these observations for identification of the parameters because employer/MSA combinations in which all plans are offered or no plans are offered are explained completely by the employer/MSA fixed effects.

HEDIS score was greater for the plans offered as was each of the four components individually. These differences were statistically significant, but small.

Turning to the other covariates, the price information shows that the offered plans are slightly less expensive than the plans that are not offered (about 5%). There are much bigger differences in other plan traits. Offered plans are much more likely to be non-profit, greater than 10 years old and IPA or network models. They have more Medicare beneficiaries and fewer Medicaid beneficiaries and are more likely to be affiliated with national managed care firms. They are less likely to be affiliated with BCBS plans.

The findings from Table 1 may be misleading because they do not adjust for the choice set facing employers and do not control for the other covariates. Table 2 reports the results from the fixed effects logit models using the CAHPS measures of performance. Recall that these models control for the available set of plans in each market. The first column reports the unconditional relationship between the performance and the likelihood that a plan will be offered. It suggests that better performance increases the likelihood that a plan is offered. The sum of the ratings has a mean value of 475 and a standard deviation of 26. At the mean offer probability of 15.2%, the coefficient of .010 implies that the offer probability would increase by 3.4 percentage points per 1 standard deviation increase in the sum of CAHPS ratings. Because no covariates are included in this specification, this finding is consistent with the theory that employers are attracted to high performing plans but may simply be because high performing plans exhibit other traits that attract employers. Regardless of the reason for the observed relationship, the results answer the policy question of whether large employers are more or less likely to offer higher performing plans.

The second column presents the results from the full model, which includes covariates for price and other plan traits. The estimated relationship between performance and the likelihood of offering remains significant and doubles in magnitude. A one standard deviation increase in the sum of the ratings is now projected to increase the offer probability by about 7.0 percentage points at the mean offer probability. The estimated effect of price is negative and statistically significant. This indicates that plans with higher FEHBP prices are less likely to be offered, conditional on the other regressors.

The coefficients on the other covariates generally have plausible signs and are mostly statistically significant. Employers are more likely to offer plans that have existed for more than 10 years. This may reflect the importance of continuity in plan offerings. They are also less likely to offer for-profit plans, which is consistent with the performance results if one assumes non-profit status is a positive signal of unobserved quality (Hirth 1999). Employers appear to prefer network model plans relative to group/staff model plans, which may reflect the desirability of the provider panels in these plans, although we have no direct evidence to support this point. Employers also seem less likely to offer IPA model plans. Plans with many Medicare beneficiaries are more likely to be offered and plans with many Medicaid beneficiaries are less likely to be offered. These findings may arise because plans with high Medicare enrollment have traits that are attractive to commercial beneficiaries and plans with high Medicaid enrollment have traits that are unattractive to commercial beneficiaries. However, it may also be the case that Medicare or Medicaid payment policy affects the performance of the plans which in turn affects the plans attractiveness to commercial beneficiaries (Glazer and McGuire 2002).

Finally, employers seem more likely to offer plans affiliated with national chains but less likely to offer BCBS plans. The attraction to national chains may reflect an economy in

bargaining and contracting and the lack of attraction to BCBS plans may reflect the loose affiliations of these plans, which do not provide the same ease of contracting as do national chains. It is important to note that these traits that are attractive to employers may also be the same traits that are attractive to workers, particularly if they reap some of the savings associated with contracting efficiencies.

The final column of Table 2 expands the sample to allow for markets with more plans with missing data, as discussed in Section 3.4. This increases the number of observations from 3667 to 4500 plan/employer/MSA combinations. The coefficients on CAHPS performance and price are reasonably stable across specifications. The other covariates continue to reflect the attraction of employers to established, non-profit, network model plans with fewer Medicaid enrollees, lower IPA enrollment and many Medicare enrollees and to plans that are affiliated with a national chain.

Table 3 replicates this analysis using the administrative HEDIS measures of performance instead of the CAHPS measures. The unconditional results, which do not control for any plan traits, indicate a positive relationship between performance and the likelihood of offer, suggesting again that unconditional on covariates, employers are not offering inferior plans (column 1). The magnitude of the response to the administrative HEDIS measures is similar to the magnitude for the CAHPS measures. The HEDIS measures have a mean of 35.7 and a standard deviation of 2.5. At the mean offer probability of 15.2%, the coefficient of .161 implies that the offer probability would increase by 5.2 percentage points per 1 standard deviation increase in the sum of HEDIS ratings.

When the full set of covariates are included, the coefficient on ratings is virtually unchanged. Moreover, the results for the other covariates are similar to those reported when the

CAHPS summary measure was used. The price coefficient is again negative and significant. Employers prefer established plans, plans that are not for-profit, network plans with relatively many Medicare enrollees and few Medicaid enrollees and plans that are affiliated with national chains and are not BCBS plans.

The final column of Table 3 replicates the sensitivity analysis reported in Table 2 for the CAHPS measures. The results are similar to that of the full model reported in column 2, except that the coefficient on performance is smaller (though still significant) and the price coefficient is substantially smaller and no longer statistically significant.

Tables 4 and 5 report estimates using a logit specification without fixed effects. To maintain comparability, the sample is kept the same, but because this analysis does not discard observations from employer/MSA combinations in which all plans were offered or no plans were offered, more observations are effectively included. Recall that this model imposes that the decision of whether or not to offer a plan is based upon absolute, not relative, performance.

The unconditional model reveals no statistically significant relationship between performance and offering. This result can be reconciled with the results from the fixed effects logit model by the fact that a regression of performance data on MSA dummies indicates that plan performance is correlated within markets.

When covariates are added (column 2), the results become very consistent with the fixed effects specifications. Good performance is positively related to the likelihood of offer. A one standard deviation increase in performance evaluated at the sample mean probability of offer increases the likelihood of offer by 4.4 percentage points, compared to 7.0 percentage points for the comparable fixed effects specification. Price is inversely related to the likelihood of offer, demonstrating a similar effect to the fixed effects specification. The other covariates support

much of the same qualitative story as before, although the sign of the coefficient on IPAs is reversed.

In the large sample (column 3), the coefficients on performance and price remain similar to those reported in the analogous fixed effect specification (Table 2, column 3). Column 4 adds a variable measuring the number of HMOs in the market and thereby controls, in part, for the degree of market competition. The coefficient on this variable is negative, indicating that employers are less likely to offer any given plan in markets with many plans to choose from. The other findings are similar to the other specifications, although the Medicare coefficient is no longer significant and the CAHPS coefficient is about 20% smaller than in the full model (column 2).

Table 5 reports analogous logit models using the administrative HEDIS measures instead of the CAHPS measure. The estimates consistently indicate a positive and statistically significant relationship between performance and the likelihood of offer. The price coefficient remains negative and statistically significant across columns. The coefficients on the other covariates yield similar conclusions to those from Table 4, although the coefficient on network is not significant.

To help place our results in context, we examined the relationship between performance and plan market share. We estimate multinomial logit models using two different definitions of market share. First, we define market share as the share of the commercial HMO market based upon data from InterStudy. This is loosely comparable to our analysis of large firm plan offerings, because we only focus on HMO offerings.[12] Second, we define market share using the total non-elderly population in the MSA as reported by the Census bureau as the denominator. In this case,

the outside good is a composite of non-HMO private coverage, public coverage, and uninsured. In both cases we include an MSA level fixed effect. We performed our analysis using the log-linear method of Berry (1994), which includes unobserved product characteristics, and use the same base sample of markets.

The results are reported in Table 6. The qualitative findings regarding performance are consistent with the results from large employers. Better CAHPS performance and better HEDIS performance are associated with greater market share. At the mean market share of 27.7% (with no outside good), the coefficient of .009 from column 1 implies that a one standard deviation increase in the CAHPS ratings is associated with a 4.69 percentage point increase in market share. Note that these magnitudes are not directly comparable with earlier numbers, as plan offering by an employer is different than plan choice by an individual.

The results regarding price are not significantly different from zero in each case. This may suggest that the FEHBP premium data are worse proxies for the prices charged to small and medium size firms than for those charged to large firms.[13] The other coefficients tell a story that is similar to those reported in other tables, except that the Medicare, Medicaid and national chain coefficients are no longer significant in most specifications, while the BCBS is significantly positive. While we have no particular explanation for the change in the Medicare/Medicaid effect, the national chain effect can be explained by the fact that smaller employers would be less concerned with coverage in multiple location. The BCBS result can be explained by the fact that BCBS plans have historically served small business markets.

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[12] InterStudy does not provide commercial enrollment by MSA. We allocated plan level commercial enrollment to MSAs based on the percentage of total plan enrollment in each MSA.
[13] Plans are supposed to base FEHBP prices on the price that would be charged to an actuarially similar large group.

5. Discussion and Conclusion

In competitive markets the lower bound on quality is generally determined by consumers' willingness to pay for higher quality products. Low quality products may exist in the market if they are sufficiently inexpensive to attract customers. In some cases there may be no market, at any reasonable price, for products of inferior quality and these products would be driven from the market.

Because of information imperfections in health care markets, policy makers worry that the standard disciplinary mechanisms that prevent quality from falling too low in competitive markets may not apply. Individual consumers may not be aware of the quality of the health care systems they join and employers may be able to capture some of the savings associated with offering lower quality, less expensive health plans.

Our analysis of the health plan choices of 17 large employers suggests that employers do not preferentially offer plans with poor performance scores. Given our cross sectional research design, we cannot definitively determine whether the positive relationship between plan performance and the likelihood of a plan being offered reflects a conscious attempt by employers to act as agents for their employees, perhaps because of pressure from labor markets to offer plans with good performance, or a correlation between plan performance and unobserved plan traits, such as provider networks. Omitted worker traits could also play a role. For example, the fact that large employers disproportionately offer plans with high quality measures fits with the fact that their employees are more highly compensated than average. Because the relationship between performance and the likelihood of offering a plan gets stronger when more control

variables are added, any remaining unobservables would not negate our findings unless they had the opposite effect of the observed covariates.[14]

Our results indicate that factors other than plan performance affect the likelihood of a plan being offered as well. We found employers less likely to offer plans with high prices. This finding should be interpreted with some caution. As with our analysis of the performance measures, omitted variables may also influence our estimates regarding the impact of price. To the extent that high-priced plans have valuable unobserved traits, this will cause the estimated price coefficient to be upwardly biased relative to the structural coefficient. Moreover, as noted in Section 3, the price data are imprecisely measured, which may affect the estimates. Finally, employer response to price may be dulled by their ability to pass along higher prices to employees, for instance through co-premiums in cafeteria-style plans.

Consistently, the analysis suggests that employers prefer plans that are more established, non-profit, and affiliated with national chains. Though not uniform, the bulk of the evidence suggests that employers prefer network model plans and plans with relatively few Medicaid enrollees.

There are several limitations to this work. First, we observe data for only 17 employers. Large employers such as these may be the most responsive to plan performance and in fact large employers were instrumental in developing the HEDIS system. Moreover, these employers were self selected and employers interested in performance may have been more likely to participate in the study. Yet it may be that a few large employers can drive the market for performance and

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[14] Preliminary analysis using data from the prior year yielded much the same conclusions regarding the relationship between performance on the CAHPS domains and employer offerings. However the earlier data do not indicate a consistent relationship between the administrative HEDIS data and employer plan offerings. This might be because the earlier HEDIS data was noisier (the earlier data was not required to be audited), or it could be that there are omitted variables affecting the findings related to administrative HEDIS data in one or both years.

encourage plans to improve quality. As more information about performance becomes available pressure may mount on other employers to respond to performance when offering plans.

Another limitation of this work is that there were considerable challenges with the data. Even though we had access to the most comprehensive database about plan performance available, we did not have data for many plans. As discussed above, data on plan premiums was equally problematic. Even the data on plan availability by MSA were not perfect because of concerns about how geographic market areas for plans were coded.

It is also important to note that the measures of performance used in our analysis, though among the most widely circulated, are not synonymous with plan quality. We do not have sufficient data on health outcomes to assess whether the plans with better scores on our performance variables have better health outcomes. Moreover, it may be the case that 'quality' is more important at the provider level than at the plan level. But since plans can influence employee access to providers and the care received from those providers, the health plan is an important determinant of the quality of care and the main way in which pressure from employers gets reflected in the health care system.

Finally, the decision about which health plans to offer is not the only way employers can respond to poorly performing plans. They can freeze enrollment in poorly performing plans or steer employees away from such plans. Employers may be reluctant to stop offering poorly performing plans since employees may be reluctant to change plans. Plan changes are likely to generate provider search costs for employees. Employers can also use poor performance as a tool in negotiations, paying less to poor performing plans. Our analysis cannot measure any of these responses.

A considerable amount of effort is being made to measure plan performance. Measurement is the first step towards helping the market function and discipline the market into providing adequate quality care. To date, consumers have relied mainly on informal sources of information and various agencies and accreditation bodies to assure some minimum level of quality through licensure and certification. Only recently have we moved to disclosure of data (mainly of HEDIS and CAHPS based report cards and measures) directly to the consumers (individuals and employers). The extent to which this information translates into improved performance at the plan level depends on the extent to which consumers respond to the information. Providers have an incentive to invest heavily in improving performance only if employers and employees can understand the signal and then alter purchasing decisions accordingly. Though we are a long way from assessing the employer or health plan response to information, the positive relationship between performance and the likelihood a plan will be offered by this subset of employers is encouraging to supporters of a decentralized, employer based health care system.

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	Offer	Not Offer
Sum CAHPS variables	475.3 (23.9)	475.5 (26.8)
	n=654	n=2318
How Doctors Communicate***	87.5 (3.41)	89.1 (2.92)
	n=654	n=2318
Getting Needed Care***	73.6 (6.45)	74.6 (6.72)
	n=654	n=2318
Getting Care Quickly***	76.8 (4.93)	77.9 (5.35)
	n=654	n=2318
Courteous Office Staff***	90.0 (2.52)	90.6 (2.84)
	n=654	n=2318
Customer Service***	68.3 (6.01)	65.6 (6.06)
	n=654	n=2318
Claims Processing***	79.2 (6.50)	77.7 (8.81)
	n=654	n=2318
Sum HEDIS variables (score) ***	36.0 (2.39)	35.5 (2.53)
	n=656	n=2184
MMR immunization rate***	89.5 (5.02)	88.6 (6.56)
	n=661	n=2317
Mammography rate***	75.5 (4.07)	73.94 (5.62)
	n=662	n=2322
Provider consistency rate**	-7.98 (-3.78)	-8.40 (-4.47)
(Negative of provider turnover rate)	n=657	n=2219
% Primary care physicians that are board certified**	80.6 (5.98)	79.9 (7.24)
	n=657	n=2218
FEHBP price***	$86.52 (14.31)	$90.24 (15.45)
	n=705	n=2213
More than 10 years old***	.982 (.131)	.833 (.373)
	n=750	n=2917
For Profit***	.597 (.507)	.722 (.490)
	n=750	n=2917

The first row contains the mean followed by the standard deviation in parentheses. The second row contains the number of non-missing values. CAHPS values are on a 0 – 100 scale and HEDIS variables are the rates per 100 as defined in HEDIS.

[a]The unit of observation is a Plan x MSA x Employer combination. Means are taken over observations without missing data. The number of observations, n, varies by cell because of missing data.

***P<.01; ** P<.05; * P<.10

Table 1 (continued): Means of Explanatory Variables[a]

	Offer	**Not Offer**
% IPA***	.301 (.358)	.249 (.349)
	n=750	n=2917
% Network***	.202 (.388)	.074 (.214)
	n=750	n=2917
% Medicare enrollees***	.110 (.081)	.0091 (.095)
	n=750	n=2917
% Medicaid enrollees***	.055 (.093)	.091 (.156)
	n=750	n=2917
National Affiliation***	0.738 (.440)	.543 (.498)
	n=750	n=2917
Blue Cross Blue Shield Affiliation***	.077 (.267)	.160 (.366)
	n=750	n=2917

The first row contains the mean followed by the standard deviation in parentheses. The second row contains the number of non-missing values.

[a]The unit of observation is a Plan x MSA x Employer combination. Means are taken over observations without missing data.

***P<.01; ** P<.05; * P<.10

Table 2:

Fixed Effects Logit Results[a]
(CAHPS Variables)

	Performance Only	Full Model	Large Sample[b]
Sum CAHPS variables	.010***	.021***	.016***
	(.003)	(.004)	(.003)
FEHBP price		-.015**	-.011**
		(.006)	(0.005)
More than 10 years old		1.31***	1.36***
		(.354)	(.289)
For Profit		-.582**	-.371**
		(.229)	(.180)
% IPA		-.223	-.415*
		(.286)	(.239)
% Network		.852***	.955***
		(.258)	(.232)
% Medicare enrollees		3.04***	2.96***
		(.947)	(.786)
% Medicaid enrollees		-4.47***	-3.39***
		(.742)	(.568)
National Affiliation		1.71***	1.36***
		(.303)	(.231)
Blue Cross Blue Shield Affiliation		-.515**	-.326
		(.244)	(.229)
N	1959	1959	2467

[a] Specifications include missing data dummies for CAHPS data, FEHBP data and the percentage of enrollment by model type. Standard errors are corrected for clustering among observations of the same employer within an MSA using the bootstrap.

[b] This sample changes the market exclusion restriction to include markets with valid matches for CAHPS and FEHBP price data for either 60% of plans or for 3 or more plans. This raises the number of observations from 1959 to 2467.

***P<.01; ** P<.05; * P<.10. Standard errors are in parentheses.

Table 3: Fixed Effects Logit Results[a]
(Administrative HEDIS Variables)

	Performance Only	Full Model	Large Sample[b]
Sum HEDIS variables[c] (score)	.161***	.160***	.094***
	(.033)	(.048)	(.034)
FEHBP Price		-.012*	-.008
		(.006)	(.005)
More than 10 years old		1.42***	1.41***
		(.338)	(.273)
For Profit		-.729***	-.382**
		(.242)	(.166)
% IPA		-.241	-.413*
		(.284)	(.227)
% Network		.649**	.977***
		(.292)	(.246)
% Medicare enrollees		2.92***	2.77***
		(.985)	(.785)
% Medicaid enrollees		-3.44***	-2.77***
		(.632)	(.557)
National Affiliation		1.438***	1.17***
		(.285)	(.220)
Blue Cross Blue Shield Affiliation		-.632**	-.415**
		(.255)	(.210)
N	1959	1959	2467

[a] Specifications include missing data dummies for HEDIS data, FEHBP price data and the percentage of enrollment by model type. Standard errors are corrected for clustering among observations of the same employer within an MSA using the bootstrap.

[b] This sample changes the market exclusion restriction to include markets with valid matches for CAHPS and FEHBP price data for either 60% of plans or for 3 or more plans. This raises the number of observations from 1959 to 2467.

[c] HEDIS variables include: MMR immunization rate, mammography rate, provider consistency rate and the percent of primary care physicians that are board certified.

***P<.01; ** P<.05; * P<.10. Standard errors are in parentheses.

Table 4: Logit Results[a]
(CAHPS Variables)

	Performance Only	Full Model	Large Sample[b]	With #HMOs
Sum CAHPS variables	-.0004	.013***	.011***	.009**
	(.003)	(.004)	(.003)	(.004)
FEHBP price		-.012**	-.013**	-.014**
		(.006)	(.006)	(.006)
More than 10 years old		1.82***	1.72***	1.86***
		(.344)	(.252)	(.338)
For Profit		-.968***	-.768***	-1.01***
		(.203)	(.180)	(.223)
% IPA		.848***	.607***	.767***
		(.230)	(.185)	(.222)
% Network		.608**	.697***	.599**
		(.260)	(.256)	(.251)
% Medicare enrollees		1.54*	.156*	1.24
		(.931)	(.818)	(.963)
% Medicaid enrollees		-1.39**	-1.06**	-1.68***
		(.615)	(.518)	(.63)
National Affiliation		1.39***	1.20***	1.48***
		(.282)	(.229)	(.264)
Blue Cross Blue Shield Affiliation		-.426	-.204	-.439
		(.294)	(.238)	(.305)
# HMOs in market				-.163***
				(.044)
N	3667	3667	4500	3667

[a] Specifications include a constant, missing data dummies for CAHPS data, FEHBP price data and the percentage of enrollment by model type. Standard errors are corrected for correlation among observations of the same plan within the same MSA using the bootstrap.

[b]This sample changes the market exclusion restriction to include markets with valid matches for CAHPS and FEHBP price data for either 60% of plans or for 3 or more plans. This raises the number of observations from 3667 to 4500.

***P<.01; ** P<.05; * P<.10. Standard errors are in parentheses.

Table 5: Logit Results[a]
(Administrative HEDIS Variables)

	Performance Only	Full Model	Large Sample[b]	With #HMOs
Sum HEDIS variables[c] (score)	.083**	.192***	.147***	.172***
	(.033)	(.039)	(.030)	(.038)
FEHBP Price		-.015**	-.014**	-.017***
		(.006)	(.006)	(.006)
More than 10 years old		1.789***	1.700***	1.815**
		(.367)	(.269)	(.349)
For Profit***		-.872***	-.658***	-.904***
		(.216)	(.158)	(.214)
% IPA		.631***	.458**	.623***
		(.215)	(.172)	(.198)
% Network		.388	.560**	.402
		(.258)	(.258)	(.244)
% Medicare enrollees		2.04**	2.01**	1.785**
		(1.03)	(0.835)	(.901)
% Medicaid enrollees		-1.13***	-.881*	-1.411**
		(.531)	(.516)	(.585)
National Affiliation		1.290***	1.094***	1.462***
		(.249)	(.186)	(.246)
Blue Cross Blue Shield Affiliation		-.406	-.208	-.389
		(.269)	(.247)	(.260)
# HMOs in MSA				-.163***
				(.039)
N	3667	3667	4500	3667

[a] Specifications include a constant, missing data dummies for CAHPS data, FEHBP price data and the percentage of enrollment by model type. Standard errors are corrected for correlation among observations of the same plan within the same MSA using the bootstrap.

[b]This sample changes the market exclusion restriction to be markets with valid matches for CAHPS and FEHBP price data for either 60% of plans or for 3 or more plans. This raises the number of observations from 3667 to 4500

[c] HEDIS variables include: MMR immunization rate, mammography rate, provider consistency rate and the percent of primary care physicians that are board certified.

***P<.01; ** P<.05; * P<.10. Standard errors are in parentheses.

	CAHPS Variables		HEDIS Variables	
	No outside good[a]	Outside good[b]	No outside good[a]	Outside good[b]
Sum CAHPS Variables	.009***	.019***		
	(.003)	(.003)		
Sum HEDIS variables[c] (score)			.101***	.188***
			(.028)	(.028)
FEHBP Price	.001	-.003	-.002	-.004
	(.004)	(.004)	(.004)	(.004)
More than 10 years old	.038	.408***	.083	.466***
	(.127)	(.163)	(.124)	(.160)
For Profit	.315***	-.107	.281**	-.074
	(.125)	(.132)	(.126)	(.131)
% IPA	-.170	-.455***	-.139	.256
	(.163)	(.171)	(.163)	(.164)
% Network	.658***	.598***	.593***	.470**
	(.190)	(.208)	(.195)	(.209)
% Medicare enrollees	-.155	-.049	-.295	-.077
	(.618)	(.649)	(.614)	(.645)
% Medicaid enrollees	.095	.351	.120	.265
	(.334)	(.405)	(.334)	(.397)
National Affiliation	.067	.325**	.025	.117
	(.143)	(.161)	(.142)	(.149)
Blue Cross Blue Shield Affiliation	.261*	.325*	.282*	.258
	(.145)	(.173)	(.148)	(.170)
N	320	425	320	425

[a]HMO plan market share within an MSA sums to 100%. Estimates use MSA fixed effects.

[b]HMO plan market share equals the percent of persons under 65 years of age enrolled in HMO within an MSA. The outside good is all non-HMO coverage (including the uninsured) within an MSA.

[c] HEDIS variables include: MMR immunization rate, mammography rate, provider consistency rate and the percent of primary care physicians that are board certified.

***P<.01; ** P<.05; * P<.10. Standard errors are in parentheses.