An Analysis of Private-Sector Prices for Hospital Admissions

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Abstract

Prices for hospital admissions have received considerable attention in recent years, both because they are an important component of health care spending and because they can vary widely. In this paper, we use 2013 claims data from three large insurers to examine the hospital payment rates of those insurers in their commercial plans and their Medicare Advantage plans and compare them with Medicare's fee-for-service (FFS) rates; we also examine the variation of those rates across and within markets. We found that the average commercial payment rate for a hospital admission was about $21,400, but the prices for common types of admissions usually varied widely. By contrast, we found that the average payment rate in Medicare's FFS program for the same mix of admissions and hospitals was about $11,400 (including Medicare's additional payments for admissions to teaching hospitals and certain other supplemental payments). On average, therefore, commercial rates for inpatient services were 89 percent higher than Medicare's FFS rates—or Medicare's FFS rates were 47 percent lower than commercial rates, on average. The ratio of commercial rates to Medicare's FFS rates varied greatly across metropolitan areas and across hospitals within metropolitan areas.

By contrast, we found that Medicare Advantage rates for hospital inpatient services were roughly equal to Medicare's FFS rates, on average. In our preferred comparison, we excluded Medicare's additional payments for admissions to teaching hospitals from the FFS rates, because the Medicare program makes such payments directly to hospitals for Medicare Advantage enrollees. Those additional payments were thus excluded from our estimated payment rates for both FFS and Medicare Advantage. But including those additional payments in the FFS rates affected the comparison only modestly. We also found that the ratio of Medicare Advantage rates to Medicare's FFS rates varied much less across hospital stays, across metropolitan areas, and across hospitals within metropolitan areas than the corresponding ratio for commercial rates. Finally, we found that hospital payment rates in Medicare Advantage plans do not increase or decrease noticeably as the share of enrollees in those plans grows—a finding that has informed the Congressional Budget Office's analysis of proposals to change the terms of competition between Medicare Advantage plans and Medicare's FFS program.

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I.   Summary

The prices that private insurers pay hospitals have received considerable attention in recent years. In this paper, we use 2013 claims data from three large insurers (Aetna, Humana, and UnitedHealthcare) to examine the payment rates for hospital inpatient services in their commercial plans and their Medicare Advantage plans, and we compare those rates with Medicare's fee-for-service (FFS) rates. We also investigate how commercial and Medicare Advantage payment rates vary across markets and within markets. We obtained the data used for this analysis from the Health Care Cost Institute (HCCI). Hospital payment rates are of interest to policymakers and the Congressional Budget Office for several reasons: Those payments account for a large share of national health expenditures; the federal government effectively subsidizes most private-sector payments to hospitals by giving favorable tax treatment to the private insurance plans that finance those payments; and payment rates under Medicare Advantage plans are an important consideration in many policy proposals affecting the Medicare program. (In this analysis, we use "payment rates," "rates," and "prices" interchangeably.)

A key feature of the HCCI database is that it contains the amounts hospitals were actually paid for each admission, rather than hospitals' charges or other proxy measures. Because the actual payment amounts are the result of negotiations with insurers, those data are sensitive and not usually reported. For each hospital stay in the private claims data, we determined the total payment to the hospital by summing the payment from the insurer and any cost-sharing amount owed by the patient. We then applied the payment rules of the Medicare FFS program to estimate the amount that the hospital would have been paid for that same admission if the patient had been covered by Medicare, based on the geographic location of the hospital, the diagnosis-related group (DRG) to which the stay was assigned, and certain other factors. (HCCI assigned a DRG code to each stay in the private claims data using the same approach as Medicare.) By using that method, we are able to hold the mix of patients and hospitals constant in the analysis. We limited the analysis to stays at acute care hospitals located in metropolitan areas, and we examined the variation in payment rates across and within those areas.

The average commercial payment rate for a hospital admission in 2013 was about $21,400. Payment rates were typically higher for more complex types of care; for example, the average commercial payment rate for admissions in which surgery was performed was more than twice as high as the average rate for all other admissions. Commercial payment rates also varied widely for each specific DRG that we examined. The average Medicare FFS payment rate for the same set of admissions that were included in our analysis of commercial rates was about $11,400, once additional payments for teaching hospitals, disproportionate share hospitals, and extraordinarily costly cases are included. Thus, commercial rates were an average of 89 percent higher than Medicare's FFS rates with those additional payments included—or, inversely, Medicare's rates were 47 percent below commercial rates, on average.

The average Medicare Advantage payment rate for a hospital admission in 2013 was about $10,700. The average Medicare FFS rate we calculated for the same set of admissions was about $10,700—or virtually identical to the average Medicare Advantage rate. That estimate for the average FFS rate is slightly lower than the $11,400 average reported above, for two reasons: first, the mix of hospitals and DRGs differed slightly between the commercial and Medicare Advantage patients in our sample, so our calculation of the corresponding FFS rates also differed slightly; and, second, we excluded additional payments to teaching hospitals for this comparison with Medicare Advantage rates. We excluded those additional payments from Medicare's FFS rates because, by law, hospitals receive such payments directly from the Medicare program for Medicare Advantage enrollees. Our estimates of Medicare FFS and Medicare Advantage payment rates were thus measured on the same basis, since neither included Medicare's additional payments to teaching hospitals.

Looking at average payment rates across more than 100 metropolitan statistical areas (MSAs), commercial prices varied greatly whereas Medicare Advantage prices varied much less. To illustrate that, we computed two sets of ratios in each MSA: the ratio of average commercial prices to Medicare's FFS prices and the corresponding ratio for average Medicare Advantage prices. (Medicare's FFS prices are adjusted to account for geographic variation in hospitals' input prices, so by measuring commercial prices and Medicare Advantage prices relative to Medicare's local FFS prices, we sought to factor out those geographic differences in input prices.) We then ranked the MSAs from lowest to highest using the ratio of average prices, and we examined the price ratio in the MSA at the 90th percentile of the distribution and the price ratio in the MSA at the 10th percentile of that distribution. On average, commercial rates were about 150 percent higher than Medicare's FFS rates in the MSA at the 90th percentile, compared with about 45 percent higher in the MSA at the 10th percentile—so that span of prices roughly equals the average FFS rate. (That analysis included about 140 MSAs, so that range ran from the 14th most expensive to the 14th cheapest MSA.) By contrast, the average Medicare Advantage rate in the MSA at the 90th percentile of the distribution was only 6 percent higher than the average FFS rate, and the average Medicare Advantage rate in the MSA at the 10th percentile of the distribution was only 2 percent below the average FFS rate. (That analysis included about 200 MSAs, so that range ran from the 20th most expensive to the 20th cheapest MSA.)

Our findings also indicate that hospital payment rates in Medicare Advantage plans do not increase or decrease noticeably as the share of beneficiaries enrolled in those plans in an area rises. Furthermore, commercial payment rates for hospital services varied greatly across hospitals within metropolitan areas, and Medicare Advantage rates varied much less. The variation in rates was greater in some metropolitan areas than others—particularly for commercial rates. Our analysis of price variation within metropolitan areas was limited to a small number of such areas, however, so the results may not apply to other areas.

II.   Background on Hospital Prices

In this section, we summarize the evidence from prior studies on how hospital payment rates for commercial and Medicare Advantage plans compare with Medicare's FFS rates and on how they vary across and within markets. We focus on studies that examined rates for hospital inpatient services because those are the rates we analyze in this study.

Commercial Payment Rates

Several recent studies have found that private insurers' hospital payment rates for their commercial plans are much higher than the rates paid by the Medicare FFS program. A study by Zack Cooper and others using claims data from three large national insurers available through the Health Care Cost Institute—the same data source we used in this paper—found that commercial rates for inpatient hospital care were an average of 87 percent higher than Medicare's FFS rates over the 2007–2011 period.[1] A recent study by Laurence Baker and others, which also used claims data from HCCI, found that commercial rates for inpatient hospital care were an average of about 65 percent higher than Medicare's FFS rates in 2012.[2] Although both studies used HCCI data to estimate commercial rates, they differed in their approach to the analysis—particularly in how Medicare's FFS payment rates were computed.[3]

A study by Thomas Selden and others found that commercial rates for inpatient hospital care have grown relative to Medicare's FFS rates over the past decade and that in 2012 (the most recent year for which data were available), commercial rates were an average of 75 percent higher than Medicare's rates.[4] That study used data on hospital payments from the Medical Expenditure Panel Survey (MEPS).

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[1] Zack Cooper and others, *The Price Ain't Right? Hospital Prices and Health Spending on the Privately Insured*, Working Paper 21815 (National Bureau of Economic Research, December 2015), p. 14.

[2] Laurence C. Baker and others, "Medicare Advantage Plans Pay Hospitals Less Than Traditional Medicare Pays," *Health Affairs*, vol. 35, no. 8 (August 2016), pp. 1444-1451.

[3] Cooper and others computed Medicare FFS rates by applying the Medicare payment rules to calculate the amount that Medicare would have paid for each commercial stay in the HCCI database, accounting for the hospital's location and the DRG assigned to the stay—which is similar to our approach. The amount paid by Medicare for each stay included the base payment rate plus payments for the indirect costs of medical education and disproportionate share hospital payments. In contrast, Baker and others used Medicare claims data to estimate Medicare FFS prices and included all of the categories of Medicare payments that were included by Cooper and others plus two more: outlier payments for extraordinarily costly cases and "pass-through" payments. The latter are payments that Medicare makes periodically to hospitals (rather than as add-ons to the payment for each stay) and include the following: direct costs of medical education, Medicare beneficiaries' bad debt, kidney acquisition costs, and capital costs of hospitals in their first two years of operation. For reasons discussed below, we did not include pass-through costs in computing Medicare FFS payment rates in this paper. The two studies also differed in their approach to estimating commercial rates and in their geographic scope; Cooper and others presented national estimates whereas Baker and others presented estimates for up to 125 metropolitan areas.

[4] See Appendix Table F.2 in Thomas M. Selden and others, "The Growing Difference Between Public and Private Payment Rates for Inpatient Hospital Care," *Health Affairs*, vol. 34, no. 12 (December 2015), pp. 2147–2150.

Those findings are generally consistent with data compiled by the American Hospital Association (AHA), which imply that commercial rates for hospital services were, on average, about 65 percent higher than Medicare's FFS rates over the most recent five-year period for which data are available (2009–2013). That estimate was not calculated directly from data on payment rates; instead, it reflects differences in payment-to-cost ratios computed for each major type of payer derived from hospitals' financial data, and it includes an adjustment to remove uninsured patients from the AHA data on hospitals' payments from private payers.[5] However, the payment-to-cost ratios for private payers increased sharply in 2012, which raises questions about the data and highlights the need for additional research.

Previous studies have also found that commercial payment rates for hospital services exhibit substantial geographic variation. HCCI found that the commercial rates for hospital services of three national insurers vary greatly across 41 selected metropolitan areas.[6] Although it is expected that those geographic differences in rates partly reflect differences in the prices of hospitals' inputs, HCCI found that adjusting for differences in area wage rates (which were used as a proxy for hospitals' input prices) had little effect on the variation in hospital payment rates.[7] After making that adjustment, HCCI found that the average payment rate for inpatient services in 2013 was nearly twice as high in the highest-priced metropolitan area as in the lowest-priced metropolitan area, and the average payment rate in the metropolitan area at the 75th percentile of the distribution of payment rates was 23 percent higher than the average rate in the metropolitan area at the 25th percentile.

Using the same data, Cooper and others found that commercial payment rates for hospital inpatient services vary greatly across hospital referral regions (HRRs).[8] After adjusting for

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[5] See American Hospital Association, *Trendwatch Chartbook 2015: Trends Affecting Hospitals and Health Systems.* According to the AHA data, hospitals' payments for Medicare beneficiaries were an average of about 10 percent below their costs of serving those patients over the 2009–2013 period, whereas their payments from private payers were an average of about 40 percent above their costs. However, the latter figure includes payments for privately insured patients and uninsured patients. Using estimates from the Medicare Payment Advisory Commission regarding the relationship between payment-to-cost ratios for privately insured patients and all private-pay patients, we estimate that hospitals' payments for privately insured patients were about 50 percent above costs. (See Medicare Payment Advisory Commission, *A Data Book: Health Care Spending and the Medicare Program*, June 2015, pp. 82–83.) Those estimates depend critically on how hospitals allocate costs across patients, which may reflect somewhat arbitrary accounting conventions.

[6] Heath Care Cost Institute, *2015 Healthy Marketplace Index Report* (September 2015). The analysis was limited to 41 metropolitan areas in which at least 100,000 people ages 18 to 64 were covered by employment-based insurance and at least one-quarter of those covered people were captured in the HCCI database.

[7] HCCI adjusted for geographic differences in hospitals' input prices using the Medicare wage index, which the federal government uses to account for such differences in setting Medicare's hospital payment rates.

[8] Zack Cooper and others, *The Price Ain't Right? Hospital Prices and Health Spending on the Privately Insured*, Working Paper 21815 (National Bureau of Economic Research, December 2015). There are 306 HRRs in the United States. They were defined by researchers at the Dartmouth Institute for Health Care Policy on the basis of where Medicare patients are referred for major cardiovascular procedures and neurosurgery. Each HRR includes at least one major referral center for those services. See "The Dartmouth Atlas of Health Care," www.dartmouthatlas.org/data/region/.

geographic differences in wage rates, the average payment rate was more than four times as high in the highest-priced HRR as in the lowest-priced HRR. (As in the study conducted by HCCI, adjusting for geographic differences in wage rates had little effect on the variation in payment rates.) An earlier study by the Government Accountability Office found substantial variation across metropolitan areas in private insurers' payment rates for preferred provider organization plans offered in the Federal Employees Health Benefits program.[9]

Past studies have also found that commercial payment rates vary greatly across hospitals within markets. Chapin White and others analyzed the hospital rates paid by private insurance plans covering autoworkers in 13 Midwestern metropolitan areas in 2011 and found that the highest-priced hospital in those markets was typically paid 60 percent higher rates for inpatient services than the lowest-priced hospital, although the amount of that difference varied greatly across markets.[10] The study also found substantial variation in payment rates across markets. Those findings were generally consistent with those of an earlier study by Paul Ginsburg, which relied on information provided by four large insurers on how their commercial rates compared with Medicare's rates in eight markets.[11]

The difference in payment rates between commercial payers and Medicare partly reflects differences in how those rates are established. Medicare's payment rates are set administratively, following rules specified in federal law, whereas commercial rates are generally negotiated. Commercial rates depend, in part, on the relative negotiating leverage of hospitals and insurers, which in turn depends on factors such as the number of competing hospitals and insurers in a local market area. Hospitals with substantial negotiating leverage with insurers often command much higher rates than other hospitals. One study found that, compared with other hospitals in their market area, hospitals with the highest prices tend to be larger, be major teaching hospitals, be part of health systems with large market shares, and provide specialized services such as level I trauma care.[12] (A full analysis of the factors affecting commercial payment rates is beyond the scope of this analysis, however.)

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[9] Government Accountability Office, *Federal Employees Health Benefits Program: Competition and Other Factors Linked to Wide Variation in Health Care Prices*, GAO-05-856 (August 2005).

[10] Chapin White, Amelia Bond, and James Reschovsky, "High and Varying Prices for Privately Insured Patients Underscore Hospital Market Power," Center for Studying Health System Change, Research Brief No. 27 (September 2013).

[11] Paul Ginsburg, "Wide Variation in Hospital and Physician Payment Rates Evidence of Provider Market Power," Center for Studying Health System Change, Research Brief No. 16 (November 2010).

[12] See Chapin White, James D. Reschovsky, and Amelia M. Bond, "Understanding Differences Between High- and Low-Price Hospitals: Implications for Efforts to Rein in Costs," *Health Affairs*, vol. 33, no. 2 (February 2014), pp. 324–331.

Medicare Advantage Payment Rates

Less information is available from prior studies about payment rates in Medicare Advantage plans, but the limited evidence suggests that those payment rates are similar to Medicare's FFS rates, on average.

A recent study by Robert Berenson and others, drawing on interviews with stakeholders, reported that Medicare Advantage plans typically pay hospital rates that are similar to Medicare's FFS rates.[13] Specifically, the authors collected information from interviews with senior personnel at 10 hospitals or health systems and 11 insurers. They found that the most common arrangement is for Medicare Advantage plans to pay hospitals Medicare's FFS rates and that in most other cases hospitals are paid between 1 percent and 5 percent more than Medicare's rates. In rare cases, hospitals obtain rates that are up to 10 percent above Medicare's FFS rates. The study included hospitals and insurers of varying sizes and from different geographic areas, which suggests that the rates paid by Medicare Advantage plans exhibit much less variation across and within markets than the rates paid by commercial plans. The study's findings are generally consistent with information that CBO staff had obtained earlier through informal discussions with industry sources.

A limitation of relying on interviews with industry sources rather than an analysis of claims data to assess how Medicare Advantage payment rates compare with Medicare's FFS rates is that the sources might differ in how they define or calculate those FFS rates. For example, they might differ on the extent to which they include the additional payments per stay that some hospitals receive from Medicare if they operate medical education programs or if their share of patients with low income exceeds a specified threshold. The Medicare program makes those medical education payments directly to hospitals for Medicare Advantage patients, and such payments are excluded from the calculation of the payment benchmarks for the program.[14] Therefore, Medicare Advantage plans that pay hospitals Medicare's FFS rates might not include those add-on payments for medical education in their calculation of FFS rates.

Another recent study by Laurence Baker and colleagues using 2012 HCCI data found that Medicare Advantage hospital payment rates were 5.6 percent less than Medicare's FFS rates after adjusting for the smaller network of providers in Medicare Advantage. Without adjusting for the narrower networks, Medicare Advantage rates were 8.0 percent less than Medicare's FFS rates.[15] Subsequently, however, the authors conducted a separate analysis that responded to a critique that their original study included the indirect medical education (IME) payments that

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[13] Robert A. Berenson and others, "Why Medicare Advantage Plans Pay Hospitals Traditional Medicare Prices," *Health Affairs*, vol. 34, no. 8 (August 2015), pp. 1289–1295.

[14] Medicare Advantage benchmarks are determined at the county level and represent the maximum per capita payment that a plan can receive from Medicare for a beneficiary of average health.

[15] Laurence C. Baker and others, "Medicare Advantage Plans Pay Hospitals Less Than Traditional Medicare Pays," *Health Affairs*, vol. 35, no. 8 (August 2016), pp. 1444-1451.

hospitals receive from Medicare for FFS patients but did not account for the fact that hospitals also receive IME payments from Medicare for Medicare Advantage patients.[16] For that reason, the authors' original estimates overstated the difference in the payments that hospitals receive for Medicare Advantage patients and Medicare FFS patients. In their revised analysis, Baker and colleagues focused on nonteaching hospitals (which would be expected to receive little or no IME payments), and they found that for those hospitals Medicare Advantage payment rates were 4.7 percent lower than FFS rates. Baker and colleagues also examined how the ratio of Medicare Advantage prices to Medicare FFS prices varied with Medicare Advantage penetration. They found that in metropolitan areas with the greatest share of enrollees in Medicare Advantage plans, the ratio of Medicare Advantage prices to Medicare FFS prices was somewhat lower— suggesting that greater penetration might give insurers more leverage to bargain for lower prices. That difference, however, was not statistically significant.

Industry sources have cited several reasons that hospitals may be willing to accept substantially lower payment rates for Medicare Advantage plans than for commercial plans.[17] One commonly cited reason is that when Medicare Advantage enrollees go outside their plan's provider network to obtain covered services, federal law requires providers to accept Medicare's FFS rates as payment in full.[18] Industry sources report that that provision of federal law reduces hospitals' negotiating leverage with Medicare Advantage plans. In contrast, with commercial plans, providers that are not in a plan's network typically charge rates for out-of-network services that are substantially higher than the rates paid by the plan for services received within the network— which creates substantial room for bargaining over those in-network rates. Another relevant factor cited by industry sources is that the maximum payments Medicare Advantage plans receive from Medicare are based on costs per enrollee in Medicare's FFS program, so Medicare Advantage plans are constrained in how much they can pay hospitals and remain competitive with the Medicare FFS program. A third factor may be that hospitals and insurers view Medicare's payment rates as establishing pricing norms for Medicare Advantage (perhaps because they would receive Medicare's FFS rates in the absence of the Medicare Advantage program).

Hospital Payment Methods

Insurers differ not only in how much they pay for hospital admissions, but also in how they structure those payments. Medicare pays most hospitals using a prospective payment system, which specifies a flat rate for each stay that depends primarily on a patient's medical condition or

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[16] Laurence C. Baker and others, "Calculating Medicare Advantage/Fee-for-Service Price Differences Is Harder Than It Looks," *Health Affairs* (blog entry, November 28, 2016). As discussed below, IME payments are additional amounts per admission that Medicare pays hospitals that operate medical resident training programs.

[17] Robert A. Berenson and others, "Why Medicare Advantage Plans Pay Hospitals Traditional Medicare Prices," *Health Affairs*, vol. 34, no. 8 (August 2015), pp. 1289–1295.

[18] Sections 1866(a)(1)(O) and 1876(j)(1) of the Social Security Act contain the relevant provisions for hospitals and physicians, respectively. The implementing regulation for that legislation is at 42 C.F.R. 422.214.

treatment.[19] More specifically, that rate is computed from two national base rates, one of which is intended to reflect hospitals' operating costs and the other their capital costs.[20] Two adjustments are made to the base rates before they are summed. One adjustment accounts for the relative costliness of patients by assigning each stay to a diagnosis-related group based on a patient's diagnosis, on whether certain surgical procedures were performed, and in some cases on whether certain comorbidities or complications were present. Each DRG is assigned a weight that reflects the relative cost of stays for that group compared with the national average—which generally ranges from 0.2 to 26.0—and that weight is multiplied by the base rates to generate the payment amount. Another adjustment accounts for geographic differences in hospitals' input prices by multiplying the labor component of the base rate by an index measuring the wage rates in a hospital's local market area relative to the national average. The base rates are set and updated according to law.

Certain other adjustments are applied to Medicare's payments in some cases. In particular, some hospitals may receive several types of add-ons to the Medicare payment amount per admission: First, hospitals that operate medical resident training programs receive an IME adjustment; second, hospitals whose share of low-income and uninsured patients exceeds a certain threshold receive disproportionate share hospital (DSH) payments; and, third, hospitals may receive additional payments for "outlier" cases that are extraordinarily costly. Conversely, Medicare reduces its payment to hospitals for inpatient care for certain cases that are transferred to another facility and for hospitals that do not meet certain targets related to health care quality.[21]

Teaching hospitals receive IME payments from the Medicare program for both FFS patients and Medicare Advantage patients. For Medicare Advantage patients, hospitals receive the same IME payments they would have received if the patients had been enrolled in Medicare's FFS program. In the formula for computing DSH payments, both Medicare FFS patients and Medicare Advantage patients are included in the calculation of a proxy for the share of a hospital's patients that have low income. For reasons discussed below, in our main approach to comparing Medicare Advantage rates with Medicare's FFS rates, we included DSH payments but excluded IME payments from the calculation of FFS rates.

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[19] Medicare pays hospitals designated as critical access hospitals and certain other types of hospitals on the basis of their allowable costs. Those hospitals account for about 5 percent of all Medicare payments for hospital admissions.

[20] For fiscal year 2016, the operating base rate is $5,466 and the capital base rate is $438. The capital base rate is intended to reflect costs for depreciation, interest, rent, and property-related insurance and taxes.

[21] In fiscal year 2013, the maximum penalty under the Hospital Readmissions Reduction Program was 1 percent; and under the Hospital Value-Based Purchasing program, 1 percent of payments was withheld and redistributed to hospitals based on their performance. See Centers for Medicare & Medicaid Services, "Readmissions Reduction Program (HRRP)," www.cms.gov/medicare/medicare-fee-for-service-payment/acuteinpatientpps/readmissions-reduction-program.html and "Medicare Learning Network Hospital Value-Based Purchasing Fact Sheet," www.cms.gov/Outreach-and-Education/Medicare-Learning-Network-MLN/MLNProducts/Downloads/Hospital_VBPurchasing_Fact_Sheet_ICN907664.pdf.

In addition to those payments for each stay, the Medicare program makes certain lump-sum payments to many hospitals periodically. Those "pass-through" payments compensate hospitals for the direct costs of medical education, Medicare beneficiaries' bad debt, kidney acquisition costs, and capital costs of hospitals in their first two years of operation. [22] In this paper, we focus on Medicare's payments per admission. As discussed in the following section, we estimated private payments for each admission from the HCCI data and estimated the payments that the Medicare FFS program would have made for that admission, including any payments for DSH and IME. We did not factor in the lump-sum payments that the Medicare program makes to many hospitals.

The methods that private insurers use to pay for hospital inpatient care vary by insurer and by market area. Payment methods used by private insurers for their commercial plans include a DRG-based flat rate per stay, a specified rate per day, and a discount off the hospitals' listed charges for the services provided.[23] According to the study by Berenson and others, the Medicare DRG system is by far the most common hospital payment method used by private insurers for their Medicare Advantage plans.[24] Other approaches used for Medicare Advantage plans include paying hospitals a specified rate per day and paying health systems a percentage of the total capitation payment they receive from Medicare. (The HCCI data include only claims in which hospitals were paid on an FFS basis. However, it is not possible to identify in the HCCI data what payment method was used for each stay.)

III. Data and Methods

The main data source for our study is a database of private health insurance claims created by HCCI. The HCCI database includes claims data from Aetna, Humana, and UnitedHealthcare and covers all 50 states and the District of Columbia. A key strength of the HCCI database is that it contains the rates those insurers actually paid for each discharge, rather than hospitals' charges or other proxy measures. Those data are sensitive because they are the result of negotiations between hospitals and insurers and are not usually reported.

We used HCCI claims for inpatient services provided in 2013. In that year, the data included the claims of more than 50 million individuals from the group, nongroup, and Medicare Advantage markets. About 41.2 million of those individuals were under age 65 and had group coverage, accounting for about 25 percent of all individuals younger than 65 with employment-based

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[22] Payments for the direct costs of graduate medical education compensate hospitals for the salaries of residents and supervising physicians and certain other costs. The formula for computing those direct medical education payments includes the share of a hospital's inpatient days that are attributable to Medicare (counting both Medicare FFS patients and Medicare Advantage patients), so an additional Medicare admission increases those payments slightly.

[23] Paul B. Ginsburg, *Wide Variation in Hospital and Physician Payment Rates Evidence of Provider Market Power* (Center for Studying Health System Change, Research Brief No. 16, November 2010).

[24] Robert A. Berenson and others, "Why Medicare Advantage Plans Pay Hospitals Traditional Medicare Prices," *Health Affairs*, vol. 34, no. 8 (August 2015), pp. 1289–1295.

insurance.[25] About 4.4 million were 65 or older and had coverage through a Medicare Advantage plan, accounting for about a third of all such enrollees in Medicare Advantage.[26]

Study Samples

We analyzed two samples of hospital stays from the HCCI claims: a sample of stays for people with commercial coverage and a corresponding sample for people enrolled in Medicare Advantage plans.

Initial Steps in Constructing the Samples. To construct the samples, we first identified all claims for hospital inpatient services in the 2013 HCCI database. Using that information, we identified hospital stays from each claim's unique admission identifier, which HCCI created to identify all of the hospital claims associated with an inpatient stay from admission through discharge. Using that approach, we identified approximately 3.5 million hospital stays in the HCCI data in 2013. We then applied two restrictions:

- We restricted the sample to stays at acute care hospitals by linking the HCCI data with data from the AHA's Annual Survey of Hospitals and using the AHA's data to determine the type of hospital for each stay.[27]

- We restricted the sample to stays at hospitals that are paid under Medicare's inpatient prospective payment system by linking the HCCI data with the "CMS Final Rule Impact File," which contains the data we used to estimate the amount that the Medicare FFS program would have paid for each stay—including hospital-specific payment adjustments for IME and DSH.

The first restriction eliminated stays at other types of facilities, such as rehabilitation, psychiatric, and long-term-care hospitals. The second restriction eliminated stays at hospitals that are paid by Medicare on a cost basis (such as critical access hospitals, cancer hospitals, and children's hospitals).[28] We used the national provider identifier (NPI) on the HCCI claims to identify

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[25] Health Care Cost Institute, "2013 Health Care Cost and Utilization Report" (October 2014); Health Care Cost Institute, "Taking the Pulse of Health Care Markets," Data Brief No. 2 (September 2015), www.healthcostinstitute.org/files/HMI%20Data%20Brief%20-%20Final.pdf; Health Care Cost Institute, "What Makes HCCI Data Unique?" www.healthcostinstitute.org/files/How%20HCCI%20Data%20is%20Unique%20-%20October%202014.pdf; and Health Care Cost Institute, "HCCI Methodology," http://www.healthcostinstitute.org/publications-and-research/methodology/.

[26] For reasons discussed below, we excluded from our analysis people with nongroup coverage, people with group coverage who were less than 18 years of age or age 65 or older, and Medicare Advantage enrollees who were under age 65.

[27] In using AHA data to identify acute care hospitals in the HCCI data, we followed the approach used in Zack Cooper and others, *The Price Ain't Right? Hospital Prices and Health Spending on the Privately Insured*, Working Paper 21815 (National Bureau of Economic Research, December 2015).

[28] To be designated as a critical access hospital under Medicare, hospitals must have no more than 25 inpatient beds and meet certain other criteria. Most critical access hospitals are located in rural areas. We excluded from our

hospitals and link the HCCI data with data from the AHA and the Centers for Medicare & Medicaid Services (CMS) Impact File.[29] Applying those restrictions eliminated 28 percent of the hospital stays in the 2013 HCCI data, leaving us with a sample of about 2.5 million stays. (Appendix A provides more detail on the sample selection process.)

We next restricted the sample of stays to those in hospitals located in metropolitan statistical areas.[30] We imposed that restriction because we wanted to examine the variation in prices across and within geographic areas, and we thought MSAs would be the best unit of analysis for our purposes. Although many other studies have been conducted at the level of the hospital referral region, we chose MSAs as the geographic unit of analysis for this study because in our judgment they correspond more closely to hospital markets and thus better capture the effects of hospital-insurer negotiations over commercial prices.

We also excluded stays at hospitals in Maryland and West Virginia because those states regulate hospital payment rates.[31] In addition, we excluded stays at hospitals in Puerto Rico, stays at hospitals with fewer than 50 discharges of any type in 2013 in the HCCI claims data, stays with more than one DRG on the associated claims, and stays with an invalid NPI.[32] Together, those restrictions eliminated 7 percent of the stays that had been identified in the previous step, leaving us with a sample of about 2.3 million stays. (Table A-1 shows the number of stays that were excluded in each step.)

Selecting the Commercial and Medicare Advantage Samples. After applying the restrictions discussed above, we ended up with a sample for which two-thirds of the stays were for enrollees in commercial plans and one-third were for enrollees in Medicare Advantage plans. We further restricted the commercial sample to hospital stays for adults between the ages of 18 and 64, and we excluded stays associated with childbirth because those are common in commercial plans but very rare in Medicare and thus could skew the comparisons. We also restricted the commercial

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sample hospitals that were identified as critical access hospitals in the AHA data as well as hospitals that were not in the CMS Impact File.

[29] Because hospitals in the HCCI data could have more than one NPI, we had to develop a crosswalk to map the multiple NPIs per hospital in the claims data to a unique identifier for each hospital (the HCCI data did not have a crosswalk available at the time of our analysis). Appendix A provides more details on that process.

[30] Some stays at hospitals located outside MSAs were already excluded in the previous step, when we excluded stays at critical access hospitals.

[31] Maryland regulates hospital rates for all payers, and West Virginia regulates hospital rates for private payers. For additional information on rate setting in those states, see Anna Sommers, Chapin White, and Paul Ginsburg, *Addressing Hospital Pricing Leverage Through Regulation: State Rate Settin*g, NIHCR Policy Analysis No. 9 (National Institute for Health Care Reform, May 2012).

[32] Some hospitals had very few discharges in the HCCI claims, and we were concerned that some of them might have been outside the insurer's network (in which case the payment amounts on the claim could be much higher than the rates normally paid by the insurer).

sample to people with employment-based coverage.[33] We restricted the Medicare Advantage sample to beneficiaries who were 65 or older.

For both the commercial sample and the Medicare Advantage sample, we excluded hospital stays in which the patient was transferred to another hospital. In such cases, we retained the stay at the "receiving" hospital but excluded the stay at the "transferring" hospital. We excluded such stays because the Medicare FFS program reduces the payment to the transferring hospital if the patient's length of stay at that hospital is below a certain threshold, but the receiving hospital always receives the full Medicare payment rate.[34]

Applying all of those restrictions yielded a sample of roughly 681,000 stays for commercial enrollees and 645,000 stays for Medicare Advantage enrollees (see Table A-2).[35] As discussed below, we excluded additional stays from each sample if the payment amounts were extremely low or high.

Hospital Price Measures

We first determined the total payment for each stay in the commercial and Medicare Advantage samples and then computed the amount that the Medicare FFS program would have paid for each stay. By using that method, the mix of admissions and hospitals is held constant in our comparison of private payment rates and Medicare FFS rates.

Commercial and Medicare Advantage Prices. We measured the price for each stay by summing the allowed amounts on the associated hospital claims for services delivered from admission through discharge.[36] The allowed amount represents the total payment made to the hospital by both the insurer and the patient (in the form of members' cost sharing).[37]

We excluded from our sample stays for which, in our judgment, the payment amount was too low or too high to be credible. We first eliminated stays with payment amounts that were zero or

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[33] Our decision to restrict the sample to people with employment-based coverage is consistent with the approach taken in two other recent studies that used HCCI data to analyze hospital price variation: Zack Cooper and others, *The Price Ain't Right? Hospital Prices and Health Spending on the Privately Insured*, Working Paper 21815 (National Bureau of Economic Research, December 2015); and Heath Care Cost Institute, *2015 Healthy Marketplace Index Report* (September 2015). We conducted a sensitivity analysis and found that including people with nongroup coverage in the sample had minimal effects on our results, which is not surprising given that excluding such people reduced the number of stays in our commercial sample by only 2 percent.

[34] In particular, Medicare reduces the payment to the transferring hospital for patients whose length of stay at that hospital is at least one day less than the geometric mean for the patient's DRG. In such cases, Medicare pays the transferring hospital a specified amount per day that is equal to the full payment amount for the DRG divided by the average length of stay for that DRG, multiplied by the patient's length of stay at the transferring hospital.

[35] We applied a few additional restrictions that were not discussed above and that reduced the sample by very small amounts (see Table A-2).

[36] To be consistent with Medicare FFS payment policy, if a patient in the HCCI data received outpatient services at the same hospital within three days of the admission date, we added the allowed amounts for those services to the total price of the stay in our calculation of private payment rates. For a further discussion, see Appendix A.

[37] The HCCI database does not include any claims paid on a capitated basis.

negative.[38] Some of the remaining stays had very low payment amounts, and those might represent either data errors or cases in which the insurer in the HCCI data was a secondary payer. The HCCI database used for this analysis did not include a flag to indicate whether the claim was for a secondary payer; to avoid including such stays in our samples, we excluded stays from the commercial and Medicare Advantage samples for which the total payment amount was less than 50 percent of the MSA-level average Medicare FFS base payment amount for that DRG.[39] Applying that restriction reduced the number of stays in the commercial sample by 7 percent and the number in the Medicare Advantage sample by 3 percent (see Table A-2).[40] We also excluded stays with durations or payment amounts in the top 1 percent of the DRG-level distribution.[41]

After applying all of those criteria, we had a final analytic sample that comprised approximately 621,000 stays in the commercial sample and 593,000 in the Medicare Advantage sample (see Table A-2). Both samples include stays from 297 MSAs (out of about 370 MSAs nationwide) and approximately 1,900 hospitals (out of about 3,400 community hospitals nationwide). Our final sample of hospitals differs from the national population of acute care hospitals in the AHA's Annual Survey of Hospitals in two main ways. By design, all of the hospitals in our sample are located in MSAs, whereas 73 percent of hospitals nationally are in MSAs (see Table A-3). The other main difference is that hospitals in our sample are larger than average compared with hospitals nationally. Because our sample of hospitals is located in MSAs, some 34 percent of the hospitals in our sample have at least 300 beds, compared with 23 percent of hospitals nationally. Our final sample of hospitals included 57 percent of acute care hospitals in the United States and accounted for about three-fourths of discharges from such hospitals.

Medicare FFS Prices. We computed the amount that the Medicare FFS program would have paid for each stay in our sample using the DRG on the claim and the 2013 inpatient prospective

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[38] Negative payment amounts in the data were a result of claim reversals.

[39] After our analysis of the 2013 data was mostly complete, HCCI added an indicator to the 2014 data identifying claims on which the insurer was a secondary payer.

[40] We would expect to see more secondary payer claims among commercial enrollees than among Medicare Advantage enrollees because some common reasons for having secondary coverage (such as employees being covered under both their spouse's plan and their own plan and adult children being covered under their parents' plan and their own plan) do not apply to the Medicare population. For Medicare Advantage enrollees, the main source of secondary coverage is employment-based coverage for those who are actively working. Beneficiaries with such coverage are unlikely to be enrolled in Medicare Part B, however, in which case they would not be eligible to enroll in a Medicare Advantage plan. The higher proportion of stays excluded in this step from the commercial sample than from the Medicare Advantage sample tends to confirm our suspicion that some of the claims we excluded were secondary payer claims.

[41] The previously cited paper by Cooper and others also excluded stays with durations or payment amounts in the top 1 percent of the distribution by DRG. However, that analysis adopted a different approach than our analysis for dealing with low-cost outliers. Specifically, the analysis by Cooper and others excluded stays in the bottom 1 percent of the distribution of payment amounts by DRG, whereas we excluded stays with payment amounts of less than 50 percent of the Medicare FFS payment amount by DRG. In Appendix Tables A-4 and A-5, we present the results of a sensitivity analysis in which we applied that alternative approach to eliminating low-cost outliers. As an additional sensitivity analysis, we included stays with durations in the top 1 percent of the distribution by DRG and found that it had minor effects on our results.

payment system's payment rules and final rule tables.[42] That amount includes the Medicare beneficiary's cost-sharing amount, which is consistent with how we constructed the commercial and Medicare Advantage prices. (HCCI applied the DRG classification used by Medicare to assign a DRG to inpatient claims regardless of whether the insurer used a DRG-based system to pay the hospital. In the HCCI data, it is not possible to identify what payment method was used for each stay.) We multiplied the Medicare operating and capital base rates by the DRG weight and adjusted for the area wage index. We also calculated hospital-specific payments per discharge for IME and DSH.[43] As discussed below, we excluded IME payments from FFS payment rates in our preferred comparison of those rates with Medicare Advantage rates, because the Medicare program makes IME payments directly to hospitals for Medicare Advantage enrollees (and those payments were not captured in our data). IME payments were thus excluded from both Medicare's FFS rates and Medicare Advantage rates, placing them on an equal footing. Our calculation of the Medicare FFS payment rates includes a 2 percent reduction to the total payment amount for the sequestration that took effect on April 1, 2013.[44]

To compare average private payment rates with average Medicare FFS rates nationally, we applied an adjustment factor to account for outlier payments in our estimates of national average Medicare FFS rates. We computed that adjustment factor separately for surgical DRGs and medical DRGs and for four common DRGs (identified below) that we analyzed. However, we were unable to adjust the Medicare FFS rate for outlier payments in specific markets or hospitals.[45]

We did not include pass-through amounts in our calculation of Medicare's FFS rates. The pass-through amounts include payments to hospitals for the direct costs of graduate medical education

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[42] Medicare assigns a DRG to each stay on the basis of the diagnosis, whether certain procedures are performed, and whether complications and comorbidities are present. See Centers for Medicare & Medicaid Services, "FY 2013 Final Rule Tables," www.cms.gov/Medicare/Medicare-Fee-for-Service-Payment/AcuteInpatientPPS/FY-2013-IPPS-Final-Rule-Home-Page-Items/FY2013-Final-Rule-Tables.html, and "FY 2013 Final Rule Data Files," www.cms.gov/Medicare/Medicare-Fee-for-Service-Payment/AcuteInpatientPPS/FY-2013-IPPS-Final-Rule-Home-Page-Items/FY2013-Final-Rule-Data-Files.html.

[43] Our approach to estimating the payment that the Medicare FFS program would have made for stays in the HCCI data has been used in other studies. For example, see Zack Cooper and others, *The Price Ain't Right? Hospital Prices and Health Spending on the Privately Insured*, Working Paper 21815 (National Bureau of Economic Research, December 2015); and Chapin White, Amelia Bond, and James Reschovsky, "High and Varying Prices for Privately Insured Patients Underscore Hospital Market Power," Center for Studying Health System Change, Research Brief No. 27 (September 2013). Neither study adjusted Medicare rates to account for outlier payments.

[44] Centers for Medicare & Medicaid Services, "Mandatory Payment Reductions in the Medicare Fee-for-Service (FFS) Program – 'Sequestration'" (March 8, 2013), www.cms.gov/outreach-and-education/outreach/ffsprovpartprog/downloads/2013-03-08-standalone.pdf. We applied the 2 percent payment reduction to the Medicare FFS rate for hospital stays with dates of service or dates of discharge on or after April 1, 2013.

[45] We derived our outlier adjustment factor from Medicare FFS claims data. On average, Medicare FFS outlier payments across all types of hospital stays nationwide boosted total Medicare FFS payments to hospitals by about 4 percent. Because of data restrictions, we did not use Medicare claims to calculate the other components of Medicare FFS rates.

(mostly salaries for medical residents and supervising physicians), bad debt of Medicare beneficiaries, organ acquisition costs, and unusual capital costs. The Medicare program makes periodic lump-sum payments to hospitals for the pass-through amounts, rather than making additional payments for each inpatient stay as is done for IME and DSH. Our analysis thus compares the payments per stay made by private insurers with the corresponding payments per stay made by Medicare. Our exclusion of pass-through amounts from Medicare's FFS rates is consistent with the approach of Zack Cooper and others in their recent analysis of HCCI data. However, as noted above, Laurence Baker and others included pass-through amounts in Medicare's FFS rates in their study.

We believe that the case for excluding pass-through amounts from Medicare's FFS payment rates is especially strong when comparing those rates with Medicare Advantage rates. A key component of pass-through amounts is payment for the direct costs of graduate medical education. Those payments are calculated on the basis of the total number of Medicare patients that the hospital serves, including both Medicare FFS and Medicare Advantage. The rationale for excluding those payments from Medicare's FFS rates is thus analogous to the rationale for excluding IME payments. Moreover, both IME payments and pass-through payments are excluded from the calculation of Medicare Advantage benchmarks.

Price Comparisons. To compare prices nationally, we computed the mean commercial, Medicare Advantage, and Medicare FFS prices across all DRGs in our sample. We also computed mean prices for four specific DRGs (two surgical and two medical) that had a high volume of discharges in both the commercial and Medicare Advantage samples: major joint replacement or reattachment of lower extremity without major complications and comorbidities, DRG 470 (hip and knee replacements); percutaneous cardiovascular procedure with drug-eluting stent without major complications and comorbidities, DRG 247 (coronary stent); esophagitis, gastroenteritis, and miscellaneous digestive disorders without major complications and comorbidities, DRG 392 (gastrointestinal disorders); and cellulitis without major complications and comorbidities, DRG 603 (bacterial infection of the skin and underlying tissues).[46]

To measure the amount of price variation across MSAs, we identified the 20 most common DRGs separately in the commercial and Medicare Advantage samples and constructed a weighted average of the prices for those DRGs in each MSA for each sample. For each MSA, we constructed the weighted average price by multiplying the average price for each DRG in the MSA by the proportion of stays in that DRG in our entire sample (relative to the total number of stays in the top 20 DRGs) and then summing those products across DRGs.[47] The weights were

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[46] We examined the composition of the principal procedures under DRG 470. The majority of principal procedures for DRG 470 were for total hip replacement and total knee replacement, and those procedures had a similar price per discharge.

[47] For some analyses, we computed the weighted average ratio of commercial prices (and Medicare Advantage prices) to Medicare FFS prices by entering the relevant average price ratio for each DRG in this calculation.

constructed separately for the commercial and Medicare Advantage samples. For each sample, the resulting weighted average thus provides a measure of how prices vary across MSAs, holding constant the distribution of stays across DRGs. For some analyses, we divided the weighted average price for each MSA by the weighted average price for the 20 DRGs in our entire sample to yield a Laspeyres price index with a value centered around 1.0.[48]

We limited the calculation of weighted average prices to include the top 20 DRGs in our sample so that a sufficient number of MSAs would have at least one discharge in each DRG.[49] Increasing the number of DRGs in the calculation resulted in substantially fewer MSAs that met that criterion. The 20 DRGs included in that calculation represent 35 percent of all stays and 30 percent of all payments for inpatient hospital care in the commercial sample (see Table A-6). The 20 DRGs chosen for the Medicare Advantage sample represent 35 percent of all stays and 26 percent of all payments for inpatient care in that sample (see Table A-7).

IV.   Results

In this section, we present the results of our analysis that compares commercial and Medicare Advantage payment rates for hospital inpatient care with Medicare's FFS rates and examine how those payment rates vary across and within metropolitan areas. We find that commercial rates are substantially higher than Medicare's FFS rates and that Medicare Advantage rates are similar to Medicare's FFS rates. We also find that commercial rates vary greatly across metropolitan areas and across hospitals within metropolitan areas, whereas Medicare Advantage rates vary much less.

Comparison of Commercial Prices With Medicare's FFS Prices

The average commercial payment rate for all hospital stays in our sample was $21,433, or 89 percent higher than the estimated average Medicare FFS payment for those stays, holding the mix of patients and hospitals constant ($11,354; see Table 1). Put another way, Medicare's FFS rates were an average of 47 percent *lower* than commercial rates. The gaps were similar across different types of stays. For surgical procedures, commercial rates averaged $30,880, or 88 percent higher than the Medicare FFS average of $16,454. For medical stays, commercial rates averaged $13,469, or 89 percent higher than the Medicare FFS average of $7,117.

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[48] Another study that used a similar approach to examine geographic price variation is Michael McKellar and others, *Geographic Variation in Health Care Spending, Utilization, and Quality Among the Privately Insured*, Final Technical Report Presented to the Institute of Medicine Committee on Geographic Variation in Health Care Spending and Promotion of High-Value Care (August 2012), https://iom.nationalacademies.org/~/media/Files/Report%20Files/2013/Geographic-Variation/Sub-Contractor/Harvard-University.pdf.

[49] A total of 137 MSAs in the commercial sample and 196 MSAs in the Medicare Advantage sample had at least one stay in each of the top 20 DRGs and were thus included in the calculation of the weighted average prices.

The average commercial payment rates for the four common DRGs mentioned earlier ranged from $9,349 for DRG 392 (gastrointestinal disorders) to $29,691 for DRG 247 (coronary angiography with drug-eluting stent; see Table 2). The commercial rates for those four DRGs were substantially higher than Medicare's FFS rates, ranging from 77 percent higher than Medicare's FFS rates for DRG 603 (cellulitis) to 120 percent higher than Medicare's FFS rates for DRG 247 (coronary angiography with drug-eluting stent). Those differences might stem from various factors; for example, admissions for a coronary stent might occur more frequently in MSAs where average commercial prices relative to Medicare's FFS prices are particularly high, or they might occur more frequently at the highest-priced hospitals within an MSA. It is also possible that some hospitals might charge higher prices (relative to Medicare's FFS prices) for some types of stays than for others.

The estimates of Medicare's FFS payment rates for those calculations include the base payment amount plus any additional payments for IME and DSH and an adjustment to account for outlier payments. We believe that that measure of Medicare FFS payments is the most appropriate basis for comparison with commercial rates because it captures the total payment that hospitals receive from Medicare for each stay.

Comparison of Medicare Advantage Prices With Medicare's FFS Prices

The average Medicare Advantage payment rate for all hospital stays in our sample was $10,667 (see Table 3). The estimated average Medicare FFS payment for those stays was $10,716—or nearly identical to the average Medicare Advantage rate. The Medicare Advantage and Medicare FFS payment rates were similar, on average, for both surgical stays and medical stays (although the average payment rate was higher for surgical stays than for medical stays).

The average Medicare Advantage payment rates for the four common DRGs ranged from $4,640 for DRG 392 (gastrointestinal disorders) to $12,685 for DRG 470 (hip and knee replacements; see Table 4). On average, the Medicare Advantage payment rates for those four DRGs were between 1 percent and 3 percent higher than Medicare's FFS rates.

For those calculations, we computed Medicare FFS payment rates as the base payment amount plus any additional payments for DSH and an adjustment for outlier payments. We did not include IME payments in those calculations because Medicare makes IME payments directly to hospitals for Medicare Advantage patients. We thus excluded IME payments from the calculations of both Medicare Advantage payment rates and Medicare FFS rates, so our estimates reflect the differences in payments that hospitals receive for the two types of patients.

Although we excluded IME payments from Medicare's FFS rates in our preferred comparison of those rates with Medicare Advantage rates, we included DSH payments. That approach reflects differences in how Medicare Advantage patients are incorporated in the formulas for determining the two types of payments. Medicare's DSH payments at each hospital are calculated through a complex formula that depends partly on a hospital's "DSH patient percentage," which is the sum

of the proportion of the hospital's Medicare inpatient days provided to patients who are eligible for Supplemental Security Income benefits and the proportion of its total inpatient days provided to Medicaid patients. Medicare Advantage patients are included along with Medicare FFS patients in computing the first term in that sum. Thus, unlike the case for IME payments, a hospital's DSH payments are not tied directly to the number of Medicare Advantage patients it treats. Reflecting that difference, IME payments are excluded from the Medicare Advantage benchmarks, but DSH payments are included.[50]

Although we believe that IME payments should be excluded from Medicare's FFS rates when comparing those rates with Medicare Advantage rates, we examined the sensitivity of our results to that decision. If IME payments are included in Medicare's FFS rates, we find that Medicare Advantage rates are 5 percent lower than Medicare's FFS rates, on average (see Table B-1). For the four common DRGs, Medicare Advantage rates are between 1 percent and 3 percent lower than Medicare's FFS rates, on average (see Table B-2). Those estimates overstate the difference in the payments that hospitals receive for Medicare Advantage patients and Medicare FFS patients because they capture the IME payments that hospitals receive for FFS patients but not the IME payments they receive for Medicare Advantage patients.

Nationwide Variation of Prices for a Given DRG

Commercial payment rates varied substantially within major types of stays. To examine that variation, we ranked commercial stays within each of the four common DRGs from lowest to highest on the basis of the payment amount. For the most common DRG (470; hip and knee replacements), the commercial price at the 90th percentile of the distribution ($41,535) was 171 percent higher than the price at the 10th percentile ($15,321; see Table 5). Commercial prices also varied widely for the other common DRGs. For the average commercial stay, across all DRGs, the price at the 90th percentile of the distribution ($36,423) was more than three times the price at the 10th percentile ($9,653).[51] That substantial variation in commercial prices nationally reflects three components: variation in average prices across MSAs, variation in average prices across hospitals within MSAs, and variation in prices across stays within hospitals (which could result from differences across insurers in the negotiated payment rates at particular hospitals).

Medicare Advantage payment rates exhibited much less variation within major types of stays. For DRG 470 (hip and knee replacements), the Medicare Advantage price at the 90th percentile of the distribution ($14,727) was 33 percent higher than the price at the 10th percentile ($11,056; see Table 6). The variation in Medicare Advantage prices was similar for the other common

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[50] Medicare Advantage benchmarks are determined at the county level and reflect the maximum payment that a plan may receive from Medicare for an enrollee of average health.

[51] The weighted average commercial price across all DRGs was calculated by multiplying the average price for each DRG by the proportion of stays in that DRG in our entire sample of commercial stays and then summing those products across DRGs. The weighted average percentiles of the price distribution were constructed analogously. We used the same approach for our analysis of Medicare Advantage prices.

DRGs. For the average Medicare Advantage stay, the price at the 90th percentile of the distribution ($13,177) was 52 percent higher than the price at the 10th percentile ($8,659).

Variation of Average Prices Across Metropolitan Statistical Areas

Average commercial payment rates varied substantially across MSAs, but average Medicare FFS rates and Medicare Advantage rates exhibited much less variation. To examine that variation, we first computed the average commercial price in each MSA and then ranked MSAs from lowest to highest on the basis of those average prices. We then repeated the analysis for Medicare FFS prices and Medicare Advantage prices. For commercial rates, the weighted average price for the top 20 DRGs in the MSA at the 90th percentile of the distribution ($23,822) was 68 percent higher than the weighted average price in the MSA at the 10th percentile ($14,187; see Table 7).[52] That analysis included about 140 MSAs, so that range ran from about the 14th most expensive MSA to the 14th cheapest MSA.

Commercial prices for the four common DRGs exhibited greater variation across MSAs than the weighted average price for the top 20 DRGs. For each of those four DRGs, the average price in the MSA at the 90th percentile of the distribution was more than twice as high as the average price in the MSA at the 10th percentile (see Table 7).[53] The greater price variation for individual DRGs reflects the modest correlation in MSA-level prices across some DRGs. The MSAs with the lowest or highest average prices for some DRGs do not necessarily have the lowest or highest average prices for other DRGs, so the weighted average price for the top 20 DRGs has a narrower distribution than the average price for individual DRGs.

Medicare's FFS payment rates exhibited much less geographic variation than commercial payment rates. To examine that variation, we computed the payment that the Medicare FFS program would have made for each stay in the commercial sample in Table 7, including the base Medicare FFS rate plus any additional payments for IME and DSH. We did not include an adjustment for outlier payments in that analysis, however, because we were unable to compute such payments for specific MSAs with the available data. Using that approach, we find that the weighted average Medicare FFS price for the top 20 DRGs in the MSA at the 90th percentile of the distribution ($11,372) was 35 percent higher than the weighted average price in the MSA at the 10th percentile ($8,448; see Table 8). The variation in Medicare's FFS rates across MSAs reflects geographic differences in hospitals' input prices and in hospital payments for IME and

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[52] We restricted that analysis to the 137 MSAs that had at least one stay in the commercial sample for each of the 20 DRGs. We applied the analogous restriction below in our analysis of Medicare Advantage prices. As discussed above, we identified the top 20 DRGs separately for the commercial and Medicare Advantage samples.

[53] For each DRG, we restricted the analysis to the MSAs that had at least 10 stays in the commercial sample in that DRG. The number of MSAs included in the analysis varied across DRGs from 149 to 233 (see Table 7). We applied the analogous restrictions below in our analysis of Medicare Advantage prices. We also conducted the analysis with the sample restricted to the MSAs that had at least 10 stays in the commercial sample for all four DRGs (thus yielding the same set of MSAs for each DRG), and the results were similar to those presented in Table 7.

DSH. The geographic variation in Medicare FFS payment rates for each of the four DRGs we examined was nearly identical to that for the weighted average price for the top 20 DRGs, because the same payment formula is applied for each DRG.

Average Medicare Advantage payment rates also exhibit much less variation across MSAs than average commercial rates. The weighted average Medicare Advantage price for the top 20 DRGs in the MSA at the 90th percentile of the distribution ($9,119) was 27 percent higher than the weighted average price in the MSA at the 10th percentile ($7,117; see Table 9). That analysis included about 200 MSAs, so that range ran from the 20th most expensive MSA to the 20th cheapest MSA. A similar pattern was observed across the four DRGs. Those results cannot be directly compared with the Medicare FFS results presented in Table 8, however, because the estimates in that table are based on the MSAs included in the analysis of commercial prices, which differ from those included in the analysis of Medicare Advantage prices.[54] We therefore constructed a variant of the previous table showing the geographic variation in Medicare's FFS rates across the same set of MSAs that were included in our analysis of Medicare Advantage rates (see Table B-3), and we found that the geographic variation in the two sets of rates was very similar.

In another approach to measuring price variation across MSAs, we examined how the average prices paid by commercial plans and Medicare Advantage plans in each MSA compared with the prices paid by the Medicare FFS program.[55] By using that approach, we were able to adjust for geographic differences in hospitals' input prices. For the top 20 DRGs in the commercial sample, we computed the weighted average ratio of commercial prices to Medicare's FFS prices in each MSA, and we ranked MSAs from lowest to highest using that ratio. Commercial prices were 148 percent higher than Medicare's FFS prices in the MSA at the 90th percentile of the distribution and 44 percent higher than Medicare's FFS prices in the MSA at the 10th percentile (see Table 10). Moreover, the average ratio of commercial prices to Medicare's FFS prices in the MSA at the 90th percentile of the distribution was 72 percent higher than the ratio in the MSA at the 10th percentile of the distribution.

The ratio of Medicare Advantage prices to Medicare's FFS prices exhibited much less variation across MSAs than the corresponding ratio for commercial prices. The average Medicare Advantage price for the top 20 DRGs was only 6 percent higher than the average Medicare FFS price in the MSA at the 90th percentile of the distribution and only 2 percent lower than the average Medicare FFS price in the MSA at the 10th percentile. In addition, the average ratio of Medicare Advantage prices to Medicare's FFS prices in the MSA at the 90th percentile of the

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[54] The estimates of Medicare FFS prices in Table 8 were obtained by computing the payment that the Medicare FFS program would make for each stay in the commercial sample. The MSAs that met the criteria to be included in the analysis of price variation across MSAs in the commercial sample differed from those that met the inclusion criteria in the Medicare Advantage sample.

[55] For the reasons described above, our estimates of Medicare FFS rates at the MSA level did not include an adjustment for outlier payments.

distribution was only 8 percent higher than the average ratio in the MSA at the 10th percentile of the distribution. The wide variation in the ratio of commercial prices to Medicare FFS prices and the narrow variation in the ratio of Medicare Advantage prices to Medicare FFS prices for the top 20 DRGs across MSAs can also be viewed as histograms (see Figures B-1 and B-2). We found similar differences between commercial prices and Medicare Advantage prices for the four common DRGs we examined (see Tables B-4 and B-5).

Variation of Prices Within Metropolitan Statistical Areas

We next examined the variation of commercial prices and Medicare Advantage prices across hospitals within the 10 MSAs with the most commercial discharges. We conducted the analysis for the four common DRGs specified above, and we measured commercial prices and Medicare Advantage prices at each hospital relative to Medicare FFS prices.[56] To limit the influence of stays with very high or very low payment amounts, we computed the median payment for each hospital for each DRG rather than the mean.[57]

Commercial prices varied greatly across hospitals within MSAs, and Medicare Advantage prices varied much less. The variation in prices was greater in some MSAs than in others—particularly for commercial prices. For DRG 470 (hip and knee replacements), the commercial rate in three of the 10 MSAs (Houston, New York, and Philadelphia) ranged from below the Medicare FFS rate to more than three times that rate (see Figure 1, left panel). Commercial rates also varied widely in the other MSAs. By contrast, Medicare Advantage rates for DRG 470 exhibited little variation across hospitals in eight of the 10 MSAs, with most hospitals in those eight MSAs having rates that were close to the Medicare FFS rate (see Figure 1, right panel). Medicare Advantage rates for DRG 470 exhibited greater variation in Philadelphia, where the rates ranged from the Medicare FFS rate to at least 50 percent higher than the Medicare FFS rate, and in New York, where the Medicare Advantage rate ranged from at least 10 percent lower than the Medicare FFS rate to at least 20 percent higher than the Medicare FFS rate.

We found similar patterns for DRG 392 (gastrointestinal disorders), although there was less commercial price variation across hospitals within most MSAs than for DRG 470 (see Figure 2, left panel). Medicare Advantage prices for DRG 392 varied much less than commercial prices

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[56] Our estimates of Medicare FFS prices in this analysis did not include an adjustment for outlier payments, because we were not able to construct such an adjustment factor at the hospital level with the available data. In addition, we restricted the analysis to hospitals that had at least five stays for each of the selected DRGs in 2013 and to MSAs in which at least five hospitals met that criterion and at least 100 stays in the DRG occurred in total in the MSA (we applied those criteria separately to commercial stays and Medicare Advantage stays). We imposed those restrictions to satisfy HCCI's rules for reporting data. Modifying the criteria to restrict the analysis to hospitals with at least 10 stays in a given DRG (and restricting the analysis to MSAs with at least five hospitals that met those criteria) did not change the basic conclusions of the analysis, but it reduced the number of MSAs that could be included.

[57] Throughout our analysis of price variation within MSAs, we measured the commercial price at each hospital for a given DRG as the median ratio of the commercial price to the Medicare FFS price, and we computed the Medicare Advantage price analogously.

and exhibited a similar pattern of variation as we found for DRG 470 (see Figure 2, right panel). We obtained similar results for the other two DRGs we examined (603 and 247), but we present the results for those DRGs only for commercial prices because few MSAs met our inclusion criteria for Medicare Advantage prices (see Figures B-3 and B-4).

In another approach to illustrating the variation of commercial prices across hospitals within MSAs, we ranked the hospitals in each MSA from lowest to highest on the basis of the ratio of the commercial price to the Medicare FFS price for each of the four common DRGs. We then examined the price ratios at the 90th and 10th percentiles of the distribution in each MSA (separately by DRG), and we computed the unweighted average of those ratios for the 10 MSAs. On average, the commercial price for the most common DRG (470; hip and knee replacements) was 184 percent higher than the Medicare FFS price in the hospital at the 90th percentile of the within-MSA distribution and 44 percent higher than the Medicare FFS price in the hospital at the 10th percentile of the within-MSA distribution (see Table 11). The results of that analysis indicate that commercial prices also varied greatly across hospitals within MSAs for the other DRGs. As noted above, the variation in commercial prices across hospitals was greater in some MSAs than in others.

We next applied that approach to examining the variation of Medicare Advantage prices across hospitals within MSAs.[58] On average, for both of the DRGs included in this part of the analysis, the Medicare Advantage price was 12 percent higher than the Medicare FFS price in the hospital at the 90th percentile of the within-MSA distribution and 1 percent lower than the Medicare FFS price in the hospital at the 10th percentile of the within-MSA distribution (see Table 12). In eight of the 10 MSAs, the Medicare Advantage price for DRG 470 in the hospital at the 10th percentile of the distribution was within 5 percent of the Medicare FFS price, and the Medicare Advantage price for that DRG in the hospital at the 90th percentile of the distribution was no more than 8 percent higher than the Medicare FFS price. The variation in Medicare Advantage prices in those eight MSAs was similar for DRG 392. In the MSA with the greatest variation in Medicare Advantage prices, the Medicare Advantage price in the hospital at the 90th percentile of the distribution for DRG 470 was 62 percent higher than the Medicare FFS price, and the price in the hospital at the 10th percentile of the distribution for that DRG was 6 percent higher than the Medicare FFS price.

Correlation of Payer Penetration Rates and Hospital Prices

We next investigated whether Medicare Advantage prices for hospital services (measured relative to Medicare FFS prices) vary with the share of Medicare beneficiaries in the local market who are enrolled in Medicare Advantage plans. That relationship is particularly important to CBO's work in modeling the effects of converting Medicare to a premium support system.

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[58] We restricted that analysis to the two DRGs with enough Medicare Advantage admissions in the data to meet our inclusion criteria for 10 MSAs.

Such a system could be designed in various ways, but in recent years CBO has focused on analyzing systems in which beneficiaries would obtain their Medicare coverage from one of a number of competing plans—including the FFS program—and the federal government's contribution toward the cost of the coverage would be determined from the plans' bids. Under such a system, the share of Medicare beneficiaries enrolled in private plans could increase substantially in some geographic areas.

In previous work, CBO expected that such an increase in the market share of private plans under a premium support system would cause the hospital payment rates of those plans to increase relative to the rates paid by Medicare Advantage plans under current law.[59] Although it was commonly believed that Medicare Advantage prices were closer to Medicare FFS prices than to those paid by commercial plans, there were no published data on Medicare Advantage prices when CBO developed that approach. Moreover, the reasons that Medicare Advantage plans might pay less than commercial plans were not well understood. CBO estimated that in geographic areas where the market share of private plans increased substantially under a premium support system, the influence of the FFS program on the hospital payment rates of those plans would diminish, causing those rates to rise.

With that background as a rationale for the analysis, we found that the MSA-level hospital prices of Medicare Advantage plans are not correlated with the share of beneficiaries enrolled in such plans (see Figure 3). In particular, the correlation between the price index measuring the ratio of the average Medicare Advantage hospital price to the average Medicare FFS price for the top 20 DRGs defined above and the share of beneficiaries enrolled in a Medicare Advantage plan is only 0.12.[60] Because any possible effect of an increase in the Medicare Advantage penetration rate on Medicare Advantage payment rates might not occur until the penetration rate exceeds a particular threshold, we examined the correlation separately for MSAs with a Medicare Advantage penetration rate of less than 30 percent and those with a penetration rate of 30 percent or more. For both sets of MSAs, the index of Medicare Advantage payment rates was not correlated with the Medicare Advantage penetration rate (see Figures B-5 and B-6).[61] We obtained similar results for the four common DRGs we analyzed (see Figures B-7 through B-10).

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[59] Congressional Budget Office, *A Premium Support System for Medicare: Analysis of Illustrative Options* (September 2013), pp. 39–40.

[60] We constructed the Laspeyres price index in Figure 3 by computing the weighted average ratio of the Medicare Advantage price to the Medicare FFS price for the 20 DRGs defined above in each MSA and then dividing the value in each MSA by the average value for the entire sample. Thus, a value of 1.0 for an MSA indicates that the average ratio of Medicare Advantage prices to Medicare FFS prices for that MSA is equal to the national average ratio for our sample, and values above or below 1.0 indicate that the average ratio of those prices is above or below the national average.

[61] The correlation was 0.044 for MSAs with a penetration rate of less than 30 percent and 0.102 for MSAs with a penetration rate of at least 30 percent. Neither estimate differed significantly from zero.

The share of beneficiaries enrolled in the MSAs included in the analysis ranged from roughly zero to 60 percent.[62]

We conducted a similar analysis of commercial prices, examining the correlation between those prices at the MSA level and the share of the commercially insured population in the MSA that was captured in the HCCI data.[63] Although it would have been preferable to identify the share of the commercially insured by individual insurer, the HCCI data do not include an indicator that allows for this. As with the analysis of Medicare Advantage prices, we constructed a price index measuring the ratio of the average commercial hospital price to the average Medicare FFS price for the top 20 DRGs. In the case of commercial prices, one might expect a negative relationship between hospital prices in an MSA and the share of the commercially insured population in the MSA that is covered by the three insurers captured in the HCCI data, because insurers might be expected to have greater negotiating leverage with hospitals in MSAs where they enroll a larger share of the commercial market. However, our analysis cannot yield any firm conclusions about such a relationship because we have not controlled for other factors (such as concentration of the hospital market) that might affect hospital prices. We found a small negative correlation between the commercial penetration rate and the commercial price index ratio (-0.13), but it was not significantly different from zero in the statistical sense (see Figure 4). A similar pattern was observed for the four DRGs included in our study (data not shown).

Additional Analysis of Hospital Prices

We conclude our analysis of hospital prices by examining how hospital-level commercial prices and Medicare Advantage prices are correlated with Medicare's FFS prices, how hospital prices are correlated across service lines, and how Medicare Advantage prices vary with local payment benchmarks for that program (which represent the maximum payment from Medicare for an enrollee in a Medicare Advantage plan).

Correlation of Hospital Prices Between Payers. Hospitals with higher Medicare FFS payment rates tend to have higher commercial payment rates, and the correlation between those rates is 0.66 (see Figure 5). Thus, although commercial rates appear to be affected by some of the same factors that affect Medicare FFS rates (such as hospitals' input prices), they are also affected to a considerable degree by other factors. The correlation between Medicare FFS rates and Medicare Advantage rates is much stronger, at 0.98 (see Figure 6). We obtained those estimates by computing the median commercial price for every hospital in our sample with at least five stays

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[62] We computed the share of Medicare beneficiaries in each MSA who were enrolled in a Medicare Advantage plan by using county-level data on plan enrollments and total Medicare enrollment in the July 2013 "Medicare Advantage Enrollment by State/County/Contract" and "Medicare Advantage State/County Penetration" files.

[63] We computed the number of 18- to 64-year-olds covered by employment-based insurance in each MSA from the three-year estimates that were aggregated at the MSA level in the Census Bureau's 2011–2013 American Community Survey. We then calculated the share of that population in each MSA that was captured in the HCCI data.

and computing the amount that the Medicare FFS program would have paid for those stays—and doing the analogous calculations for stays in the Medicare Advantage sample.[64] Roughly 1,700 hospitals in the commercial sample and 1,400 hospitals in the Medicare Advantage sample were included in the analysis. We observed a similar pattern across the four DRGs by payer (data not shown).

Correlation of Prices Across Hospital Service Lines. Hospitals that have higher prices for some services tend to have higher prices for other services, although the strength of those relationships varies. Turning first to commercial prices, the correlation between hospital-level prices for medical DRGs and surgical DRGs is substantial, at 0.80 (see Table 13). (In this analysis, we measured commercial prices at each hospital relative to Medicare FFS prices.)[65] Among the four common DRGs we examined, commercial prices were more strongly correlated within a given type of stay (medical or surgical) than across types of stay. For example, the hospital-level median price for cellulitis is strongly correlated with the price for gastrointestinal disorders (0.75), both of which are medical stays, but less strongly correlated with the price for hip and knee replacements (0.50) and coronary angioplasty with drug-eluting stent (0.46), both of which are surgical stays. The correlation of prices across types of stay was generally higher among Medicare Advantage prices than among commercial prices (see Table 14).

Correlation of Medicare Advantage Hospital Prices and Benchmarks. We next examined whether the hospital prices of Medicare Advantage plans (measured relative to Medicare FFS prices) are correlated with Medicare Advantage benchmarks. The rationale for this analysis is that industry sources report that one reason hospitals are willing to accept payment rates near Medicare's FFS rates from Medicare Advantage plans is that those plans are under a budget constraint determined in large part by the payments they receive from Medicare.[66] That suggests that hospitals might try to obtain higher prices in areas where Medicare Advantage benchmarks are high—or in areas where those benchmarks are high relative to local per capita Medicare FFS spending.

To investigate, we examined the correlation between the MSA-level index of the average ratio of Medicare Advantage prices to Medicare FFS prices for the top 20 DRGs (as defined above) and two measures of payments to Medicare Advantage plans at the MSA level: the average Medicare Advantage benchmark, and the ratio of the average Medicare Advantage benchmark to local per

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[64] For each hospital, we computed the median commercial price for each DRG and then used the DRG with the median price at that hospital as our measure of the hospital's median price. We used the Medicare FFS price for that DRG in the analysis.

[65] We computed the median ratio of commercial prices to Medicare FFS prices for each hospital, and we restricted the analysis to hospitals with at least five discharges for each of the selected DRGs. We adopted analogous restrictions for the analysis of Medicare Advantage prices.

[66] Robert A. Berenson and others, "Why Medicare Advantage Plans Pay Hospitals Traditional Medicare Prices," *Health Affairs*, vol. 34, no. 8 (August 2015), pp. 1289–1295.

capita FFS spending.[67] In both cases, the correlations were near zero (see Figures 7 and 8). Those findings suggest that variation in payments from the Medicare program to Medicare Advantage plans bears little relationship to the differences in the amounts that Medicare Advantage plans pay providers.

V.   Discussion

We found that the hospital payment rates of three large insurers in their commercial plans in 2013 were an average of 89 percent higher than Medicare's FFS rates—or put another way, Medicare's FFS rates were 47 percent lower than commercial rates. That estimate is broadly consistent with the findings of previous studies, although the estimates from those studies differ depending on the data sources and methods used.

In addition, we found that the hospital payment rates of Medicare Advantage plans in 2013 were equal to Medicare's FFS rates, on average. That finding is broadly consistent with estimates from previous studies but with slight variations depending on which payment add-ons are included in the calculation of Medicare's FFS rates. For our preferred analysis, we computed FFS payment rates as the base rate plus any additional DSH payments and an adjustment for outlier payments for extraordinarily costly cases. We excluded IME payments in our calculation of FFS rates because hospitals receive IME payments directly from Medicare for their Medicare Advantage patients, and those payments are not captured in our data. By excluding IME payments for both FFS and Medicare Advantage patients, the payment rates for the two sets of patients were measured on the same basis.

Another important finding in this paper is that the hospital payment rates of Medicare Advantage plans (measured relative to Medicare's FFS rates) are not correlated with the share of Medicare beneficiaries in a local market who are enrolled in such plans. Baker and others obtained a similar result. As discussed above, in modeling the effects of premium support proposals, CBO had estimated that in geographic areas where the market share of private plans increased substantially under such a system, the influence of the FFS program on the hospital payment rates of those plans would diminish, causing those rates to rise. The results of our analysis (along with the findings of the papers by Baker and others and Berenson and others) have been incorporated into the agency's modeling of premium support proposals. Specifically, CBO now estimates that—as long as the provisions of current law that limit payments to out-of-network providers to the Medicare FFS rate are retained—the payment rates of private plans will not rise as the market share of those plans increases under a premium support system.

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[67] The Medicare Advantage benchmarks were derived from the 2013 Medicare Advantage rate calculation data file and were weighted by plan enrollment according to star quality ratings. The benchmarks were then weighted at the MSA level by county enrollment.

Lastly, we found substantial variation in commercial prices across stays for a given DRG, across metropolitan areas, and across hospitals within metropolitan areas. By contrast, we found that Medicare Advantage prices vary much less. Although previous studies have identified some factors that contribute to the variation in commercial prices, additional research is needed.

Table 1. Comparison of Mean Commercial and Medicare FFS Prices for All Stays, Medical Stays, and Surgical Stays, 2013

	All MS-DRGs	Medical MS-DRGs	Surgical MS-DRGs
Commercial Price	$21,433	$13,469	$30,880
Medicare FFS Base Price Plus IME, DSH, and Outliers[a]	$11,354	$7,117	$16,454
Ratio of Commercial to Medicare FFS Price[a]	1.89	1.89	1.88
Number of Stays in Analysis	620,922	336,899	284,023
Number of MSAs in Analysis	297	296	297

The commercial sample excludes maternal stays associated with childbirth and was limited to adults 18-64 years.

[a]The estimates of Medicare's FFS prices in this table include the base payment amount plus any additional payments for IME and DSH and an adjustment to account for outlier payments. The Medicare payment rules were used to compute the amount that the Medicare FFS program would have paid for each stay in the commercial sample, including the base price and payments for IME and DSH (but not outlier payments). We estimated the average outlier payment for admissions in each major category of DRG from a separate analysis of Medicare claims.

DSH=disproportionate share hospital payments; FFS=fee for service; IME=indirect medical education payments; MSA=metropolitan statistical area; MS-DRG=Medicare severity-diagnosis-related group.

Table 2. Comparison of Mean Commercial and Medicare FFS Prices for Four Common Types of Stays, 2013

	Esophagitis, Gastroenteritis, & Misc. Digestive Disorders w/o MCC (MS-DRG 392)	Cellulitis w/o MCC (MS-DRG 603)	Major Joint Replacement or Reattachment of Lower Extremity w/o MCC (MS-DRG 470)	Percutaneous Cardiovascular Procedure With Drug-Eluting Stent w/o MCC (MS-DRG 247)
Commercial Price	$9,349	$9,895	$27,163	$29,691
Medicare FFS Base Price Plus IME, DSH, and Outliers[a]	$4,920	$5,597	$13,511	$13,500
Ratio of Commercial to Medicare FFS Price[a]	1.90	1.77	2.01	2.20
Number of Stays in Analysis	22,727	11,870	39,836	10,832
Number of MSAs in Analysis	292	284	287	266

The commercial sample excludes maternal stays associated with childbirth and was limited to adults 18-64 years. For each DRG, the number of MSAs reported in the table is the number of MSAs with at least one stay in that DRG.

[a]The estimates of Medicare's FFS prices in this table include the base payment amount plus any additional payments for IME and DSH and an adjustment to account for outlier payments. The Medicare payment rules were used to compute the amount that the Medicare FFS program would have paid for each stay in the commercial sample, including the base price and payments for IME and DSH (but not outlier payments). We estimated the average outlier payment for admissions in each major category of DRG from a separate analysis of Medicare claims.

DSH=disproportionate share hospital payments; FFS=fee for service; IME=indirect medical education payments; MCC=major complication or comorbidity; MSA=metropolitan statistical area; MS-DRG=Medicare severity-diagnosis-related group.

Table 3. Comparison of Mean Medicare Advantage and Medicare FFS Prices for All Stays, Medical Stays, and Surgical Stays, 2013

	All MS-DRGs	Medical MS-DRGs	Surgical MS-DRGs
Medicare Advantage Price	$10,667	$7,281	$17,661
Medicare FFS Base Price Plus DSH and Outliers[a]	$10,716	$7,236	$17,932
Ratio of Medicare Advantage to Medicare FFS Price[a]	1.00	1.01	.98
Number of Stays in Analysis	593,044	399,597	193,447
Number of MSAs in Analysis	297	296	296

The Medicare Advantage sample was limited to adults 65 years or older.

[a]The estimates of Medicare's FFS prices in this table include the base payment amount plus any additional payments for DSH and an adjustment to account for outlier payments. For our preferred estimate comparing Medicare Advantage prices with Medicare's FFS prices, we excluded IME payments from the FFS prices because Medicare makes IME payments directly to hospitals for Medicare Advantage enrollees. Also, IME payments are excluded in the calculation of Medicare Advantage benchmarks. The Medicare payment rules were used to compute the amount that the Medicare FFS program would have paid for each stay in the Medicare Advantage sample, including the base price and payments for DSH (but not outlier payments). We estimated the average outlier payment for admissions in each major category of DRG from a separate analysis of Medicare claims.

DSH=disproportionate share hospital payments; FFS=fee for service; IME=indirect medical education payments; MSA=metropolitan statistical area; MS-DRG=Medicare severity-diagnosis-related group.

Table 4. Comparison of Mean Medicare Advantage and Medicare FFS Prices for Four Common Types of Stays, 2013

	Esophagitis, Gastroenteritis, & Misc. Digestive Disorders w/o MCC (MS-DRG 392)	Cellulitis w/o MCC (MS-DRG 603)	Major Joint Replacement or Reattachment of Lower Extremity w/o MCC (MS-DRG 470)	Percutaneous Cardiovascular Procedure With Drug-Eluting Stent w/o MCC (MS-DRG 247)
Medicare Advantage Price	$4,640	$5,264	$12,685	$12,511
Medicare FFS Base Price Plus DSH and Outliers[a]	$4,516	$5,171	$12,601	$12,341
Ratio of Medicare Advantage to Medicare FFS Price[a]	1.03	1.02	1.01	1.01
Number of Stays in Analysis	12,385	6,751	35,227	8,062
Number of MSAs in Analysis	272	262	288	255

The Medicare Advantage sample was limited to adults 65 years or older. For each DRG, the number of MSAs reported in the table is the number of MSAs with at least one stay in that DRG.

[a]The estimates of Medicare's FFS prices in this table include the base payment amount plus any additional payments for DSH and an adjustment to account for outlier payments. For our preferred estimate comparing Medicare Advantage prices with Medicare's FFS prices, we excluded IME payments from the FFS prices because Medicare makes IME payments directly to hospitals for Medicare Advantage enrollees. Also, IME payments are excluded in the calculation of Medicare Advantage benchmarks. The Medicare payment rules were used to compute the amount that the Medicare FFS program would have paid for each stay in the Medicare Advantage sample, including the base price and payments for DSH (but not outlier payments). We estimated the average outlier payment for admissions in each major category of DRG from a separate analysis of Medicare claims.

DSH=disproportionate share hospital payments; FFS=fee for service; IME=indirect medical education payments; MCC=major complication or comorbidity; MSA=metropolitan statistical area; MS-DRG=Medicare severity-diagnosis-related group.

Table 5. Variation in Commercial Prices for Hospital Inpatient Care Across Hospital Stays, 2013

	Weighted Average Price Across All DRGs[a]	Esophagitis, Gastroenteritis, & Misc. Digestive Disorders w/o MCC (MS-DRG 392)	Cellulitis w/o MCC (MS-DRG 603)	Major Joint Replacement or Reattachment of Lower Extremity w/o MCC (MS-DRG 470)	Percutaneous Cardiovascular Procedure With Drug-Eluting Stent w/o MCC (MS-DRG 247)
Commercial Price					
Mean price	$21,433	$9,349	$9,895	$27,163	$29,691
10th percentile	$9,653	$4,302	$4,606	$15,321	$15,899
25th percentile	$13,402	$6,102	$6,564	$19,477	$20,285
50th percentile	$18,442	$8,247	$8,783	$25,650	$26,539
75th percentile	$25,522	$11,130	$11,895	$33,054	$36,154
90th percentile	$36,423	$15,382	$16,015	$41,535	$47,593
Ratio of 10th to median	.52	.52	.52	.60	.60
Ratio of 90th to median	1.98	1.87	1.82	1.62	1.79
Ratio of 75th to 25th	1.90	1.82	1.81	1.70	1.78
Ratio of 90th to 10th	3.77	3.58	3.48	2.71	2.99
Number of Stays in Analysis	620,922	22,727	11,870	39,836	10,832
Number of MSAs in Analysis	297	292	284	287	266

The commercial sample excludes maternal stays associated with childbirth and was limited to adults 18-64 years. For each DRG, the number of MSAs reported in the table is the number of MSAs with at least one stay in that DRG.

[a]The weighted average price across all DRGs was calculated by multiplying the average price for each DRG by the proportion of stays in that DRG in our entire sample and then summing those products across DRGs. The weighted average of each percentile of the distribution was computed analogously.

MCC=major complication or comorbidity; MSA=metropolitan statistical area; MS-DRG=Medicare severity-diagnosis-related group.

Table 6. Variation in Medicare Advantage Prices for Hospital Inpatient Care Across Hospital Stays, 2013

	Weighted Average Price Across All DRGs[a]	Esophagitis, Gastroenteritis, & Misc. Digestive Disorders w/o MCC (MS-DRG 392)	Cellulitis w/o MCC (MS-DRG 603)	Major Joint Replacement or Reattachment of Lower Extremity w/o MCC (MS-DRG 470)	Percutaneous Cardiovascular Procedure With Drug-Eluting Stent w/o MCC (MS-DRG 247)
Medicare Advantage Price					
Mean price	$10,667	$4,640	$5,264	$12,685	$12,511
10th percentile	$8,659	$3,935	$4,410	$11,056	$10,793
25th percentile	$9,411	$4,165	$4,721	$11,666	$11,344
50th percentile	$10,183	$4,513	$5,128	$12,354	$12,059
75th percentile	$11,331	$4,981	$5,681	$13,351	$13,147
90th percentile	$13,177	$5,613	$6,401	$14,727	$14,851
Ratio of 10th to median	.85	.87	.86	.89	.90
Ratio of 90th to median	1.29	1.24	1.25	1.19	1.23
Ratio of 75th to 25th	1.20	1.20	1.20	1.14	1.16
Ratio of 90th to 10th	1.52	1.43	1.45	1.33	1.38
Number of Stays in Analysis	593,044	12,385	6,751	35,227	8,062
Number of MSAs in Analysis	297	272	262	288	255

The Medicare Advantage sample was limited to adults 65 years or older. For each DRG, the number of MSAs reported in the table is the number of MSAs with at least one stay in that DRG.

[a]The weighted average price across all DRGs was calculated by multiplying the average price for each DRG by the proportion of stays in that DRG in our entire sample and then summing those products across DRGs. The weighted average of each percentile of the distribution was computed analogously.

MCC=major complication or comorbidity; MSA=metropolitan statistical area; MS-DRG=Medicare severity-diagnosis-related group.

Table 7. Variation in Commercial Prices for Hospital Stays Across Metropolitan Areas, 2013

	Weighted Average Price for Top 20 DRGs[a]	Esophagitis, Gastroenteritis, & Misc. Digestive Disorders w/o MCC (MS-DRG 392)	Cellulitis w/o MCC (MS-DRG 603)	Major Joint Replacement or Reattachment of Lower Extremity w/o MCC (MS-DRG 470)	Percutaneous Cardiovascular Procedure With Drug-Eluting Stent w/o MCC (MS-DRG 247)
Commercial Price					
10th percentile	$14,187	$6,671	$6,625	$18,595	$19,605
25th percentile	$16,064	$7,784	$7,954	$21,841	$24,360
50th percentile	$18,436	$9,415	$9,535	$26,781	$29,428
75th percentile	$21,212	$11,033	$11,165	$32,527	$35,522
90th percentile	$23,822	$13,442	$13,768	$37,633	$42,438
Ratio of 10th to median	0.77	0.71	0.69	0.69	0.67
Ratio of 90th to median	1.29	1.43	1.44	1.41	1.44
Ratio of 75th to 25th	1.32	1.42	1.40	1.49	1.46
Ratio of 90th to 10th	1.68	2.01	2.08	2.02	2.16
Number of MSAs in Analysis	137	192	149	233	152

The commercial sample excludes maternal stays associated with childbirth and was limited to adults 18-64 years.

[a]The weighted average price for the top 20 DRGs was computed for each MSA with at least one discharge in each of those DRGs. For each MSA, the average price for each DRG was weighted by the share of stays in that DRG in our national sample. The analysis for each of the four DRGs was limited to MSAs with at least 10 discharges in that DRG. We computed the mean price for each MSA, and each MSA received an equal weight in the analysis.

MCC=major complication or comorbidity; MSA=metropolitan statistical area; MS-DRG=Medicare severity-diagnosis-related group.

Table 8. Variation in Medicare FFS Prices for Hospital Stays Across Metropolitan Areas, 2013

	Weighted Average Price for Top 20 DRGs[a]	Esophagitis, Gastroenteritis, & Misc. Digestive Disorders w/o MCC (MS-DRG 392)	Cellulitis w/o MCC (MS-DRG 603)	Major Joint Replacement or Reattachment of Lower Extremity w/o MCC (MS-DRG 470)	Percutaneous Cardiovascular Procedure With Drug-Eluting Stent w/o MCC (MS-DRG 247)
Medicare FFS Base Price Plus IME and DSH					
10th percentile	$8,448	$4,149	$4,784	$11,638	$11,215
25th percentile	$8,739	$4,342	$4,943	$12,172	$11,729
50th percentile	$9,195	$4,585	$5,240	$12,747	$12,336
75th percentile	$10,191	$4,974	$5,654	$14,064	$13,426
90th percentile	$11,372	$5,680	$6,473	$15,843	$15,216
Ratio of 10th to median	0.92	0.90	0.91	0.91	0.91
Ratio of 90th to median	1.24	1.24	1.24	1.24	1.23
Ratio of 75th to 25th	1.17	1.15	1.14	1.16	1.14
Ratio of 90th to 10th	1.35	1.37	1.35	1.36	1.36
Number of MSAs in Analysis	137	192	149	233	152

The Medicare payment rules were used to compute the amount that the Medicare FFS program would have paid for each stay in the commercial sample, including the base price and payments for IME and DSH (but not outlier payments).

[a]The weighted average price for the top 20 DRGs was computed for each MSA with at least one discharge in each of those DRGs. For each MSA, the average price for each DRG was weighted by the share of stays in that DRG in our national sample. We computed the mean Medicare FFS price for each MSA based on the case mix of commercial discharges. The analysis for each of the four DRGs was limited to MSAs with at least 10 commercial discharges in that DRG, and each MSA received an equal weight in the analysis.

DSH=disproportionate share hospital payments; FFS=fee for service; IME=indirect medical education payments; MCC=major complication or comorbidity; MSA=metropolitan statistical area; MS-DRG=Medicare severity-diagnosis-related group.

Table 9. Variation in Medicare Advantage Prices for Hospital Stays Across Metropolitan Areas, 2013

	Weighted Average Price for Top 20 DRGs[a]	Esophagitis, Gastroenteritis, & Misc. Digestive Disorders w/o MCC (MS-DRG 392)	Cellulitis w/o MCC (MS-DRG 603)	Major Joint Replacement or Reattachment of Lower Extremity w/o MCC (MS-DRG 470)	Percutaneous Cardiovascular Procedure With Drug-Eluting Stent w/o MCC (MS-DRG 247)
Medicare Advantage Price					
10th percentile	$7,177	$4,170	$4,698	$11,530	$11,120
25th percentile	$7,406	$4,351	$4,854	$11,873	$11,617
50th percentile	$7,704	$4,539	$5,084	$12,432	$12,167
75th percentile	$8,251	$4,781	$5,371	$13,151	$12,934
90th percentile	$9,119	$5,213	$5,830	$14,758	$14,371
Ratio of 10th to median	0.93	0.92	0.92	0.93	0.91
Ratio of 90th to median	1.18	1.15	1.15	1.19	1.18
Ratio of 75th to 25th	1.11	1.10	1.11	1.11	1.11
Ratio of 90th to 10th	1.27	1.25	1.24	1.28	1.29
Number of MSAs in Analysis	196	157	117	224	148

The Medicare Advantage sample was limited to adults 65 years or older.

[a]The weighted average price for the top 20 DRGs was computed for each MSA with at least one discharge in each of those DRGs. For each MSA, the average price for each DRG was weighted by the share of stays in that DRG in our national sample. The analysis for each of the four DRGs was limited to MSAs with at least 10 discharges in that DRG. We computed the mean price for each MSA, and each MSA received an equal weight in the analysis.

MCC=major complication or comorbidity; MSA=metropolitan statistical area; MS-DRG=Medicare severity-diagnosis-related group.

Table 10. Variation Across Metropolitan Areas in the Weighted Average Ratio of Commercial Prices and Medicare Advantage Prices to Medicare FFS Prices for Top 20 DRGs, 2013

	Weighted Average Ratio of Commercial Prices to Medicare FFS Prices for Top 20 DRGs	Weighted Average Ratio of Medicare Advantage Prices to Medicare FFS Prices for Top 20 DRGs
Percentiles		
10th	1.44	0.98
25th	1.65	1.00
50th	1.88	1.01
75th	2.16	1.03
90th	2.48	1.06
Ratios		
10th to median	0.77	0.97
90th to median	1.32	1.05
75th to 25th	1.31	1.03
90th to 10th	1.72	1.08
Number of MSAs in Analysis	137	196

The commercial sample excludes maternal stays associated with childbirth and was limited to adults 18-64 years, and the Medicare Advantage sample was limited to adults 65 years or older.

The analysis of variation in commercial prices across MSAs was restricted to the MSAs with at least one discharge in each of the top 20 DRGs in the commercial sample. The analogous restriction was imposed for the analysis of variation in Medicare Advantage prices across MSAs. For each MSA, we first computed the mean ratio of commercial prices to Medicare FFS prices for each DRG. For each MSA, we then computed the weighted average ratio of commercial prices to Medicare FFS prices for the 20 DRGs, where each DRG was weighted by the share of discharges in our national sample of commercial discharges that were assigned to that DRG. We used the same approach to compute the weighted average ratio of Medicare Advantage prices to Medicare FFS prices for each MSA. Each MSA received an equal weight in the analysis.

The Medicare payment rules were used to compute the amount that the Medicare FFS program would have paid for each stay in the commercial sample and the Medicare Advantage sample. For the comparison with commercial prices, the estimates of Medicare FFS prices include the base payment amount plus any additional payments for IME and DSH. For the comparison with Medicare Advantage prices, Medicare FFS prices were estimated in the same manner except that payments for IME were excluded. Because of data limitations, the FFS prices were not adjusted to account for outlier payments.

DRG=diagnosis-related group; DSH=disproportionate share hospital payments; FFS=fee for service; IME=indirect medical education payments; MSA=metropolitan statistical area.

Figure 1. Variation in the Ratio of Commercial Prices to Medicare FFS Prices and the Ratio of Medicare Advantage Prices to Medicare FFS Prices Within Metropolitan Areas for DRG 470 (Major Joint Replacement or Reattachment of Lower Extremity Without Major Complications and Comorbidities), 2013

For each MSA, we computed the median ratio of the commercial price to the Medicare FFS price for each hospital, and we computed the analogous ratio for Medicare Advantage prices. We restricted the analysis to hospitals that had at least five stays in 2013 in the DRG being analyzed (we applied that criterion separately for the analysis of commercial prices and Medicare Advantage prices). The bottom and top edges of the box for each MSA represent the 25th and 75th percentiles of the price ratio, the horizontal line inside the box represents the median, the marker inside the box represents the mean, and the "whiskers" (i.e., the endpoints of the lines extending outside the box) represent the minimum and maximum values—except in cases when some values are classified as "outliers," which are shown as circles beyond the whiskers. Outliers are defined as values that are above the 75th percentile or below the 25th percentile by at least 1.5 times the "interquartile range" (which is the difference betwe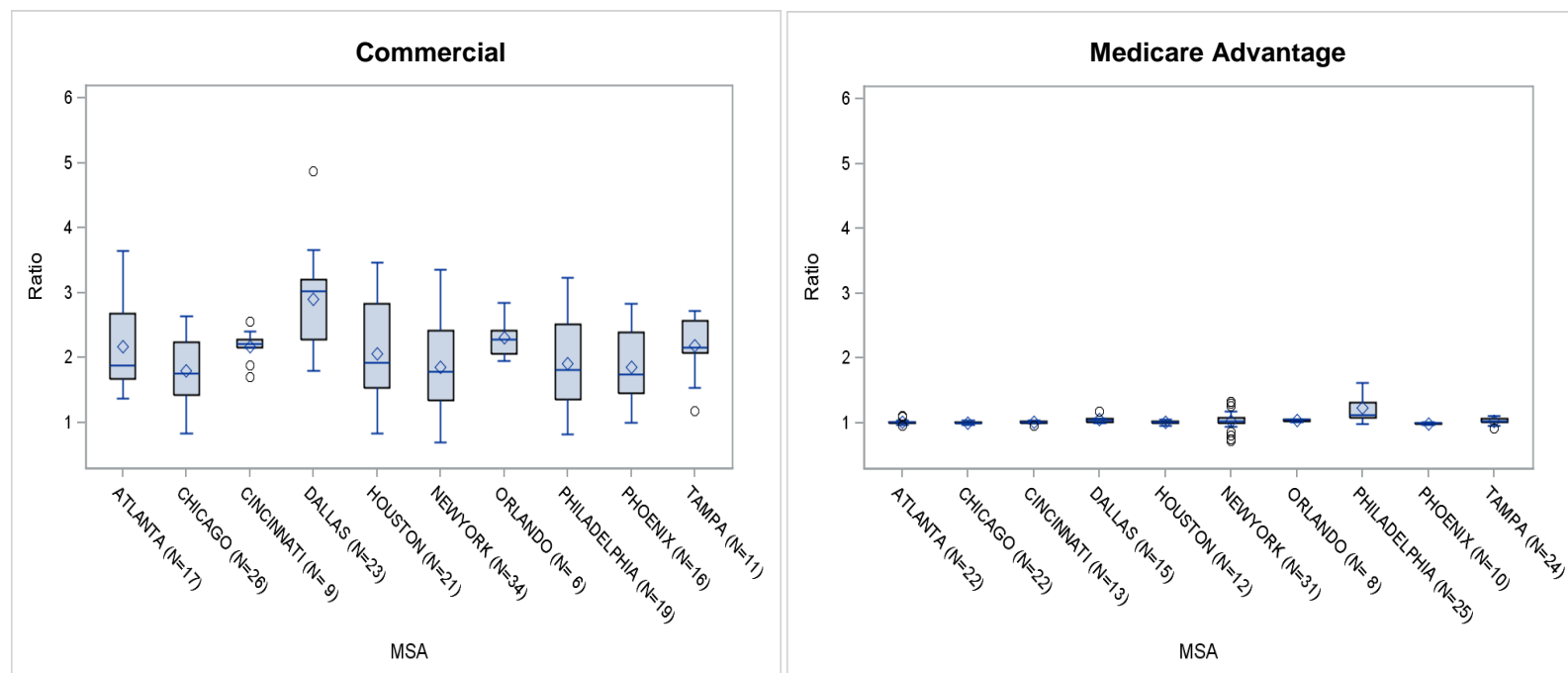en the 75th percentile and the 25th percentile). The commercial sample excludes maternal stays associated with childbirth and was limited to adults 18-64 years, and the Medicare Advantage sample was limited to those 65 years and older.

The Medicare payment rules were used to compute the amount that the Medicare FFS program would have paid for each stay in the commercial sample and the Medicare Advantage sample. For the comparison with commercial prices, the estimates of Medicare FFS prices include the base payment amount plus any additional payments for IME and DSH. For the comparison with Medicare Advantage prices, Medicare FFS prices were estimated in the same manner except that payments for IME were excluded. Because of data limitations, the FFS prices were not adjusted to account for outlier payments.

DRG=diagnosis-related group; DSH=disproportionate share hospital payments; FFS=fee for service; IME=indirect medical education payments; MSA=metropolitan statistical area.

Figure 2. Variation in the Ratio of Commercial Prices to Medicare FFS Prices and the Ratio of Medicare Advantage Prices to Medicare FFS Prices Within Metropolitan Areas for DRG 392 (Esophagitis, Gastroenteritis, and Miscellaneous Digestive Disorders Without Major Complications and Comorbidities), 2013
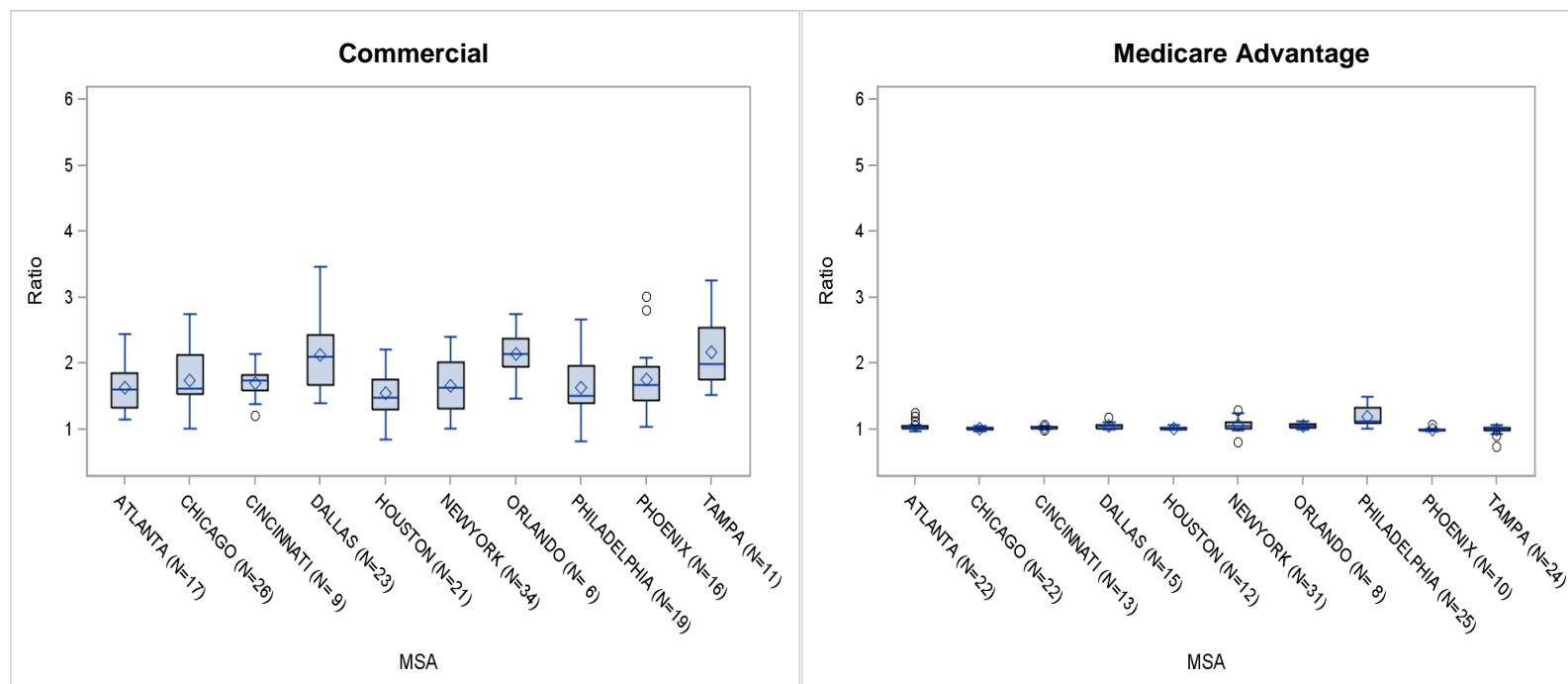

For each MSA, we computed the median ratio of the commercial price to the Medicare FFS price for each hospital, and we computed the analogous ratio for Medicare Advantage prices. We restricted the analysis to hospitals that had at least five stays in 2013 in the DRG being analyzed (we applied that criterion separately for the analysis of commercial prices and Medicare Advantage prices). The bottom and top edges of the box for each MSA represent the 25th and 75th percentiles of the price ratio, the horizontal line inside the box represents the median, the marker inside the box represents the mean, and the "whiskers" (i.e., the endpoints of the lines extending outside the box) represent the minimum and maximum values—except in cases when some values are classified as "outliers," which are shown as circles beyond the whiskers. Outliers are defined as values that are above the 75th percentile or below the 25th percentile by at least 1.5 times the "interquartile range" (which is the difference between the 75th percentile and the 25th percentile). The commercial sample excludes maternal stays associated with childbirth and was limited to adults 18-64 years, and the Medicare Advantage sample was limited to those 65 years and older.

The Medicare payment rules were used to compute the amount that the Medicare FFS program would have paid for each stay in the commercial sample and the Medicare Advantage sample. For the comparison with commercial prices, the estimates of Medicare FFS prices include the base payment amount plus any additional payments for IME and DSH. For the comparison with Medicare Advantage prices, Medicare FFS prices were estimated in the same manner except that payments for IME were excluded. Because of data limitations, the FFS prices were not adjusted to account for outlier payments.

DRG=diagnosis-related group; DSH=disproportionate share hospital payments; FFS=fee for service; IME=indirect medical education payments; MSA=metropolitan statistical area.

Table 11. Variation in the Ratio of Commercial Prices to Medicare FFS Prices Within Metropolitan Areas for Four Common Types of Stays, 2013

	Esophagitis, Gastroenteritis, & Misc. Digestive Disorders w/o MCC (MS-DRG 392)	Cellulitis w/o MCC (MS-DRG 603)	Major Joint Replacement or Reattachment of Lower Extremity w/o MCC (MS-DRG 470)	Percutaneous Cardiovascular Procedure With Drug-Eluting Stent w/o MCC (MS-DRG 247)
Top 10 MSAs (n=182)[a]				
Discharges	6,804	3,467	8,504	3,291
10th percentile	1.24	1.27	1.44	1.56
90th percentile	2.45	2.29	2.84	3.22
New York-Northern New Jersey-Long Island NY-NJ-PA (n=34)				
Discharges	1,035	587	878	747
10th percentile	1.20	1.26	.94	1.28
90th percentile	2.18	2.24	2.56	2.61
Dallas-Forth Worth-Arlington TX (n=23)				
Discharges	789	362	624	331
10th percentile	1.44	1.40	2.03	1.95
90th percentile	2.73	2.67	3.34	3.84
Houston-Sugar Land-Baytown TX (n=21)				
Discharges	839	519	828	366
10th percentile	1.17	1.14	1.33	1.81
90th percentile	2.09	2.07	3.04	3.30
Philadelphia-Camden-Wilmington PA-NJ-DE (n=19)				
Discharges	638	366	981	314
10th percentile	1.04	1.32	1.25	1.30
90th percentile	2.36	2.13	3.06	4.45
Atlanta-Sandy Springs-Marietta GA (n=17)				
Discharges	645	255	1,413	318
10th percentile	1.18	1.18	1.49	1.08
90th percentile	2.01	2.40	3.18	2.53
Chicago-Naperville-Joliet IL-IN-WI (n=26)				
Discharges	658	379	866	305
10th percentile	1.04	1.05	1.03	1.36
90th percentile	2.38	2.25	2.62	3.30
Phoenix-Mesa-Glendale AZ (n=16)				
Discharges	598	324	818	234
10th percentile	1.10	1.14	1.14	1.15
90th percentile	2.80	2.70	2.55	2.35
Orlando-Kissimmee-Sanford FL (n=6)				
Discharges	712	226	474	208
10th percentile	1.47	1.45	1.95	1.96
90th percentile	2.74	2.42	2.85	3.56
Tampa-St. Petersburg-Clearwater FL (n=11)				
Discharges	498	245	533	238
10th percentile	1.54	1.54	1.54	2.11
90th percentile	3.04	2.11	2.69	3.47
Cincinnati-Middletown OH-KY-IN (n=9)				
Discharges	392	204	1,089	230
10th percentile	1.21	1.21	1.70	1.62
90th percentile	2.15	1.94	2.55	2.77

The analysis is limited to 10 MSAs and 182 hospitals. We computed the median ratio of commercial prices to Medicare FFS prices for each hospital. Hospitals with at least five discharges for each of the selected DRGs were included in the analysis. The commercial sample excludes maternal stays associated with childbirth and was limited to adults 18-64 years.

The Medicare payment rules were used to compute the amount that the Medicare FFS program would have paid for each stay in the commercial sample. The estimates of Medicare FFS prices include the base payment amount plus any additional payments for IME and DSH. Because of data limitations, the FFS prices were not adjusted to account for outlier payments.

[a]The average 10th percentile price ratio was computed as the unweighted average of the corresponding percentile price ratio for the 10 MSAs. The average 90th percentile price ratio was computed in an analogous manner.

DSH=disproportionate share hospital payments; FFS=fee for service; IME=indirect medical education payments; MCC=major complication or comorbidity; MSA=metropolitan statistical area; MS-DRG=Medicare severity-diagnosis-related group.

Table 12. Variation in the Ratio of Medicare Advantage Prices to Medicare FFS Prices Within Metropolitan Areas for Two Common Types of Stays, 2013

	Esophagitis, Gastroenteritis, & Misc. Digestive Disorders w/o MCC (MS-DRG 392)	Major Joint Replacement or Reattachment of Lower Extremity w/o MCC (MS-DRG 470)
Top 10 MSAs (n=182)[a]		
Discharges	2,750	5,990
10th percentile	.99	.99
90th percentile	1.12	1.12
New York-Northern New Jersey-Long Island NY-NJ-PA (n=31)		
Discharges	303	438
10th percentile	1.00	.86
90th percentile	1.19	1.17
Dallas-Forth Worth-Arlington TX (n=15)		
Discharges	130	281
10th percentile	1.01	1.00
90th percentile	1.11	1.07
Houston-Sugar Land-Baytown TX (n=12)		
Discharges	116	247
10th percentile	1.00	.99
90th percentile	1.04	1.05
Philadelphia-Camden-Wilmington PA-NJ-DE (n=25)		
Discharges	289	601
10th percentile	1.04	1.06
90th percentile	1.38	1.62
Atlanta-Sandy Springs-Marietta GA (n=22)		
Discharges	265	1,048
10th percentile	1.00	.98
90th percentile	1.12	1.04
Chicago-Naperville-Joliet IL-IN-WI (n=22)		
Discharges	191	335
10th percentile	.99	.99
90th percentile	1.04	1.02
Phoenix-Mesa-Glendale AZ (n=10)		
Discharges	103	215
10th percentile	.97	.97
90th percentile	1.04	1.01
Orlando-Kissimmee-Sanford FL (n=8)		
Discharges	361	448
10th percentile	1.00	1.02
90th percentile	1.12	1.06
Tampa-St. Petersburg-Clearwater FL (n=24)		
Discharges	668	1,226
10th percentile	.93	.99
90th percentile	1.06	1.08
Cincinnati-Middletown OH-KY-IN (n=13)		
Discharges	324	1,151
10th percentile	1.00	1.00
90th percentile	1.05	1.03

The analysis is limited to 10 MSAs and 182 hospitals. The results for only DRGs 392 and 470 are presented because few MSAs met our inclusion criteria for Medicare Advantage for DRGs 603 and 247. We computed the median ratio of Medicare Advantage prices to Medicare FFS prices for each hospital. Hospitals with at least five discharges for each of the selected DRGs were included in the analysis. The Medicare Advantage sample was limited to adults 65 years or older. The ranking of the top 10 MSAs is based on discharges from the commercial sample.

The Medicare payment rules were used to compute the amount that the Medicare FFS program would have paid for each stay in the Medicare Advantage sample. The estimates of Medicare FFS prices include the base payment amount plus any additional payments for DSH. Because of data limitations, the FFS prices were not adjusted to account for outlier payments.

[a]The average 10th percentile price ratio was computed as the unweighted average of the corresponding percentile price ratio for the 10 MSAs. The average 90th percentile price ratio was computed in an analogous manner.

DSH=disproportionate share hospital payments; FFS=fee for service; MCC=major complication or comorbidity; MSA=metropolitan statistical area; MS-DRG=Medicare severity-diagnosis-related group.

Figure 3. Scatter Plot of the Medicare Advantage Penetration Rate and an Index of the Ratio of Medicare Advantage Prices to Medicare FFS Prices, 2013

Correlation = 0.122; p = 0.088

The scatter plot shows the bivariate association between the MSA-level Medicare Advantage penetration rate and the Laspeyres price index of the ratio of Medicare Advantage prices to Medicare FFS prices based on the top 20 DRGs for Medicare Advantage. There are 196 MSAs in this analysis. The Medicare Advantage sample was limited to adults 65 years or older.

The Medicare payment rules were used to compute the amount that the Medicare FFS program would have paid for each stay in the Medicare Advantage sample. The estimates of Medicare FFS prices include the base payment amount plus any additional payments for DSH. Because of data limitations, the FFS prices were not adjusted to account for outlier payments.

DRG=diagnosis-related group; DSH=disproportionate share hospital payments; FFS=fee for service; MSA=metropolitan statistical area.

Figure 4. Scatter Plot of the Commercial Penetration Rate and an Index of the Ratio of Commercial Prices to Medicare FFS Prices, 2013

Correlation = -0.131; p = 0.127
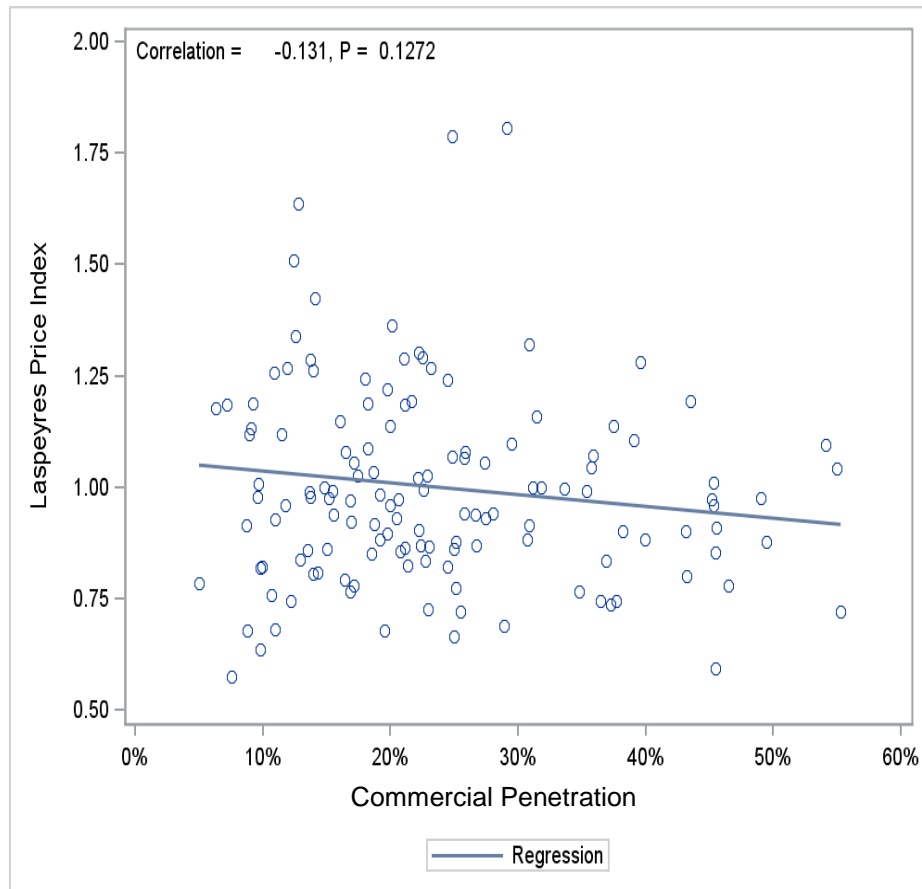
The scatter plot shows the bivariate association between the MSA-level commercial penetration rate and the Laspeyres price index of the ratio of commercial prices to Medicare FFS prices based on the top 20 DRGs for commercial payers. There are 137 MSAs in this analysis. The commercial sample was limited to adults 18-64 years.
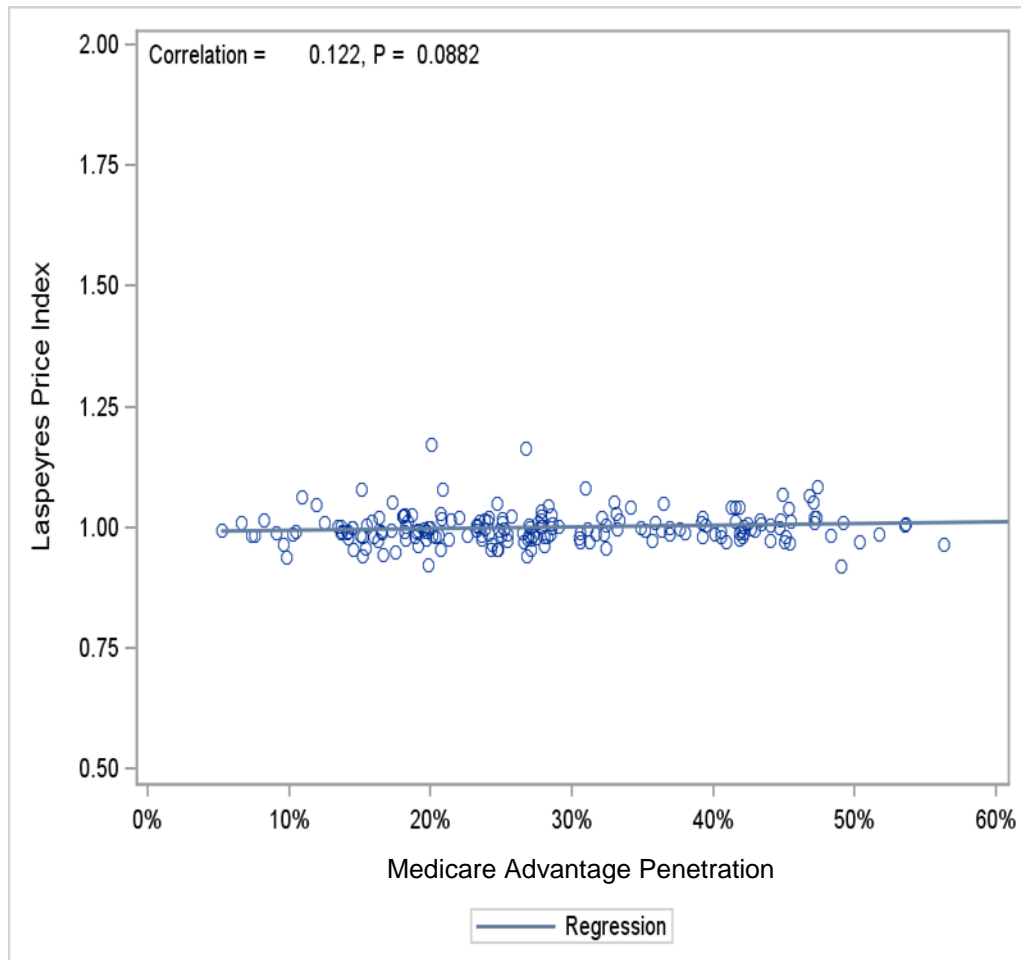
The Medicare payment rules were used to compute the amount that the Medicare FFS program would have paid for each stay in the commercial sample. The estimates of Medicare FFS prices include the base payment amount plus any additional payments for IME and DSH. Because of data limitations, the FFS prices were not adjusted to account for outlier payments.

DRG=diagnosis-related group; DSH=disproportionate share hospital payments; FFS=fee for service; IME=indirect medical education payments; MSA=metropolitan statistical area.

Figure 5. Scatter Plot of Hospital-Level Commercial Price per Discharge and Medicare FFS Price per Discharge for All Stays, 2013

Correlation = 0.664; p<.0001
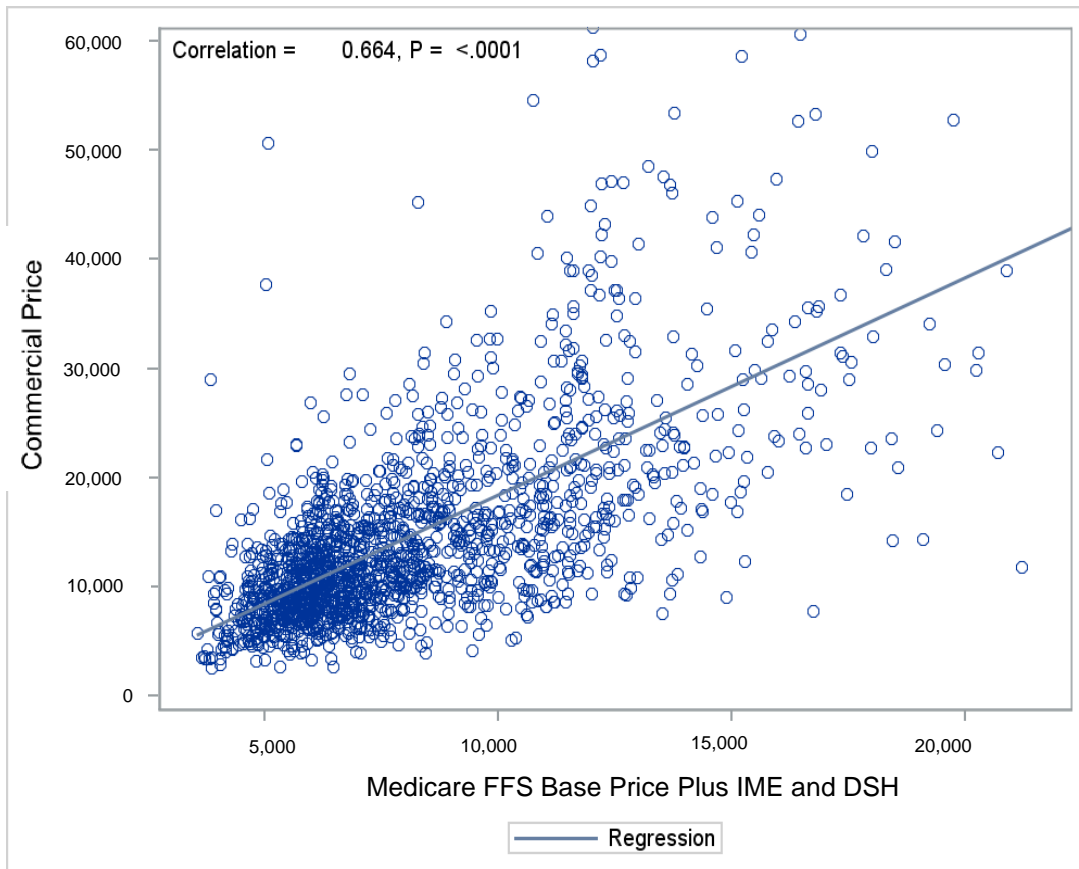
The scatter plot shows the bivariate association between the hospital-level median price per discharge for commercial payers and Medicare FFS for all hospital stays. For each hospital, we computed the median commercial price for each DRG and then used the DRG with the median price at that hospital as our measure of the hospital's median price. We used the Medicare FFS price for that DRG in the analysis. There are 1,683 hospitals in this analysis that have at least five discharges. The commercial sample excludes maternal stays associated with childbirth and was limited to adults 18-64 years.

The Medicare payment rules were used to compute the amount that the Medicare FFS program would have paid for each stay in the commercial sample. The estimates of Medicare FFS prices include the base payment amount plus any additional payments for IME and DSH. Because of data limitations, the FFS prices were not adjusted to account for outlier payments.

DRG=diagnosis-related group; DSH=disproportionate share hospital payments; FFS=fee for service; IME=indirect medical education payments.

Figure 6. Scatter Plot of Hospital-Level Medicare Advantage Price per Discharge and Medicare FFS Price per Discharge for All Stays, 2013

Correlation = 0.981; p<.0001
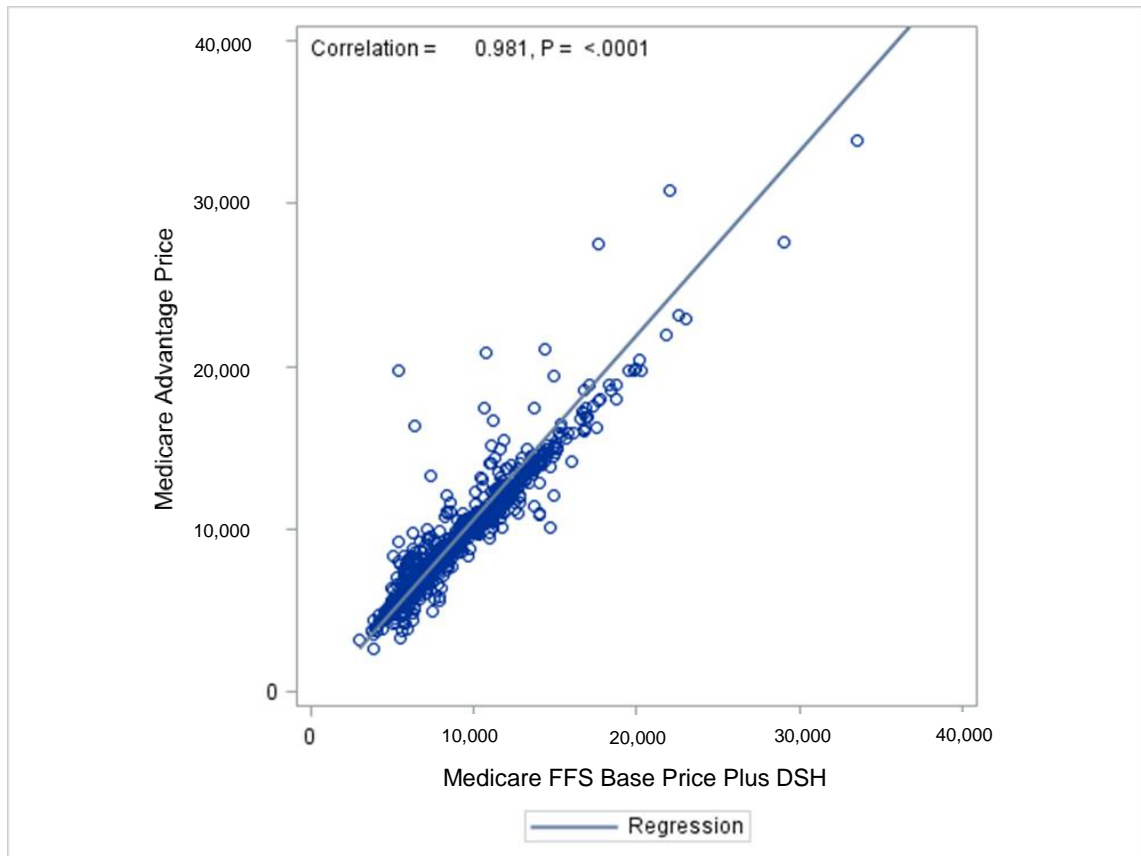
The scatter plot shows the bivariate association between the hospital-level median price per discharge for Medicare Advantage and Medicare FFS for all hospital stays. For each hospital, we computed the median Medicare Advantage price for each DRG and then used the DRG with the median price at that hospital as our measure of the hospital's median price. We used the Medicare FFS price for that DRG in the analysis. There are 1,425 hospitals in this analysis that have at least five discharges. The Medicare Advantage sample was limited to adults 65 years or older.

The Medicare payment rules were used to compute the amount that the Medicare FFS program would have paid for each stay in the Medicare Advantage sample. The estimates of Medicare FFS prices include the base payment amount plus any additional payments for DSH. Because of data limitations, the FFS prices were not adjusted to account for outlier payments.

DRG=diagnosis-related group; DSH=disproportionate share hospital payments; FFS=fee for service.

Table 13. Correlation of Hospital-Level Ratio of Commercial Prices to Medicare FFS Prices Across Service Lines

	All DRGs	Medical DRGs	Surgical DRGs	Esophagitis, Gastroenteritis, & Misc. Digestive Disorders w/o MCC (MS-DRG 392)	Cellulitis w/o MCC (MS-DRG 603)	Major Joint Replacement or Reattachment of Lower Extremity w/o MCC (MS-DRG 470)	Percutaneous Cardiovascular Procedure With Drug-Eluting Stent w/o MCC (MS-DRG 247)
All DRGs	1.00	0.94	0.89	0.79	0.71	0.67	0.62
Medical DRGs	0.94	1.00	0.80	0.80	0.76	0.64	0.59
Surgical DRGs	0.89	0.80	1.00	0.68	0.58	0.71	0.65
Esophagitis, Gastroenteritis, & Misc. Digestive Disorders w/o MCC (MS-DRG 392)	0.79	0.80	0.68	1.00	0.75	0.55	0.53
Cellulitis w/o MCC (MS-DRG 603)	0.71	0.76	0.58	0.75	1.00	0.50	0.46
Major Joint Replacement or Reattachment of Lower Extremity w/o MCC (MS-DRG 470)	0.67	0.64	0.71	0.55	0.50	1.00	0.65
Percutaneous Cardiovascular Procedure With Drug-Eluting Stent w/o MCC (MS-DRG 247)	0.62	0.59	0.65	0.53	0.46	0.65	1.00
Number of Hospitals	469	469	469	469	469	469	469

We computed the median ratio of commercial prices to Medicare FFS prices for each hospital. This analysis includes hospitals with at least five discharges for each of the selected DRGs. The greyed out cells indicate weak correlations of less than 0.60.

The Medicare payment rules were used to compute the amount that the Medicare FFS program would have paid for each stay in the commercial sample. The estimates of Medicare FFS prices include the base payment amount plus any additional payments for IME and DSH. Because of data limitations, the FFS prices were not adjusted to account for outlier payments.

DSH=disproportionate share hospital payments; FFS=fee for service; IME=indirect medical education payments; MCC=major complication or comorbidity; MS-DRG=Medicare severity-diagnosis-related group.

Table 14. Correlation of Hospital-Level Ratio of Medicare Advantage Prices to Medicare FFS Prices Across Service Lines

	All DRGs	Medical DRGs	Surgical DRGs	Esophagitis, Gastroenteritis, & Misc. Digestive Disorders w/o MCC (MS-DRG 392)	Cellulitis w/o MCC (MS-DRG 603)	Major Joint Replacement or Reattachment of Lower Extremity w/o MCC (MS-DRG 470)	Percutaneous Cardiovascular Procedure With Drug-Eluting Stent w/o MCC (MS-DRG 247)
All DRGs	1.00	0.88	0.79	0.81	0.73	0.76	0.75
Medical DRGs	0.88	1.00	0.78	0.90	0.73	0.73	0.76
Surgical DRGs	0.79	0.78	1.00	0.76	0.62	0.66	0.69
Esophagitis, Gastroenteritis, & Misc. Digestive Disorders w/o MCC (MS-DRG 392)	0.81	0.90	0.76	1.00	0.69	0.70	0.72
Cellulitis w/o MCC (MS-DRG 603)	0.73	0.73	0.62	0.69	1.00	0.72	0.54
Major Joint Replacement or Reattachment of Lower Extremity w/o MCC (MS-DRG 470)	0.76	0.73	0.66	0.70	0.72	1.00	0.67
Percutaneous Cardiovascular Procedure With Drug-Eluting Stent w/o MCC (MS-DRG 247)	0.75	0.76	0.69	0.72	0.54	0.67	1.00
Number of Hospitals	277	277	277	277	277	277	277

We computed the median ratio of Medicare Advantage prices to Medicare FFS prices for each hospital. This analysis includes hospitals with at least five discharges for each of the selected DRGs. The greyed out cells indicate weak correlations of less than 0.60.

The Medicare payment rules were used to compute the amount that the Medicare FFS program would have paid for each stay in the Medicare Advantage sample. The estimates of Medicare FFS prices include the base payment amount plus any additional payments for DSH. Because of data limitations, the FFS prices were not adjusted to account for outlier payments.

DSH=disproportionate share hospital payments; FFS=fee for service; MCC=major complication or comorbidity; MS-DRG=Medicare severity-diagnosis-related group.

Figure 7. Scatter Plot of the Medicare Advantage Benchmark and an Index of the Ratio of Medicare Advantage Prices to Medicare FFS Prices, 2013

Correlation = -0.129; p = 0.072
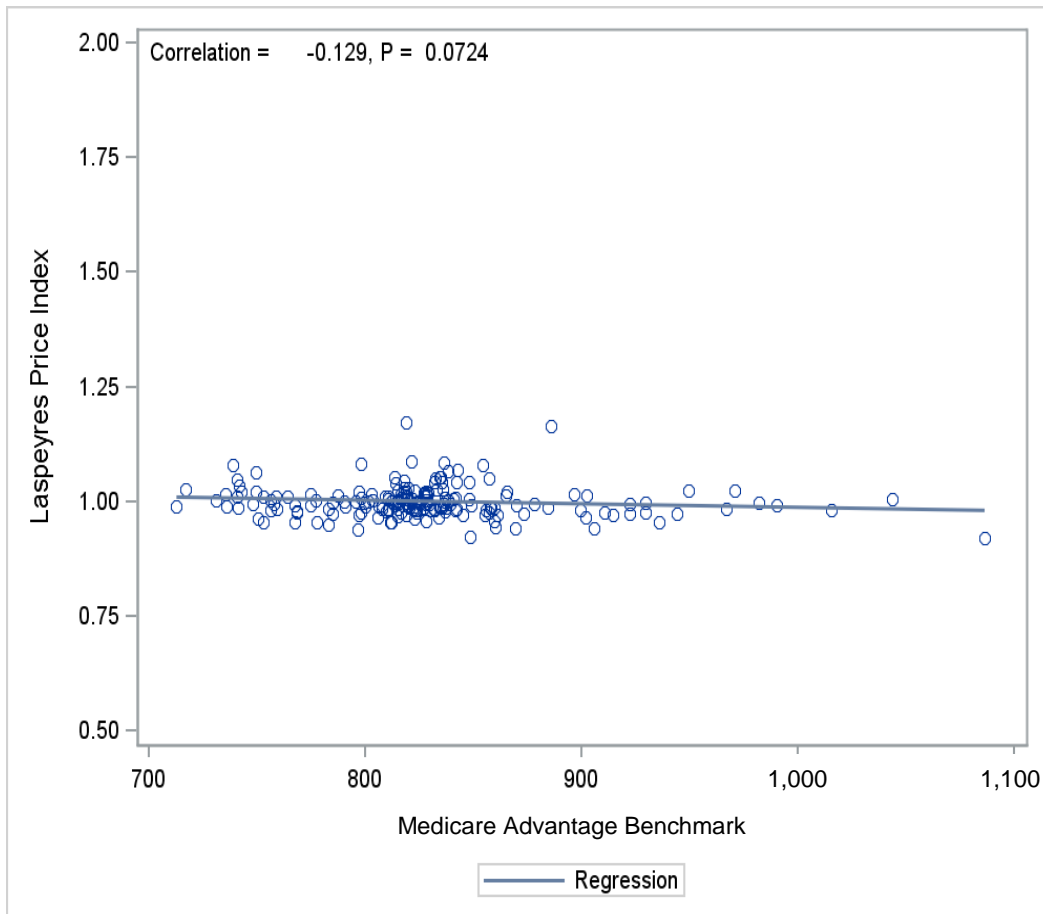
The scatter plot shows the bivariate association between the MSA-level Medicare Advantage benchmark and the Laspeyres price index ratio of Medicare Advantage prices to Medicare FFS prices based on the top 20 DRGs for Medicare Advantage. There are 196 MSAs in this analysis. The Medicare Advantage sample was limited to adults 65 years or older.

The Medicare payment rules were used to compute the amount that the Medicare FFS program would have paid for each stay in the Medicare Advantage sample. The estimates of Medicare FFS prices include the base payment amount plus any additional payments for DSH. Because of data limitations, the FFS prices were not adjusted to account for outlier payments.

DRG=diagnosis-related group; DSH=disproportionate share hospital payments; FFS=fee for service; MSA=metropolitan statistical area.

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Figure 8. Scatter Plot of the Ratio of the Medicare Advantage Benchmark to Medicare FFS per Capita Spending and an Index of the Ratio of Medicare Advantage Prices to Medicare FFS Prices, 2013

Correlation = 0.125; p = 0.080
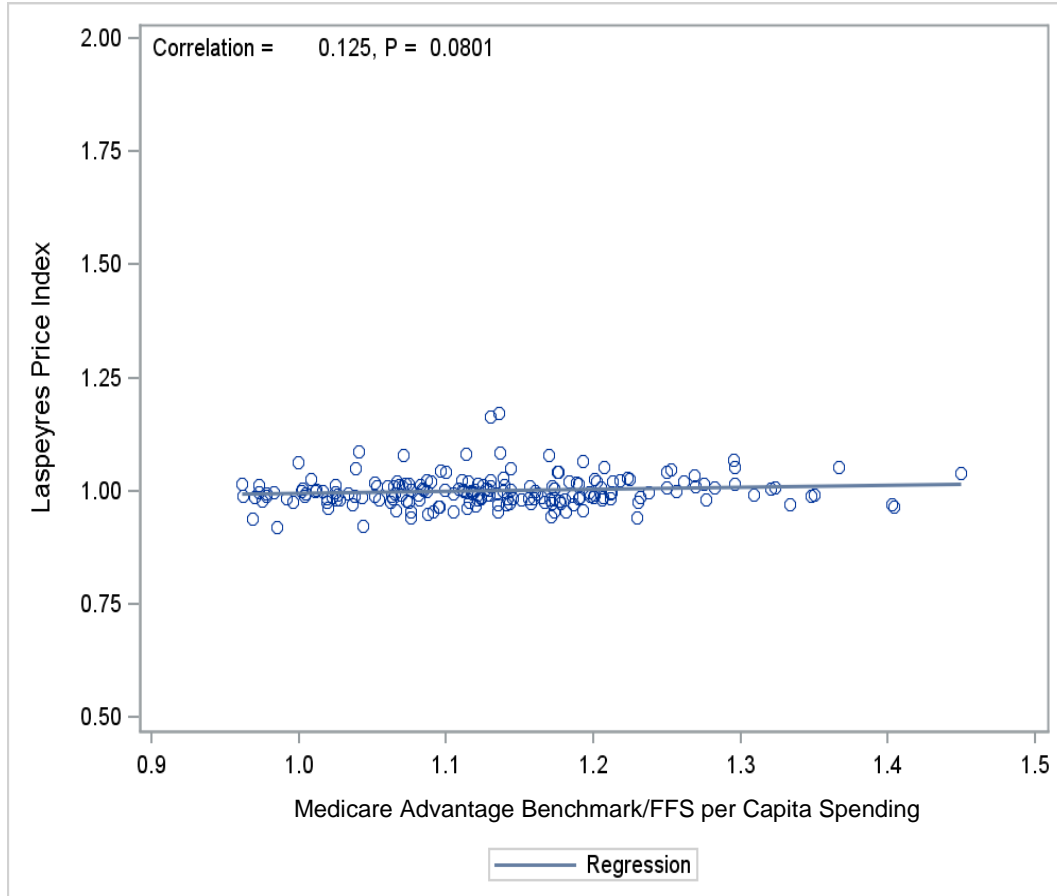
The scatter plot shows the bivariate association between the MSA-level ratio of the Medicare Advantage benchmark to Medicare FFS per capita spending and the Laspeyres price index ratio of the Medicare Advantage prices to Medicare FFS prices based on the top 20 DRGs for Medicare Advantage. There are 196 MSAs in this analysis. The Medicare Advantage sample was limited to adults 65 years or older.

The Medicare payment rules were used to compute the amount that the Medicare FFS program would have paid for each stay in the Medicare Advantage sample. The estimates of Medicare FFS prices include the base payment amount plus any additional payments for DSH. Because of data limitations, the FFS prices were not adjusted to account for outlier payments.

DRG=diagnosis-related group; DSH=disproportionate share hospital payments; FFS=fee for service; MSA=metropolitan statistical area.

Appendix A: Supplemental Material on Data and Methods

The main text described the major features of our approach to selecting the sample of hospital stays for this analysis and computing the payment amount for each stay. This appendix provides additional details about our approach.

Constructing the Samples

The major steps in constructing our samples of hospital stays for the analysis were discussed in the main text. Table A-1 indicates the number and percentage of stays that were removed in the initial steps and the number of metropolitan statistical areas (MSAs) that were represented in our sample at each step. We then applied certain additional restrictions to select the commercial and Medicare Advantage samples, and we discussed most of those restrictions in the main text. Table A-2 indicates the number of stays that were removed from the commercial and Medicare Advantage samples in each step.

The sample restrictions that were not discussed in the main text resulted in small numbers of stays being excluded from our samples. First, we excluded stays in the commercial sample in which the product type was listed as unknown, other, indemnity, or short-term plan. This left us with stays for which the product type was a preferred provider organization, point-of-service plan, or health maintenance organization. Applying that restriction removed 0.7 percent of the stays from the commercial sample (see Table A-2). We also eliminated members who were enrolled in a commercial plan for part of the year and a Medicare Advantage plan for part of the year, and we eliminated stays with overlapping admission dates. Applying those restrictions removed less than 1 percent of the stays. Finally, we excluded stays in which the patient received an organ transplant, because that service is typically "carved out" of coverage benefits—meaning that it is not usually included in the contract and is paid separately.[68] Although a payment amount is still included on the claim, commercial insurers typically pay hospitals and physicians for transplant services through a bundled payment.[69] Removing stays with transplant diagnostic-related groups (DRGs) eliminated 0.3 percent of the stays from the commercial sample and less than 0.1 percent of the stays from the Medicare Advantage sample.

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[68] Most commercial insurers will typically not contract directly with providers for transplant services; instead, insurers will usually outsource the contracting to large transplant payer networks. See Michael Abecassis, "Financial Outcomes in Transplantation—A Provider's Perspective," *American Journal of Transplantation*, vol. 6 (2006), pp. 1257–1263. Discharges related to transplants included MS-DRGs 001 (heart transplant or implant of heart assist system with MCC), 002 (heart transplant or implant of heart assist system without MCC), 005 (liver transplant with MCC or intestinal transplant), 006 (liver transplant without MCC), 007 (lung transplant), 008 (simultaneous pancreas/kidney transplant), 010 (pancreas transplant), 014 (allogenic bone marrow transplant), 016 (autologous bone marrow transplant with CC/MCC), 017 (autologous bone marrow transplant without CC/MCC), and 652 (kidney transplant).

[69] Government Accountability Office, *Medicare: Private Sector Initiatives to Bundle Hospital and Physician Payments for an Episode of Care*, GAO -11-126R (January 2011), www.gao.gov\\products\\GAO-11-126R.

Table A-3 compares the characteristics of hospitals in our study sample with those of all hospitals in the American Hospital Association's (AHA's) Annual Survey of Hospitals. We discussed those comparisons in the main text.

Sensitivity Analysis

To investigate the sensitivity of our results to our approach to excluding stays with very low payment amounts, we repeated the analysis using different criteria. For the analyses presented in the main text, we excluded stays from our sample for which the payment amount was less than 50 percent of the MSA-level average Medicare fee-for-service (FFS) base payment amount for each DRG. We adopted that approach because we were concerned that stays with payment amounts below that threshold might have been cases in which the claim in the data from the Health Care Cost Institute (HCCI) was for a secondary payer. Under the alternative approach tested here, we excluded stays for which the payment was in the bottom 1 percent of the DRG-specific distribution nationally (we did that separately for the commercial and Medicare Advantage samples). That alternative approach was used in the paper by Cooper and others.[70] For this sensitivity analysis, we excluded stays in the top 1 percent of the payment distribution or top 1 percent of the distribution of lengths of stay, by DRG, which is the approach we followed in the main text and is the approach followed in the paper by Cooper and others.

Under the alternative approach to excluding low-cost outliers, the average commercial rate for all stays in our sample was $20,316, which is 5 percent lower than the corresponding value of $21,433 reported in the main text (compare Table A-4 and Table 1). Under the alternative approach, the average commercial rate was 78 percent higher than the average Medicare FFS rate (compared with an 89 percent difference using our main approach). For the Medicare Advantage sample, the alternative approach to excluding low-cost outliers resulted in an average Medicare Advantage payment rate of $10,523 for all stays, which is only 1 percent lower than the value of $10,667 reported in the main text (compare Table A-5 and Table 2). The alternative approach had little effect on the ratio of Medicare Advantage payment rates to Medicare's FFS rates. The difference between the two sets of estimates is greater for the commercial sample than for the Medicare Advantage sample because a larger share of claims with low payment amounts was removed from the commercial sample than from the Medicare Advantage sample under our main approach.

Hospital Price Measures

One aspect of our approach to computing the payment amount for each stay was not discussed in the main text. Specifically, if a patient received outpatient services at the same hospital within three days of the admission date, we added the allowed amounts for those services to the total

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[70] Zack Cooper and others, *The Price Ain't Right? Hospital Prices and Health Spending on the Privately Insured*, Working Paper 21815 (National Bureau of Economic Research, December 2015), pp. 19–20.

price of the stay. (We linked outpatient claims to inpatient stays using the hospital's national provider identifier (NPI), unique patient identifier, and dates of service on the claims.) We included the payments for those outpatient services in the total price of inpatient stays in an effort to achieve consistency between the services captured in the total price of stays in the HCCI claims and the corresponding Medicare FFS prices we estimated. In the Medicare FFS program, the payment for a beneficiary's inpatient stay represents payment not only for the stay itself but also for all outpatient diagnostic services and other services related to the admission that were furnished by the admitting hospital (or an entity that is wholly owned or operated by that hospital) within three days of the admission date. We do not know if the private insurers included in the HCCI data also use that type of three-day payment window policy; however, we applied that rule to the private claims in an effort to achieve consistency in our comparisons of private payment rates with Medicare's FFS rates.

Following that approach, we added the payments on outpatient claims to the payments for 9 percent of the stays in the commercial sample and for 3 percent of the stays in the Medicare Advantage sample. In those cases, the average amount of the outpatient payment that was added to the payment for the inpatient stay was $2,134 for the commercial sample and $493 for the Medicare Advantage sample. Those adjustments had small effects on the overall mean payments, however, increasing the mean commercial payment by $186 and the mean Medicare Advantage payment by $16. In each case, the adjustment increased the mean payment by less than 1 percent.

Addressing the Problem of Multiple NPIs

A single hospital facility in the HCCI claims data could have more than one national provider identifier (that is, one NPI for the emergency department, one NPI for the radiology department, and one NPI for the inpatient setting, for example). Because of that data issue, we needed to create a crosswalk to map the multiple NPIs per facility to a single facility so that we could conduct some of the analyses at the hospital level since there was no crosswalk available at the time of our study. To do that, we used the Centers for Medicare & Medicaid Services's (CMS's) National Plan and Provider Enumeration System (NPPES) file, the AHA's Annual Survey of Hospitals, and CMS's Standard Analytic File (SAF). We used a similar approach described by other researchers to develop that crosswalk.[71]

1. We first standardized all variations of the hospital name/address/city/state/zip code in the 2013AHA file and NPPES file.
2. We then checked to make sure that the AHA file had only one unique NPI per hospital. If there was more than one hospital in the AHA file with the same NPI, we looked the NPI up in the NPPES registry and resolved the discrepancy.

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[71] Ibid.

3. Because some hospitals in the AHA file were missing an NPI, we linked any hospitals in the AHA that had a missing NPI with the SAF based on the Medicare provider number. We then added the NPI that was listed on the SAF to the AHA file.
4. Because some hospitals in the AHA were still missing an NPI after this step, for any remaining hospitals in the AHA file with a missing NPI we looked up the NPI in the NPPES registry by name and address.
5. We then removed any invalid NPIs from the NPPES registry.
6. We extracted NPIs from the NPPES registry that belonged to general acute care and specialty hospitals.
7. We then matched NPIs from the NPPES file with NPIs in the AHA data. When a match was found, we marked this as the "primary" NPI for that hospital.
8. We matched the remaining NPIs in the NPPES file to the AHA file using various combinations of the following criteria: hospital name, similar hospital name, other hospital name (a change in the organization name verified by web search), or Medicare provider number with address, similar address, city, state, and zip code.
9. When a match was found on the remaining NPIs, we attached the primary NPI.

Because some hospitals in the NPPES file were not in the AHA file, we designated one of the NPIs as the "primary" NPI for those hospitals. Based on the matching steps discussed above, we attached the primary NPI to all data rows for the same hospital.

Study Samples

Table A-1. Initial Steps in Selecting the Sample of Hospital Stays from HCCI Claims, 2013

	Step Description	Number of Discharges	Number of Members	Percent of Discharges Removed From Previous Step	Number of Core Based Statistical Areas
1	Start with the 2013 HCCI inpatient claims	4,305,469	2,754,794	-	375
2	Restrict to inpatient hospital claims and exclude skilled nursing facility/hospice/other types of facility claims	3,489,508	2,644,537	19%	375
3	Restrict to stays that can be linked with the AHA's Annual Survey of Hospitals and use the AHA data to limit our sample to acute care hospitals. Among the hospitals excluded are non-acute care, psychiatric, rehabilitation, long-term care, alcohol/chemical dependency, units of an institution, and Christian Science hospitals Also restrict to stays that can be linked with the CMS Impact File so we can compute the Medicare IPPS price for each stay. Hospitals paid by Medicare on a cost basis were excluded.	2,505,162	1,990,401	28%	315
4	Restrict to stays in metropolitan statistical areas	2,466,009	1,961,921	2%	314
5	Exclude stays from Maryland, West Virginia, or Puerto Rico	2,351,654	1,870,520	5%	305
6	Exclude hospitals with <50 discharges across all DRGs	2,348,319	1,867,930	0%	297
7	Restrict to acute care stays with one unique DRG and one unique NPI	2,328,735	1,856,744	1%	297

AHA=American Hospital Association; CMS=Centers for Medicare & Medicaid Services; DRG=diagnosis-related group; HCCI=Health Care Cost Institute; IPPS=inpatient prospective payment system; NPI=national provider identifier.

Table A-2. Selecting the Commercial and Medicare Advantage Samples of Hospital Stays, 2013

	Step Description	Commercial Sample			Medicare Advantage Sample			Number of Core Based Statistical Areas
		Number of Discharges	Number of Patients	Percent of Discharges Removed From Previous Step	Number of Discharges	Number of Patients	Percent of Discharges Removed From Previous Step	
1	Identify stays for the commercial sample and Medicare Advantage sample	1,550,231	1,324,079	-	778,504	532,990	-	297
2	Exclude stays for people age 65 and older for commercial and under age 65 for Medicare Advantage	1,239,427	1,064,209	20%	652,678	453,545	16%	297
3	Restrict to non-pregnancy, non-childbirth and non-puerperium discharges	922,887	763,845	26%	652,675	453,543	0%	297
4	Exclude stay at transferring hospital when patient is transferred to another hospital	898,381	752,863	3%	644,681	452,099	1%	297
5	Restrict to adults age 18-64 for commercial sample	703,918	569,463	22%	644,681	452,099	0%	297
6	Restrict to large and small group market segments for commercial sample	685,997	554,803	3%	644,681	452,099	0%	297
7	Exclude product types unknown, all, other, indemnity, and short term plan for commercial sample and unknown, all, other, and special needs plans for Medicare Advantage	680,947	550,692	1%	644,681	452,099	0%	297
8	Exclude members who had commercial coverage for part of the year and Medicare Advantage coverage for the rest of the year, and exclude stays with overlapping admission dates	679,632	549,956	0%	641,099	449,665	1%	297
9	Exclude tranplant DRGs	677,393	548,924	0%	640,905	449,589	0%	297
10	Restrict to stays with positive payment amounts $\geq$ .01	676,648	548,427	0%	619,657	438,274	3%	297
11	Exclude stays with payment <50% basic Medicare FFS by DRG and MSA	631,260	513,400	7%	602,551	429,039	3%	297
12	Exclude stays with payment >99th percentile by DRG	624,845	509,568	1%	596,703	426,293	1%	297
13	Exclude stays with length of stay >99th percentile by DRG	620,922	507,511	1%	593,044	424,722	1%	297

DRG=diagnosis-related group; FFS=fee for service; MSA=metropolitan statistical area.

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Table A-3. Hospital Characteristics of the HCCI Sample and All Hospitals in the AHA's Annual Survey of Hospitals, 2013

Hospital Characteristics	HCCI study sample		All AHA Hospitals	
	n	Col %	n	Col %
Teaching Status				
Non-Teaching	1,711	88%	3,115	92%
Teaching	223	12%	276	8%
Ownership				
For-profit	493	25%	792	23%
Non-profit	1,257	65%	2,117	62%
Government	184	10%	482	14%
Number of Beds				
Less than 100	374	19%	1,157	34%
100-299	900	47%	1,446	43%
300-499	410	21%	512	15%
500 or more	250	13%	276	8%
Urban/Rural[a]				
Rural	-	-	907	27%
Urban	1,934	100%	2,484	73%
Region				
Midwest	470	24%	775	23%
Northeast	369	19%	516	15%
South	709	37%	1,458	43%
West	386	20%	642	19%

Includes community hospitals and excludes rehabilitation, psychiatric, alcoholic and chemical dependency, long-term care, and critical access hospitals and hospital units of institutions. Teaching hospitals were defined as a member of the Council of Teaching Hospitals. Metropolitan divisions and metropolitan statistical areas were defined as urban areas. Micropolitan statistical areas and rural were defined as rural areas.

[a]The proportion of hospital beds that are in urban areas across all AHA hospitals is 87 percent.

AHA=American Hospital Association; HCCI=Health Care Cost Institute.

Table A-4. Comparison of Mean Commercial and Medicare FFS Prices for All Stays, Medical Stays, and Surgical Stays Under Alternative Criteria for Removing Stays With Low Payments, 2013

	All MS-DRGs	Medical MS-DRGs	Surgical MS-DRGs
Commercial Price	$20,316	$12,712	$29,465
Medicare FFS Base Price Plus IME, DSH, and Outliers[a]	$11,409	$7,162	$16,607
Ratio of Commercial to Medicare FFS Price[a]	1.78	1.77	1.77
Number of Stays in Analysis	659,992	360,430	299,562
Number of MSAs in Analysis	297	296	297

This analysis excludes the bottom one percentile of stays of the payment distribution by DRG instead of removing stays that were less than 50 percent of the MSA-level average Medicare FFS base price for a given DRG. The commercial sample excludes maternal stays associated with childbirth and was limited to adults 18-64 years.

[a]The estimates of Medicare's FFS prices in this table include the base payment amount plus any additional payments for IME and DSH and an adjustment to account for outlier payments. The Medicare payment rules were used to compute the amount that the Medicare FFS program would have paid for each stay in the commercial sample, including the base price and payments for IME and DSH (but not outlier payments). We estimated the average outlier payment for admissions in each major category of DRG from a separate analysis of Medicare claims.

DSH=disproportionate share hospital payments; FFS=fee for service; IME=indirect medical education payments; MSA=metropolitan statistical area; MS-DRG=Medicare severity-diagnosis-related group.

Table A-5. Comparison of Mean Medicare Advantage and Medicare FFS Prices for All Stays, Medical Stays, and Surgical Stays Under Alternative Criteria for Removing Stays With Low Payments, 2013

	All MS-DRGs	Medical MS-DRGs	Surgical MS-DRGs
Medicare Advantage Price	$10,523	$7,168	$17,527
Medicare FFS Base Price Plus DSH and Outliers[a]	$10,702	$7,230	$17,977
Ratio of Medicare Advantage to Medicare FFS Price[a]	.98	.99	.97
Number of Stays in Analysis	604,375	408,672	195,703
Number of MSAs in Analysis	297	296	296

This analysis excludes the bottom one percentile of stays of the payment distribution by DRG instead of removing stays that were less than 50 percent of the MSA-level average Medicare FFS base price for a given DRG. The Medicare Advantage sample was limited to adults 65 years or older.

[a]The estimates of Medicare's FFS prices in this table include the base payment amount plus any additional payments for DSH and an adjustment to account for outlier payments. For our preferred estimate comparing Medicare Advantage rates with Medicare's FFS rates, we excluded IME payments from the FFS prices because Medicare makes IME payments directly to hospitals for Medicare Advantage enrollees. Also, IME payments are excluded in the calculation of Medicare Advantage benchmarks. The Medicare payment rules were used to compute the amount that the Medicare FFS program would have paid for each stay in the Medicare Advantage sample, including the base price and payments for DSH (but not outlier payments). We estimated the average outlier payment for admissions in each major category of DRG from a separate analysis of Medicare claims.

DSH=disproportionate share hospital payments; FFS=fee for service; IME=indirect medical education payments; MSA=metropolitan statistical area; MS-DRG=Medicare severity-diagnosis-related group.

Table A-6. Average Payment per Stay and Total Number of Stays for the Top 20 Commercial DRGs, 2013

DRG	DRG Description	Average Payment per Discharge	Sum of Payment per Discharge	Number of Discharges	Percent of Spending	Percent of Discharges
470	MAJOR JOINT REPLACEMENT OR REATTACHMENT OF LOWER EXTREMITY WITHOUT MCC	$27,163	$1,082,072,177	39,836	8.1%	6.4%
392	ESOPHAGITIS; GASTROENTERITIS AND MISCELLANEOUS DIGESTIVE DISORDERS WITHOUT MCC	$9,349	$212,485,837	22,727	1.6%	3.7%
743	UTERINE AND ADNEXA PROCEDURES FOR NONMALIGNANCY WITHOUT CC/MCC	$10,933	$180,237,844	16,486	1.4%	2.7%
885	PSYCHOSES	$8,987	$125,945,836	14,014	0.9%	2.3%
603	CELLULITIS WITHOUT MCC	$9,895	$117,450,313	11,870	0.9%	1.9%
247	PERCUTANEOUS CARDIOVASCULAR PROCEDURE WITH DRUG-ELUTING STENT WITHOUT MCC	$29,691	$321,609,154	10,832	2.4%	1.7%
460	SPINAL FUSION EXCEPT CERVICAL WITHOUT MCC	$51,374	$554,888,423	10,801	4.2%	1.7%
621	O.R. PROCEDURES FOR OBESITY WITHOUT CC/MCC	$20,003	$198,228,486	9,910	1.5%	1.6%
473	CERVICAL SPINAL FUSION WITHOUT CC/MCC	$27,179	$209,168,302	7,696	1.6%	1.2%
419	LAPAROSCOPIC CHOLECYSTECTOMY WITHOUT C.D.E. WITHOUT CC/MCC	$13,367	$101,505,356	7,594	0.8%	1.2%
287	CIRCULATORY DISORDERS EXCEPT ACUTE MYOCARDIAL INFARCTION; WITH CARDIAC CATHETERIZATION WITHOUT MCC	$13,950	$101,552,807	7,280	0.8%	1.2%
871	SEPTICEMIA OR SEVERE SEPSIS WITHOUT MECHANICAL VENTILATION 96+ HOURS WITH MCC	$25,191	$182,939,544	7,262	1.4%	1.2%
330	MAJOR SMALL AND LARGE BOWEL PROCEDURES WITH CC	$30,766	$207,578,496	6,747	1.6%	1.1%
313	CHEST PAIN	$6,997	$45,788,018	6,544	0.3%	1.1%
310	CARDIAC ARRHYTHMIA AND CONDUCTION DISORDERS WITHOUT CC/MCC	$6,699	$42,908,646	6,405	0.3%	1.0%
897	ALCOHOL/DRUG ABUSE OR DEPENDENCE WITHOUT REHABILITATION THERAPY WITHOUT MCC	$7,465	$46,130,749	6,180	0.3%	1.0%
872	SEPTICEMIA OR SEVERE SEPSIS WITHOUT MECHANICAL VENTILATION 96+ HOURS WITHOUT MCC	$13,670	$79,257,200	5,798	0.6%	0.9%
343	APPENDECTOMY WITHOUT COMPLICATED PRINCIPAL DIAGNOSIS WITHOUT CC/MCC	$10,831	$62,666,305	5,786	0.5%	0.9%
690	KIDNEY AND URINARY TRACT INFECTIONS WITHOUT MCC	$9,359	$48,367,073	5,168	0.4%	0.8%
331	MAJOR SMALL AND LARGE BOWEL PROCEDURES WITHOUT CC/MCC	$20,062	$101,835,366	5,076	0.8%	0.8%
	Top 20 DRGs	$18,796	$4,022,615,933	214,012	30.2%	34.5%
	ALL DRGs	$21,433	$13,308,281,021	620,922	100.0%	100.0%

CC=complication or comorbidity; CDE=common duct exploration; DRG=diagnosis-related group; O.R.=operating room; MCC=major complication or comorbidity.

Table A-7. Average Payment per Stay and Total Number of Stays for the Top 20 Medicare Advantage DRGs, 2013

DRG	DRG Description	Average Payment per Discharge	Sum of Payment per Discharge	Number of Discharges	Percent of Spending	Percent of Discharges
470	MAJOR JOINT REPLACEMENT OR REATTACHMENT OF LOWER EXTREMITY WITHOUT MCC	$12,685	$446,845,597	35,227	7.1%	5.9%
871	SEPTICEMIA OR SEVERE SEPSIS WITHOUT MECHANICAL VENTILATION 96+ HOURS WITH MCC	$11,769	$218,376,214	18,556	3.5%	3.1%
392	ESOPHAGITIS; GASTROENTERITIS AND MISCELLANEOUS DIGESTIVE DISORDERS WITHOUT MCC	$4,640	$57,466,383	12,385	0.9%	2.1%
292	HEART FAILURE AND SHOCK WITH CC	$6,236	$75,017,573	12,029	1.2%	2.0%
291	HEART FAILURE AND SHOCK WITH MCC	$9,334	$99,091,416	10,616	1.6%	1.8%
690	KIDNEY AND URINARY TRACT INFECTIONS WITHOUT MCC	$4,890	$49,950,688	10,215	0.8%	1.7%
378	GI HEMORRHAGE WITH CC	$6,334	$61,984,122	9,786	1.0%	1.7%
683	RENAL FAILURE WITH CC	$6,143	$60,026,892	9,771	0.9%	1.6%
194	SIMPLE PNEUMONIA AND PLEURISY WITH CC	$6,178	$55,741,287	9,023	0.9%	1.5%
247	PERCUTANEOUS CARDIOVASCULAR PROCEDURE WITH DRUG-ELUTING STENT WITHOUT MCC	$12,511	$100,867,431	8,062	1.6%	1.4%
190	CHRONIC OBSTRUCTIVE PULMONARY DISEASE WITH MCC	$7,241	$58,286,175	8,050	0.9%	1.4%
310	CARDIAC ARRHYTHMIA AND CONDUCTION DISORDERS WITHOUT CC/MCC	$3,537	$26,095,586	7,378	0.4%	1.2%
65	INTRACRANIAL HEMORRHAGE OR CEREBRAL INFARCTION WITH CC	$7,004	$51,634,422	7,372	0.8%	1.2%
193	SIMPLE PNEUMONIA AND PLEURISY WITH MCC	$8,974	$65,287,155	7,275	1.0%	1.2%
312	SYNCOPE AND COLLAPSE	$4,671	$33,069,755	7,080	0.5%	1.2%
641	MISCELLANEOUS DISORDERS OF NUTRITION; METABOLISM; AND FLUIDS AND ELECTROLYTES WITHOUT MCC	$4,399	$30,463,782	6,925	0.5%	1.2%
191	CHRONIC OBSTRUCTIVE PULMONARY DISEASE WITH CC	$5,869	$40,290,241	6,865	0.6%	1.2%
603	CELLULITIS WITHOUT MCC	$5,264	$35,535,442	6,751	0.6%	1.1%
309	CARDIAC ARRHYTHMIA AND CONDUCTION DISORDERS WITH CC	$5,070	$33,793,324	6,665	0.5%	1.1%
872	SEPTICEMIA OR SEVERE SEPSIS WITHOUT MECHANICAL VENTILATION 96+ HOURS WITHOUT MCC	$6,821	$43,758,812	6,415	0.7%	1.1%
	Top 20 DRGs	$7,961	$1,643,582,301	206,446	26.0%	34.8%
	ALL DRGs	$10,667	$6,325,985,610	593,044	100.0%	100.0%

CC=complication or comorbidity; DRG=diagnosis-related group; GI=gastrointestinal; MCC=major complication or comorbidity.

Appendix B: Supplemental Tables and Figures

This appendix presents additional tables and figures that supplement the analyses presented in the main text.

Table B-1. Two Approaches to Comparing the Mean Medicare Advantage and Medicare FFS Prices for All Stays, Medical Stays, and Surgical Stays, 2013

	All MS-DRGs	Medical MS-DRGs	Surgical MS-DRGs
Prices			
Medicare Advantage	$10,667	$7,281	$17,661
Medicare FFS Base Price Plus DSH and Outliers[a, b]	$10,716	$7,236	$17,932
Medicare FFS Base Price Plus IME, DSH, and Outliers[b]	$11,231	$7,555	$18,851
Ratios			
Medicare Advantage/Medicare FFS Base Price Plus DSH and Outliers[a, b]	1.00	1.01	.98
Medicare Advantage/Medicare FFS Base Price Plus IME, DSH, and Outliers[b]	.95	.96	.94
Number of Stays in Analysis	593,044	399,597	193,447
Number of MSAs in Analysis	297	296	296

The Medicare Advantage sample was limited to adults 65 years or older. This table is analogous to Table 3 in the main text, except we show that if payments for IME, DSH, and outliers are all included in the calculation of Medicare's FFS prices, Medicare Advantage rates are 5 percent lower than Medicare's FFS prices for all MS-DRGs, on average.

[a]For our preferred estimate comparing Medicare Advantage prices with Medicare's FFS prices (highlighted in grey), we excluded IME payments from the FFS prices because Medicare makes IME payments directly to hospitals for Medicare Advantage enrollees. Also, IME payments are excluded in the calculation of Medicare Advantage benchmarks.

[b]The Medicare payment rules were used to compute the amount that the Medicare FFS program would have paid for each stay in the Medicare Advantage sample, including the base price and payments for DSH and, in certain cases, IME (but not outlier payments). We estimated the average outlier payment for admissions in each major category of DRG from a separate analysis of Medicare claims.

DSH=disproportionate share hospital payments; FFS=fee for service; IME=indirect medical education payments; MSA=metropolitan statistical area; MS-DRG=Medicare severity-diagnosis-related group.

Table B-2. Two Approaches to Comparing the Mean Medicare Advantage and Medicare FFS Prices for Four Common Types of Stays, 2013

	Esophagitis, Gastroenteritis, & Misc. Digestive Disorders w/o MCC (MS-DRG 392)	Cellulitis w/o MCC (MS-DRG 603)	Major Joint Replacement or Reattachment of Lower Extremity w/o MCC (MS-DRG 470)	Percutaneous Cardiovascular Procedure With Drug-Eluting Stent w/o MCC (MS-DRG 247)
Prices				
Medicare Advantage	$4,640	$5,264	$12,685	$12,511
Medicare FFS Base Price Plus DSH and Outliers[a, b]	$4,516	$5,171	$12,601	$12,341
Medicare FFS Base Price Plus IME, DSH, and Outliers[b]	$4,679	$5,365	$13,028	$12,894
Ratios				
Medicare Advantage/Medicare FFS Base Price Plus DSH and Outliers[a, b]	1.03	1.02	1.01	1.01
Medicare Advantage/Medicare FFS Base Price Plus IME, DSH, and Outliers[b]	.99	.98	.97	.97
Number of Stays in Analysis	12,385	6,751	35,227	8,062
Number of MSAs in Analysis	272	262	288	255

The Medicare Advantage sample was limited to adults 65 years or older. For each DRG, the number of MSAs reported in the table is the number of MSAs with at least one stay in that DRG. This table is analogous to Table 4 in the main text, except we show that if payments for IME, DSH, and outliers are all included in the calculation of Medicare's FFS prices, Medicare Advantage rates are between 1 percent and 3 percent lower than Medicare's FFS prices for the four DRGs.

[a]For our preferred estimate comparing Medicare Advantage prices with Medicare's FFS prices (highlighted in grey), we excluded IME payments from the FFS prices because Medicare makes IME payments directly to hospitals for Medicare Advantage enrollees. Also, IME payments are excluded in the calculation of Medicare Advantage benchmarks.

[b]The Medicare payment rules were used to compute the amount that the Medicare FFS program would have paid for each stay in the Medicare Advantage sample, including the base price and payments for DSH and, in certain cases, IME (but not outlier payments). We estimated the average outlier payment for admissions in each major category of DRG from a separate analysis of Medicare claims.

DSH=disproportionate share hospital payments; FFS=fee for service; IME=indirect medical education payments; MCC=major complication or comorbidity; MSA=metropolitan statistical area; MS-DRG=Medicare severity-diagnosis-related group.

Table B-3. Variation in Medicare FFS Prices for Hospital Stays Across Metropolitan Areas, 2013

	Weighted Average Price for Top 20 DRGs[a]	Esophagitis, Gastroenteritis, & Misc. Digestive Disorders w/o MCC (MS-DRG 392)	Cellulitis w/o MCC (MS-DRG 603)	Major Joint Replacement or Reattachment of Lower Extremity w/o MCC (MS-DRG 470)	Percutaneous Cardiovascular Procedure With Drug-Eluting Stent w/o MCC (MS-DRG 247)
Medicare FFS Base Price Plus DSH					
10th percentile	$7,152	$4,105	$4,580	$11,415	$10,952
25th percentile	$7,369	$4,207	$4,772	$11,911	$11,410
50th percentile	$7,639	$4,387	$4,975	$12,324	$11,818
75th percentile	$8,118	$4,618	$5,219	$13,044	$12,485
90th percentile	$8,752	$4,995	$5,682	$14,321	$13,637
Ratio of 10th to median	0.94	0.94	0.92	0.93	0.93
Ratio of 90th to median	1.15	1.14	1.14	1.16	1.15
Ratio of 75th to 25th	1.10	1.10	1.09	1.10	1.09
Ratio of 90th to 10th	1.22	1.22	1.24	1.25	1.25
Number of MSAs in Analysis	196	157	117	224	148

This table is analogous to Table 8 in the main text, except that it is restricted to the MSAs that were included in the analysis of variation in Medicare Advantage prices across metropolitan areas (whereas Table 8 was restricted to the metropolitan areas that were included in the corresponding analysis of variation in commercial prices). The Medicare payment rules were used to compute the amount that the Medicare FFS program would have paid for each stay in the Medicare Advantage sample, including the base price and payments for DSH (but not outlier payments).

[a] The weighted average price for the top 20 DRGs was computed for each MSA with at least one discharge in each of those DRGs. For each MSA, the average price for each DRG was weighted by the share of stays in that DRG in our national sample. We computed the mean Medicare FFS payment for each MSA based on the case mix of Medicare Advantage discharges. The analysis for each of the four DRGs was limited to MSAs with at least 10 Medicare Advantage discharges in that DRG, and each MSA received an equal weight in the analysis.

DSH=disproportionate share hospital payments; FFS=fee for service; MCC=major complication or comorbidity; MSA=metropolitan statistical area; MS-DRG=Medicare severity-diagnosis-related group.

Figure B-1. Histogram of the Weighted Average Ratio of Commercial Prices to Medicare FFS Prices for the Top 20 DRGs at the Metropolitan Area Level, 2013
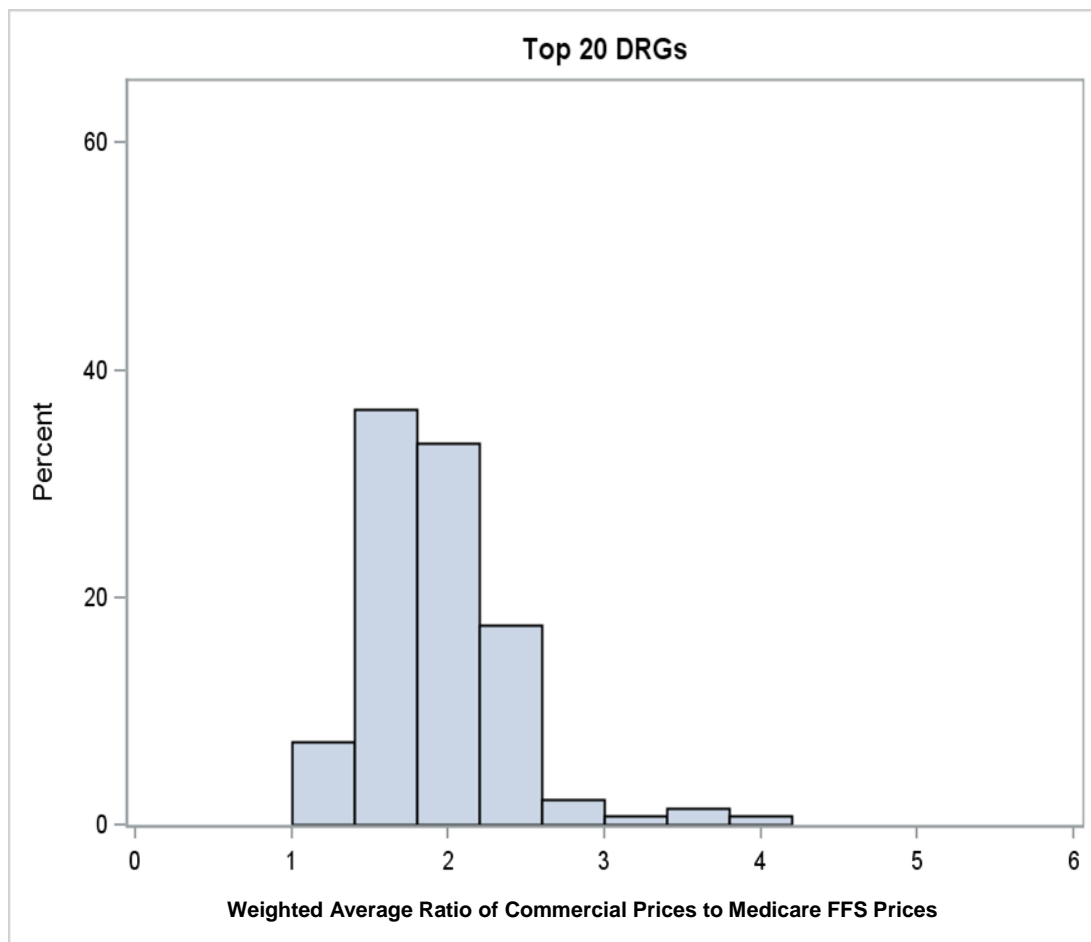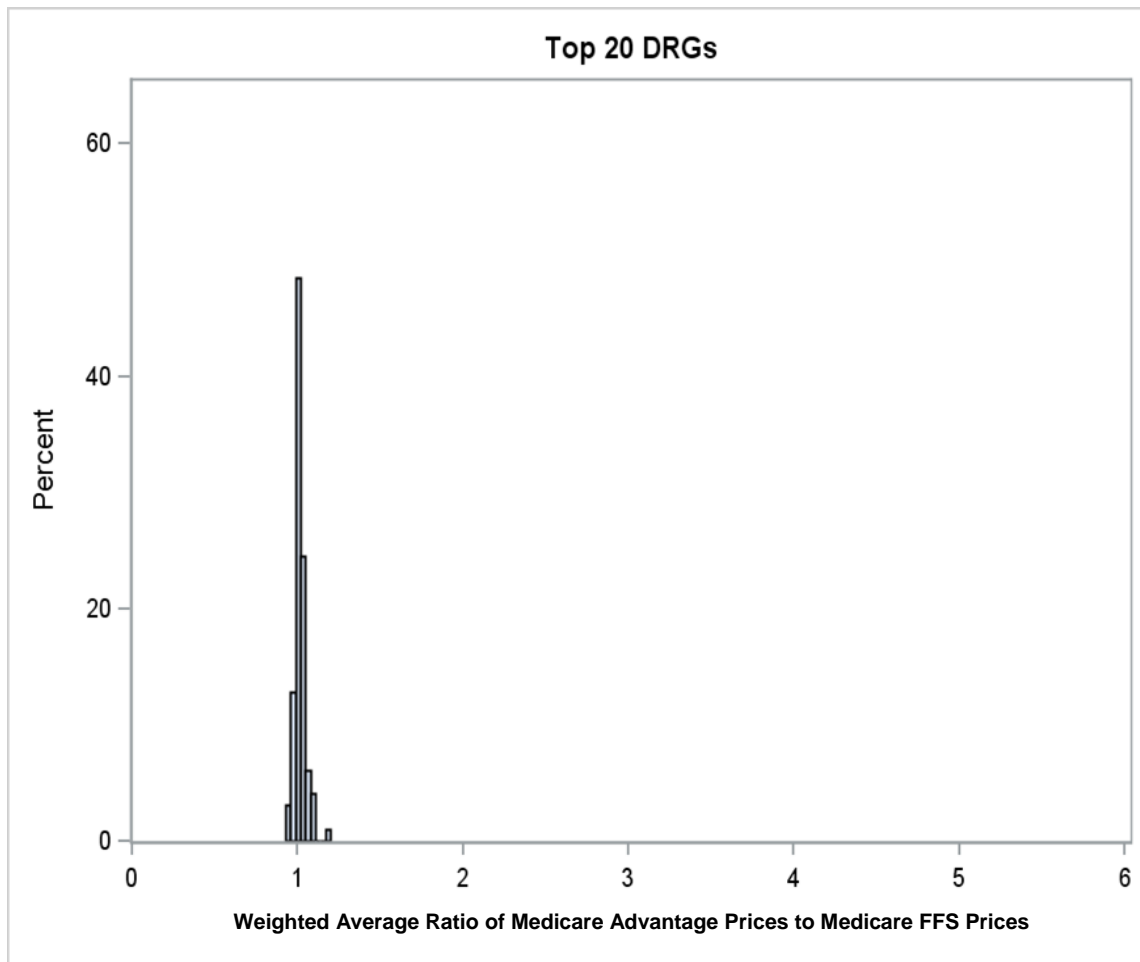

This analysis includes 137 MSAs that had at least one discharge in the commercial sample for each of the top 20 DRGs. For each MSA, we computed the ratio of the average commercial price to the average Medicare FFS price for each DRG. We then computed the weighted average ratio of commercial prices to Medicare FFS prices in each MSA, with each DRG weighted by its share of discharges in our national sample. Each MSA received an equal weight in the analysis. The commercial sample excludes stays associated with childbirth and was limited to adults ages 18 to 64.

The Medicare payment rules were used to compute the amount that the Medicare FFS program would have paid for each stay in the commercial sample. The estimates of Medicare FFS prices include the base payment amount plus any additional payments for IME and DSH. Because of data limitations, the FFS prices were not adjusted to account for outlier payments.

DRG=diagnosis-related group; DSH=disproportionate share hospital payments; FFS=fee for service; IME=indirect medical education payments; MSA=metropolitan statistical area.

Figure B-2. Histogram of the Weighted Average Ratio of Medicare Advantage Prices to Medicare FFS Prices for the Top 20 DRGs at the Metropolitan Area Level, 2013

This analysis includes 196 MSAs that had at least one discharge in the Medicare Advantage sample for each of the top 20 DRGs. For each MSA, we computed the ratio of the average Medicare Advantage price to the average Medicare FFS price for each DRG. We then computed the weighted average ratio of Medicare Advantage prices to Medicare FFS prices in each MSA, with each DRG weighted by its share of discharges in our national sample. Each MSA received an equal weight in the analysis. The Medicare Advantage sample was limited to adults 65 years or older.

The Medicare payment rules were used to compute the amount that the Medicare FFS program would have paid for each stay in the Medicare Advantage sample. The estimates of Medicare FFS prices include the base payment amount plus any additional payments for DSH. Because of data limitations, the FFS prices were not adjusted to account for outlier payments.

DRG=diagnosis-related group; DSH=disproportionate share hospital payments; FFS=fee for service; MSA=metropolitan statistical area.

Table B-4. Variation Across Metropolitan Areas in the Ratio of Commercial Prices to Medicare FFS Prices for Four Common Types of Stays, 2013

	Esophagitis, Gastroenteritis, & Misc. Digestive Disorders w/o MCC (MS-DRG 392)	Cellulitis w/o MCC (MS-DRG 603)	Major Joint Replacement or Reattachment of Lower Extremity w/o MCC (MS-DRG 470)	Percutaneous Cardiovascular Procedure With Drug-Eluting Stent w/o MCC (MS-DRG 247)
Ratio of Commercial Prices to Medicare FFS Prices				
10th percentile	1.48	1.29	1.43	1.61
25th percentile	1.67	1.52	1.66	1.94
50th percentile	1.98	1.76	1.98	2.32
75th percentile	2.30	2.10	2.36	2.74
90th percentile	2.68	2.34	2.91	3.23
Ratio of 10th to median	0.75	0.73	0.72	0.70
Ratio of 90th to median	1.35	1.33	1.47	1.39
Ratio of 75th to 25th	1.38	1.38	1.42	1.41
Ratio of 90th to 10th	1.81	1.82	2.03	2.00
Number of MSAs in Analysis	192	149	233	152

The analysis for each DRG was limited to MSAs with at least 10 discharges in that DRG. We computed the mean ratio of commercial prices to Medicare FFS prices for each MSA. Each MSA received an equal weight in the analysis. The commercial sample excludes maternal stays associated with childbirth and was limited to adults 18-64 years.

The Medicare payment rules were used to compute the amount that the Medicare FFS program would have paid for each stay in the commercial sample. The estimates of Medicare FFS prices include the base payment amount plus any additional payments for IME and DSH. Because of data limitations, the FFS prices were not adjusted to account for outlier payments.

DSH=disproportionate share hospital payments; FFS=fee for service; IME=indirect medical education payments; MCC=major complication or comorbidity; MSA=metropolitan statistical area; MS-DRG=Medicare severity-diagnosis-related group.

Table B-5. Variation Across Metropolitan Areas in the Ratio of Medicare Advantage Prices to Medicare FFS Prices for Four Common Types of Stays, 2013
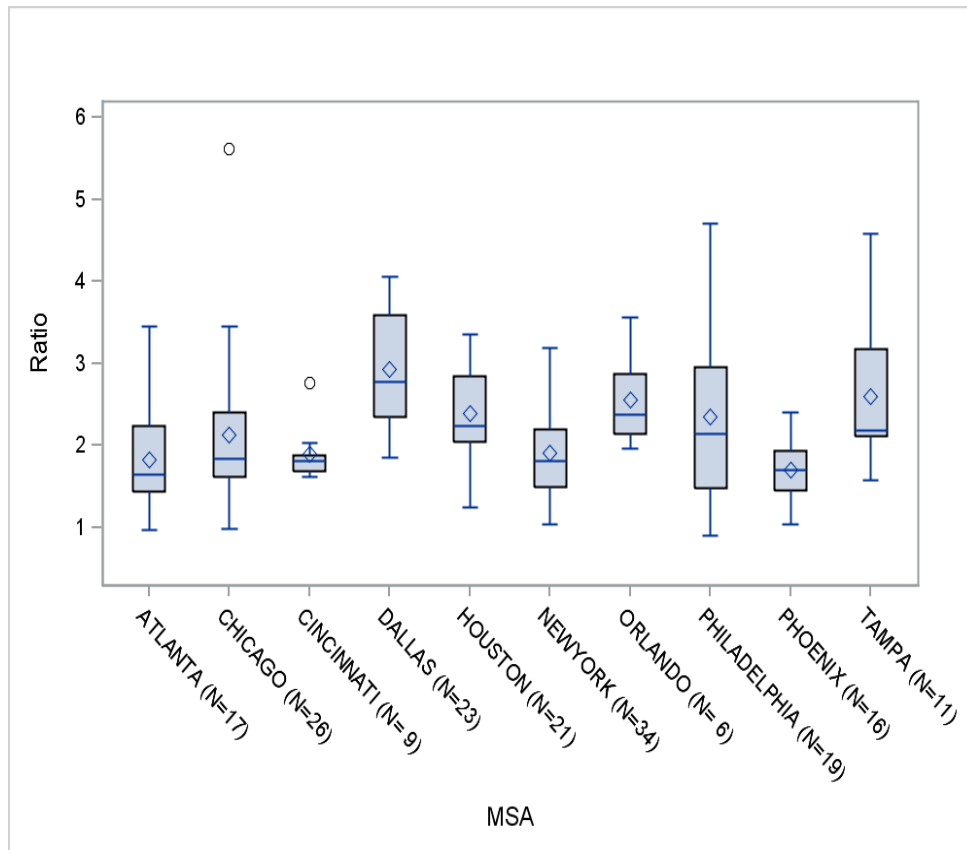
	Esophagitis, Gastroenteritis, & Misc. Digestive Disorders w/o MCC (MS-DRG 392)	Cellulitis w/o MCC (MS-DRG 603)	Major Joint Replacement or Reattachment of Lower Extremity w/o MCC (MS-DRG 470)	Percutaneous Cardiovascular Procedure With Drug-Eluting Stent w/o MCC (MS-DRG 247)
Ratio of Medicare Advantage Prices to Medicare FFS Prices				
10th percentile	0.99	0.98	0.96	0.99
25th percentile	1.01	1.00	0.98	1.00
50th percentile	1.04	1.02	1.00	1.02
75th percentile	1.05	1.04	1.03	1.05
90th percentile	1.08	1.08	1.05	1.08
Ratio of 10th to median	0.95	0.96	0.96	0.96
Ratio of 90th to median	1.04	1.06	1.04	1.06
Ratio of 75th to 25th	1.04	1.04	1.04	1.05
Ratio of 90th to 10th	1.09	1.10	1.09	1.10
Number of MSAs in Analysis	157	117	224	148

The analysis for each DRG was limited to MSAs with at least 10 discharges in that DRG. We computed the mean ratio of Medicare Advantage prices to Medicare FFS prices for each MSA. Each MSA received an equal weight in the analysis. The Medicare Advantage sample was limited to adults 65 years or older.

The Medicare payment rules were used to compute the amount that the Medicare FFS program would have paid for each stay in the Medicare Advantage sample. For the comparison with Medicare Advantage prices, the estimates of Medicare FFS prices include the base payment amount plus any additional payments for DSH. Because of data limitations, the FFS prices were not adjusted to account for outlier payments.

DSH=disproportionate share hospital payments; FFS=fee for service; MCC=major complication or comorbidity; MSA=metropolitan statistical area; MS-DRG=Medicare severity-diagnosis-related group.

Figure B-3. Variation in the Ratio of Commercial Prices to Medicare FFS Prices Within Metropolitan Areas for DRG 247 (Percutaneous Cardiovascular Procedure With Drug-Eluting Stent Without Major Complications and Comorbidities), 2013
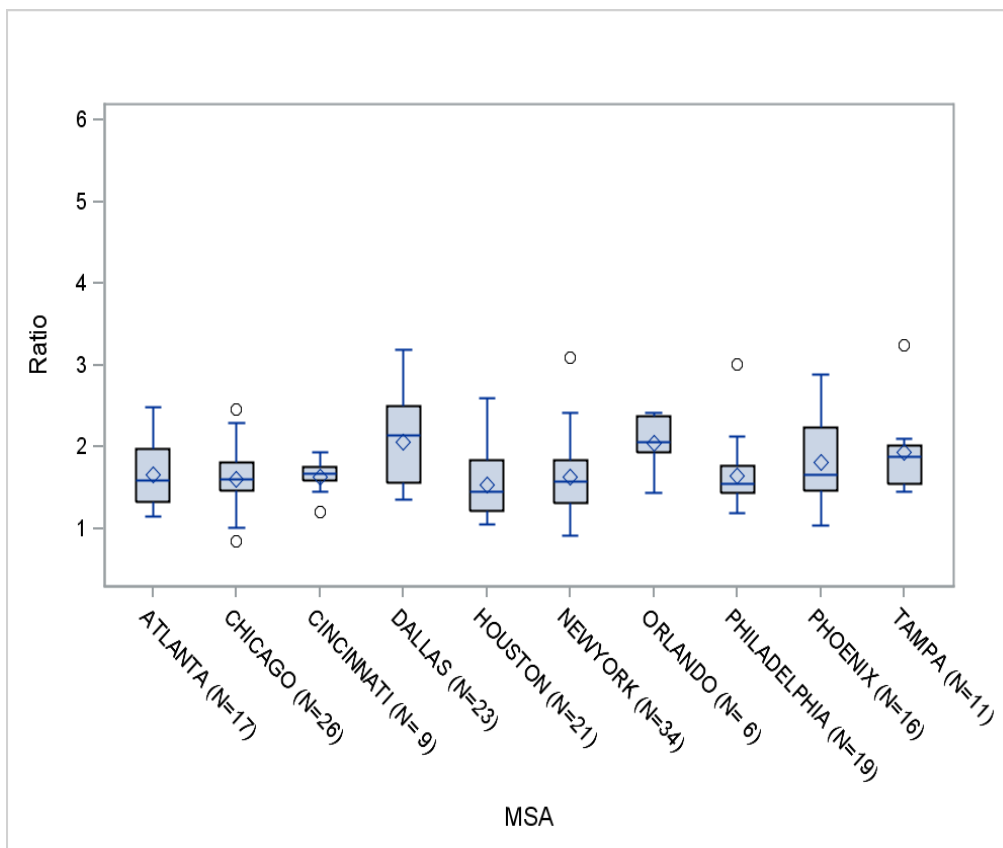

For each MSA, we computed the median ratio of the commercial price to the Medicare FFS price for each hospital. We restricted the analysis to hospitals that had at least five stays in 2013 in the DRG being analyzed. The bottom and top edges of the box for each MSA represent the 25th and 75th percentiles of the price ratio, the horizontal line inside the box represents the median, the marker inside the box represents the mean, and the "whiskers" (i.e., the endpoints of the lines extending outside the box) represent the minimum and maximum values—except in cases when some values are classified as "outliers," which are shown as circles beyond the whiskers. Outliers are defined as values that are above the 75th percentile or below the 25th percentile by at least 1.5 times the "interquartile range" (which is the difference between the 75th percentile and the 25th percentile). The commercial sample excludes maternal stays associated with childbirth and was limited to adults 18-64 years.

The Medicare payment rules were used to compute the amount that the Medicare FFS program would have paid for each stay in the commercial sample. The estimates of Medicare FFS prices include the base payment amount plus any additional payments for IME and DSH. Because of data limitations, the FFS prices were not adjusted to account for outlier payments.

DRG=diagnosis-related group; DSH=disproportionate share hospital payments; FFS=fee for service; IME=indirect medical education payments; MSA=metropolitan statistical area.

Figure B-4. Variation in the Ratio of Commercial Prices to Medicare FFS Prices Within Metropolitan Areas for DRG 603 (Cellulitis Without Major Complications and Comorbidities), 2013


For each MSA, we computed the median ratio of the commercial price to the Medicare FFS price for each hospital. We restricted the analysis to hospitals that had at least five stays in 2013 in the DRG being analyzed. The bottom and top edges of the box for each MSA represent the 25th and 75th percentiles of the price ratio, the horizontal line inside the box represents the median, the marker inside the box represents the mean, and the "whiskers" (i.e., the endpoints of the lines extending outside the box) represent the minimum and maximum values—except in cases when some values are classified as "outliers," which are shown as circles beyond the whiskers. Outliers are defined as values that are above the 75th percentile or below the 25th percentile by at least 1.5 times the "interquartile range" (which is the difference between the 75th percentile and the 25th percentile). The commercial sample excludes maternal stays associated with childbirth and was limited to adults 18-64 years.

The Medicare payment rules were used to compute the amount that the Medicare FFS program would have paid for each stay in the commercial sample. The estimates of Medicare FFS prices include the base payment amount plus any additional payments for IME and DSH. Because of data limitations, the FFS prices were not adjusted to account for outlier payments.

DRG=diagnosis-related group; DSH=disproportionate share hospital payments; FFS=fee for service; IME=indirect medical education payments; MSA=metropolitan statistical area.

Figure B-5. Scatter Plot of the Medicare Advantage Penetration Rate of Less Than 30 Percent and an Index of the Ratio of Medicare Advantage Prices to Medicare FFS Prices, 2013
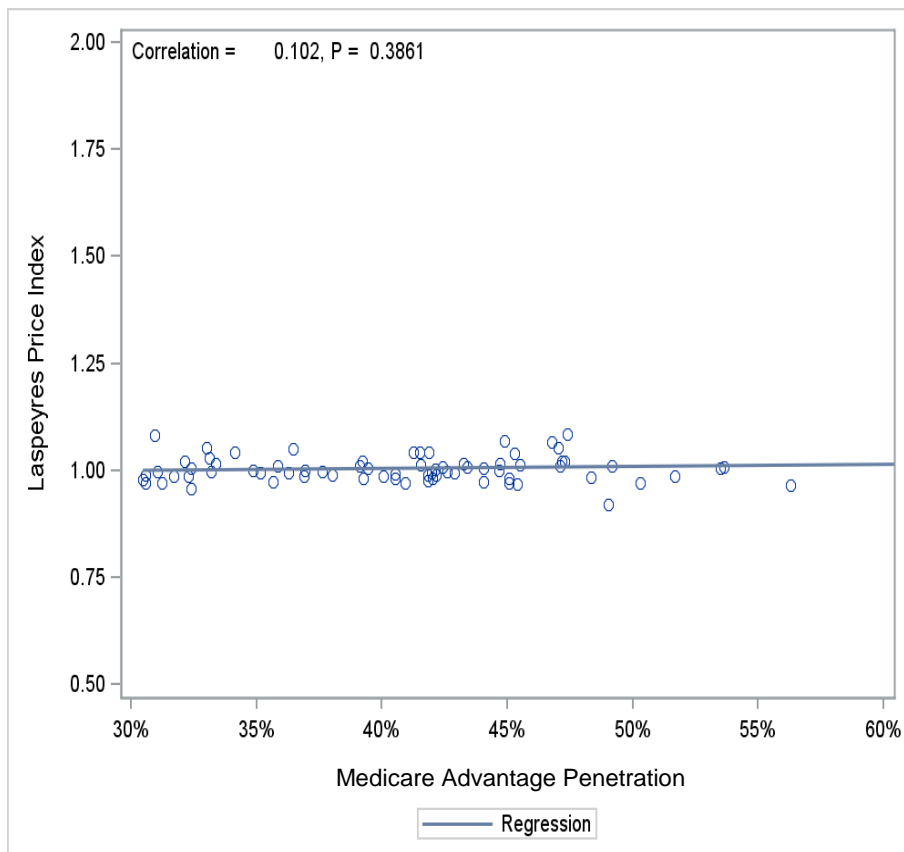
Correlation = 0.044; p = 0.628
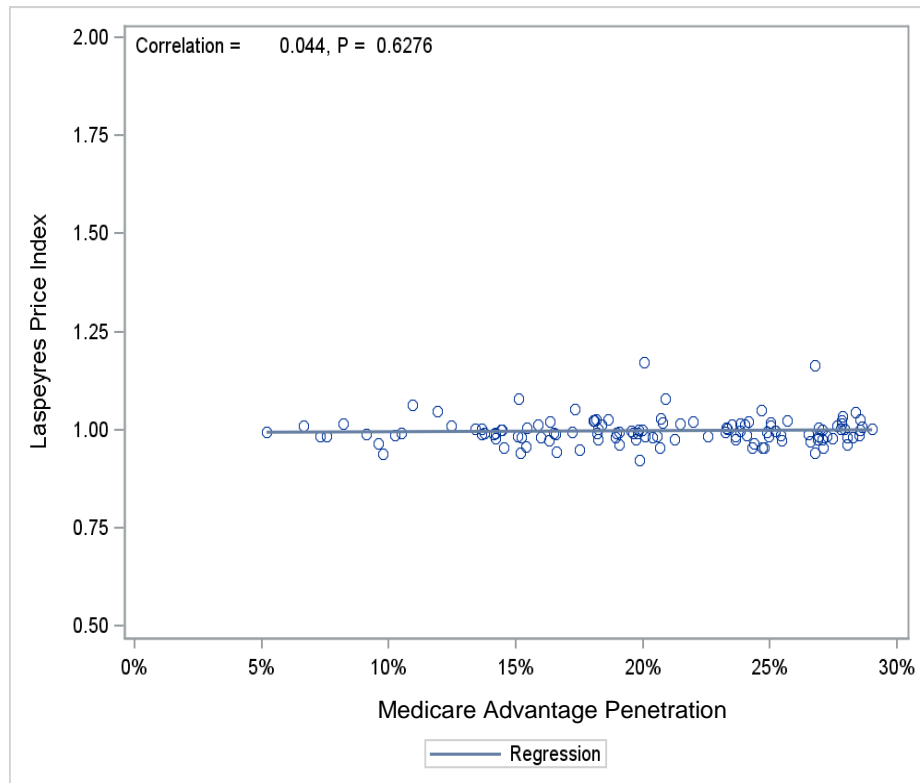
The scatter plot shows the bivariate association between the MSA-level Medicare Advantage penetration rate and the Laspeyres price index of the ratio of Medicare Advantage prices to Medicare FFS prices based on the top 20 DRGs for Medicare Advantage. There are 122 MSAs in this analysis. The Medicare Advantage sample was limited to adults 65 years or older.

The Medicare payment rules were used to compute the amount that the Medicare FFS program would have paid for each stay in the Medicare Advantage sample. The estimates of Medicare FFS prices include the base payment amount plus any additional payments for DSH. Because of data limitations, the FFS prices were not adjusted to account for outlier payments.

DRG=diagnosis-related group; DSH=disproportionate share hospital payments; FFS=fee for service; MSA=metropolitan statistical area.

Figure B-6. Scatter Plot of the Medicare Advantage Penetration Rate Greater Than or Equal to 30 Percent and an Index of the Ratio of Medicare Advantage Prices to Medicare FFS Prices, 2013
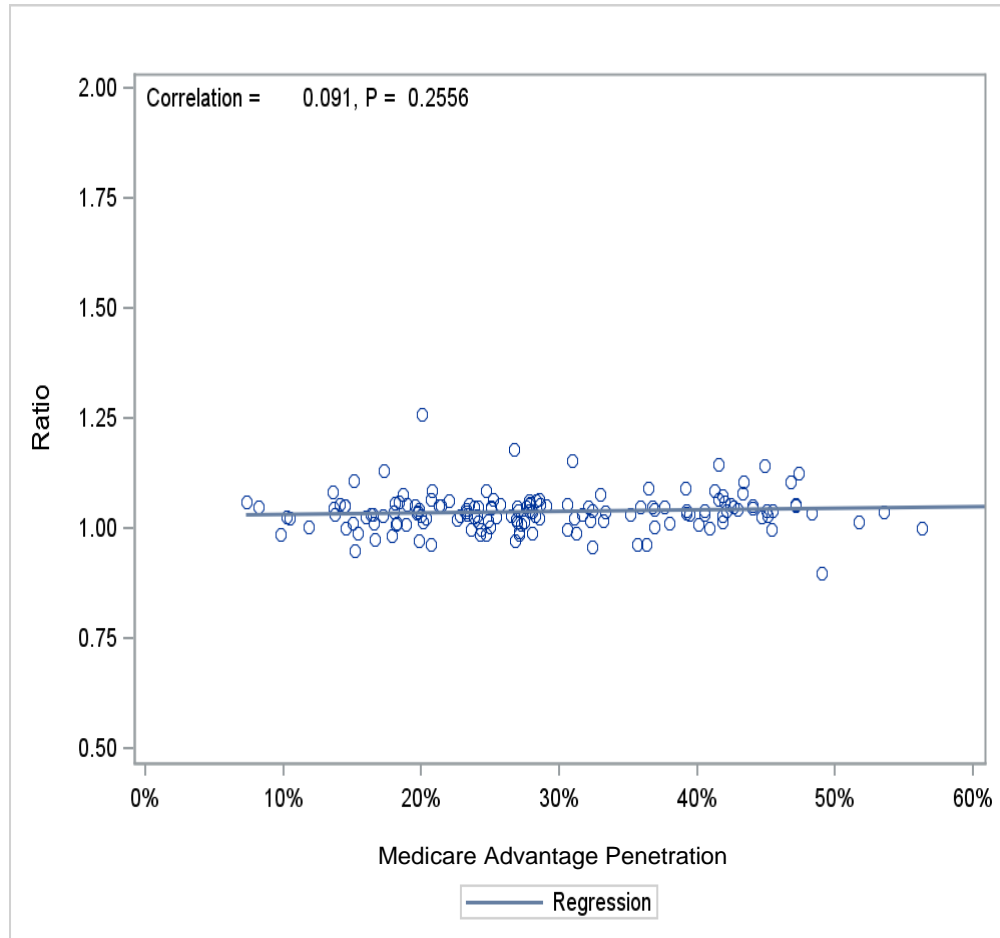
Correlation = 0.102; p = 0.386

The scatter plot shows the bivariate association between the MSA-level Medicare Advantage penetration rate and the Laspeyres price index of the ratio of Medicare Advantage prices to Medicare FFS prices based on the top 20 DRGs for Medicare Advantage. There are 74 MSAs in this analysis. The Medicare Advantage sample was limited to adults 65 years or older.

The Medicare payment rules were used to compute the amount that the Medicare FFS program would have paid for each stay in the Medicare Advantage sample. The estimates of Medicare FFS prices include the base payment amount plus any additional payments for DSH. Because of data limitations, the FFS prices were not adjusted to account for outlier payments.

DRG=diagnosis-related group; DSH=disproportionate share hospital payments; FFS=fee for service; MSA=metropolitan statistical area.

Figure B-7. Scatter Plot of the Medicare Advantage Penetration Rate and the Ratio of Medicare Advantage Prices to Medicare FFS Prices for DRG 392 (Esophagitis, Gastroenteritis, and Miscellaneous Digestive Disorders Without Major Complications and Comorbidities), 2013
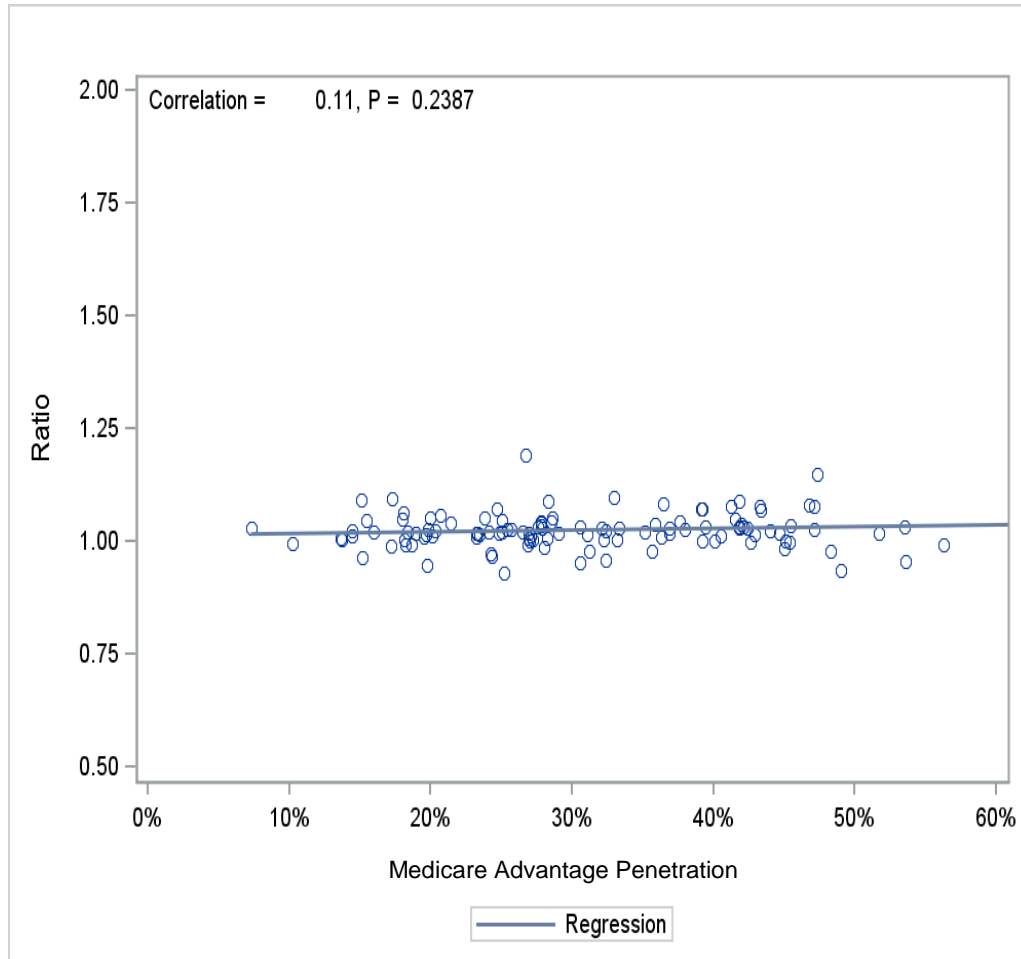
Correlation = 0.091; p = 0.256

The scatter plot shows the bivariate association between the MSA-level Medicare Advantage penetration rate and the ratio of Medicare Advantage prices to Medicare FFS prices for DRG 392. There are 157 MSAs in this analysis. The Medicare Advantage sample was limited to adults 65 years or older.

The Medicare payment rules were used to compute the amount that the Medicare FFS program would have paid for each stay in the Medicare Advantage sample. The estimates of Medicare FFS prices include the base payment amount plus any additional payments for DSH. Because of data limitations, the FFS prices were not adjusted to account for outlier payments.

DRG=diagnosis-related group; DSH=disproportionate share hospital payments; FFS=fee for service; MSA=metropolitan statistical area.

Figure B-8. Scatter Plot of the Medicare Advantage Penetration Rate and the Ratio of Medicare Advantage Prices to Medicare FFS Prices for DRG 603 (Cellulitis Without Major Complications and Comorbidities), 2013
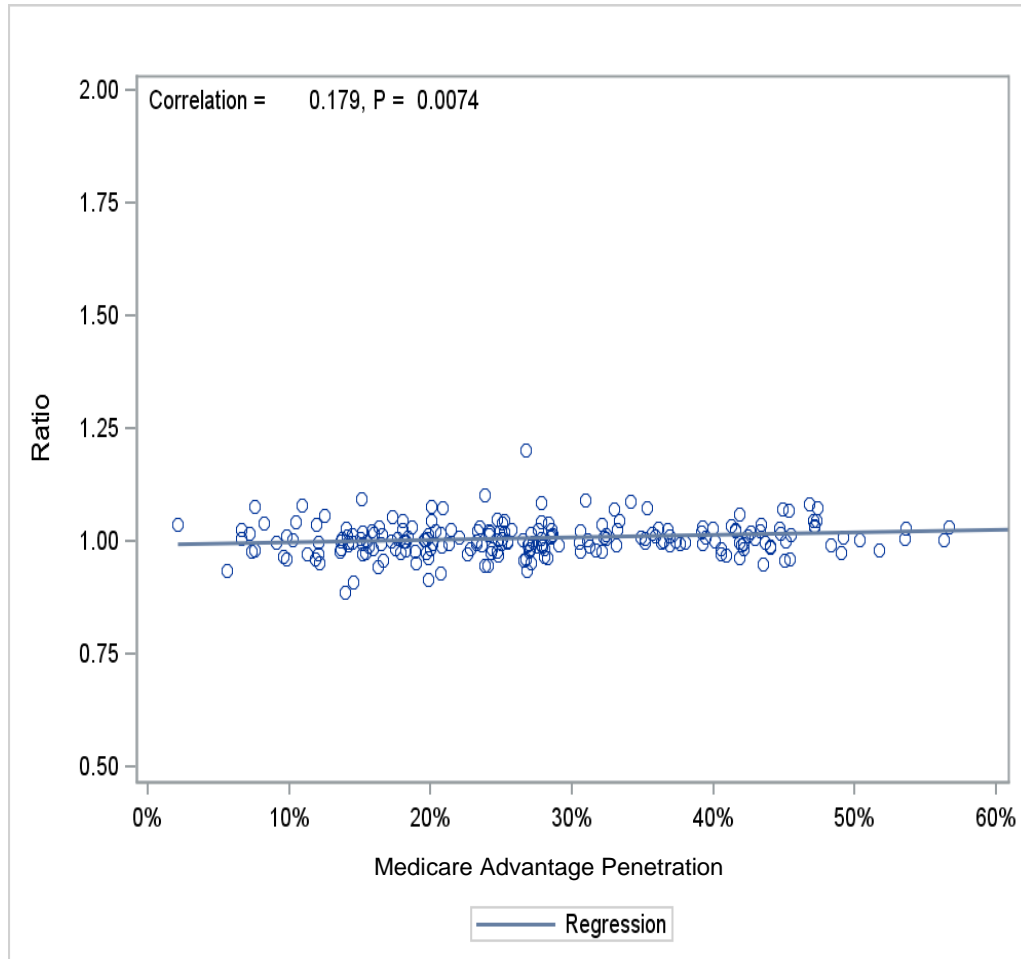
Correlation = 0.11; p = 0.239

The scatter plot shows the bivariate association between the MSA-level Medicare Advantage penetration rate and the ratio of Medicare Advantage prices to Medicare FFS prices for DRG 603. There are 117 MSAs in this analysis. The Medicare Advantage sample was limited to adults 65 years or older.

The Medicare payment rules were used to compute the amount that the Medicare FFS program would have paid for each stay in the Medicare Advantage sample. The estimates of Medicare FFS prices include the base payment amount plus any additional payments for DSH. Because of data limitations, the FFS prices were not adjusted to account for outlier payments.

DRG=diagnosis-related group; DSH=disproportionate share hospital payments; FFS=fee for service; MSA=metropolitan statistical area.

Figure B-9. Scatter Plot of the Medicare Advantage Penetration Rate and the Ratio of Medicare Advantage Prices to Medicare FFS Prices for DRG 470 (Major Joint Replacement or Reattachment of Lower Extremity Without Major Complications and Comorbidities), 2013
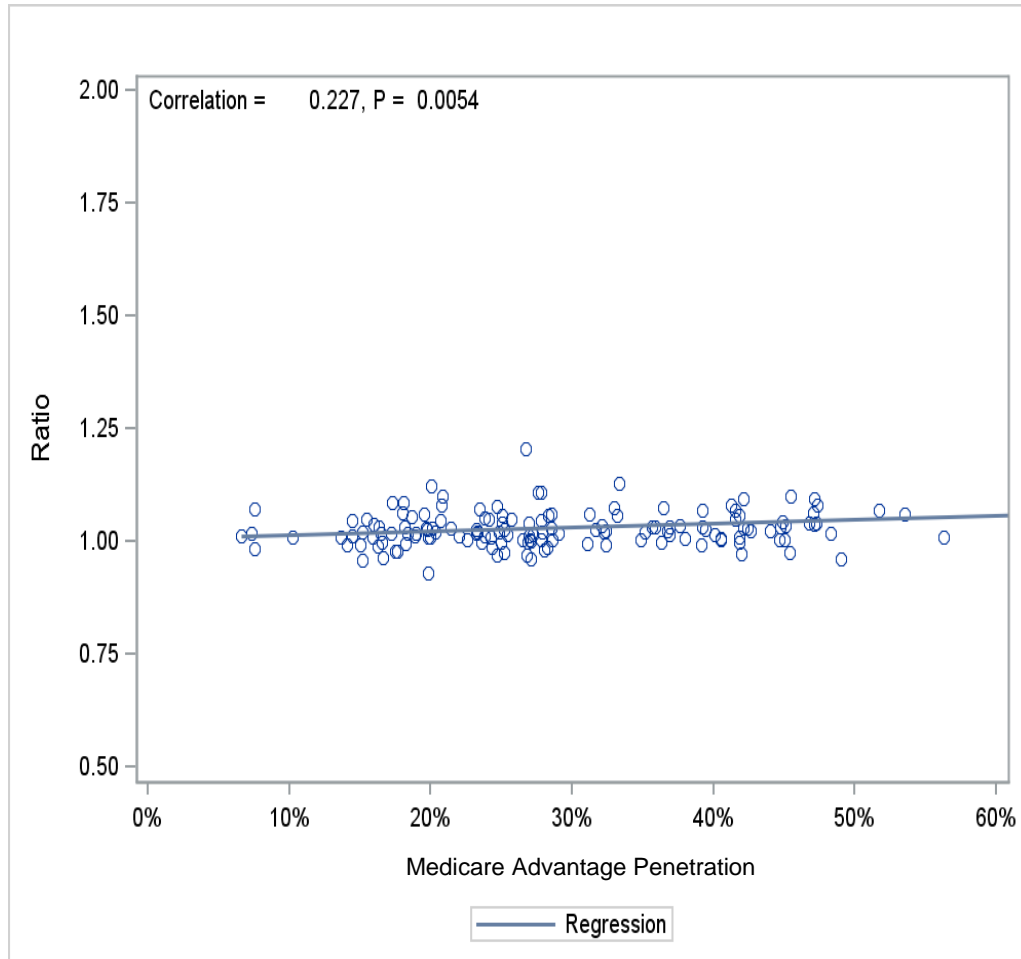
Correlation = 0.179; p = 0.007

The scatter plot shows the bivariate association between the MSA-level Medicare Advantage penetration rate and the ratio of Medicare Advantage prices to Medicare FFS prices for DRG 470. There are 224 MSAs in this analysis. The Medicare Advantage sample was limited to adults 65 years or older.

The Medicare payment rules were used to compute the amount that the Medicare FFS program would have paid for each stay in the Medicare Advantage sample. The estimates of Medicare FFS prices include the base payment amount plus any additional payments for DSH. Because of data limitations, the FFS prices were not adjusted to account for outlier payments.

DRG=diagnosis-related group; DSH=disproportionate share hospital payments; FFS=fee for service; MSA=metropolitan statistical area.

Figure B-10. Scatter Plot of the Medicare Advantage Penetration Rate and the Ratio of Medicare Advantage Prices to Medicare FFS Prices for DRG 247 (Percutaneous Cardiovascular Procedure With Drug-Eluting Stent Without Major Complications and Comorbidities), 2013

Correlation = 0.227; p = 0.005

The scatter plot shows the bivariate association between the MSA-level Medicare Advantage penetration rate and the ratio of Medicare Advantage prices to Medicare FFS prices for DRG 247. There are 148 MSAs in this analysis. The Medicare Advantage sample was limited to adults 65 years or older.

The Medicare payment rules were used to compute the amount that the Medicare FFS program would have paid for each stay in the Medicare Advantage sample. The estimates of Medicare FFS prices include the base payment amount plus any additional payments for DSH. Because of data limitations, the FFS prices were not adjusted to account for outlier payments.

DRG=diagnosis-related group; DSH=disproportionate share hospital payments; FFS=fee for service; MSA=metropolitan statistical area.