Spillovers in Health Care Markets: Implications for Current Law Projections

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Abstract

This paper reviews theory and evidence on how changes in one health care sector (e.g., the private sector) may affect outcomes in other sectors (e.g., the public sector). Evidence suggests that these cross-sector "spillovers" may be substantial in both the short- and long-term. This has important implications for projections of future Medicare spending in the Trustees report: the spillovers observed in the past suggest that while some divergences in public and private spending trajectories may occur in the short-run, persistent, substantial, long-run divergences between sectors are unlikely. That said, the conclusions we can draw from the literature are limited. Evidence drawn from past years, when many policy changes were occurring, may not adequately capture what would occur in the future in a current-law setting. Furthermore, while the existing literature is clear about the existence of spillovers between markets in the short run, it fails to provide a narrow range of magnitudes to be used in projections. Moreover, the conclusions concerning spillovers in the long run are based on a smaller literature that examines spillover effects on infrastructure, which should affect long run spending, as opposed to being based on direct investigation of spillovers on spending over long periods of time. Lastly, most evidence focuses on the effects of HMO penetration on care in non-HMO markets or on the impact of public fee reductions on private markets, with limited evidence on broader spillovers. Despite these limitations, incorporating cross-market spillovers into projection models is likely to generate a more complete picture of future Medicare spending.

I. Introduction

Patients with different types of insurance are often served by the same networks of health care providers. For example, the average HMO patient in the 1990s was treated by physicians whose patient panel was comprised of at least 25% fee-for-service (FFS) Medicare patients as well as additional privately insured patients not in HMOs. Similarly, more than 25% of FFS Medicare patients visited a practice whose patient panel was over 20% HMO (Glied and Zivin 2002). Because patients with different types of insurance often receive care from the same providers and health systems (and thus share a common infrastructure and set of available resources), changes in care induced by activities in one sector may influence treatment and outcomes for patients in others. In theory, these cross-sector "spillover effects" could be cost-increasing or cost-decreasing: increased spending in one sector might drive spending in other sectors up or down.

Because of spillovers, changes in the type and intensity of private sector health spending may drive changes in the utilization and spending of Medicare beneficiaries. Therefore

understanding spillovers is an important component of understanding the forces that will shape Medicare spending in the years to come: changes in private sector spending patterns may be a key driver of changes in Medicare utilization. In this review, we pay particular attention to whether such spillovers may serve as a brake on Medicare spending, even under current law.

II. Conceptual framework

Expenditures in any insurance sector (commercial, Medicare, or Medicaid; HMO or FFS) are the product of the quantity and mix of services consumed and the prices that are paid for those services. Activities in one market may generate changes in expenditures in other markets by affecting either prices or quantities. For example, commercial-sector incentives to decrease utilization by their patients or the prices they pay to providers who serve their patients may generate spillovers to the Medicare sector. These effects could apply in cases of increased spending as well: the commercial sector might seek to increase the use of preventive services in the short-run (with the hope of decreasing spending in the longer run), and this pattern of care might also spill over to Medicare patients.

The direction and magnitude of these spillovers depends on how prices and quantities are determined in different sectors. Traditional FFS Medicare operates on a fixed fee schedule developed by CMS based on estimates of the resources associated with delivery of different services. Because prices are set administratively for FFS Medicare, spillovers from other sectors will only affect the quantity of services utilized by FFS Medicare patients, not the price – unless indirectly through the cost of providing care.

In contrast, prices for care in the commercial sectors are set by the market, though private insurers often use FFS Medicare fee schedules as a base from which to negotiate rates with local providers. Thus, we might expect to observe a stronger direct impact of changes in public sector prices on the private sector. Prices for premiums in the Medicare managed care market have a less direct association with Medicare FFS fee schedules.

Utilization spillovers: changes in the quantity and mix of services utilized

Spillovers in utilization may arise through several mechanisms. One particularly likely channel is through physicians' use of common practice styles across all of their patients regardless of their source of insurance (Baumgardner 1994, Glied and Zivin 2002). This may occur because physicians apply the clinical knowledge gained in one sector to patients in another, or because physicians find it difficult to apply a different practice style across differently insured patients. This mechanism is likely to be strongest across patients insured in different sectors but with similar demographic characteristics because they will share similar clinical problems. For example, practice pattern changes in the commercial sector may not strongly spill over into the Medicare sector if the Medicare patients suffer from different conditions or have different comorbidities. Moves towards less-intensive practice patterns in the commercial sector are likely to generate cost-decreasing spillovers, with reduced utilization in the private sector resulting in lower Medicare spending.

An alternative model of utilization spillovers focuses on "demand inducement" or volume offsets, in which providers encourage greater utilization of more profitable services and sectors in response to reductions in profits from another sector (McGuire and Pauly 1991). Specifically, physicians are better informed than their patients (Arrow 1963), giving them the opportunity to

encourage greater use of health care services than they might if they were perfect agents for their patients. This phenomenon is termed "demand inducement" or "supplier induced demand." It implies that changes in profitability in one sector may have spillover effects to other sectors as providers increase volume in the more profitable sectors. This type of spillover suggests that private sector efforts to reduce spending will be cost increasing for Medicare: if the Medicare market is more profitable, providers may induce demand in the Medicare market in response to reductions in profitability in the commercial sector.

Spillovers through demand inducement may occur within a given sector (as providers shift use to more profitable services) or across sectors (as providers shift activities to more profitably insured patients). This type of demand inducement may be motivated by a target income model if providers are not strictly profit-maximizing. However, it may also be motivated by a profit-maximizing substitution of effort driven by changes in the opportunity cost of serving a private versus publicly insured patient. Similar analysis can be applied to spillovers from the managed care to the non-managed care sectors. Much of the research in this area focuses on reductions in profitability due to reductions in fees paid by public payers. These findings may also have implications for the effect of reductions in profitability due to private sector efforts to reduce utilization or price.

Short-run vs. long-run effects

Practice style and demand inducement models apply primarily in the short run. However, in the long run, utilization spillovers may also be generated by shared infrastructure: investments in personnel, hospitals, and free-standing service providers such as imaging centers and ambulatory surgery centers may affect utilization across sectors. For example, if low managed care prices or managed care-induced volume reductions result in hospital closures, reductions in available beds, or reduced availability of certain medical services (such as imaging centers), this diminished capacity may affect access (and thus utilization) for patients from all sectors. This is particularly likely if health care services have high fixed costs and low marginal costs. Generous payers may encourage investment in high fixed cost services, but once the investment is made, the low marginal cost may generate substantial use among patients in the less generous sector. These infrastructure spillovers may be particularly salient in the long run and are likely to be cost decreasing: as private payers' efforts to control spending dampen investment in infrastructure, the less abundant infrastructure will tend to result in less Medicare spending than would otherwise occur.

Price spillovers

Spillovers may also operate through price-offsets across sectors, analogous to the volume-offsets described above.

One channel for such price spillovers is cost shifting: providers may raise prices in the private sector in response to a decline in prices in the public sector. As with changes in utilization above, this enables them to restore lost income in a model in which they are attempting to achieve a specific target income. This is most likely if providers are not strictly profit maximizing, where there is 'room' to raise prices in the private sector. However, even if providers are profit-maximizing, a bargaining model may lead to cost shifting. Specifically, the reduction in profits in one sector may change the threat point in negotiations in the other sector, resulting in higher

prices. For example, if Medicare reduces prices, providers may negotiate more aggressively with private payers, resulting in higher prices paid by private insurers.

Other models suggest a different spillover mechanism: providers may lower price levels in the private sector in response to a price drop in the public sector (which typically has lower relative price levels) if they are trying to encourage greater volume from the private sector whose relative profitability has grown. Lower public price levels make private patients relatively more profitable, so providers may lower the prices charged to private payers to attract greater volume of these more profitable patients. Similarly, if marginal costs are upward sloping, and lower price levels from public payers reduce equilibrium volume, then the equilibrium marginal cost would be lower and privately insured patients would be charged lower price levels.

Most of the literature on price spillovers focuses on spillovers from administratively-set public prices to market-determined private prices. The literature on the impact in the other direction of private sector activities on Medicare prices is not well developed. Although prices for the FFS Medicare program are set administratively, they reflect assessments of access for Medicare beneficiaries and the profitability of providers. For this reason, changes in the private sector may eventually induce changes in Medicare prices. For example, in addition to the utilization-related infrastructure changes, it is possible that public payers will be forced to raise prices to support infrastructure investment and related access if private payers lower fees or cut utilization in a way that would otherwise cause providers to exit the market or scale back capacity and thus reduce access to care for publicly insured beneficiaries.

Similarly, practice style and infrastructure spillovers may generate practice efficiencies that reduce unit costs, and thus prices, associated with treating patients from all sectors. If the private sector induces efficiencies, provider profitability may rise for any given level of Medicare reimbursement. To the extent that this occurs, public payers may be able to reduce prices (or increase them more slowly).

Figure 1 summarizes the potential impact of private sector price or utilization reductions on Medicare expenditures. As discussed above, however, other possible spillovers exist, including spillovers from the public to private sector. Ultimately, the connection between sectors is an empirical question. Evidence supports the existence of a number of the mechanisms described above.

Figure 1: Impact of Private Sector Changes on Medicare Expenditures

	Impact on Medicare Expenditures (Use x Price)	
Private Sector Action ↓	Medicare Use	Medicare Price (FFS Medicare)
Decreased use	Demand inducement (cost increasing)	
	Practice style spillover (cost decreasing)	
	Infrastructure consolidation (cost decreasing)	Infrastructure consolidation (cost increasing, as Medicare raises prices to ensure access and prevent facility closure)
Decreased price	Demand inducement (cost increasing)	Cost decreasing as Medicare lowers price to hold down margins on public patients (assumes providers lower unit costs)
	Infrastructure consolidation (cost decreasing)	Infrastructure consolidation (cost increasing, as Medicare raises prices to ensure access and prevent facility closure)

III. Empirical Evidence: Spillovers from Utilization Changes

Medicare utilization may be affected by commercial markets in several ways. First, we explore the evidence on spillovers to FFS Medicare utilization from managed care utilization. These spillovers may flow *from* Medicare HMOs in particular or from the commercial sector overall, and may flow *to* spending on Medicare patients in particular or to health care spending overall. Second, we turn to the evidence on the spillover effects on Medicare utilization from changes in prices paid in the commercial market. This literature is mostly focused on the demand inducement effect operating through providers.

A. The Spillover Effects of Managed Care on FFS Utilization and Spending

We review three strands of literature examining the spillover effects of managed care on utilization and spending in different sectors, and then explore the mechanisms through which those spillovers may be occurring.

A1. Evidence of Spillovers on Utilization in Different Sectors

Spillover effects of Medicare managed care on FFS Medicare expenditures

There is a substantial literature suggesting that innovations in private health plans, particularly managed care, have led to savings in other sectors. Several studies focus on spillovers between Medicare HMOs and FFS Medicare, examining the effect that increased Medicare HMO penetration has on spending for the FFS population. The hypothesis being tested is usually that better management of care among HMO patients will lead to lower costs for the FFS patients who will also benefit from those better management techniques. It is important to interpret these studies in light of whether or not they account for potential selection effects. However, if patients enrolling in HMO plans differ systematically from those who remain in FFS, then changes in costs of FFS patients when HMO penetration increases will reflect both changes in expenditures per patient *and* changes in the mix of patients left in the FFS pool. Many estimates suggest that HMO enrollees are systematically healthier than FFS enrollees, implying that this selection effect would lead to increased costs for FFS enrollees as HMO penetration increases. An estimated positive relationship between managed care enrollment and FFS costs is thus often interpreted as evidence that selection effects dominate spillover effects, while a negative relationship is interpreted as evidence that spillover effects dominate.

The evidence from this strand of literature generally suggests a cost-reducing spillover between sectors as Medicare HMO penetration increases (Table 1). Specifically, when Medicare HMOs reduce costs, costs for other patients tend to decline as well. For example, Chernew, DeCicca and Town (2008) use instrumental variables models (using Medicare payment rates as instruments) and report that, controlling for selection effects, a 10 percentage point increase in county-level Medicare HMO penetration is associated with a 9% reduction in overall per beneficiary annual spending within FFS Medicare. These results are consistent with a review of other studies reported by Baker (2003) and Baker and Shankarkumar (1998); these studies suggest that a 10 percentage point increase in Medicare HMO penetration leads to 1.2% to 5% decreases in total FFS expenditures. Overall, the literature on the effects of Medicare HMO penetration on total FFS expenditures suggests a 10 percentage point increase in Medicare HMO penetration is associated with 1% to 9% decreases in total FFS expenditures (with IV models such as Chernew, DeCicca and Town (2008) contributing magnitudes in the upper range) (Baker and Shankarkumar 1998, Baker 2003, Chernew, DeCicca and Town 2008).

Another strand of literature assesses the effects of Medicare HMO penetration on Part A and Part B spending separately. These studies are generally quite sensitive to methods and initial HMO penetration, and typically do not distinguish well between selection and spillover effects, making it likely that actual spillover effects exceed the effects reported. Specifically, a series of studies by Baker and co-authors examine the effects of Medicare HMO penetration on spending in Medicare Part A and Part B using fixed effects and IV models, and allowing the effects of increasing HMO penetration to differ when initial levels are low versus when they are high. The results vary widely. For example, using IV methods, Baker (1997) suggests that a 10

percentage point increase in Medicare HMO penetration causes a 22.3% *increase* in Part B spending as penetration moves from 10 to 20%, but a 32% *decrease* in Part B spending when penetration moves from 20 to 30%. The fixed effects models, which are more stable, suggest that a 10 percentage point increase in Medicare HMO penetration causes 4% to 7% reductions in Part A and B spending (Baker 1997). Baker and Shankarkumar (1998) examine a slightly more recent period (the early 1990s) using fixed effects models and find that increases in Medicare HMO market share cause smaller decreases in Part B spending and *increases* in Part A spending. Baker interprets the increase in Part A as evidence that the selection effects and endogenous relationship between HMO penetration and spending offset any cost-reducing spillover in inpatient spending from Medicare HMO to Medicare FFS. Several studies support the idea that selection effects are important (Batata 2004, Hill and Brown 1990, Hellinger 1995).

Table 1. Effect of Medicare HMO Penetration on FFS Medicare Spending: Estimates from the Recent Literature

			Effect of a 10 percentage point increase in Medicare HMO Market Share on:		
Author (year)	**Study design**	**Years**	**Part A expenditures**	**Part B expenditures**	**Total Medicare expenditures**
Baker (1997)	Fixed effects model and IV estimation	1986-1990	For fixed effects, 4.5% to 6.6% decrease. For IV estimation, 38.4% decrease to 6.3% increase, depending on initial HMO share.	For fixed effects model, 4.1% to 5.6% decrease. For IV estimation, 32.0% decrease to 22.3% increase, depending on initial HMO share.	-
Baker and Shankarkumar (1998)	Fixed effects model	1990-1994	7.7% to 9.4% increase, depending on initial HMO share.	0.7% to 2.4% decrease, depending on initial HMO share.	-
Chernew, DeCicca and Town (2008)	IV model	1994-2001	-	-	9% reduction in total annual per beneficiary spending.

Spillover effects of system-wide managed care penetration on FFS Medicare expenditures

A related literature examines spillovers between system-wide HMO (commercial + public sectors) and FFS Medicare. We might expect a weaker effect because commercial HMO patients are likely to be less similar to Medicare fee-for-service patients than they are to Medicare HMO patients. However, this literature is less likely to suffer from confounding effects due to non-random selection into HMOs because many of the HMO enrollees were not eligible for Medicare.

Evidence on spillovers from this literature is also mixed, but studies generally suggest that increases in state- or county-level HMO penetration are associated with decreases in FFS Medicare spending (Baker 1997, 1999, Baker and Shankarkumar 1998 in Table 2; for a review, see Baker 2003). For example, using an instrumental variables estimation (but not controlling for Medicare HMO penetration), Baker (1997) finds that the relationship between system-wide HMO penetration and FFS Medicare expenditures is concave and downward sloping with respect to system-wide HMO market share: an increase in HMO market share from 10 to 20% would lead to increases in Part A and Part B FFS spending, but increases from 20 to 30% would lead to decreases in Part A and Part B spending. Studies accounting for Medicare HMO penetration (and thus controlling for a potential selection effect that would associate increases in Medicare HMO market share with increases in Medicare FFS spending) yield more conservative estimates and more consistently suggest an expenditure-reducing spillover. For example, Baker (1999) finds that, when controlling for Medicare HMO penetration, an increase in system-wide HMO market share from 10 to 20% (10 percentage points) is associated with a 1.9% decrease in Part A and 1.7% decrease in Part B FFS expenditures. Baker and Shankarkumar (1998), using fixed effects models and also controlling for Medicare HMO penetration, estimate that a 10 percentage point increase in system-wide HMO market penetration is associated with 1.9 to 3.0% decreases in Part A expenditures and 1.6 to 1.7% decreases in Part B expenditures, depending on the initial level of HMO penetration. A central estimate from the literature that controls for selection effects would suggest 1.6% to 3.0% decreases in Part A or Part B expenditures following a 10 percentage point increase in system-wide HMO penetration.

Some studies, however, reach somewhat different conclusions. Chernew, DeCicca and Town (2008), for example, do not find a strong spillover between system-wide HMO penetration and FFS Medicare spending, once they control for Medicare HMO penetration.

Table 2. Effect of System-wide HMO Penetration on FFS Medicare Spending: Estimates from the Literature

			Effect of a 10 percentage point increase in System-wide HMO Market Share on:	
Author (year)	**Study Design**	**Years**	**Part A Expenditures**	**Part B Expenditures**
Baker (1997)	IV estimation only (for system-wide)	1986-1990	27.9% decrease to 7.8% increase, depending on initial level of HMO.	44.9% decrease to 17.4% increase, depending on initial level of HMO.
Baker and Shankarkumar (1998)	Fixed effects model	1990-1994	1.9% to 3.0% decrease, depending on initial level of HMO.	1.6% to 1.7% decrease, depending on initial level of HMO.
Baker (1999)	Least squares regressions that model the natural log of expenditures in each market as a function of HMO market share	1990-1994	1.9% to 3.0% decrease, depending on initial level of HMO.	1.6% to 1.7% decrease, depending on initial level of HMO.
Chernew, DeCicca and Town (2008)	IV model	1994-2001	No effect on total expenditures once Medicare HMO penetration is controlled for.	

Spillover effects of managed care on expenditure growth

The literature focused on the effect of system-wide HMO penetration on the Medicare program is supplemented by studies that explore the effects of HMO penetration on the commercial population or the overall health care system (commercial and public). The majority of these studies focus on the relationship between HMO penetration and expenditure growth (as opposed to expenditures), exploring the possibility that spillover effects may operate differently in the long run.

These studies generally suggest that greater managed care penetration is associated with lower spending growth, particularly in the case of hospital spending growth. For example, Cutler and Sheiner (1998) explore the relationship between cross-state average HMO penetration and total health cost growth, and find that from 1988 to 1993, every 10 percentage point increase in average HMO penetration resulted in a 0.5% reduction in hospital spending growth and a 0.4% reduction in overall spending growth, although an increase in spending growth for physician services partially offset the reduction in hospital cost growth. This offset seems even stronger over longer time periods: looking at 1980-1993 suggests that increases in physician and

prescription drug spending growth mostly offset the reduction in hospital spending growth. The relationship between average state HMO penetration and non-Medicare total, hospital and physician-spending growth is found to be statistically insignificant (Cutler and Sheiner 1998).

Much of the remaining literature focuses on hospital spending growth in particular. The findings are generally consistent with those of Cutler and Sheiner (1998), although the magnitudes of the estimates vary. For example, Robinson (1991) uses data from 1982 to 1988 and estimates that a 10 percentage point increase in hospital HMO market share (fraction of hospital patients covered by HMOs) results in a 9.4% decrease in the growth of costs per admission in private, non-HMO California hospitals. Robinson (1996) reports that hospital cost growth from 1983 to 1993 was 44% slower in markets with high hospital HMO penetration. In this study, slower cost growth within high HMO penetration markets is tied to reductions in the volume and mix of services offered and bed capacity, as well as changes in the intensity of services provided. Gaskin and Hadley (1997) report slower hospital cost growth (8.3% vs. 11.2%) in areas with high HMO penetration compared to those with low HMO penetration from 1985 to 1993. A review of the literature by Chernew et al. (1998) is consistent with the findings from these studies, and concludes that while managed care appears to lower spending growth, its impact on spending growth is unlikely to be large enough to freeze or decrease the growing share of GDP devoted to health spending.

A2. Mechanisms for Utilization Spillovers

Practice Pattern Norms

One mechanism through which HMO penetration may affect system-wide utilization is through changes in practice pattern norms. Several studies provide evidence that physicians adopt practice styles that apply across differently-insured patients (Williams et al. 1982; Hardwick et al. 1975, Campbell 1982, Rothert et al. 1984, Eisenberg 1979). Consistent with this practice pattern behavior, the literature suggests that system-wide HMO penetration affects practice patterns for both managed and non-managed care patients (Glied and Zilvin 2002). For example, Baker and McClellan (2001) find that increased HMO penetration is associated with overall increases in cancer diagnosis rates. Other studies link HMO penetration with better disease management and lower rates of intensive procedures. For example, Heidenreich et al. (2001) find that Medicare beneficiaries with myocardial infarctions in areas with higher managed care activity are more likely to receive beta blockers and aspirin and less likely to have undergone coronary angiography than those in areas with lower managed care activity. Bundorf et al. (2004) estimate the effect of market-level HMO activity on treatment of FFS Medicare beneficiaries with acute myocardial infarction. They report that higher HMO penetration is associated with lower rates of FFS revascularization and cardiac catheterization. They also report that areas characterized by high HMO competition are associated with higher frequencies of cardiac catheterizations for FFS beneficiaries with AMI. Greater HMO penetration has also been associated with lower overall (Chiswick 1976, Mello, Stearns and Norton 2002) and non-managed hospital admission rates (Goldberg and Greenberg 1980). Despite these findings, other evidence suggests that commonality in practice patterns is not perfect. A few studies demonstrate that even within provider groups, patients insured in different sectors are sometimes treated differently (Arnould, Debrock and Pollard 1984; Udvarhelyi et al 1991). Thus, while managed care penetration may have broad panel-wide effects, differences between managed and non-managed patients may exist, even in the same practices.

Infrastructure

Utilization spillovers may also occur through investment in infrastructure – particularly in the long run. Predicting these long-run changes is difficult, however. Chernew, Gowrisankaran and Fendrick (2002) report that hospital decisions about entering the market for open heart surgery depend on anticipated volume, and specifically volume from more generous payers. This would imply that a shift in coverage towards less generous payers would discourage adoption of new medical services. This is consistent with MedPAC evidence suggesting that costs are lower, and Medicare margins higher, in areas with substantial managed care (MedPAC 2008).

Similarly, managed care penetration has been associated with changes in the size and composition of the physician workforce (Escarce et al 1998, 2000; Polsky et al 2000), hospital capacity (Chernew 1995), and use and adoption of medical equipment and technologies (Baker and Brown 1999, Baker and Phibbs 2002, Baker 2001, Mas and Seinfeld 2008). For example, Baker and Phibbs (2002) tie managed care penetration to slower adoption of mid-level NICUs, while Baker (2001) and Baker and Wheeler (1998) conclude higher managed care penetration is associated with slower adoption of MRI equipment. Mas and Seinfeld (2008) investigate the effect of increases in managed care penetration from 1984 to 1995, attributing this growth to a 7.3% reduction in the number of hospitals with radiation therapy technology, a 5.3% reduction in the number of hospitals with diagnostic radiology technology, and a 4.1% reduction in the number of hospitals with cardiac technologies. Managed care penetration has also been associated with increased consolidation of the health care system. For example, Dranove et al. (2002) report that increases in managed care penetration between 1981 and 1984 are associated with consolidation in hospital and physician markets. Several other studies support these findings (Baker and Brown 1999, Burns et al 2000).

Evidence of the impact of the introduction of Medicare is consistent with the finding of broad infrastructure effects. Finkelstein (2007) estimates that the introduction of Medicare was associated with a 37% increase in hospital expenditures, stemming from both higher spending at existing hospitals and new hospital entry. This increased spending suggests that the introduction of Medicare was associated with fixed cost investments that likely spilled over to all payers in the market.

The long-run net impact of these infrastructure effects is not well known. Most of the spillover literature holds infrastructure constant. In general, one would expect that if Medicare maintains administrative pricing that is not affected by competitive pressures, infrastructure reductions would create cost-saving spillovers from the commercial to the public sector. The magnitude of that effect depends on the extent to which Medicare uses it power to set prices to maintain access to care for its beneficiaries and thus mutes the cost-saving effects from infrastructure consolidation.

A3. Utilization Spillover Summary

In sum, there is reasonable evidence that increases in managed care penetration that reduce spending create cost-decreasing spillovers that reduce FFS Medicare utilization. A review of the literature of the effects of Medicare HMO penetration suggests a central estimate in the range of a 1% to 9% reduction in total FFS Medicare spending from a 10 percentage point increase in Medicare HMO penetration (although results are sensitive to methods). The evidence for spillover effects stemming from system-wide HMO penetration suggests a similar but slightly smaller effect, and these results are also quite sensitive to the time period studied, methodology, control of selection effects and initial market share considered.

One of the mechanisms for this spillover is changes in practice patterns. However, the bulk of the literature suggests important impacts of HMOs on infrastructure. This suggests that in the long run we would expect cost decreasing activities in the private sector that reduce available infrastructure to generate cost saving spillovers on Medicare, but these effects depend crucially on Medicare policy. If Medicare does not act to offset the pressures on infrastructure arising when commercial payers reduce fees or restrict volume, we would expect these spillover pressures to lead to slower growth in Medicare spending and a relatively narrow difference between non-Medicare and Medicare spending growth rates.

B. The Spillover Effects of Prices on Utilization

The literature on spillovers from managed care generally does not distinguish between the effects of more conservative managed care practice patterns or lower managed care prices. The evidence on changes in utilization suggests that conservative practice patterns may be important, but prices may be important as well. Another strand of literature investigates these price spillovers.

Price changes in one sector may change volume in another through "demand inducement." The utility maximizing model developed by McGuire and Pauly (1991) posits that physician volume responses to Medicare fee reductions will depend on how the change in relative prices affects physicians' ability and willingness to induce demand. The model predicts that in the presence of income effects, physicians will seek a target income by inducing demand for all procedures. In contrast, in the absence of income effects, physicians are expected to maximize profit by reducing the volume of less profitable services while increasing the volume of more profitable services.

A wide literature provides support for the premise that fee reductions in one sector induce increases in utilization in other sectors. For example, using data for a longitudinal panel of physicians and the McGuire and Pauly model to motivate empirical estimations, Yip (1998) finds that physicians whose incomes were reduced the most by Medicare fee cuts for coronary artery bypass graft surgeries subsequently performed higher volumes of the procedure in both the Medicare and private markets. Rice et al. (1999) examine volume offsets using fixed effects models and report that for most surgical procedures examined, reductions in Medicare fees were associated with an increase in the volume of such procedures among privately insured patients.

Other studies examine system-wide effects of Medicare fee reductions and report volume offsets as well (Nguyen and Derrick 1997, Lee and Mitchell 1994, Hadley and Reschovsky

2006, Mitchell and Cromwell 1995, Rice et al 1996, Christensen 1992), though findings are mixed and vary by specialty and procedure type. Nguyen (1996) estimates that for every 10% fee reduction in certain services through the Omnibus Budget Reconciliation Act (OBRA) of 1989, service volume increased by 3.7%. Rice et al. (1999) report a larger volume offset – they find that for seven procedures examined, a Medicare fee drop of 1.0% corresponds with a 1.1% private volume increase. Additionally, studies have identified both own-price and cross-price effects on volume in the absence of substantial income effects. For example, Mitchell et al. (2000) examined Medicare claims data for ophthalmologists and orthopedic surgeons for each year from 1991 to 1994, a period in which fees were reduced. They find that the overall volume of cataract extractions decreased in response to both increases in fees for other ophthalmologic services and decreases in Medicare fees for cataract procedures. Using similar data, Mitchell, Hadley and Gaskin (2002) also report cross-price effects; they estimate that a 10% reduction in cataract extraction fees is associated with a 5% increase in non-cataract service volume over the 1992-1994 period.

A related literature examines the relationship between Medicaid fees and relative access to care (patient volume) between private and Medicaid patients. For example, Hadley (1979) reports that a 10% increase in Medicaid fees was associated with a 20% increase in Medicaid patient volume, whereas a 10% increase in private insurance fees was associated with a 33% decrease in the Medicaid caseload. This finding is consistent with several other studies that also report a patient-level volume effect in response to fee changes (Mitchell 1983, 1991; Perloff, Kletke, and Neckerman 1986).

This literature focuses entirely on the spillover effects of changes in *public* prices on the quantity of care delivered, however. To date, no studies explore the effect of *private* sector fee reductions on public sector patient or service volume, and there is little reason to assume that these effects would be symmetric. That said, the strength of the relationship between public prices and private use suggests that providers may be likely to respond to changes in private payment rates by adjusting the share of time and resources that they devote to profitable services. Thus, if payment rates from public payers are sufficiently generous, we would expect lower private fees to increase public utilization.

These studies are best interpreted in the context of short run spillovers because they keep the infrastructure constant. If lower prices eventually lead to consolidation in the industry, we might expect a weaker connection between price changes and volume increases.

IV. Empirical Evidence: Spillovers from Price Changes

In this section we explore the estimated effects of prices in one sector on prices paid in other sectors. This type of spillover is typically termed “cost shifting.” We review the literature examining the impact of public sector (Medicare or Medicaid) fee reductions on prices charged to private payers. It is possible that changes in commercial sector prices will also affect Medicare fees, but there is little direct evidence of such spillovers. Because Medicare fees are set administratively while private fees are negotiated in the market, we do not necessarily expect these two effects to be symmetric.

Cost shifting to other payers is one strategy through which providers can compensate for fee reductions in one sector. A growing literature examines the impact of Medicare fee reductions on charges to private payers by hospitals. Here, the focus is on the phenomenon of dynamic

cost shifting, in which one payer pays more *because* another payer pays less. This is distinct from static cost shifting or price discrimination, in which different payers are charged different amounts for the same service because they have different demand elasticities and providers with market power can exploit those elasticities to charge a higher price for the payer with less elastic demand. In the static cost shifting model, reductions in fees from one payer do not *cause* increases in fees paid by the other, even though at a point in time one payer pays more than the other.

Dynamic cost-shifting should primarily occur in the short-run if providers have market power which they have not fully exercised, as raising prices to private payers in response to a public payer fee cut would not increase profits if the initial prices reflect profit maximization (Morrisey 1993). In the long-run, however, dynamic cost shifting may occur even if providers were initially profit-maximizing, as consolidation in the provider market due to price reductions could lead to a reduction in competition which could in turn lead to higher profit-maximizing prices.

Several methods have been employed to study the phenomenon of cost shifting, with differing results. Findings from cross-sectional studies that compare hospital prices and mark-ups across individual hospitals or charges and costs by payer tend to suggest that hospitals do cost shift to private payers, though the literature is not unanimous. For example, Lynk (1995) examines 1989 California hospital data and reports that hospitals with larger Medicare and Medicaid shares had lower net prices and fully-billed charges. This approach is fraught with methodological challenges, however, including the difficulty in controlling for hospital- or market-specific factors (Morrisey 1996). Using industry-wide revenue-to-cost margins as well as payments to hospitals as a proportion of average hospital costs, reports by the Congressional Budget Office (CBO) and the Prospective Payment Advisory Commission (ProPAC) find evidence of substantial cost shifting to private payers during the latter portion of the 1980s and early 1990s (CBO 1993; ProPAC 1995a,b), but not subsequently (ProPAC 1996). However, these data sources omit information about important revenue sources including copayments from Medicaid and private insurance, further bringing these findings into question. A study described in a report by the Lewin Group uses Medicare trust fund payments obtained from the American Hospital Association's Annual Survey and facility-wide expense to charge ratios and identifies a substantial cost shift, estimating that about 40% of the increase in public program payment shortfalls to hospitals was passed on to private payers (Sheils 2009). Other cross-sectional studies attempt to quantify differences in charges and costs of care by payer at any point in time. For example, Sloan and Becker (1984) use 1979 hospital data and estimate that private payers were charged 15% more than all other payers for identical hospital charges. Comparing payers' share of charges with payments to hospitals in 1979, they find that Medicare and Medicaid underpaid hospitals by $1.9 billion, $1.7 billion of which was shifted to commercial payers, according to their estimates. Similarly, Dobson, DaVanzo and Sen (2006) compare cost to charges per payer in 2003 and estimate that Medicare payments covered 95% and Medicaid 89% of the costs of care, while private payers were charged 122% of the costs of care. This evidence is consistent with dynamic cost shifting, but could also simply reflect price discrimination (static cost shifting).

However, not all cross-sectional studies suggest that cost shifting is an inevitable response to financial pressure from public payers. A recent report by Milliman describes the findings of one study that compared regional variations in hospital utilization and spending (allowed per member per month hospital inpatient expenses) for Medicare and commercial payers in 2007.

While the authors find evidence of disproportionately large differences in Medicare and commercial reimbursements in some cities, which they attribute to cost shifting, they also identify small differences in some cities with low Medicare reimbursement, which they attribute to a strategy of cost management among local hospitals (Pyenson et al 2010). A crucial methodological limitation of this and the above cross sectional studies is that they fail to establish that increased charges to private payers were actually caused by reduced public prices (Morrisey 1996).

Other studies use longitudinal designs to identify hospital responses to fiscal pressure. Some of these studies find evidence of cost shifting, especially in the 1980s. For example, Dranove (1988) measures the correlation between changes in profits for Illinois hospitals following reductions in Medicaid funding for hospitalizations in 1981 and 1982 and changes in charges to private payers and finds evidence of cost shifting. He estimates that for every $1 lost in public funding per private admission, the average hospital raised prices to private payers by $0.51 (Dranove 1988). The authors note, however, that hospitals' ability to cost shift is likely to decrease over time, as competition in private sector pricing increases. Zwanziger, Melnick and Bamezai (2000) and Zwanziger and Bamezai (2006) examine California hospital data from 1983-1991 and from 1993-2001, respectively. During the earlier period, they find that a 10% decrease in Medicare prices was associated with 1.8% to 5.9% increases in private prices, depending on for-profit status, local competition and sub-time period analyzed. Responses to Medicaid price reductions from 1983-1991 were generally statistically insignificant and much smaller. For 1993 to 2001, they generally report a smaller effect of cost shifting. Specifically, they estimate that a 10% reduction in Medicare fees is associated with a 1.7% increase in private prices (Zwanziger and Melnick 2006). The findings of Zwanziger and Melnick are consistent with some evidence that suggests that hospitals' ability to cost shift may have decreased after the mid 1980s as insurers began to establish preferred hospital networks and negotiate payments more aggressively (CBO 2008). Finally, evidence presented in Newhouse (2002) is also consistent with a bargaining model, which suggests that in the short run, lower Medicare prices lead to higher prices charged to private payers.

However, not all longitudinal studies find evidence of dynamic cost shifting. For example, Hadley, Zuckerman and Iezzoni (1996) compare individual measures of hospital prices through time, in essence using each hospital as its own control. Using Medicare and AHA cost report data from 1987-1989, they find no evidence of successful cost shifting. Similarly, Dranove and White (1998) examine changes in price and cost margins for hospitals in California between 1983 and 1992, when Medicaid payments declined from 91 to 83% of average costs. They also find no evidence of cost shifting to private payers. Rice et al (1996) examine prices paid by Medicare and privates payers from 1988 to 1991 (following fee reductions from the Omnibus Budget Reconciliation Acts of 1989 and 1990) for sixteen procedure groups and find no evidence of cost shifting as well. Several other studies confirm these findings (Hadley and Feder 1985, Morrisey and Sloan 1989). These findings are consistent with a model in which providers facing price pressure in one sector may respond by lowering costs, which could lead to lower prices for all payers. A recent MedPAC analysis supports this possibility, finding that hospitals under high levels of financial pressure from the private sector during the 2002 to 2006 period

had lower costs (and therefore higher Medicare margins) in 2007 (MedPAC 2009). While these examples are based on pressure from private, not public, payers, the endogeneity of costs is consistent with the hypothesis that financial pressure from public payers may drive down costs, and thus prices charged to private patients.

On balance, the best evidence seems to suggest that lower prices paid by public payers are *not* associated with significantly higher prices for private patients in the short-run (and may in fact be associated with lower prices). A recent review of the literature by the CBO supports this view, concluding that the effects of cost shifting are likely small for hospitals, with hospitals shifting (at best) substantially less than half of the cost of uncompensated care to private payers (CBO 2008). Cost shifting seems to be even less of an important factor with respect to physician payment rates (CBO 2008). As noted above, however, there is little reason to assume that these estimated effects of the spillovers generated by changes in public sector prices would apply symmetrically to spillovers generated by changes in private sector prices.

V. Summary of Findings

The literature provides strong evidence of the interconnectedness of health care markets. These spillovers likely occur through several mechanisms (including changes in quantity and changes in price) and across several sectors (including between commercial and public sectors and between managed care and non-managed care sectors).

There is reasonable evidence of spillovers between Medicare HMOs and FFS Medicare utilization, suggesting that greater Medicare HMO penetration is likely to lower spending for patients in FFS Medicare. The evidence of spillovers from system-wide HMO penetration to Medicare markets is less clear but also generally consistent with a cost-saving spillover. A substantial literature (mostly focused on hospital cost growth) suggests that increases in system-wide HMO penetration may reduce the growth of health care costs in the long run.

While there is some limited evidence of cost-shifting from changes in public prices to the prices charged to the privately insured, the best evidence seems to suggest that financial pressure from public payers does not lead to higher private prices, and may in some cases lead to better management of costs and thus lower prices. In addition, even if cost shifts are occurring, there is little reason to expect symmetric price spillovers from changes in private sector prices to the prices paid by Medicare. The literature does suggest, however, that price changes may have spillover effects operating through changes in quantities, with decreasing generosity of payment in one sector leading to increased quantity of care delivered in other sectors. These price and quantity spillovers are typically observed in the short run. In fact, the existing literature is based almost entirely on studies that measure short term effects.

In the long run, the largest spillovers may be driven by changes in system infrastructure and capacity, workforce composition, and practice patterns. Specifically, it is reasonable to believe that the long-run trajectory of spending across sectors will be similar because they share common technology and infrastructure, though at points in time actions in one sector may cause some transitory divergence in spending trends. Of course, short term spillovers may affect the long-run trajectory for all sectors. For example, if providers can offset financial pressure from the commercial sector by increasing volume from Medicare patients (or if provider financial distress leads to higher Medicare payments), the cost saving pressure on infrastructure generated by commercial payers would be diminished.

Unfortunately, the existing literature cannot provide narrow guidance for analysts seeking to model the degree to which spillover effects will affect spending trajectories by sector. Existing results, even those from rigorous studies, provide a wide range of estimates, such that a wide range of assumptions could be reasonable (although the best studies do suggest a central range of estimates). Additionally, the findings are based on activity in health care markets in which policy changes were possible. Thus, they may not be analogous to what would happen if current law were held constant. Yet the relatively short term nature of most empirical studies suggests the bias may be small. Overall, while the infrastructure studies suggest spending trends in Medicare will probably not radically diverge from that of the commercial sector, the short run studies are consistent with possible increases in Medicare spending resulting from fiscal pressure on providers due to cost containment in the non-Medicare sector. Moreover, neither the short nor long run studies are able to yield precise estimates of the impact changes the non-Medicare sector will have on Medicare spending.

VI. Implications for Projections

These findings have important implications for how we evaluate approaches for forecasting Medicare spending growth. The challenge for analysts making current law projections of future health care cost growth is that we have seen very little persistent slowing in health care spending growth in the past. This makes it difficult to model potential reductions in spending growth using historical data. Models reliant on past experience (such as time series models or actuarial analysis of past spending trends) often result in implausible forecasts of future health spending – for example, growth to levels that exceed the Social Security Administrations' projections of GDP. Most prominent forecasting models thus impose some exogenous slowing in health care spending without having a model of the factors that might generate that slowing.

One of the drivers of projections of unaffordable future health costs is the (required) assumption that current law remains unchanged. This forces analysts to focus on other channels that might slow spending. Spillovers between sectors are potentially one such factor, although they have not yet been incorporated into most models.

The current OACT approach assumes that long-run, real, per capita, age-adjusted Medicare spending will grow only one percentage point faster than GDP (GDP + 1). The GDP + 1 assumption implies that excess spending growth (the gap between spending growth and income growth) would be about half of the historic gap. This assumption was justified by a technical panel based on the belief that technological progress (assumed to be exogenous) accounted for about half of health care spending growth and that this portion of spending growth would remain in the future. This implies that all other factors driving up spending (besides aging) will no longer contribute to spending growth. The OACT forecast does not explicitly model factors that would slow Medicare spending growth or spending in non-Medicare sectors. The technical panel did not appeal to spillovers as a reason for the slowdown in spending growth, although the reduction in excess spending growth is consistent with the presence of spillovers.

The CBO model (for the June 2009 report) addresses the issue of historic cost growth that exceeds GDP growth in a different way. It posits a 3 sector model consisting of Medicare, Medicaid, and other health spending. For each category, initial rates of spending growth are set to equal historical averages. Spending on non-health goods and services is assumed never to decline. This non-health goods assumption is based on a paper by Chernew, Hirth and Cutler that examined affordability (Chernew, Hirth and Cutler 2003). It was not intended to represent

an estimate of the trajectory of spending growth, but rather provides a convenient way to capture the notion that spending growth will be forced to slow once the country can no longer "afford" to spend more.

In this model, most of the slowing in health care spending growth is assumed to occur in the non-Medicare, non-Medicaid sector, but spillovers partially transmit that slowing to the Medicare sector. Specifically, once the assumption of no decline in non-health spending becomes binding, the CBO assumes that the decline in spending growth in the Medicare sector (1.5% per year from 2020 to 2083) will be 33% of the decline in the non-Medicare, non-Medicaid sector (4.5% per year), while the decline in Medicaid spending growth will be the same as the decline in the non-Medicare, non-Medicaid sector (4.5% per year). These assumptions allow computation of spending growth in each sector. Current CBO assumptions project a slowdown in excess Medicare spending from 2020 to 2083 such that the rate of excess cost growth in 2083 will be 0.9 percentage points, down from 2.3 percentage points in 2020 (relative to 1 percentage point for OACT) (CBO June 2009).

Both of these approaches rely on ad hoc assumptions to generate a reduction in spending growth. In both cases, the slowdown in spending is motivated by the belief that consumers will not be willing or able to maintain existing spending growth. In neither case are specific behavioral assumptions explicitly modeled, although the CBO model does assume explicit spillovers between Medicare and other sectors.

While our review of the literature provides strong support for the inclusion of a spillover assumption in forecasting models for health care spending growth, the observed range in spillover effects between private and public markets is rather broad. This precludes us from making precise recommendations for the assumed magnitude of spillovers or making judgments regarding the plausibility of different specific assumptions, like the CBO's assumption of different rates between sectors and the OACT's assumption of parallel growth trajectories between sectors. For instance, studies of the effect of a 10 percentage point increase in Medicare HMO penetration suggest changes in total FFS Medicare expenditures ranging from a 38.4% decrease to a 22.3% increase. The range for studies that use system-wide HMO penetration is similarly broad; the projected effects of a 10 percentage point increase in system-wide HMO penetration on FFS Part A or Part B Medicare expenditures range from a 44.9% decrease to a 17.4% increase in expenditures, depending on the base level of HMO market share and study design. Overall, the evidence is consistent with some short-run divergences in spending trajectories between sectors, but we believe (though these conclusions are based on a smaller literature) that this is unlikely in the long-run due to spillovers from shared technology and infrastructure.

This does not mean that we can make no improvements in forecasts based on the existing literature, however. First, given substantial evidence of managed care's broad influence on care via system-wide infrastructure and practice pattern changes, we conclude that scenarios in which public and private spending trends are persistently and widely divergent seem unlikely. Second, we believe it is reasonable to use the spillover literature to justify the reduced rate of excess spending growth. Our general sense is that an even further reduction in the assumed rate of excess spending growth might be justifiable if one assumed that: (1) commercial plans would be able to successfully slow spending (evidence of which is weak, but economics suggests that private spending is likely to slow as the share of GDP devoted to health care

rises); and (2) public payers would not react by providing a financial cushion to providers to maintain access for public plan enrollees

Furthermore, the literature suggests that not all ranges of spending growth are reasonable. While it is difficult to quantify exactly how much slower than GDP + 1 spending might grow, we do not think that GDP + 0 is likely.

The literature also suggests potentially productive extensions to the OACT model. For example, it would be possible to construct a model that explicitly modeled cost growth among commercial beneficiaries and allowed the user to make parametric assumptions about the magnitude of spillovers. While the literature is not precise enough to suggest exactly what those spillover assumptions should be, a model with such flexibility would yield insights about how different spillover assumptions affect Medicare spending.

This approach would avoid a central concern about the CBO approach. Specifically, the CBO (June 2009 report) uses spillover assumptions only to allocate spending between sectors. The fundamental brake on spending growth in the CBO model is the assumption that non-health spending cannot decline – essentially allowing up to 100% of the gains in GDP to be devoted to health care spending. This is a weak assumption, given that in the past the share of income gains devoted to health has not exceeded 30%. A model based on an explicit spillover assumption, designed so that spillovers provide a brake on spending, could be an advance.

A model that explicitly incorporates spillovers is useful for another reason as well. Given the large uncertainty surrounding spillovers (particularly long-run spillover) in the future, it is important for forecasters to evaluate the impact different assumptions will have on policy. Assuming strong spillovers will tend to generate forecasts of slower Medicare spending growth and dampen the alarm sent to policy-makers about the need for policy action. Making that spillover assumption explicit may help illustrate that, while spending for Medicare is slowing, it is doing so only because private sector spending is assumed to be slowing. The public policy consequences and distributional implications of spending growth slowed by spillovers, rather than through other mechanisms, are quite different.

Spillovers clearly exert an important but imprecisely measured force on long-run spending. The literature gives us confidence that meaningful spillovers exist and gives us some sense of the mechanisms through which they are most likely to operate. In particular, potentially pivotal spillover effects of infrastructure changes are difficult to quantify and will depend on political choices within current law. While existing estimates may be frustratingly imprecise, more explicit modeling of a range of spillover parameters can help analysts assess the implications of different mechanisms for slowing growth and the broader consequences of policy interventions that may have system-wide ramifications.

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