



Investment subsidies and the adoption of electronic medical records in hospitals



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ABSTRACT

In February 2009 the U.S. Congress unexpectedly passed the Health Information Technology for Economic and Clinical Health Act (HITECH). HITECH provides up to \$27 billion to promote adoption and appropriate use of Electronic Medical Records (EMR) by hospitals. We measure the extent to which HITECH incentive payments spurred EMR adoption by independent hospitals. Adoption rates for all independent hospitals grew from 48 percent in 2008 to 77 percent by 2011. Absent HITECH incentives, we estimate that the adoption rate would have instead been 67 percent in 2011. When we consider that HITECH funds were available for all hospitals and not just marginal adopters, we estimate that the cost of generating an additional adoption was \$48 million. We also estimate that in the absence of HITECH incentives, the 77 percent adoption rate would have been realized by 2013, just 2 years after the date achieved due to HITECH.

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1. Introduction

Critics of the United States health sector have long pointed to its combination of high costs and poor outcomes, such as a high rate of medical errors (IOM, 2001). An often discussed source of these problems is the relative low utilization of information technology compared to other industries (Gartner, 2010). Many health policy analysts and academics suggest that the widespread adoption of Electronic Medical Records (EMR) will transform the US healthcare system, simultaneously reducing costs and improving outcomes (Hillestad et al., 2005; Buntin and Cutler, 2009). Several studies suggest that increasing the use of EMR will increase efficiency and either decrease health care expenditures, increase quality, or ideally both (McCullough et al., 2010; Miller and Tucker, 2011; Freedman et al., 2014). Summarizing this literature, Buntin et al. (2011) found that over 90 percent of studies found positive outcomes from EMR.

Despite these purported benefits, EMR adoption has, until recently, been largely confined to large healthcare systems; smaller

and independent hospitals, as well as other medical providers, have remained on the sidelines. This suggests that either (a) there is a meaningful market failure that creates a separation between the private and social benefits of EMR, or (b) many providers are unconvinced about the benefits of EMR and have taken a “wait-and-see” approach to this investment decision.

Several unique features of the health market could cause a market failure with respect to EMR adoption. For example, hospitals have found that being a high quality provider has a relatively weak relationship to patient volume (Culter et al., 2004). The lack of a strong volume response limits the potential profits from investments in quality. In addition, the existing reimbursement system for most hospitals means much of the lower costs resulting from more efficient care or better health outcomes flows to other entities. Absent an increased use of bundled payments or more effective shared savings programs, hospitals are unable to fully capture the value created by their spending on EMR. Instead, these benefits are split across a wide variety of public and private payers, none of which individually has the incentive to increase reimbursement rates to the level necessary to cover the costs of EMR.

Given the potential collective action problem, there could be a case for taxpayer subsidies for EMR. This would alter the benefit/cost calculus for potential adopters, leading more providers to conclude that benefits outweigh the (now subsidized) costs. This may be a justification for the United States government's heavy

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involvement in promoting the adoption of these benefits. These efforts culminated in the 2009 passage of the Health Information Technology for Economic and Clinical Health Act (henceforth, simply HITECH). HITECH provides up to \$27 billion to promote adoption of EMR and encourage the adoption and what regulators have described as the “meaningful use” of these systems by hospitals and physicians¹. HITECH also specifies future cuts to Medicare reimbursement rates for hospitals that do not maintain meaningful use standards (ARRA, 2009).

Of course, a large number of providers failing to adopt EMR is not conclusive evidence of a market failure. Many hospitals may have remained on the EMR sidelines because adoption costs are high and they are not convinced that these systems will deliver the promised benefits. Indeed, while many studies have found positive effects from EMR, the magnitude of the cost savings are, at best, modest in comparison to the large installation costs (Agha, 2014; Lee et al., 2013; Himmelstein et al., 2010). Other studies find that the quality improvements are fairly small or limited to specific circumstances (DesRoches et al., 2009; Himmelstein et al., 2010). Some studies reveal a great deal of heterogeneity in the benefits across hospitals and areas (McCullough et al., 2010; Dranove et al., 2014). It also could be that the technology itself, or the knowledge about how best to implement the existing products, is improving over time. If any or all of these factors are in play, then many providers will choose not to adopt EMR at any given time. We might instead expect the relatively smooth pattern of adoption that existed in the market prior to HITECH. If this were the case, investment subsidies would simply shift investments in time and not change the ultimate adoption decisions of firms. Moreover, subsidizing the installation of EMR might cause inefficiently high adoption rates at a time when many hospitals are struggling to find how best to extract the benefits of the technology.

Regardless of the merits of EMR or the cause of the lack of widespread adoption to date, it is not immediately clear that HITECH subsidies would materially affect the investment decisions of private firms. Prior research suggests that, despite their intentions, such subsidies may not actually stimulate private investment. Peltzman (1973) introduces the notion that government subsidies might crowd-out private investment, and provides evidence of dollar-for-dollar crowd out in investments in higher education. Most of the subsequent research evidence also casts doubt on effectiveness of government subsidies for promoting aggregate private investment. For example, reviews of national “industrial policies,” in which nations subsidize capital investments in specific sectors, find no connection between sector subsidies and sector capital accumulation (Pack and Saggi, 2006). Other studies fail to reject 100 percent crowd out from government R&D subsidies (Dranove, 2000; Lach, 2002). On the other hand, Gonzalez and Pazo (2008) find that public subsidies for R&D do not produce 100 percent crowd-out of private R&D.

Tax incentives, which are of course closely related to investment subsidies, also seem to have little net effect on investments. In a review article, Hanlon and Heitzman (2010) state “the literature has had little success documenting a link between tax incentives and investment.” In an earlier review of the research on tax policy, Hassett and Hubbard (2002) state: “[t]he apparent inability of tax incentives to stimulate aggregate investment spending is one of the major puzzles in the empirical investment literature.” Goolsbee (1998) offers one potential explanation for some of these findings: government subsidies may fail to spur investment because they are captured by capital suppliers through higher prices. A similar concern is relevant in our setting, as the EMR market is concentrated,

with the top seven vendors holding a market share of 75 percent with even higher concentration in various hospital segments². It is therefore possible that vendors captured much of these HITECH incentive payments through increased prices.

In this paper we measure the extent to which the HITECH incentive payments spurred EMR adoption. Applying the rules governing HITECH payments to information from annual hospital cost reports, we calculate each hospital’s expected HITECH incentive payments and estimate the effect of these incentives on adoption³. Our research setting is somewhat different than most of these earlier studies of government subsidies on investments in other settings. HITECH represents a large lump sum subsidy for a large fixed cost investment, whereas most of the existing research examines marginal responses to marginal subsidies and tax incentives. In addition, we are able to document the timing of investments, so we can assess whether the incentive payments increase aggregate investments or simply change the timing of the investment decision. If the incentives simply shift forward the timing of the investments they likely provide fewer welfare benefits than if they change the ultimate adoption decision of a firm.

As we discuss below, HITECH subsidies did not merely target new adopters. Hospitals that had previously adopted EMR were also eligible for incentive payments, in part as a way to encourage “meaningful use.” We therefore also estimate the cost per new adopter—a necessary metric for evaluating the efficacy of this incentive scheme.

The stylized facts suggest that HITECH encouraged adoption by at least some hospitals. Time series evidence shows a marked increase in adoption following the passage of HITECH. As of 2008, about 48 percent of independent hospitals and 60 percent of system hospitals had adopted at least one of two advanced EMR technologies, physician documentation (PD) and computerized practitioner order entry (CPOE). By 2011, these adoption rates for both independent and system members had risen to 76 percent⁴.

The coincident timing of this increase provides only suggestive evidence about the causal role of HITECH in EMR adoption. Prior to the passage of HITECH, EMR adoption had been steadily rising, so at least part of the growth is simply the continuation of this pre-existing trend. In addition, while on its face \$27 billion is a substantial pool of funds, it was not exclusively targeted towards new adopters. Hospitals that had previously installed EMR were also eligible for this program, suggesting that the incentive payments for new adopters were far smaller. If a large market failure was actually creating a meaningful difference between the costs and benefits of EMR adoption for the hospitals which had not installed EMR by 2009, it is possible these smaller payments for new adopters may not bridge the gap.

As noted above, adoption rates for all independent hospitals grew to 76 percent by 2011. Absent HITECH incentives, we estimate that the adoption rate would have instead been 66 percent. Thus, HITECH promoted adoption among independent hospitals by an additional 10 percentage points. While this may seem like a substantial effect, when we consider that HITECH funds were available for all hospitals and not just marginal adopters, we estimate that the cost of generating an additional adoption was \$47 million, which is more than enough to cover the cost of a generous EMR system. We also estimate that in the absence of HITECH incentives, the 76 percent adoption rate would have been realized by 2013, just 2 years after the date achieved due to HITECH.

² See for example, <http://thehealthcareblog.com/blog/2012/08/06/numbers-dont-lie-the-ehr-market-must-consolidate/>.

³ Because adoption by system hospitals may be decided by corporate parents, we primarily focus our analysis on independent hospitals.

⁴ Authors’ calculation using HIMSS data.

¹ We explain the meaningful use standard in detail in Section 2.

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