How you buy affects what you get: Technology acquisition by state governments

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ABSTRACT

Research suggests that governments should rely on standardized information technology solutions rather than custom built ones. We find that, for many categories of taxes, states that have contracted out the development of their tax-processing systems to providers offering standardized solutions see statistically and economically significant increases in collections relative to states that have not. We find no evidence that financial administration expenditures increase for these states. At the same time, there are several categories of taxes where we do not find a positive impact. We reconcile these findings by developing a qualitative argument that standardized solutions in tax administration may be most effective for the types of taxes that are the most difficult to enforce.

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1. Introduction

Much of what government does involves acquiring, processing, storing, and making sense of data. How well government works, therefore, depends upon the quality of its information technology (IT) and the ability of its personnel to make good use of that technology. Unfortunately, government IT acquisition programs frequently underachieve and sometimes fail disastrously (Anthopoulos, Reddick, Giannakidou, & Mavridis, 2015). Indeed, the fraction of government IT projects that are fully successful is likely between 15 and 30% (Anthopoulos et al., 2015; Ellis & Berry, 2013; Heeks, 2001), which is similar to numbers seen in the private sector (Bouras & Bendak, 2014; Hidding & Nicholas, 2009; Standish Group, 2013). Jain (2003) even goes so far as to argue that the more states spend on IT, the worse they perform.

On the other hand the best evidence suggests that private organizations are slowly but steadily improving their performance in this area (Buntin, Burke, Hoaglin, & Blumenthal, 2011; Mithas, Tafti, Bardhan, & Goh, 2012). That may be true of government IT projects as well (Cordella & Tempini, 2015). Indeed, Pang, Tafti, and Krishnan (2011) conclude that, ceteris paribus, a $1 increase in state IT spending leads, on average, to more than $4 in efficiency gains, and even Jain (2003) acknowledges that there is some evidence of cumulative improvement in state IT performance over time.

Unfortunately, IT project management is rarely a mature capability of governmental organizations (Meijer, 2015; Valdés et al., 2011). Moreover, government seems especially resistant to adopting the kinds of organizational arrangements that facilitate the effective utilization of IT in the private sector (Kim & Lee, 2006; Pee & Kankanhalli, 2015). Consequently, governments are often advised to contract out the design and operation of core IT systems to providers who know what they are doing. This implies that governments should, so far as possible, acquire standardized systems from providers that have a record of successful past performance (Kelman, 1990; Mithas et al., 2012; NASPO, 2012).

State tax administration offers a unique opportunity to evaluate this advice. Research that relies on subjective outcomes often introduces the possibility of measurement error or bias that is difficult to correct statistically (Favero & Bullock, 2015; Meier & O'Toole, 2013), but tax administration has an independent and objective measure of effectiveness: tax collection.

Tax administration also offers an ongoing natural experiment. Currently many state governments are at various stages of installing integrated tax-processing systems acquired from firms that specialize in government collections management. Do these standardized systems work? Have states that have installed them increased revenue yields relative to other states? In this paper we find evidence that they do, and they have.

Because of the significant time delays involved in the implementation of tax-processing systems our tests measure their impact on individual categories of taxes, where we can pinpoint the timing of their

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implementation more precisely. We find strong benefits for some taxes. In particular tobacco taxes, amusement taxes, motor vehicle license taxes, and severance taxes[1] show both economically and statistically significant positive impacts following software implementations. Individual income taxes show positive results that are strictly speaking, statistically insignificant, but are suggestive of a real impact. Other taxes do not show significant impacts however, and several point estimates are negative, leading us to propose a theory that, perhaps, tax-processing software is most effective at improving collections in places where enforcement is most difficult.

We also test to see whether these software implementations increase state expenditure for tax administration. While both the data and the experimental framework around this question are much less clean, we find no evidence that states increase their expenditures following the implementation of tax processing software once the concentration of their tax revenue sources is accounted for.

We arrive at these conclusions through a series of difference in difference regressions that rely on a dataset built from a combination of data about when each state implemented standardized IT systems for each type of tax, and the state government financial data available from the U.S Census and the government finance database (Pierson, Hand, & Thompson, 2015).

2. Theory

When faced with the need to explain government's IT problems, scholars and practitioners tend to round up the usual suspects: incommensurable goals, compartmentalization of policy making, siloed bureaucracies, inflexible budgets, and cumbersome procurement processes, among others (Anthopoulos et al., 2015; Gil-García & Pardo, 2005). But these are not really *problems*, since problems have solutions. For many governments they are conditions that must be accommodated. Were things different, government could adopt the kinds of organizational arrangements that promote competency in the acquisition of IT and facilitate its effective utilization (Brynjolfsson & Hitt, 2000; Hitt & Brynjolfsson, 1996; Roberts & Thompson, 2006). They are not.

Instead, it has been suggested that accommodation should focus on governance issues. Holley, Dufner, and Reed (2002), for example, claim that states should rely on government-wide planning committees that link policy with IT acquisition, thereby integrating policy making and execution, rather than devolving IT acquisition to the agency level and giving it a nonstrategic, operational orientation. Others suggest that the key governance issue to be faced is whether to obtain required services using government employees or contracts with the private sector. A third governance issue is how to structure the acquisition of IT capacity. Jim Johnson, the chairman of the Standish Group, a consultancy known for its annual surveys of IT project performance, claims that project success comes from small, focused projects, which attract multiple competitive bids (Standish Group, 2013). According to his firm's analysis, the success rate for small-scale government contracting projects in the past decade is nearly 55%. In contrast, large-scale, complex IT projects almost always fail (Gauld (2007); Globerman & Vining, 1996; Hidding & Nicholas, 2009).

These governance issues are not unrelated. Agencies rely on in-house personnel largely because they believe that the functions they perform are unique and their solutions can be fully understood only by those inside the agency. This is especially the case when so-called uniquely governmental activities, such as tax administration, are involved. This causes IT planners to defer to existing capacities, processes, and procedures, automating the status quo instead of re-engineering workflows. Because existing processes are idiosyncratic, the resulting systems tend to be equally one-off.

As a consequence, agencies frequently end up with an assortment of clunky, hard-to-maintain, special-purpose systems. These are usually highly inflexible, or worse, they work at cross-purposes to each other. Fixing this situation leads agencies to embrace large-scale, excessively complex projects aimed at integrating their one-off systems (Scholl, Kubicek, Cimander, & Klischewski, 2012). Because such projects are both unique and complex, they frequently exceed government's capacity to manage them effectively, attract very few qualified bidders, and all too often end in failure and acrimony (Brown, Potoski, & Van Slyke, 2010; Goldfinch, 2007). As Brown et al. (2010) explain: the fundamental source of contracting failure is product uncertainty.

In other words, the main difficulty for government technology acquisition is the snag associated with any kind of innovation: people do not know how to do something until they do it. Lack of knowledge leads to its own host of problems: project requirements are often unclear or contradictory, resources are inadequate, schedules are overly optimistic, planning is based on insufficient data, and risks must be assumed rather than managed. Consequently, smaller, simpler government IT projects are more likely to be successful (Heeks, 2005).

What is a simple project? Again the answer applies to any kind of innovation. While not all previously completed projects are simple, a project that has already been carried out successfully elsewhere will be *simpler* than one that has not. The secret of project success is mimesis — minimizing the extrapolation needed to transfer a system known to work elsewhere from a source site to the target site.

Given this logic, governments are often advised to contract out the design and operation of core systems to specialized service providers, which have acquired a distinct competence to perform specific services (Barret & Green, 2001; Brown & Brudney, 1998; Chen & Perry, 2003; Edmiston, 2003; Garson, 2003). Indeed, this advice figures prominently in the guide to making smart IT choices produced by the Center for Technology in Government, a highly respected research center at SUNY Albany.

Tax administration by state governments currently presents us with a unique opportunity to evaluate this prescription. Taxes are unambiguously a uniquely governmental activity. Indeed, in some respects they are paradigmatically so. Nevertheless, many state governments are at various stages of installing integrated tax-processing systems acquired from firms that specialize in government collections management, creating a natural experiment. Fast Enterprises, the leading firm in the field, and CGI, the organization responsible for the federal government's HealthCare.gov website, dominate this space, but several other companies also compete in it (Jimenez, Mac an tSionnaigh, & Kamenov, 2013).

This type of software is marketed as a complete solution for agencies with multiple taxes, covering tax processing from the collection of returns and payments, through billing, compliance, audits, and collecting delinquent accounts. Because of the breadth of their coverage these software packages are not standardized to the extent that many consumer software packages are, but they are considerably more standardized than the legacy systems that many state tax collection agencies have used or the custom solutions that are competing in this space.

By way of an analogy, you can view these software systems as "tailored" in the same sense that one might buy a tailored suit. The level of customization (and expense) is higher than a ready-to-wear suit purchased at a retail chain, but is still considerably less than a bespoke suit made to an individual's specifications from scratch. The essential components of the design of the system tend not to change from state to state, but each company must still work to make their software fit their client's needs.

The spectrum of acquisition options available to state revenue agencies is illustrated by the diversity of approaches seen with systems for DMV modernization. In 2013 several states had active DMV modernization projects either underway or recently completed, and their approach to procurement is shown in Table 1.

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[1] Taxes on the harvest of resources like coal, oil, or timber.