Financial Management Information Systems and accounting policies retention in Brazil

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Abstract

Purpose – The successful implementation of International Public Sector Accounting Standards (IPSAS) depends on the adoption and subsequent maintenance of accrual accounting policies. Moreover, Financial Management Information Systems (FMIS) are important drivers of reforms, and their replacement might disrupt the execution of accrual accounting policies. This paper aims to analyze the effects of FMIS replacement (or maintenance) on the retention of accrual accounting policies in Brazilian local governments.

Design/methodology/approach – The research adopts a sequential mixed-methods approach, starting with a quantitative analysis of the presence of accrual accounting policies in local governments and the effects of FMIS replacement. Next, a qualitative analysis is conducted with a survey, documents and interviews to observe the FMIS replacement process. Our analysis focuses on local governments from one state in Brazil, but the context is highly transferable to other states, as the same procurement law and accounting regulations apply.

Findings – FMIS replacement may reduce accounting policies retention; consequently, public procurement regulation may induce a public procurement context in which the IPSAS project would find more difficulties to prosper.

Research limitations/implications – This research contributes to the IPSAS literature by examining the phenomenon of accounting policies retention or persistence, as one should not take it for granted that an adopted accounting procedure will be sustained over time. The analysis argues that FMIS replacement due to compulsory rebidding should be carefully considered.

Practical implications – Promoters of accounting reforms may consider the regulation of contracting out for FMIS a relevant issue to the institutionalization of accounting policies.

Originality/value – The analysis innovates by linking IPSAS accounting reform to the contracting out of FMIS.

Keywords: Accrual accounting; Contracting out; Local governments; IPSAS; FMIS.

Article Classification: Research paper

1. Introduction

The development of accrual-based financial reporting standards for public sector organizations has been discussed and globally supported since the late 1990s. It is generally argued that the adoption of International Public Sector Accounting Standards (IPSAS) would improve the quality of accounting information, leading to more efficient and transparent public sector activities worldwide (ACCA, 2017; Brusca et al., 2016). Extant literature identifies several obstacles for IPSAS adoption by governments (Christiaens et al., 2010; Brusca et al., 2015; Liguori and Steccolini, 2017). In general, the focus is on lack of legitimacy or enforcement (Arnaboldi and Lapsley, 2009), cultural barriers (Brusca et al., 2015), and lack of capabilities (Caperchione et al., 2014; Brusca et al., 2015).

The continuous development of accounting reforms depends on initiatives to push forward the persistence and maintenance of accrual accounting policies over time, even if an accounting policy is already being performed. One should not take for granted that an adopted procedure will be easily sustained, especially if it is not fully connected with or embedded in other systems. Internal factors, rather than external pressures, may affect accounting policies retention (i.e., a situation in which the execution of an accounting policy is maintained in subsequent periods): for instance, challenges associated with Financial Management Information Systems (FMIS), which are considered crucial to driving accounting reforms in developing countries (Peterson, 2007; Scott, 2003).

Usually, FMIS are contracted out in a competitive bidding process, and public procurement regulation mandates the rebidding of such systems in several countries. In effect, the regulation may force the replacement of FMIS, even when the systems perfectly fit the requirements of the government (Khemani and Diamond, 2014; Alaranta and Jarvenpaa, 2010). This may create temporary interruptions in accounting practices (Khemani and Diamond, 2014). We propose that, in extreme cases, FMIS replacement might challenge the accounting ecosystem and disrupt the accrual accounting policies execution, i.e., reduce its retention. The disruption might happen if there is a lack of *ex ante* specification of the FMIS features, an unclear set of performance criteria for the FMIS solutions, or weak penalties for FMIS performance noncompliance (Cohen et al., 2007). Therefore, the process of FMIS replacement can encounter difficulties because the accounting teams' capability lack to evaluate the current contracted-out systems (Venieris and Cohen, 2004).

A remarkable feature of Brazilian local governments is that they usually contract out their FMIS under a commercial off-the-shelf model. The contracting model lasts 12 months and is renewable for another 36 months. Each year, governments are required to evaluate whether to extend the agreement or issue a new procurement bill to recontract. At the end of the agreement, local governments are required to rebid for the FMIS, which may lead to FMIS replacement.

The article analyses the effects of FMIS replacement (or maintenance) on the retention of accrual accounting policies in Brazilian local governments. The research adopts a sequential mixed-methods approach, starting with a quantitative analysis looking at whether the occurrence of accrual accounting policies is affected by FMIS replacements. Our focus is on the local governments from one Brazilian state, covering approximately 850 local governments. The quantitative analysis first observed the occurrence of nine converged IPSAS in Brazil that were specifically related to changes in the 'journal entry' rules, rather than the 'reporting rules'. We compared those IPSAS that were highly dependent on software to the non-dependent on, from 2015 to 2017. Next, we focused on four (out of the nine) policies that were highly dependent on software and tested the effect of FMIS replacement on the retention of the accounting policies for municipalities that had adopted them previously. We finally conducted a qualitative analysis, triangulating a short survey with documental analysis and interviews to observe accountant engagement in the bidding process.

The results show that FMIS replacement may reduce accounting policy retention. Such an effect may emerge due to poor contracting out practices, leading to difficulties in an IPSAS reform's success. The discussion opens a debate on the influence of the market for FMIS and on how the mandatory rebidding of FMIS may affect public financial management reforms, specifically regarding the adoption of IPSAS. For countries in which FMIS are often outsourced, such as Brazil, a weak contracting out process potentially reduces the chances of success of IPSAS reforms.

2. Previous literature on the adoption of accrual-based accounting

The comparative government accounting literature on accrual-based accounting is broad. Usually, these studies compare the design of accounting policies of a country, whether at the central or local level, emphasizing the multiplicity of accounting regimes within the country, the scope of the reforms (the set of accounting policies that are covered), the influence of international organizations (Aquino and Batley, 2015; Adhikari and Garseth-Nesbakk, 2016; Brusca et al., 2016), the difficulties in adoption, the strategies of implementation (i.e., gradual or universal), and the need for capabilities (Brusca et al., 2015; Adhikari and Gårseth-Nesbakk, 2016; Brusca et al., 2016; OECD, 2017; Orelli et al., 2016). The literature also discusses the low perception of accrual accounting usefulness by politicians, considering it a "waste of time and money" (Brusca et al., 2015: 39), despite their alleged role in supporting accountability. As an IPSAS convergence project would be a political decision (Tanjeh, 2016), the political apathy regarding an accrual accounting agenda can lead to a symbolic, not real, accrual accounting adoption (Arnaboldi and Lapsley, 2009).

Technical challenges arise due to the complexity of some economic transactions in public sector organizations, as specific assets and liabilities do not exist in the private sector. For instance, the registration of revenues and expenditures for public-private partnerships or any pension funds (Adhikari and Garseth-Nesbakk, 2016; Brusca et al., 2016) is not yet fully resolved. Such conceptual complexity in producing accounting reports under accrual-based accounting requires civil servants' and consultants' capabilities (Caperchione et al., 2014). Moreover, the usually high implementation costs reduce the willingness to adopt IPSAS (Tanjeh, 2016). In the Brazilian case, the lack of capabilities and political willingness prevented the full success of the first phase of the IPSAS project: the deadlines were postponed, and the strategy was changed (Azevedo et al., 2018).

These studies, however, do not investigate in-depth how the actors implement procedures and routines to run the new accounting policies required by IPSAS. Recently, the IPSAS adoption global analyses by ACCA (2017), PwC (2014) and OECD (2017) highlighted and presented evidence on the sensitiveness of FMIS and the chart of accounts for IPSAS project effectiveness.

In the IPSAS literature, some studies have highlighted the role of FMIS in accounting reforms (e.g., Chan, 2006; Cohen et al., 2007). As described by Cohen et al. (2007), the governments in Greece were dealing with difficulties in implementing accounting policies due to their FMIS inadequacies, despite the governments' attempts to develop or contract accounting systems. The national government, acknowledging the relevance of FMIS to the IPSAS project, enacted a set of requirements that a commercial FMIS should present to be certificated. Next, the national authority evaluated the commercial FMIS, rating the degree of their compliance with the legal requirements. In the Brazilian context, the National Treasury is discussing a similar initiative and will develop a rating initiative. However, the FMIS effect also challenges the IPSAS project in Brazil. Azevedo et al. (2019) empirically tested the effect of dependency on software and deadline postponements on IPSAS adoption and 'accounting policy retention' in Brazilian local governments. Their analysis concluded that despite the dependency on software, the postponements of deadlines increased the uncertainty about the process and reduced the "willingness of new adopters to move forward and of the previous adopters to retain the policy". According to Azevedo et al. (2019), suppliers' commercial logic drives which functionalities are going to be developed next, looking for attending to their clients' demands (governments); consequently, national suppliers drive the IPSAS agenda at the local level.

The relevance of FMIS to public financial reforms has increased, as these systems are currently considered a last resort for driving reforms in developing countries; however, FMIS contracting out has been appointed as one of the main barriers to Public Finance Management reforms (Peterson, 2007). However, to impose an FMIS with new functionalities does not guarantee its correct and full installment and usage and may automate bad practices (Peterson, 2007). As an ERP system, to implement or replace an FMIS requires an organizational change in the flow of information, procedures, and tasks and even in the roles that the employees play (Khemani and Diamond, 2014). It is a complex process; as Alaranta and Jarvenpaa (2010, p.3) warn, it is "*a pain that lasts up to one year*" and at worst, a failure can bring about subsequent supplier switching (Peterson, 2007).

The first challenge in contracting out FMIS is the specification (Peterson, 2007). The government should carefully investigate the software capabilities, checking whether the commercial FMIS fits the governmental 'business processes'; for instance, whether it fits IPSAS policies and whether it is customizable, allowing the moving of data from "legacy" systems to the new database. However, as the specification often fails, FMIS suppliers take advantage and delineate their solution to gain scalability (Khemani and Diamond, 2014). Second, the competitive bidding and the selection of the license agreement that is required when an FMIS is contracted out may be inefficient. In Finland, for instance, Alaranta and Jarvenpaa (2010) have pointed out that competitive bidding forces the switching of suppliers even when governments are satisfied with their FMIS. The expected cost reduction proposed by the compulsory rebidding is usually not achieved. Moreover, international experience indicates that FMIS replacement brings about a temporary interruption in accounting practices, from 9 to 12 months (Khemani & Diamond, 2014). The same has been observed in Finland (Alaranta & Jarvenpaa, 2010).

3. The context of the IPSAS project and software procurement in Brazil

Brazilian governments operate dual-system accounting, a budgetary system under a modified cash-basis regime (cash for revenues and commitment for expenses) and a financial system for reporting on an accrual basis. Such a dual system is not new; it came from the 1964 Financial Law. However, the reporting system was mostly ignored, and the government's reports mostly consolidated the cash-basis accounts. Budgetary information (revenues and expenses, financial assets and liabilities) still dominates Brazilian public financial management. The financial accounting for reporting purposes has been neglected, but the demand for such information was revigorated when Brazil decided for the IPSAS (see Aquino et al., 2019).

The requirement to implement IPSAS accrual accounting was launched in 2009, to be concluded in 2013. The National Treasury (hereafter Treasury) was in charge of the process, but it was weakly legitimated to play the standard-setter role (see Aquino et al., 2019) and enacted the first normative handbook emphasizing the compulsory adoption of (i) a new standardized chart of accounts (unifying it with budget classification), (ii) standardized financial statements, and (iii) a set of accrual accounting policies converging on the IPSAS. The chart of accounts and the financial statements were broadly adopted by the states and municipalities up to 2014. This was possible, as the commercial FMIS suppliers developed their systems, implementing a new chart-of-accounts and functionalities to electronically gather the numbers to release financial reports. Rather than that, however, the accounting policies did not evolve, and the Treasury postponed the original deadlines and switched to a gradual implementation approach; currently, each IPSAS has a specific deadline (Azevedo et al., 2019).

FMIS are integrated systems to automate public financial management processes; they track financial events and summarize financial information, from budget preparation and execution to accounting and reporting (Dorotinsky, 2003; Arnety & Wepukhulu, 2013; Khemani and Diamond, 2014). They are at the core of an accounting ecosystem, bringing together other specialized information systems that process transactions in different public policy areas (Khemani and Diamond, 2014). Dai and Vasarhelyi (2017) define the accounting ecosystem as a set of IT systems, protocols for data integration, routines to store and recover data, templates and interfaces, and human support capabilities (including from suppliers). In such an ecosystem, a change in FMIS may require a revision of the consistency (and integration) with the other components of the ecosystem.

FMIS automate accounting processes, automating the routines of 'journal entry', transaction matching, account reconciliation and reporting. Following record-keeping processes, such automated routines include how the transactions are initiated, processed, recorded, reconciled, audited and reported. Automation is especially useful for accounting policies due to the high volume of transactions; for instance, for posting repetitive transactions to the general ledger (such as employee benefits). However, new FMIS involve automated processes that do not necessarily replicate the same set of accounting policies that were previously run by the old FMIS or even preserve the integration level with the remaining accounting ecosystem components. A FMIS replacement may require effort to adapt the accounting ecosystem to some extent and will probably demand resources (time and/or money) to redesign the previous accounting processes (e.g., journal entry, reconciliation) associated with each accounting policy. If the IPSAS project is not a priority for a government, this may lead to previous accounting policies being discontinued.

The Treasury realized the relevance of the FMIS issue and, in 2010, during the first phase of the IPSAS project in Brazil (Azevedo et al., 2019), it enacted a decree listing a set of requirements for a commercial or an in-house developed FMIS to ensure the reliability of the data to be consolidated into the Brazilian Whole-of-Government Accounts. The Courts of Accounts (which play the role of rule-enforcer organizations) do not check whether suppliers comply with the Treasury's standard for FMIS but only audit the bidding and the contract legality. Consequently, there is currently little incentive for local governments to consider the Treasury's standards when contracting or developing their FMIS. Conversely, the pressure on FMIS functionalities comes from the Courts' Data Collecting System (DCS), which requires that the governments' FMIS fit to the DCS to exchange a specific set and format of data, precluding the nonfitted FMIS from reporting financial and budgetary statements (Aquino et al., 2016). As governments are required by law to frequently report their financial statements and budgetary executions through these systems, compliance with the Courts' DCS becomes an important requirement in contracting for the FMIS.

The dominant IT strategy adopted by Brazilian local governments is contracting out under a commercial off-the-shelf model. In Minas Gerais, only 4 (out of 853) municipalities attempted to launch in-house software initiatives. The public procurement law (8,666/1993) mandates competitive bidding for the lowest price among previously selected suppliers based on the compliance with product/service requirements. The FMIS contracting out has three phases. First, the government specifies the required software functionalities and suppliers' features. The specification includes the routines and operations performed by the FMIS (e.g., integration with other systems) and the services to be provided by the supplier (e.g., technical support). The second phase classifies the suppliers and their FMIS according to their compliance with specifications, eliminating the noncompliant offers. In both phases, the participation of an accountant is recommended. Finally, the lowest price proposal is contracted. In addition to offering the FMIS, the suppliers usually provide services to support elaborate annual reports or implement new accounting practices.

According to Brazilian law, an FMIS contract lasts for 12 months and is subject to annual renewal for up to 4 years, when a new bid is required. However, a renewal is conditional on whether the FMIS continue to meet the contractor's needs. If the FMIS prove to be inadequate, the contract can be terminated. Compulsory requirements to open a new bid every 4 years bring negative and positive effects. As the supplier has the possibility of being replaced after a one-year term, less incentives to customize the software emerge (Gantman, 2011). On the other hand, the frequent evaluation—mandated but not practiced—would ideally induce competition and the continuous updating of the FMIS.

4. Method

The research adopts a sequential mixed-methods approach (Mele and Belardinelli, 2018) to analyze the effects of FMIS replacement (or maintenance) on the retention of accrual accounting policies. First, a quantitative analysis looked for the presence of accrual accounting policies in local governments and whether such presence was affected by the FMIS replacement. Next, we conducted a qualitative analysis in which we triangulated a short survey, document analysis and interviews to observe the bidding process itself.

Our analysis focused on local governments from one Brazilian state (of 26) to isolate the effect of the rule-enforcer. Each Brazilian state and its municipalities are submitted to audit scrutiny from a specific Regional Court of Accounts. As the Regional Courts' auditing practices and how they interpret and enforce public finance law vary in some respects (Lino and Aquino, 2018, Azevedo and Lino, 2018), we selected the Minas Gerais State, as it has the highest number of municipalities in Brazil (853) and covers a very diverse set of municipalities in terms of size and socioeconomic context. Despite some peculiarities of the rule-enforcers' interpretation, the regulatory context applies to the whole country, including the procurement law and IPSAS requirements. Therefore, the diversity of municipalities in Minas Gerais makes such an analysis more transferable to other Brazilian states and offers a rich representation of a broad context. Nevertheless, we do not claim that our results can be directly generalized to the entire country.

Accounting policies selection

Currently, Brazil has converged 21 IPSAS accounting policies out of the 42 IPSAS policies currently approved by IPSASB. However, most of them are not enforced, as the deadline is not yet due. We first selected 9 (nine) policies according to software-dependence vs. non-dependence, and second, we focused our analysis on 4 (four) policies that are highly dependent on software.

The nine policies (among the 21) were selected according to the following criteria: (i) the policy includes changing the 'journal entry' rather than the 'reporting rules'; (ii) the policy was already diffused (despite being weakly enforced) by the very first accounting standards enacted since 2008; (iii) the changes in 'journal entry' practices, indicating that the new policy is operative, can be quantitatively proxied by variations in accounts in the government's financial statement (the balance sheet and income statements) from 2015 to 2017; and (iv) a minimal set of governments adopted the new policy in 2016 and 2017 (for instance, although IPSAS 21 and 26 are useful for testing the FMIS effect, they are not being adopted at all).

We understand that new 'journal entry' rules require changing the recognition, measurement and registration of routines and that 'reporting rules' require changing the data recovery from the general ledger and the organization of new financial report templates. We selected only policies related to journal entry rather than those related to reporting rules, because (i) if the 'journal entry' does not change, this does not matter for the adoption of the new reporting rules and the accrual regime is not implemented, and because (ii) the reporting rules are often totally automated and implemented by the FMIS supplier, not requiring accountant engagement. Therefore, the main challenge for the IPSAS reform are the 'journal entry' types of policies. Table 1 presents a list covering the 21 converged IPSAS, plus the 11 being prepared for a future exposure draft by the Brazilian standard-setter.

[Insert Table 1 about here]

The selected 9 accounting policies (Table 1) vary regarding whether the deadline is due. Following the Azevedo et al. (2019) methodology, each accounting policy was classified as present or not present (0/1) in that financial statement. Additionally, we also controlled the dependence of the accounting policy on the FMIS, i.e., whether "*the execution of some policies becomes unfeasible without a computer application*" or whether the policy could be executed by "*manual calculations and accumulated records by the accountant*" (Azevedo et al., 2019). We did not intend to judge the quality of the information reported.

We obtained the data reported by the 853 municipalities to the Minas Gerais Court of Accounts, including budgetary and financial data for the City Hall and its departments (before the consolidation of the executive agencies and state-owned enterprises). Additionally, starting with the Courts of Accounts database, we identified the FMIS replacement and maintenance by the contracted FMIS suppliers as reported by each City Hall for 2015, 2016 and 2017. Our database differs from Azevedo et al.'s (2019) database, as the chart-of-accounts by the Court of Accounts offers a more detailed perspective compared to the Treasury's data adopted by Azevedo et al. (2019).

Table 2 shows the occurrence of the nine accounting policies. Note that the number of municipalities with the presence of each policy should at least increase from 2015 to 2017. However, municipalities may discontinue specific policies, which would reduce the total number of municipalities adopting one policy in that year. Such evidence also suggests that the set of municipalities adopting one accounting policy in one year is not necessarily the same as for the next year (adopters' turnover). Consequently, this is a warning for an analysis based on general average figures for a group of governments that it will not capture what is going on at the organizational level. A growing level of adoption would be a misleading mix of an increase in new adopters plus discontinuity cases.

Most of the accounting policies' deadlines have not yet expired, and smaller municipalities (less than 50,000 inhabitants) have an extended deadline, which could explain the low level of adoption compared to the 'above 50k inhabitants' group. The lower level of adoption in small cities could also be explained by the higher number of heterogeneous cities in this group, where policies are often less enforced. As the Court of Accounts oversees 853 municipalities in the Minas Gerais State, the extensive geographic area to carry out on-site auditing shall challenge monitoring in distant municipalities (Lino and Aquino, 2018).

[Insert Table 2 about here]

Interestingly, despite the extended deadline, the level of adoption for taxation revenues (IPSAS 23) and employee benefits (IPSAS 39) policies is quite similar for both groups (small and large). Among the policies that do not depend on the FMIS, the recognition of provisions shows a positive result, especially for the largest municipalities. However, as mentioned above, the level of adoption decreased in 2017 compared to 2016. Azevedo et al. (2019) tested the effect of dependence on software and deadline postponements for IPSAS adoption. The authors argued that 'accounting policy retention' in Brazilian local governments decreased due to deadline postponements. The 'policy retention' would fail due the demobilization of resources allocated to IPSAS projects. However, they did not consider FMIS replacement.

Quantitative phase: effects on accounting policies retention

The quantitative phase compared the effects of the FMIS replacement (or maintenance) on the retention of the accounting policy**.** We tested whether the municipalities adopting four accounting policies in 2016 preserved such policies in 2017 when their FMIS were replaced or not. The four analyzed policies are highly dependent on software: (i) Depreciation—non-PPE (Property, Plant, and Equipment); (ii) Depreciation—PPE; (iii) Taxation revenues; (iv) Employee benefits.

We acknowledge the fact that FMIS have functionalities that are essential to better operating accounting policies. As Cohen et al. (2017) have presented in the Greek case, some parameters would preferably favor the IPSAS project. In the Brazilian context, as presented in the next section, the Brazilian Treasury also enacted technical parameters to certificate FMIS, but such parameters are not necessarily considered in competitive bidding. We also acknowledge that, based on previous authors' professional experience and interviews with municipalities and auditors from the Courts of Accounts, the bidding often includes a consultancy service. Consequently, when considering FMIS contracting out, the authors considered the commercial software license and consultancy services to implement, give maintenance or even operate specific routines in the FMIS on behalf of the government.

As there is no rating regarding the compliance of commercial FMIS contracted by local governments according to the Treasury recommendations, the analysis classified the FMIS contracted by the municipalities in the sample according to their performance. The FMIS performance would be the set of operations effectively allowed by the system and its automation if feasible. As the FMIS performance also depends on the support and knowledge conveyed by the consulting team working for the supplier, the FMIS supplier was classified as (i) Handy or (ii) not-Handy FMIS.

- *Handy FMIS*: There are features and functionalities available to implement specific accounting policies, but the supplier also offers superior accounting services to support policy adoption.
- *Not-Handy FMIS*: There are no available functionalities (or only basic ones), even with some qualified accounting services to support the adoption. Alternatively, no functionalities or accounting services are provided.

We proxied the performance based on the average policies that the FMIS execute in the municipalities listed in the sample. A software provider is classified as Handy FMIS for one specific policy when at least one of its clients (City Halls) presented such an accounting policy as being adopted in 2016 or 2017, assuming that such FMIS have the functionality and that their supplier gives the necessary support to the client to deploy the FMIS. For the not-Handy FMIS, these were identified when none of the City Halls adopted that policy in the analyzed period.

Qualitative phase: Contracting out and accountant engagement

The qualitative phase departed from a content analysis of accounting software procurement bills in ten different municipalities concluded in 2017, which were selected from the database from cases in which a Handy FMIS was replaced by a not-Handy FMIS and in which a not-Handy FMIS was replaced by a Handy FMIS. The differences in the procurement bills were identified, observing (i) the textual construction that the government applied to detail software requirements if applicable, and (ii) whether the textual description explicitly includes compliance with the Courts' of Accounts recommendations or the IPSAS general statements.

Second, following an abductive strategy (Reichertz, 2013), we conducted 11 interviews, including interviews with 8 accounting consultants and 3 tenured government accountants (at a state capital city with 2.5 million inhabitants and a medium and a small city, with respectively 90 thousand and 6 thousand inhabitants). The sample was purposeful (Rapley, 2014) and did not intend to represent the population. The protocol covered 3 questions: how the interviewee sees the current adequacy of the FMIS in the accounting reform, (ii) whether the FMIS is decisive in the adoption of accrual-based accounting, and (iii) how engaged were the accountants in the accounting reform. The asynchronous interviews were carried out by audio messages, whereby the respondents had more time for thoughtful, reflective responses (Hewson, 2014). The questions and answers sequence took place in enough rounds to saturate the evidence from the three questions. Although we did not have facial expressions and body language to consider, compared to face-to-face interviews, we still had a tone of voice to calibrate the responses with.

Third, to confirm some of the evidence from the interviews, we gave a short survey to the local governments' accountants. The survey required them to classify on a Likert scale whether (i) the accountants were engaged in the process of the specification of the FMIS procurement bill and supplier classification and (ii) whether the FMIS was decisive in the success of the accounting policies implementation. We acquired approximately 80 responses or 15% of the 853 municipalities. Our objective was to amplify the evidence from the interviews for other cases rather than to generalize for the population. As a statistical check, due to the low response rate, we ran a nonresponse bias. We found no statistical significance; therefore, the nonresponse bias can be discarded.

5. Current scenario of accrual accounting policies by FMIS suppliers

Table 3 shows the average occurrence of the 9 accounting policies according to the contracted FMIS suppliers. As these accounting policies were not previously broadly adopted, their occurrence represents an advance in the accounting reform in the Minas Gerais State. Out of 60 suppliers, the FMIS market share in Minas Gerais is concentrated among 10 FMIS suppliers contracted out by 70% of the municipalities. From 2015 to 2017, the average occurrence of the analyzed accounting policies in the municipalities increased (0.838 to 1.585, out of 9 policies). In 2017, the average ranged from approximately 2 policies (out of 9) adopted by the municipalities that contracted the FMIS from supplier "A" to less than 0.4 for those who contracted with supplier "E."

The level of occurrence for the 9 policies and the 4 software-dependent policies is quite similar for most suppliers in 2015, except for "other suppliers", where the occurrence of non-software-dependent policies is more frequent (1.06/0.891=1.20). In 2016 and 2017, the ratio of “9 accounting policies/4 software-dependent accounting policies” also increased for the top 10 suppliers, indicating that eventually the software-dependent policies were not fully retained. In any case, accrual accounting use remains low during the analyzed period.

[Insert Table 3 about here]

6. FMIS replacement effects

Despite the indications that the contracted FMIS and related services encourage or delay the adoption of accounting policies (Cohen et al., 2017; Azevedo et al., 2019; Sediyama et al., 2018), the current analysis focuses on the effects of replacement (maintenance) of the FMIS on the retention of accounting policies.

Table 4 compares the retention of software-dependent policies for municipalities that replaced the FMIS or that maintained the contract with the same FMIS supplier from 2016 to 2017. The cases of replacement and maintenance were stratified according to the type of FMIS preserved or dismissed. Note that the FMIS were classified according to current performance, as described in the methodology, embracing the software functionalities and support services offered by the FMIS supplier under the contracting out arrangement. Table 4 also presents initial adoption in 2016 and whether the adoption varies from 2016 to 2017—for instance, the new adopters in 2017, the proportion of occurrence in 2017 that came from an adoption occurring in 2016 or earlier, and the retention rate (retained in 2017 over the adoption in 2016). The retention rate proxies the effects of FMIS replacement or maintenance on accounting policy retention. For each accounting policy, the retention rate in 2017 varies with the replacement or maintenance of a Handy or not-Handy FMIS operating at the City Hall.

Our analysis indicates that the effects of FMIS replacement can be both positive or negative. Positively, replacement might open space for ‘non-adopted accounting policies’ if the new FMIS provide more functionalities or if the support service is improved (see Table 4 for cases of replacement from a not-Handy to a Handy FMIS). Interviews supported that the supplier-client interaction seems to be as relevant as the FMIS functionality. In this interaction, the suppliers support, prepare, train and convince the accountants and technicians of the City Hall to initiate the process of adopting the policy or to help maintain and update it. For instance, after the FMIS replacement, a functionality ready to be applied may highlight the procedures to be reviewed; for example, the taxation revenues may require a timely recording of the tax-generating event rather than the tax effect on the cash flow. The replacement process may also reduce technical barriers, for instance, by amplifying the integration of the FMIS modules with the general ledger.

However, the replacement effect may be negative if a Handy FMIS is replaced by a not-Handy FMIS (Table 4). The FMIS and related downward support imply that some of the functionalities of the previous Handy FMIS will be discarded and that the lack of training and support will reduce attention to specific accounting policies. Consequently, the replacement may bring about implementation costs, interrupt FMIS functionality, and ultimately affect the reporting compliance with Courts of Accounts and the Treasury.

Moreover, when the City Hall replaces Handy FMIS by other Handy FMIS, our evidence indicates that there is still a positive effect on the adoption of accrual accounting policies (see new adopters in 2017). However, there is also a loss of retention (except for the Depreciation—PPE). This might be temporary, as changing FMIS requires time to adapt.

[Insert Table 4 about here]

Indeed, the retention rate is different for the 4 policies, from approximately full retention for depreciation-PPE (replaced by other Handy FMIS) to approximately 52% for employee benefits (Handy FMIS preserved). Whether the FMIS is replaced or maintained does not affect depreciation-PPE and employee benefits, but the retention rate is quite dissimilar between the two policies. The depreciation (PPE and non-PPE) are more stable among the four policies compared to taxes and employee benefits, which respectively retained only 62% and 73% of the cases in 2016 when the FMIS was replaced. We confirm our expectation that FMIS replacement would reduce the accounting policies retention rate for depreciation non-PPE and taxation revenues (statistically significant). Interestingly, the comparison considers only replacement by Handy FMIS; consequently, the policy discontinuity occurs due to other issues rather than FMIS functionalities, which seems to be a necessary but not sufficient condition for software-dependent accounting policies.

7. FMIS Contracting out dynamics

In general, a low adoption of accrual accounting policies is observed (Table 3). FMIS clients are not taking advantage of the existing functionalities offered by the FMIS. As has been shown, the four software-dependent accounting policies do not emerge under a not-Handy system. However, the existence of functionalities in the FMIS is not enough for the IPSAS standard to emerge, as even with Handy FMIS, the adoption rate is modest.

The following qualitative analysis triangulates a short survey with a content analysis of procurement bills and interviews. Again, it seems that FMIS is a necessary but not a sufficient factor in changing practices and routines to sustain accounting policies. A recurrent issue mentioned in the Brazilian IPSAS project is the lack of effort and resources dedicated to IPSAS implementation; the adoption of IPSAS accounting policies is not a priority (Table 5).

[Insert Table 5 about here]

The City Halls accountants' focus is on reporting to the Court of Accounts, Ministries, and Treasury, as compliance failure leads to penalties. Notwithstanding this, the quality of such information is not enforced; therefore, the adoption of policies will rarely be a part of the government's agenda (Azevedo and Lino, 2018). The overload of activities related to reporting to auditing bodies takes time away from the accounting team, preventing it from allocating time to adopt new accounting policies. The FMIS supplier and City Hall teams focus on what the Court of Accounts demands.

> *"Considering the professional obligations,... I have to be accountable regarding how the resources are used, keep several reports on the financial accounts updated, from this perspective [the adoption of new policies], it becomes impossible... Municipalities do not demand accrual accounting because they are not demanded by the Court of Accounts." (accounting consultant contracted by a City Hall)*

As the IPSAS is not a priority for the City Hall, technical training for accountants has no effect, as the training does not have political support from the mayors allocating the resources (Lino et al., 2019; Aquino and Batley, 2015). The accountant ends up being the only one involved with the reform in the local administration:

> *"It is wrong to see the accountants as being solely responsible for the implementation of accrual accounting. It is imperative that public managers are involved in the matter. I realize that they [the promoters] see it differently, they want the process to happen starting from the accountant, rather than from the public managers.." (accounting consultant contracted by a City Hall)*

The low priority reflects the weak engagement of accountants throughout the process. The FMIS agreement is revaluated every year—and eventually it can be extended for an additional 12 months, up to 48 months total. After four years, the launching of a procurement bill is compulsory. Therefore, the FMIS and the requirements should be periodically evaluated and discussed.

Accountants retain the relevant technical knowledge regarding the FMIS specification criteria and empirical experience with operating the systems. More importantly, the accountants' role and responsibilities are strongly affected by the systems in use. Consequently, one would expect their engagement in two processes: (i) the specification of the FMIS and (ii) the classification of suppliers who fulfill such a specification.

The content analysis of the procurement bills indicates a low level of specification criteria in contracting out the FMIS. Procurement bills are often generic, do not specify which requirements of the current IPSAS standards must be fulfilled, and do not even mention accounting-oriented terms such as 'accrual accounting' or 'depreciation'. Such general terminology also indicates that the accountants are distant from the specification process or that the bills disregard the relevance of the specification in selecting an adequate FMIS. Such a superficial specification in the document analysis suggests that there will be difficulties in enforcing compliance with the criteria, reducing the probability that contractors execute an effective evaluation process.

When asked if they were engaged in the last FMIS procurement at the City Hall, only 1/3 of the accountants declared that they were engaged both in the phase of specification and in the phase of validation of the FMIS to be contracted out. Table 6 compares their perceptions of their FMIS' capacity to execute automated procedures for each accounting policy. We segregated and compared the 2 groups (engaged and nonengaged accountants), as supposedly the specification should be better due to the involvement of accountants in the specification phase to keep a higher level of FMIS functionalities. However, there is no significant difference between the two groups, indicating that the selected FMIS via competitive bidding may not depend on accountant engagement in the technical specification and supplier classification tasks.

[Insert Table 6 about here]

This suggests a mere symbolic participation of the accountants or their apathy toward the process. Even when the FMIS directly affects the accountants' performance, the accountants do not participate. The accounting departments often delegate the IPSAS adoption to the FMIS suppliers, as observed during the implementation of the new chart-of-accounts (Sediyama et al., 2018).

> *"My perception is that the government accountants are not committed to accounting convergence. They are neither sensitized nor motivated nor do they believe in the process. In the case of the accountants in Minas Gerais, the situation is even worse, since most of them are not bachelors and focus on the operational issues [...] and on the Court of Accounts demands, which are not concerned with accrual accounting, but only with budgeting and legal compliance." (accounting consultant contracted by a City Hall)*

We also asked accountants to declare whether the FMIS replacement affected their routines from a previous list of negative effects (3) and positive effects (3) that were identified in the interviews (Table 7). Comparing engaged and nonengaged accountants, the negative effects were perceived by the engaged accountants as more relevant compared to the nonengaged peers. The risk of disturbing compliance routines for the Courts of Accounts and of interrupting previously operative accounting policies can be initiated by challenges stemming not only from a lack of integration with legacy systems when FMIS are replaced by other FMIS but also from other implementation barriers and resistances.

[Insert Table 7 about here]

The issue of integration with legacy systems or modules is often mentioned by the extant literature. Systems integration affects information flows in departments and requires adjustments to the various FMIS modules at the City Hall composing an integrated FMIS. Although procedures and routines are centralized in an accounting department responsible for recognizing and encoding a transaction in the general ledger, this requires (i) the department in charge of the transaction or the asset to properly register the data; (ii) to access and record the data in the general ledger; and (iii) to disclose the data through standardized financial statements (e.g., cash flow statements).

> *"In [the adoption of] some accounting policies, it is possible for the accountant to operate manually; in others it is not. The asset inventory, for example, is a 6-month job, and it is not possible for the accountant to do it alone. Then the accountant depends on the other department. So, it does not just depend on the accountant or the software [FMIS]. It depends on other civil servants executing their routines. Moreover, that is where everything gets stuck [because other teams do not cooperate]." (accounting consultant contracted by a City Hall)*

The rebidding requirement, FMIS certification, and accountant engagement are connected subjects that explain the retention of accounting policies and that are consequently relevant to IPSAS projects. In countries where rebidding is mandatory, FMIS replacement is expected, and positive and negative effects will emerge. One solution is to reduce the technical specification costs often charged to accountants with FMIS certifications. Certification could be transferred to a third part of the FMIS evaluation process, and the comparison to predefined standards, for instance, the FMIS standards, could be enacted by a central authority. In doing so, the procurement bill could simply mention the certification as a necessary requirement for competing in the bid, thus reducing the dependence on the engagement of the accounting team in the procurement process. If the government's priority is not the IPSAS process, then a certification may at least exclude the worst offers from the FMIS market. Moreover, a certification could induce standardized features to guarantee interchangeable protocols and data recovery from other commercial solutions, thus reducing the negative effects of inevitable replacements.

8. Conclusion

The analysis suggests that contracting out FMIS has implications for accrual-based policy reform. The FMIS replacement reduces the propensity to Brazilian local governments retain the accrual-accounting policies they adopted. We analyzed IPSAS, which mainly deal with “journal entry”, involving the data recorded in the general ledger, which are the main challenge for the IPSAS reform. We observed cases of discontinuity in accounting policies when Handy FMIS were replaced by other similar FMIS. Allegedly, this should not have been expected because as the FMIS functionality was not reduced, the accounting policy should have been preserved. Therefore, the replacement effect stems from factors other than FMIS functionalities.

The qualitative evidence overall implicated the local Brazilian governments, in which the accountants do not engage with the specification and classification of the FMIS during the competitive bidding process. As the procurement regulation mandates the periodic rebidding of FMIS contracts, the frequent replacement of FMIS induces supplier turnover and potentially interrupts accounting policies. The use of certifications would favor nonengaged accountants to better contract Handy FMIS, as the absence of FMIS standardization increases the risk of selecting a nonintegrated FMIS.

The results open a dialogue between FMIS technical features, mandatory rebidding, and the professional and motivational aspects of accounting teams. The combined aspects would lead to the IPSAS project prospering in the long term. FMIS are already recognized by international agencies as a crucial aspect, including whether they allow interchangeable data recovery from legacy systems and competitors’ software. Notwithstanding this, we should also consider the contracting out dynamics; specifically, whether the procurement bills could be improved by certification. It is not an obvious issue who will run and enforce the FMIS certification. There is no definitive answer as to who shall be considered the auditing authority; however, in civil-law countries, the rule-enforcer would be required to go beyond the traditional legalistic auditing of the bidding process and contracts.

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