# Properties of accrual accounts in public sector entities: evidence from the Italian National Health Service

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## Abstract

**Purpose** – This paper aims to contribute to the debate over the desirability of introducing an accrual-based accounting system in the public sector by examining whether accrual-based accounting information is superior to cash-based information in the context of public sector entities.

**Design/methodology/approach** – This paper applies a quantitative research method to assess the degree of smoothness and relevance of the accrual components of income recorded by 302 entities of the Italian National Health Service (INHS) over the period 2014–2020.

**Findings** – The analysis reveals that net income is smoother than cash flows as a summary measure of economic results and that accounting for accruals improves the predictability of future cash flows. However, the authors' novel disaggregation of accrual accounts reveals that those accounts that contribute the most to making income smoother than cash flows – noncurrent assets and liabilities – are also those that contribute the least to predicting future cash flows.

**Originality/value** – The disaggregation of accrual accounts allows to identify the sources of the informational benefits of accrual accounting, and to document the existence of an informational "trade-off" between smoothness and relevance in the context of public sector entities.

**Keywords** Healthcare, Accruals, Relevance, Public sector accounting, Smoothness

**Paper type** Research paper

## 1. Introduction

The transition of public sector entities (PSEs) toward an accrual-based accounting model is a phenomenon of growing global significance (Adhikari and Gårseth-Nesbakk, 2016). Its desirability, however, remains heavily debated in the academic accounting community (Bonollo, 2022). This paper aims to contribute to the debate over the desirability of introducing an accrual-based accounting system in the public sector by examining whether

accrual-based accounting information possesses valuable properties compared to cash-based information in the context of public sector entities (PSEs). PSEs are defined as those public sector entities that deliver most of their services at nonmarket prices and cover their costs through revenues from nonexchange transactions. Given the magnitude of revenues and related expenses managed by PSEs, there are several categories of users of the financial information produced by PSEs highly interested in the quality of this information. Given that current-period cash flows represent a simple predictive measure of future cash needs, this article examines whether accounting for accruals at PSEs provides incrementally useful information to budgetary institutions – and other categories of resource providers.

To evaluate the incremental usefulness of accrual accounting at PSEs, this article examines the smoothness and relevance (Dechow *et al.*, 2010) of the accrual components of income recorded by 302 entities of the Italian National Health Service (INHS) over the period 2012–2020. The rationale for being focused on entities of the INHS lies in two main aspects. First, INHS entities have been among the pioneers in adopting accrual accounting in Italy, which allows us to analyze almost a decade of substantial and dependable accounting data. Second, healthcare spending absorbs a significant portion of Italian total public expenditure, representing 6.9% of gross domestic product (GDP) in 2022.

Innovating over prior studies (Farshadfar *et al.*, 2022; Pinnuck and Potter, 2009; Plummer *et al.*, 2007), an original disaggregation of noncash accounts is proposed that sheds light on the accounting implications of the peculiar economics of PSEs. In particular, the disaggregation reveals that most working capital accruals reported by PSEs reflect receivables for budgetary transfers to be collected, which are used both to pay debts toward employees, suppliers and other public administrations and to acquire noncurrent assets. When incorporated into recent accrual quality models (Ball and Nikolaev, 2022; Larson *et al.*, 2018; Richardson *et al.*, 2005), this approach delivers novel evidence, qualifies the results of prior research and contributes to reconciling the differing views of scholars on the desirability of accrual-based reforms in the public sector (Anessi-Pessina *et al.*, 2022; Christiaens, 2022; Christiaens *et al.*, 2012; Christiaens and Rommel, 2008).

The contribution of this paper is threefold. First, it applies an innovative methodological approach to analyze the smoothness and usefulness of accruals in PSEs by showing their potential and limits. Second, it contributes to the ongoing debate over the usefulness of accrual accounting in the public sector, providing a mixed picture. Third, the findings provide some policy implications by suggesting that policymakers should consider that the informational benefits of accrual accounting may depend on the specific economics of different PSEs. The primary benefit lies in the ability of accrual accounting to improve the stability of the measure of economic results as opposed to significantly enhancing the ability to predict future cash flows.

The article develops as follows: Section 2 reviews the literature on the applicability of accrual accounting in the public sector and briefly summarizes the state of the art of research in this context; Section 3 provides details on the institutional setting of the INHS; Section 4 develops the hypotheses and the research design; Section 5 describes the data and Section 6 presents the results. Finally, Section 7 provides a discussion and draws some conclusions.

## 2. Literature review
The academic debate around the relevance of accrual accounting for PSE is located both within a traditional, positivist tradition that tests the properties of accruals *vis-à-vis* cash flows (Caruana *et al.*, 2019; Heiling, 2022) and a contextual and critical perspective that highlights their potential drawbacks and unintended consequences (Ellwood and Newberry, 2007; Guthrie, 1998; Bonollo, 2022).

Positivist studies begin with the premise that accrual accounting allows managers to record the results of transactions once evidence exists that wealth has been created or destroyed (Dechow, 1994). Thus, accrual accounting differs from cash accounting because it records transactions once the right to obtain economic benefits – rather than cash – is gained or lost by the entity (IASB, 2018; IPSASB, 2014). Accordingly, scholars often view the adoption of accrual accounting as a necessary premise to generate financial reports that provide comprehensive and accurate depictions of the financial performance and position of the reporting entity (Cohen et al., 2019; Stalebrink, 2007). From an empirical standpoint, researchers tend to measure the value added of accrual accounting by testing the incremental usefulness of accrual-based measures of performance over comparable, cash-based measures (Dechow et al., 2010). Typically, usefulness is operationalized as the extent to which accrual-based measures of income exhibit desirable properties – e.g. persistence, relevance and smoothness – compared to cash flows (Dechow et al., 2010). Ample evidence confirms that accrual-based measures of income – in particular, operating income – possess desirable properties by being smoother than cash flows and better able to predict future cash needs (Ball and Nikolaev, 2022; Dechow and Dichev, 2002; Finger, 1994; Kim and Kross, 2005; Larson et al., 2018; Richardson et al., 2005; Sloan, 1996). At the same time, accruals typically make income less persistent over time because of the discretion inherent in accounting for variations in noncash assets and liabilities (Sloan, 1996) – particularly, those that are recorded in working capital accounts (Richardson et al., 2005).

In the context of PSEs, researchers document that these properties replicate only in part (Farshadfar et al., 2022; Pinnuck and Potter, 2009; Plummer et al., 2007). For example, Plummer et al. (2007) examine the incremental usefulness of accrual-based measures of income and net wealth to predict future credit risk. They document that accrual-based balance sheets improve the predictability of default risk, while an accrual-based measure of income does not, compared to an equivalent, commitment-based measure. Pinnuck and Potter (2009) examine Australian local governments and document that net income is more relevant than operating cash flows as a predictive indicator of future cash needs. However, they also show that net income is more volatile than operating cash flows – perhaps due to a misalignment between the items that they include in the calculation of *net* income and *operating* cash flows (Ball and Nikolaev, 2022; Larson et al., 2018). Finally, Farshadfar et al. (2022) evaluate the properties of operating income and operating cash flows in a sample of Canadian state governments. Consistent with earlier research, they show that operating income is slightly smoother than operating cash flows and that it is incrementally relevant for predicting one-year ahead operating cash flows. Interestingly, however, they document that operating income exhibits relatively low persistence and that its accrual component does *not* reduce persistence – inconsistent with a longstanding finding of corporate research (e.g. Sloan, 1996).

The mixed results from earlier research on the properties of accrual accounting in the public sector raise the question of whether empirical results from corporate studies ought to be replicated in governmental entities in the first place. Partly for this reason, critical and contextual scholars claim that the actual benefits of the transition to accrual accounting on comparability, accountability and decision-making are elusive – particularly when compared to implementation costs (Adhikari and Gårseth-Nesbakk, 2016; Anessi-Pessina and Steccolini, 2007; Christiaens et al., 2015). In turn, several recent studies show that accrual accounting can have negative consequences because it allows public sector entities to engage in "earnings management" (EM) (Bisogno and Donatella, 2021) [1]. For example, Cohen et al. (2019) study Italian and Greek municipalities and show that they engage in EM, partly in response to electoral pressure (see also Ferreira et al., 2020), while Beck (2018) documents the EM incentives triggered by municipal bond issuances. Stalebrink (2007) finds that EM at Swedish municipalities depends on pre-EM performance, with

municipalities strategically timing the reporting of write-offs and capital depreciation expenses either when reporting a deficit or when the surplus is large enough to absorb them. Similarly, Kido et al. (2012) show that U.S. State governments manage two liability accounts in the pre-election period and Coelho (2022) and Capalbo et al. (2021) derive similar conclusions in the context of municipal firms. In the healthcare setting, Ballantine et al. (2007) document evidence of EM to avoid reporting a deficit in the U.K., but Ibrahim et al. (2019) and Greenwood et al. (2017) document the opposite result. A comprehensive review of public sector EM research is conducted by Bisogno and Donatella (2021), showing contrasting evidence emerging from the literature.

Beyond the potentially negative consequences of adopting accrual accounting on the quality of reported earnings, others question the very desirability of the accrual accounting project that several governments have embraced (Polzer et al., 2019), seeing it as yet another manifestation aspect of a neo-liberal agenda (Hyndman and Connolly, 2011; Lapsley et al., 2009). To a large extent, this critical stance rests on the intuition that, even if accrual accounting possesses desirable properties in the context of firms, it cannot be transposed to PSE without recognizing their peculiar economics and institutional role (Brusca, 2023). For example, PSE generate most of their revenues in the form of nonexchange transactions – through taxes and transfers – the accounting of which presents specific challenges (Bisogno et al., 2019; Christiaens and Rommel, 2008). Another example is given by the ongoing debate over the relevance of accounting for heritage and natural assets, which represent an important, noncash-generating asset category in governments but not in firms (Anessi-Pessina et al., 2022; Biondi et al., 2021; Carnegie and Kudo, 2022; Christiaens, 2022; Christiaens et al., 2012; Ferri et al., 2021). Against this background, prior public sector accrual quality research (Farshadfar et al., 2022; Pinnuck and Potter, 2009) does not focus on the accounting implications of the idiosyncrasies of PSE when proposing hypotheses and testing them via econometric methods. The studies that examine EM, in turn, typically take the cash-accrual models as a starting point for measuring discretionary accruals, but do not examine their applicability in the specific public sector context (Cohen et al., 2019). By attending to the idiosyncrasies of the PSE context, this paper wishes to be sensitive to arguments that characterize both positivist and contextual research and to the institutional and normative setting that surrounds one category of PSEs – healthcare organizations – as outlined in the next section.

## 3. Institutional setting

The entities studied in this article belong to the INHS. The motivation underlying this choice is twofold: (1) INHS entities were among the early adopters of accrual accounting in Italy (as we will better describe later on) so that reliable and sizeable data are available to carry out our analysis; (2) the amount of healthcare spending represents a high share of the overall Italian public spending, at 15.3% of primary current expenditure and 6.9% of GDP as of end-2022 (Corte dei Conti, 2023).

The birth of the INHS – based on universal access, solidarity and equity principles – dates back to 1978. Like other countries, the evolution of the INHS has been characterized by difficulties in balancing centralization and decentralization among the different tiers of government (Ricciardi and Tarricone, 2021; Tediosi et al., 2009). At present, the INHS is structured into three tiers: the highest is the central government; the intermediate is represented by 21 regional governments; and the lowest is composed of both local healthcare authorities (LHAs) - responsible for the health of the entire population in each area – and independent hospitals (HIs).

Born with traditional public administration logics, during the 1990s, the INHS was caught up in the pervasive wave of the New Public Management (NPM) (Hood, 1991, 1995)

with the introduction and diffusion of managerialism, regionalization and quasi-market principles (Fattore, 1999). Managerialism has led to the adoption of private-sector management logic and techniques. This trend has motivated a shift from traditional cash- and commitment-based accounting, which is aimed at authorizing spending *ex ante*, to accrual and management accounting that aims at measuring and reporting financial performance *ex-post*. The Decree Law 517/1993 initiated the accrual-based reform of the accounting information system and financial reporting of INHS. Besides, regionalization led to attributing jurisdiction over most healthcare issues to regional governments that enjoy significant budgetary autonomy and responsibility, creating 21 different Regional Health Services (RHSs) (Anessi-Pessina *et al.*, 2004). Budgetary autonomy implies that expenses for healthcare provision are funded through (1) regional taxes and levies and (2) own resources of LHAs. In turn, a national fund compensates for regional differences in fiscal capacity. This mode of financing implies that the costs that INHS entities incur for service delivery are funded through the annual transfers of regional and national resources allocated through the regional budget.

The regionalization of the INHS has affected the accounting model of INHS entities, too. In the 1990s, the INHS was the first major branch of the Italian public sector to replace and not simply supplement, commitment-based accounting systems with accrual accounting and to report an income statement and a balance sheet, albeit with regional autonomy over accounting standards (Anessi Pessina, 2012; Grandis, 1996). Regional variation in the accounting and reporting requirements of the INHS resulted from the budgetary autonomy of the Regions *vis-à-vis* the State in matters, such as healthcare, attributed to them by the Italian Constitution. However, between 1990 and 2000s, a significant increase in healthcare expenditure and systematic deficits, particularly in some regions, led to a partial return to centralization through: (1) the establishment of a monitoring and sanctioning system; (2) the reintroduction of a central imposed constraints and controls on types and volumes of services and inputs; (3) the centralization of purchases; (4) the merging of some public healthcare organizations; and (5) the partial reintroduction of global budgets (Anessi-Pessina and Cantù, 2017).

The need to monitor and review public expenditure, also at the European level, paved the way for the accounting harmonization of Italian PSE, including INHS entities. In this direction, the accounting and public finance law issued in 2009 (Law n. 196/2009), which currently shapes the Italian accounting system, required the adoption of a common set of accounting standards for all PSE, as well as the introduction of accrual accounting for those entities which still were adopting cash- and commitment-based accounting only (namely some institutional entities, some universities, instrumental entities, local and central government). However, implementing the above-mentioned law through different decrees in the different PSE resulted in a highly diversified situation in timing and content, giving rise to a debate which is still ongoing (RGS, 2019).

In implementing the new accounting and public finance law, the Legislative Decree n. 118/2011 (hereafter: "the INHS Decree") introduced nationwide accrual-based standards for INHS and mandatory consolidated financial statements for the whole of the RHS (Ibrahim *et al.*, 2019). The INHS Decree mandates that INHS entities report a full set of annual financial statements, including a statement of cash flows and notes. The accounting principles adopted in the preparation of these financial statements largely follow the accrual basis of accounting as regulated in the Italian Civil Code and applicable to firms. Deviations are allowed only insofar as they are specifically regulated in the INHS Decree. Thanks to the harmonization of the accounting model of INHS entities, accrual-based financial reports have been publicly available since 2012 and represent the primary source of data analyzed in this study.

## 4. Hypothesis

Prior accounting literature – both in the private (Dechow, 1994; Larson *et al.*, 2018; Richardson *et al.*, 2005) and public (Farshadfar *et al.*, 2022; Pinnuck and Potter, 2009) sector provides us with the theory to hypothesize the baseline relation between accruals and cash flows. The INHS context, however, suggests making some variation to the models to acknowledge the idiosyncrasies of the setting. These are inspired by the evidence provided in Table 1, which reports the main assets and liabilities held by INHS entities over the sample period. These items are expressed as a percentage of average assets over consecutive periods.

As the table shows, the balance sheet of INHS entities is dominated by property, plant and equipment – in particular, buildings – that represent 29% of average assets [2]. These buildings are not disposable from a legal standpoint, implying that they cannot be sold, but only used, by the entity to run its operations. Next, working capital represents 59% of average assets and is dominated by trade and other receivables, which collectively amount to 42% of average assets. Of these, about three-fourths reflect receivables for amounts to be collected by the Region where the entity is located. While these receivables reflect for the most part cash to be collected to finance current expenses, about a third is dedicated to finance the acquisition of noncurrent assets. Finally, cash and cash equivalents are high at 14% of

| Assets | | | Liabilities and net wealth | | |
|---|---|---|---|---|---|
| A.1 | **Noncurrent assets** *of which* | 41% | **Net wealth** *of which* | 36% | NW.1 |
| A.1.1 | Property, plant and equipment *of which* | 39% | General fund | 4% | NW1.1 |
| | | | Funds received to acquire noncurrent assets | 36% | NW.1.2 |
| A.1.1.1 | Buildings *of which* | 29% | Reserves | 3% | NW.1.3 |
| | | | Funds received to cover losses | 8% | NW.1.4 |
| A.1.1.1.a | Nondisposable buildings | 28% | Retained income (accumulated losses) | −12% | NW.1.5 |
| A.1.1.2 | Other noncurrent assets | 2% | Net income | −3% | NW.1.6 |
| A.2 | **Current assets** *of which* | 59% | Other net wealth | 0% | NW.1.7 |
| | | | **Provisions** | 13% | L.1 |
| A.2.1 | Trade and other receivables *of which* | 42% | *of which* | | |
| | | | For legal claims | 2% | L.1.1 |
| A.2.1.1 | Receivables from Region | 31% | For transfers acquired and not utilized | 3% | L.1.2 |
| | *of which* | | For other risks and future expenses | 1% | L.1.3 |
| A.2.1.1.a | for current expenses | 21% | **Current liabilities** | 50% | L.2 |
| A.2.1.1.b | for recapitalization | 10% | *of which* | | |
| A.2.1.1.b.1 | *of which: for acquisition of noncurrent assets* | 8% | Payables towards Region | 8% | L.2.1 |
| A.2.1.3 | Cash and cash equivalents | 14% | Payables towards INHS entities | 5% | L.2.2 |
| A.2.1.4 | Other current assets | 3% | Payables towards suppliers | 23% | L.2.3 |
| A.3 | **Other assets** | 0% | Other current liabilities | 15% | L.2.4 |
| | | | **Other liabilities** | 1% | L.3 |
| TA | **Total assets (A.1+A.2+A.3)** | 100% | **Total liabilities and net wealth (NW.1+L.1+L.2)** | 100% | TLNW |

**Note(s):** This table reports the value of the most important individual items reported in the balance sheet of INHS entities over the sample period, as percentage of average assets. See the Appendix for the definition of the variables
**Source(s):** Authors' own creation

average assets. Financial assets are of marginal importance as a result of legislative measures that prevent INHS entities from investing in bonds and equity shares.

On the liability side, INHS entities present a considerable amount of net wealth, at 36% of average assets. However, this high value masks some peculiarities of the economics of these entities and of their accounting model. In particular, only 4% of average assets are represented by the general fund (similar to the common equity of a corporation). Instead, 36% of average assets reflect funds received by the Region to acquire noncurrent assets. These resources do not represent liabilities – they are not "debt" to be repaid – but they can only be used to acquire noncurrent assets (Grandis, 1996) and are capitalized as multiannual deferred revenues until the investment is fully depreciated. In addition, INHS entities receive funds to cover prior losses, which are high at 12% of assets. Next, the table shows that net income of the period is on average negative, at about 3% of assets. Turning to the liabilities, INHS entities record provisions for an amount equivalent to 13% of average assets, partly reflecting provisions for legal claims. Next, current liabilities are high at 50% of assets, almost half of which reflect payables towards suppliers.

The picture that emerges from Table 1 allows to make two observations that have implications for our hypotheses. First, a little more than half of the balance sheet of INHS entities consists of receivables and payables. However, while receivables reflect primarily funds to be collected from the budgetary authority, payables reflect mostly debts towards suppliers of goods and services. Accordingly, while receivables reflect mostly nonexchange revenues, payables arise out of exchange transactions to a large extent, whereby INHS entities purchase goods and services to conduct the operations needed to deliver healthcare services. This imbalance neatly captures the financially dependent nature of INHS entities. The second insight is that if we adopt an income perspective and treat noncurrent assets, inventory, deferred income and expenses and provisions as the reflection of the working of the economic accrual principle, we see that the adoption of accrual accounting in INHS entities has led to a substantial improvement in the comprehensiveness of the statement of financial position, as these items amount to about half of the average assets and liabilities that they control. Absent economic accrual accounting, the only assets and liabilities that the financial statements could represent are either cash, or the sum of cash and cash equivalents and trade and other receivables, less trade and other payables. Thus, an important – and testable – empirical question is to understand whether the visibility of economic accounts provided by accrual accounting is associated with an improved ability to predict future cash flows.

Collectively, these insights give rise to the following hypotheses:

*H1.* The measure of net income reported by INHS entities on an accrual basis predicts one-year ahead cash flows better than current cash flows;

*H2.* Changes in noncurrent assets reported by INHS entities on an accrual basis predict one-year ahead cash flows;

*H3.* Changes in receivables and payables reported by INHS entities on an accrual basis predict one-year ahead cash flows.

## 5. Data and models
### 5.1 Data
Data used in this article are retrieved from the public Data Warehouse stored at OpenBDAP (https://openbdap.rgs.mef.gov.it). OpenBDAP is an open-access repository containing the financial data of a large set of Italian public administrations, including the INHS entities studied in this article. These data are recorded in spreadsheets that include the complete income statement and balance sheet published by all healthcare institutions for each year of

the period 2012–2020. These files contain line-by-line amounts (in €) for each item prescribed by the law [3]. The financial results of the budgetary institutions managing the healthcare system (i.e. Regions and Autonomous Provinces) included in the downloaded files are dropped from the final dataset because they represent either the linear combination of the financial statements of individual entities located in the territory (SSN entity code: #999) or the results of the centralized budget managed directly by the Region or Autonomous Province (SSN entity code: #0) (Martinelli, 2017). The data management process leads to a final panel of 1,289 observations, consisting of 302 unique INHS entities ($i$) tracked over seven years ($t$) between 2014 and 2020. All variables are winsorized at the 1st and 99th percentile to reduce the influence of extreme observations, and they are scaled by average total assets over consecutive years, in line with previous research (Larson *et al.*, 2018).

*5.2 Methods*
The model that we will use to test the hypotheses takes the following form:

$$Cash\ Flows_{i,t+1} = \alpha + \tau_t + \beta_1 Cash\ Flows_{i,t} + \beta_2 Accrual_{i,t} + \varepsilon_{i,t+1} \qquad (M.1)$$

Where $\alpha$ is an intercept and $\tau_t$ denotes year-fixed effects. Year-fixed effects are added to control for possible exogenous shocks that involve all INHS entities at the same time – e.g. the Covid-19 pandemic that began in 2020. Next, $Accrual_{i,t}$ represents the variable of interest. Accordingly, the sign and statistical significance of $\beta_2$ is the coefficient of interest because, if accounting for accruals improves the predictability of cash flows, $\beta_2 > 0$. Depending on the model specification, $Accrual_{i,t}$ is calculated with different degrees of granularity in tests of M.1. In particular, *Comprehensive accruals* is calculated as *Net Income – Cash Flows* (Dechow, 1994) measuring, therefore, the total variation in all accrual (i.e. noncash) accounts. Next, we follow prior studies (Larson *et al.*, 2018; Richardson *et al.*, 2005) and decompose the comprehensive measure of accruals into: (1) working capital accruals (*WCACC*); (2) long-term operating accruals (*LTACC*); and (3) financial accruals (*FINACC*). As shown in Table 1, working capital accruals in our setting include mostly short-term receivables and payables, while long-term operating accruals include primarily buildings and provisions. In turn, financial accruals include financial assets and liabilities. By decomposing accruals by nature, we can test the hypothesis that only some accrual accounts predict future cash flows. This test is particularly important in our public sector setting because long-term operating accruals include buildings and other fixed assets that are unlikely to generate future revenues and, therefore, cash flows (Christiaens, 2022; Christiaens *et al.*, 2012). In turn, Table 1 shows that financial assets and liabilities have a small magnitude in our setting. Therefore, we expect that insofar as accruals improve the predictability of future cash flows, such value-added should manifest in a larger and more statistically significant coefficient on the variable that captures working capital accruals.

Finally, accruals are decomposed based on the detailed breakdown of items in Table 1 to isolate the contribution of the most important *individual* items reported by INHS entities in their financial statements. Thus, accruals are separately decomposed into: *Buildings*; *Receivables towards the Region for current expenses*; *Receivables towards the region for additions to net wealth*; *Other current assets*; *Other long – term assets*; *Provisions*; *Payables towards Region and other INHS entities*; *Payables towards suppliers*; *Other current liabilities*; and *Other non – current liabilities*. This most granular decomposition allows for a highly context-specific analysis of the value-added that the reporting of each of these items has *vis-à-vis* the ability to predict the future cash flows and cash needs, of INHS entities.

In a variation of model M.1 that can be seen as a robustness test, we add fixed effects for each entity in the sample. Entity-specific fixed effects allow controlling for time-invariant characteristics of each INHS entity that are unrelated to the accounting model in use and are unobserved – e.g. its structural performance - (Ball and Nikolaev, 2022; Dechow *et al.*, 2010).

However, the inclusion of fixed effects in M.1 may generate biased coefficients because the model includes $Cash\,Flows_{i,t+1}$ on the left-hand side of the equation and its first lag, $Cash\,Flows_{i,t}$, on the right-hand side (Angrist and Pischke, 2009). Thus, the model variation that includes fixed effects excludes cash flows in the list of predictors and replaces the constant with entity-specific intercepts, as follows:

$$Cash\,Flows_{i,t+1} = \alpha_i + \tau_t + \gamma_1 Accrual_{i,t} + \eta_{i,t+1} \tag{M.2}$$

Where $\alpha_i$ is now an entity-specific intercept to capture the panel dimension of the dataset. Both models are tested using the ordinary least squares (OLS) estimator. An important innovation over prior research is that models M.1 and M.2 are estimated with standard errors clustered at the NUTS 2 level, which in Italy corresponds to the 21 Regions and Autonomous Provinces (hereafter: "Regions"). The clustering dimension is motivated by the fact that the magnitude of accruals and cash flows recorded by individual entities is determined by the budgetary allocation of the Regions in which the entity operates. Therefore, the amount of the annual regional budget allocated and disbursed to entity $i$ affects the amounts allocated and disbursed to any other entity $j \neq i$ included in *that* regional budget. This fact makes the database of INHS entities a panel nested in the regional dimension, because this is the dimension at which allocations and disbursements take place (Abadie *et al.*, 2023).

## 6. Results

### 6.1 Univariate analysis

Table 2 shows descriptive statistics of the variables used in the analysis, with the last column reporting the significance test of the hypothesis that the mean (reported in column 3) equals 0.

| | N | Mean | SD | Entity SD | p1 | p50 | p99 | SE |
|---|---|---|---|---|---|---|---|---|
| Net income (loss) | 1,289 | −0.023 | 0.062 | 0.023 | −0.329 | 0 | 0.03 | [0.010]* |
| Cash flows | 1,289 | −0.031 | 0.143 | 0.109 | −0.621 | −0.009 | 0.291 | [0.016]+ |
| Comprehensive accruals | 1,289 | 0.009 | 0.130 | 0.114 | −0.3 | −0.001 | 0.573 | [0.008] |
| Net current accruals | 1,289 | 0.029 | 0.133 | 0.116 | −0.299 | 0.016 | 0.597 | [0.009]** |
| Net noncurrent accruals | 1,289 | −0.02 | 0.048 | 0.043 | −0.21 | −0.016 | 0.122 | [0.003]*** |
| Nondisposable buildings | 1,289 | −0.005 | 0.036 | 0.032 | −0.119 | −0.006 | 0.171 | [0.002]* |
| Receivables from Region for current expenses | 1,289 | −0.012 | 0.081 | 0.081 | −0.306 | −0.001 | 0.217 | [0.005]* |
| Receivables from Region for additions to net wealth | 1,289 | 0.004 | 0.058 | 0.046 | −0.182 | 0 | 0.305 | [0.003] |
| Other noncurrent assets | 1,289 | −0.005 | 0.032 | 0.028 | −0.18 | 0 | 0.067 | [0.001]*** |
| Other current assets | 1,289 | 0 | 0.044 | 0.039 | −0.144 | 0 | 0.169 | [0.001] |
| Provisions | 1,289 | 0.011 | 0.027 | 0.024 | −0.072 | 0.007 | 0.109 | [0.002]*** |
| Payables towards Region and INHS entities | 1,289 | −0.006 | 0.073 | 0.060 | −0.356 | 0 | 0.249 | [0.003]+ |
| Payables towards suppliers | 1,289 | −0.02 | 0.067 | 0.052 | −0.339 | −0.007 | 0.133 | [0.007]** |
| Other noncurrent liabilities | 1,289 | −0.001 | 0.007 | 0.004 | −0.028 | 0 | 0.04 | [0.000] |
| Other current liabilities | 1,289 | −0.009 | 0.050 | 0.045 | −0.244 | 0 | 0.114 | [0.003]** |

**Note(s):** This table shows descriptive statistics of the variables used in the analysis. SD denotes standard deviation. SE denotes the standard error of the variable, estimated by regressing it on a constant with standard errors clustered at the regional dimension, and the statistical significance of the coefficient. $+\ p < 0.10$, $*p < 0.05$, $**p < 0.01$, $***p < 0.001$. See the Appendix for definition, source and method of construction of the variables

**Source(s):** Authors' own creation

The average INHS entity included in the sample reports negative income (about 2.3% of average assets), a value that is statistically different from zero. Similarly, cash flows are negative at 3.1% of assets, implying that the comprehensive measure of accruals, calculated as income minus cash flows, is only slightly positive at 0.9% of assets and not statistically different from 0. The table also shows substantial variation in the average value of different accrual classes. In particular, net current accruals are positive and net noncurrent accruals are negative, and their average values – 2.9 and −2 percent of average assets, respectively – are both statistically different from zero.

Turning to the most important noncash assets reported in the balance sheet of INHS entities, the value of nondisposable buildings has declined over the years, on average, by about 0.5% of assets. In turn, entities have recorded a declining level of receivables to finance current expenses and an increasing – but not statistically significant – level of receivables to increase net wealth. Other current and noncurrent asset accruals have shown little variation. Turning to liability-side accruals, the average INHS entity has significantly increased its level of provisions, by about 1.1% of total assets. In turn, payables towards all categories of creditors have declined substantially, between 0.6 and 2.0% of assets, with both categories exhibiting a statistically significant decline. Other current and noncurrent liabilities have shown minimal variation over the sample period. Collectively, the results indicate that INHS entities have substituted current for noncurrent accruals over the sample period, mostly through a reduction in payables towards suppliers. Therefore, INHS entities have improved their short-term liquidity at the expense of the long-term financial and operating capacity.

Turning our attention to columns 4 and 5, these contain measures of the volatility of the variables, through which we can assess the extent to which accounting for accruals contributes to generating a smoother measure of performance compared to cash flows. Column 4 contains the pooled standard deviation, while column 5 contains the within-entity standard deviation, which expresses the average value of the standard deviation of each variable, calculated separately for each entity. The within-entity standard deviation is a particularly suited measure of the volatility of the variables because it measures the extent to which each of the variables varies within – rather than between – each of the 302 entities in the sample (Ball and Nikolaev, 2022).

Both the pooled standard deviation reported in column 4 and the within-entity standard deviation reported in column 5 provide a similar picture and deliver important insight. Focusing on the pooled standard deviation, net income exhibits about half the standard deviation of cash flows (0.062 against 0.143). This result indicates that net income is substantially less volatile than cash flows – a desirable property of performance measures. When looking at the within-entity level of volatility, the improved degree of smoothness is even more significant, as the within-entity standard deviation of net income (0.023) is about a fourth of the within-entity standard deviation of cash flows (0.109). Thus, accounting for accruals generates a considerably less volatile measure of economic results than accounting for cash flows only.

Because net income is equal to cash flows plus changes in accrual accounts, the table also shows which accruals are responsible for making net income smoother than cash flows. Specifically, the volatility of noncurrent accruals (0.048) – which include mostly nondisposable buildings and provisions – is about a third of the volatility of current accruals – which include mostly receivables and payables. This result is similar if we examine the within-entity standard deviation. As we continue to look throughout the table, provisions exhibit the smallest standard deviation (0.027), followed by nondisposable buildings (0.036). Other accrual accounts, such as receivables and payables, also contribute to making income smoother than cash flows, but to a lesser extent, as it is evidenced by a standard deviation that is only about half of that of cash flows.

Table 3 displays the correlation and autocorrelation coefficients of the variables used in the analysis. We note that net income is, as expected, positively correlated with cash flows with a coefficient of 0.42. Net income is negatively correlated with the accrual-induced variation in the value of nondisposable buildings, provisions, payables and other liabilities, consistent with these accruals being accompanied by the recognition of costs in the income statement. Net income is also negatively correlated with receivables from the Region for funds to increase net wealth – reflecting the reliance of loss-making INHS entities on the regional budget. Other correlation coefficients of interest include the correlation between accruals and cash flows, which is negative as expected for all asset accruals and positive for all liability accruals (Larson *et al.*, 2018).

Finally, we note that the autocorrelation coefficients indicate that net income is significantly more persistent than cash flows, supporting the insights from Table 2 that accounting for income on an accrual basis improves the stability of the bottom-line measure of performance. Specifically, net income displays an autocorrelation coefficient of 0.867, which implies that for every euro of income (or loss) reported by an entity in a generic year, about 87 cents persist in the following year. In contrast, only about 19% of cash flows reported by an entity in a generic year persist in the following accounting period, implying that cash flows are highly volatile and hardly useful as predictors of future performance.

Collectively, the evidence indicates that accounting for transactions on an accrual rather than cash basis at INHS entities provides a relatively smooth measure of performance. In addition, the evidence indicates that this benefit is mostly visible when entities control a significant amount of noncurrent assets – primarily, nondisposable buildings – and record considerable levels of noncurrent liabilities – primarily, potential liabilities in the form of provisions. These findings are important because they underline an important *informational* benefit of adopting accrual accounting even in the public sector: users – including budgetary institutions – are better able to predict and assess performance when it is measured after the inclusion of changes in noncash assets and liabilities. In addition, these findings are important because they help understand the *source* of this informational benefit. Based on the evidence reported in Table 2, the source of smoothness lies in accounting for noncurrent assets and liabilities on an accrual basis. This finding is consistent with the accrual accounting process transferring certain costs and revenues from the income statement to the balance sheet and progressively debiting and crediting them as period costs and revenues over the years. Instead, accounting for current assets – mostly, receivables and payables – on an accrual basis does not contribute as much to making net income a smoother measure of performance than cash flows. In fact, receivables and payables appear to follow quite closely the dynamics of cash flows.

## 6.2 Multivariate analysis

Table 4 reports the results of estimating model M.1. The first row presents the coefficient on contemporaneous *Cash flows* across models and the first column estimates M.1 when only *Cash flows* are used as predictors of one-year ahead cash needs. The variation of the model reported in the first column can be seen, therefore, as the only predictive model that would be available to budgetary institutions, citizens, creditors and other users if INHS entities adopted cash accounting. In this model, the coefficient on *Cash flows* is positive but not statistically significant, implying that a cash-only measure of economic results is not useful to predict future cash needs. Instead, column 2 shows that incorporating accrual-based information – measured by the comprehensive measure of accruals (*Comprehensive accruals*) allows users of the financial statements of INHS entities to predict their one-year ahead cash flows. In particular, for every one-euro change in the reported amount of comprehensive accruals, about 83 cents in cash flows arise in the following twelve months [4]. Next, column 3 decomposes the comprehensive measure of accruals into working capital, long-term and

| Variables | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) | (10) | (11) | (12) | (13) | (14) | (15) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| (1) Net income (loss) | 0.867* (0.018) | | | | | | | | | | | | | | |
| (2) Cash flows | 0.420* (0.000) | 0.193* (0.029) | | | | | | | | | | | | | |
| (3) Comprehensive accruals | −0.006 (0.831) | −0.902* (0.000) | −0.011 (0.028) | | | | | | | | | | | | |
| (4) Net current accruals | −0.013 (0.633) | −0.834* (0.000) | 0.925* (0.000) | −0.001 (0.028) | | | | | | | | | | | |
| (5) Net noncurrent accruals | 0.042 (0.134) | −0.074* (0.008) | 0.080* (0.004) | −0.285* (0.000) | 0.086* (0.031) | | | | | | | | | | |
| (6) Nondisposable buildings | −0.089* (0.001) | −0.004 (0.893) | −0.042 (0.132) | −0.219* (0.000) | 0.453* (0.000) | 0.067* (0.032) | | | | | | | | | |
| (7) Receivables from Region for current expenses | 0.024 (0.398) | −0.232* (0.000) | 0.263* (0.000) | 0.291* (0.000) | −0.092* (0.001) | −0.133* (0.000) | −0.184* (0.032) | | | | | | | | |
| (8) Receivables from Region for additions to net wealth | −0.077* (0.006) | −0.370* (0.000) | 0.378* (0.000) | 0.431* (0.000) | −0.169* (0.000) | −0.132* (0.000) | 0.033 (0.242) | −0.187* (0.028) | | | | | | | |
| (9) Other noncurrent assets | 0.025 (0.371) | 0.039 (0.160) | −0.033 (0.232) | −0.166* (0.000) | 0.373* (0.000) | −0.337* (0.000) | −0.027 (0.338) | −0.150* (0.000) | 0.077* (0.031) | | | | | | |
| (10) Other current assets | 0.023 (0.409) | −0.009 (0.759) | 0.018 (0.520) | 0.037 (0.183) | −0.044 (0.114) | 0.053* (0.056) | −0.174* (0.000) | −0.128* (0.000) | 0.015 (0.592) | 0.030 (0.031) | | | | | |
| (11) Provisions | −0.107* (0.000) | 0.093* (0.001) | −0.140* (0.000) | 0.037 (0.189) | −0.500* (0.000) | 0.137* (0.000) | −0.037 (0.179) | −0.032 (0.250) | 0.034 (0.223) | 0.134* (0.000) | 0.175* (0.032) | | | | |
| (12) Payables towards Region and INHS entities | −0.072* (0.010) | 0.224* (0.000) | −0.284* (0.000) | −0.267* (0.000) | −0.012 (0.679) | −0.023 (0.401) | 0.273* (0.000) | 0.002 (0.948) | −0.034 (0.227) | 0.086* (0.002) | −0.057* (0.041) | −0.201* (0.028) | | | |
| (13) Payables towards suppliers | 0.048 (0.085) | 0.435* (0.000) | −0.459* (0.000) | −0.489* (0.000) | 0.133* (0.000) | 0.121* (0.000) | 0.092* (0.001) | −0.096* (0.001) | 0.120* (0.000) | 0.162* (0.000) | 0.054* (0.054) | −0.066* (0.017) | 0.022 (0.025) | | |

Table 3.
Correlations

**Table 3.**

| Variables | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) | (10) | (11) | (12) | (13) | (14) | (15) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| (14) Other noncurrent liabilities | −0.027 (0.334) | 0.020 (0.469) | −0.034 (0.217) | −0.004 (0.892) | −0.074* (0.008) | 0.087* (0.002) | −0.007 (0.804) | −0.003 (0.901) | 0.087* (0.002) | 0.007 (0.810) | 0.046 (0.101) | −0.033 (0.240) | 0.013 (0.632) | 0.017 (0.031) | |
| (15) Other current liabilities | 0.050* (0.071) | 0.265* (0.000) | −0.284* (0.000) | −0.337* (0.000) | 0.193* (0.000) | 0.101* (0.000) | 0.177* (0.000) | −0.003 (0.903) | 0.074* (0.008) | 0.022 (0.424) | −0.089* (0.001) | −0.098* (0.000) | 0.152* (0.000) | −0.002 (0.941) | −0.042 (0.029) |

**Note(s):** This table displays pairwise correlation (in the bottom triangle) and autocorrelation coefficients (on the diagonal) of the variables included in the analysis. Autocorrelation coefficients are estimated based on an OLS regression of each variable on its first lag. Correlations and autocorrelation coefficients that are significant with $p$-value<0.1 are accompanied by a * symbol. See the Appendix for the definition of the variables

**Source(s):** Authors' own creation

| | (1) Cash flows$_{t+1}$ | (2) Cash flows$_{t+1}$ | (3) Cash flows$_{t+1}$ | (4) Cash flows$_{t+1}$ |
|---|---|---|---|---|
| Cash flows$_t$ | 0.175 [0.113] | 0.843*** [0.185] | 0.695** [0.209] | 0.532* [0.212] |
| Comprehensive accruals$_t$ | | 0.826*** [0.163] | | |
| Working capital accruals$_t$ | | | 0.604** [0.188] | |
| Long-term operating accruals$_t$ | | | 0.502* [0.196] | |
| Financial accruals$_t$ | | | 0.488* [0.195] | |
| Nondisposable buildings$_t$ | | | | 0.392 [0.277] |
| Receivables from region for current expenses$_t$ | | | | 0.699** [0.232] |
| Receivables from region for additions to net wealth$_t$ | | | | 0.486+ [0.239] |
| Other noncurrent assets$_t$ | | | | 0.193 [0.282] |
| Other current assets$_t$ | | | | 0.472 [0.302] |
| Provisions$_t$ | | | | −0.598 [0.444] |
| Payables towards region and other INHS entities$_t$ | | | | −0.543* [0.239] |
| Payables towards suppliers$_t$ | | | | −0.262 [0.175] |
| Other noncurrent liabilities$_t$ | | | | −0.222 [0.733] |
| Other current liabilities$_t$ | | | | −0.842* [0.296] |
| Constant | −0.056+ [0.027] | −0.054* [0.025] | −0.057* [0.025] | −0.058* [0.024] |
| N | 1.289 | 1.289 | 1.289 | 1.289 |
| Adj | 0.062 | 0.169 | 0.157 | 0.148 |
| Cluster | Region | Region | Region | Region |
| Year FE | Yes | Yes | Yes | Yes |
| Entity FE | No | No | No | No |

**Note(s):** This table presents the results of testing model M.1. Standard errors in brackets are clustered at the dimension indicated at the bottom of the table. + $p < 0.10$, *$p < 0.05$, **$p < 0.01$, ***$p < 0.001$. See the Appendix for the definition of the variables
**Source(s):** Authors' own creation

financial accruals. The coefficients indicate that current accruals are more useful for predicting future cash flows than noncurrent accruals, with about 60% of working capital accruals converting reliably into cash flows in the next period. This result is consistent with working capital accruals reflecting mostly receivables and payables (i.e. working capital) that are collected and paid quickly. The model results also indicate that reporting information on other accruals – financial and long-term - also helps users predict the future cash needs of INHS entities. However, the estimated coefficient on both these accrual categories is less statistically significant and smaller in magnitude – ranging between 0.49 and 0.50.

Finally, column 4 decomposes current and noncurrent accruals into the individual accrual accounts that dominate the balance sheet of INHS entities as reported in Table 1. The column shows that of all accrual accounts, those that have predictive ability for future cash flows include *Receivables towards the Region* – particularly, to finance current expenses and *Payables towards the Region and other INHS entities*, alongside *Other current liabilities*. In particular, for every one-euro change in receivables that anticipate cash disbursement to finance current operations, about 70 cents are collected within twelve months. Similarly, for every one-euro change in receivables that anticipate cash disbursements directed at refinancing net wealth, about 49 cents are collected within twelve months. Another class of accruals that rapidly and reliably converts into cash is the combination of other current liabilities – which include, primarily, tax payables and payables toward employees, which have a high and statistically significant coefficient of 0.84. Finally, payables towards the Region and other INHS entities display a coefficient of only 0.54.

All other accrual accounts are not statistically associated with future cash flows. Nondisposable buildings exhibit a coefficient of 0.39, which is not statistically different from zero. Similarly, other current and noncurrent assets are not associated with future cash flows. Neither provisions – and other noncurrent liabilities – nor payables towards suppliers are significantly associated with future cash flows, indicating that these items do not reliably anticipate future cash flows. These findings are important when analyzed *vis-à-vis* the results reported in Table 2. In particular, Table 2 has shown that those accrual accounts that most contribute to making income a smoother measure of performance than cash flows include noncurrent assets and liabilities. Table 4 shows that these accounts are not useful to predict future cash flows. Collectively, the results suggest the existence of a trade-off in the informational benefit of accounting for operations of INHS entities on an accrual basis.

Finally, Table 5 reports the results of estimating model M.2, which includes entity fixed effects and excludes contemporaneous cash flows as predictors of future cash flows. Reassuringly, none of the coefficients' changes sign after the addition of fixed effects, which suggests that the coefficients are unbiased. The tenor of the results, too, remains relatively unchanged, although several coefficients lose statistical significance. Proceeding in order, the model confirms that the comprehensive measure of accruals has a statistically significant predictive ability *vis-à-vis* future cash flows, with a coefficient of 0.16. As we now add fixed effects, this coefficient can no longer be interpreted as the degree to which accruals convert into cash flows in the next period, as it is estimated after controlling for the entity-specific average level of accruals and cash flows. Instead, the coefficient implies that a one percentage point increase in accruals above their average level translates into a 0.16 increase in cash flows above their average level. This relatively small amount implies that accruals that are extraordinary in magnitudes have relatively small predictive power – being, presumably, due to transitory and exceptional transactions. Turning to column 2, which disaggregates accruals based on their nature, we see that the predictive ability of accruals lies entirely in the ability of working capital accruals to anticipate future cash flows, with long-term and-financial accruals not having a statistically significant association with future cash flows. This finding qualifies the results reported in Table 4, where the coefficients were estimated without including entity fixed effects. In particular, it suggests that noncurrent accruals have little predictive ability *vis-à-vis* future cash flows once we account for the fixed characteristics of each INHS entity. Finally, column 3 shows that only two items predict future cash flows once fixed effects are included in the model. In particular, *Receivables from the Region for current expenses* anticipate future cash inflows reliably, with a coefficient of 0.28, while *Other current liabilities* predict future cash outflows with a coefficient of 0.39. Thus, once the average performance of INHS entities is controlled for, it is mostly the accounting for receivables towards the Region for current expenses and other short-term liabilities on an accrual basis that predicts future cash flows. Thus, the main takeaway of our analysis holds: there is a trade-off between the informational benefit of

| | (1) Cash flows$_{t+1}$ | (2) Cash flows$_{t+1}$ | (3) Cash flows$_{t+1}$ |
|---|---|---|---|
| Comprehensive accruals$_t$ | 0.162** [0.052] | | |
| Working capital accruals$_t$ | | 0.167** [0.046] | |
| Long-term operating accruals$_t$ | | 0.052 [0.166] | |
| Financial accruals$_t$ | | −0.101 [0.214] | |
| Nondisposable buildings$_t$ | | | −0.042 [0.152] |
| Receivables from region for current expenses$_t$ | | | 0.276*** [0.039] |
| Receivables from region for additions to net wealth$_t$ | | | 0.101 [0.114] |
| Other noncurrent assets$_t$ | | | −0.231 [0.154] |
| Other current assets$_t$ | | | −0.192 [0.179] |
| Provisions$_t$ | | | −0.155 [0.352] |
| Payables towards region and other INHS entities$_t$ | | | −0.083 [0.109] |
| Payables towards suppliers$_t$ | | | −0.078 [0.100] |
| Other noncurrent liabilities$_t$ | | | 0.546 [0.827] |
| Other current liabilities$_t$ | | | −0.391* [0.168] |
| Constant | | | −0.080** [0.024] |
| N | 1.289 | 1.289 | 1.289 |
| Adj | 0.054 | 0.062 | 0.078 |
| Cluster | Region | Region | Region |
| Year FE | Yes | Yes | Yes |
| Entity FE | Yes | Yes | Yes |

**Note(s):** This table presents the results of testing model M.2. Standard errors in brackets are clustered at the dimension indicated at the bottom of the table. $+ p < 0.10$, *$p < 0.05$ and **$p < 0.01$, ***$p < 0.001$. See the Appendix for the definition of the variables
**Source(s):** Authors' own creation

Table 5.
The incremental
usefulness of accrual
accounts to predict one-
year ahead cash flows
(with entity fixed
effects)

accounting for accruals if the goal is to obtain a stable measure of performance and the informational benefit of accounting for accruals if the goal is to predict future cash flows. Such a trade-off, which we are first to document in the context of PSEs to the best of our knowledge, suggests caution in presenting accrual-based reforms in the public sector as, alternatively, an informational panacea or an undesirable project.

## 7. Discussion and conclusions
The principal aim of this paper was to contribute to the debate over the desirability of an accrual-based accounting system in the public sector by examining whether accrual-based accounting information possesses valuable properties compared to cash-based information

in the context of hereafter PSEs. Through the analytical model adopted we tested three hypotheses to assess whether an accrual-based measure of economic results, of noncurrent assets and receivables and payables have higher predictive ability for cash flows. While supporting the three hypotheses, our findings provide several new insights into the debate over the usefulness and appropriateness of accrual information in the public sector (Bonollo, 2022).

Specifically, the analysis confirms that net income is smoother than cash flows as a summary measure of economic results and that accounting for accruals improves the predictability of future cash flows (Dechow, 1994; Pinnuck and Potter, 2009). However, our novel disaggregation reveals that those accrual accounts that contribute the most to making income smoother than cash flows are also those that contribute the least to predicting future cash flows. Our evidence sheds light on the reasons behind this seemingly contradictory result. In particular, accounting for nondisposable buildings on the asset side and provisions on the liabilities side reflects an accrual logic that makes income smoother than cash flows because it allocates costs over multiple accounting periods. At the same time, recording these items on an accrual basis does not improve the predictability of cash flows, because provisions represent only probable and long-term cash outflows, while public sector assets are largely nondisposable and, often, have "service potential' – but little cash-generating capacity (Anessi-Pessina et al., 2022; Christiaens, 2022). In turn, accounting for receivables and payables on an accrual basis significantly improves the predictability of future cash flows but does little to improve the smoothness of income. Our evidence indicates that this finding is due to the close alignment between the cycle of receivables and payables and the cycle of cash collection and payment – implying that receivables and payables reliably anticipate future cash inflows and outflows, respectively. Crucially, the results also indicate that accounting for receivables on an accrual basis allows to predict the future cash needs of INHS entities better than contemporaneous cash flows – an important result for institutions in charge of the budget (Anessi-Pessina et al., 2016). Also, the evidence indicates that accounting for accruals significantly improves the transparency of the balance sheet of INHS entities, by making about half of total assets and liabilities *visible*.

Collectively, the results presented in this study suggest that the greatest benefit of introducing accrual accounting at PSEs lies in providing a comprehensive picture of assets and liabilities and a measure of economic results that is relatively stable over time, compared to the highly volatile measures of cash flows, receivables and payables. At the same time, introducing accrual accounting gives rise to an informational "trade-off". On the one hand, it generates a smoother measure of economic results compared to cash accounting, particularly when entities embark on substantial investments in operating capacity and actively use provisions to smooth future expenses over time. This result is important *vis-à-vis* the substantial increase in public investments in the post-pandemic period – in the European Union, in particular (EU, 2021) - as it suggests that accounting for capital formation on an accrual basis may be key to ensuring the transparency of investment projects. On the other hand, the benefits in terms of predictability of cash flows are limited, as these benefits are most visible for entities that operate with large amounts of short-term receivables and payables. Finally, it should be noted that the trade-off discovered by this study is likely to be valid only for PSEs that depend on transfers to cover their costs. These entities do not enjoy any degree of fiscal autonomy and, therefore, their revenues reflect receivables from transfers from higher-level budgetary institutions, which are used to pay market suppliers, employees and other INHS entities. This is an important aspect of our research, which differentiates it from previous attempts to conduct cash-accrual studies in the public sector (Farshadfar et al., 2022; Pinnuck and Potter, 2009; Plummer et al., 2007). This aspect should be kept in mind when considering possible extensions to public sector organizations that enjoy fiscal autonomy.

In conclusion, the primary takeaway of this study, at least for policymakers, is that institutions in charge of accounting reforms should have clear and realistic, evidence-based expectations as to the "value-added" (Moretti and Youngberry, 2018) that accrual accounting can bring to public sector entities – expectations that our evidence will, hopefully, help to inform (Leuz, 2018; Trombetta *et al.*, 2012). Promoting one benefit – in our setting, obtaining a stable and persistent measure of performance – may run against the ability to achieve a second benefit – e.g. predicting future cash flows. To researchers, documenting this trade-off helps qualify the dichotomous way in which the debate on the desirability of accrual accounting in the public sector is often framed. In this sense, future studies could also look at who, amongst the financial information users, benefits the most from the introduction of accrual accounting. Our evidence suggests that introducing accrual accounting in the public sector can very well generate incrementally useful information, but it is equally important to examine which accounts, if any, contribute the most to make these benefits visible.

## Notes

1. However, earnings management can also take place when the public sector entity adopts a different accounting model, such as fund accounting (Vatter, 1947), insofar as it allows exerting discretion over the timing and classification of revenues and expenditures (See, e.g. Costello *et al.*, 2017).

2. The value of noncurrent amortizable assets is expressed net of accumulated depreciation.

3. These line items are described in Attachment #2 of the INHS Decree, retrievable at: https://www.gazzettaufficiale.it/eli/id/2011/07/26/011G0160/sg (Last access: 23 September 2022).

4. Because we scale all variables by average assets, a one-euro change is to be interpreted as a one-unit change in the ratio between the variable and average assets, both expressed in euros.

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**Appendix**

| Variable | Description and method of calculation |
| --- | --- |
| Net income (loss) | The difference between revenue and expenses |
| Cash flows | The difference between net income and comprehensive accruals |
| Comprehensive accruals | The algebraic sum of the annual change in all accrual accounts (assets minus liabilities, excluding net wealth) |
| Net current accruals | The annual change in current assets, excluding cash and cash equivalents, less the annual change in current liabilities |
| Net noncurrent accruals | The annual change in noncurrent assets less the annual change in noncurrent liabilities |
| Nondisposable buildings | The annual change in the value of nondisposable buildings, net of cumulated depreciation (item AAA350) |
| Receivables from region for current expenses | The annual change in the value of receivables that record funds to be collected from the budget of the Region and Autonomous Province to finance current expenses (item ABA360) |
| Receivables from region for additions to net wealth | The annual change in the value of receivables that record funds to be collected from the budget of the Region and Autonomous Province to finance the increase in Net Wealth (item ABA470) |
| Other noncurrent assets | The annual change in the value of all noncurrent asset accounts, less nondisposable buildings |
| Other current assets | The annual change in the value of all noncash current asset accounts, less Receivables from Region for current expenses, and Receivables from Region for additions to net wealth |
| Provisions | The annual change in the value of provisions for risks, future expenses and probable claims (item PBA010) |
| Payables towards region and INHS entities | The annual change in the value of payables that record funds to be disbursed to pay the Region and Autonomous Province, and other INHS entities, for goods and services received and unutilized funds (sum of items PDA070 and PDA140) |
| Payables towards suppliers | The annual change in the value of payables that record funds to be disbursed to pay market suppliers for goods and services received (item PDA280) |
| Other noncurrent liabilities | The annual change in the value of all noncurrent liability accounts, less Provisions |
| Other current liabilities | The annual change in the value of all current liability accounts, less *Payables towards Region and INHS entities* and *Payables towards suppliers* |

**Note(s):** This table reports definitions and method of construction of the variables used in the analysis. Items refer to the item code in the implementation guidance of the accounting and financial reporting model applicable to INHS entities pursuant to Legislative Decree 185/2011, as published in the Official Gazette of the Italian Republic, ordinary supplement n. 23, general series n. 147, retrievable at: https://www.gazzettaufficiale.it/eli/id/2019/06/25/19A03830/sg (last access: 15 June 2023)
**Source(s):** Authors' own creation

**Table A1.**
Definition and method
of calculation of the
variables

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