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ACCOUNTING REPORTING COMPLEXITY MEASURED BEHAVIORALLY

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Abstract: *We propose a new measure of accounting reporting complexity (ARC) based on customized extensions XBRL elements in relation to the number of reporting tags (NRT), expressed as the relative Extension Rate (ER) as a behavioral economics solution to improve markets. Behavioral insights have recently gained attention in different scientific and applied fields. Thereby behavioral economists set out to improve market conditions to aid practitioners and consumers make wiser and more informed decisions that have a positive impact over time. XBRL extensions reduce comparability of financial disclosures and complicate financial analysis and investor decision making. We find that ER is negatively associated with market capitalization and profitability. ER is on average higher in industries perceived as complex. The preparation and disclosure of more accounting items deviating from the base taxonomy is more complex for consumers of financial and non-financial information. Increasing ER imply comparability among peers is less enabled. In comparison to commonly used measures of operating and linguistic complexity, the associations between ARC and these outcomes are more consistent, exhibit greater explanatory power, and have stronger economic significance. The*

ER resulting from IFRS-filers, i.e. companies which prepare their financial statements under International Financial Reporting Standard (IFRS) are on average significantly higher than US GAAP filers, i.e. companies which prepare their financial statements under United States General Accepted Accounting Principles (US GAAP). This article is based on the “transparency technology XBRL (eXtensible Business Reporting Language)” (Sunstein, 2013), which should make data more accessible as well as usable for private investors. Overall, the findings contribute to the emerging behavioral economics trend with a novel application in data science and accounting.

Keywords: *accounting reporting complexity, behavioral economics, behavioral insights, customized extensions elements, financial reporting quality and inductive method, IFRS taxonomy, nudging, relative extension rates, XBRL*

JEL Classification: *D03, F32, G15, G32, P34*

Introduction

Accounting complexity represents an important issue for academics as well as practitioners. Complexity has a long tradition to be discussed in behavioral economics – the interdisciplinary opening of neoclassical economics with an emphasis on addressing real-world relevant influences on decision making. An increase in complexity can have a negative impact and effect on the investor decision making as it influences the reporting quality. Assessing, mapping and analyzing accounting information is thereby deteriorated. Complexity is according to Iatridis (2011) regarded as directly related to the concept of accounting quality, as complexity increases when accounting quality decreases. While in the age of digitalization accounting also becomes digital, this paper will analyze accounting quality considering digital structured financial reporting. Ample evidence on the impact of complexity on decision making exists in behavioral economics (Bowles, 2004, Chapman & Elstein, 1995, Colinsky, 1996, Gentner, 2002, Giglio, Maggiori & Stroebel, 2014, Gintis, 2000, Green & Myerson, 2004, Kahneman, 2011, Puaschunder & Schwarz, 2012); but what the implications are for digital economies remains unclear (Puaschunder, 2019a, b, c, e).

Since the end of the 1970ies, Behavioral Economics revolutionized mainstream neo-classical economics and decision-making theory. Behavioral economists have recently started to nudge – and most recently wink – people into favorable decision outcomes, offering promising avenues to steer social responsibility in very many different domains, ranging from marketing,

corporate governance to public affairs and most recently financial leadership. A wide range of psychological, economic and sociological laboratory and field experiments proved human beings deviating from rational choices as standard neoclassical profit maximization axioms failed to explain how human actually behave. Human beings rather use heuristics in their day-to-day decision making (Puaschunder & Schwarz, 2012). These mental short cuts enable to cope with a complex world yet also often leave individuals biased and falling astray to decision making failures. What followed was the powerful extension of these behavioral insights in the domains of public administration and public policy making. Behavioral economists proposed to nudge and wink citizens to make better choices for them and the community. Many different applications of rational coordination followed ranging from improved organ donations, health, wealth and time management, to name a few. Behavioral Finance is one of the most novel developments in Behavioral Economics. In all this literature missing is clear information how to lead efficiently given mental shortcuts and behavioral biases in a complex world. Yet to this day, behavioral economics has not entered the emerging digital interactive research stream.

In the context of digital interactive reporting, the most recent academic literature assumes high volume and more unique company specific accounting information as to support the increase in complexity (Hoitash and Hoitash, 2017). However, measuring accounting complexity continues to be difficult as measures with high explanation power are not widely available. As a consequence, a large body of academic research substitutes accounting complexity with aggregate, indirect, and less exact measures of operating complexity.

Fueled by the widespread diffusion of the internet, the age of digitalization emerged in the last twenty years (Puaschunder, 2019a, b, d, e). The emerging autonomy of digitalization holds unique potentials alongside unprecedented economic superiority, data storage and computational advantages (Puaschunder, 2017a, b, c, d). With regard to Financial Reporting, this trend has led to the development of the Extensible Business Reporting Language (XBRL), which – according to the academic literature – is expected to revolutionize financial reporting (Matherne and Coffin, 2001). Financial reporting information can be automatically transferred to machines without the necessity to map, as financial reporting information is structured. XBRL is without cost available and has developed as the de-facto global language for exchanging business information electronically. XBRL taxonomy fixed by the regulator (e.g. Securities and Exchange Commission) provides an identifying tag for each individual item of data, whether numeric or textual. This tag is

computer readable and allows the information to be used interactively and more accurately as when provided in an unstructured format e.g. PDF format.

A main feature of XBRL is the optionality for the filers to create new tags (and a new custom taxonomy at the same time). This reflects the “X” which implies extensibility. These new tags are called customized extensions. Filers can create as many extensions as they want as long as local regulation allows. The background is that those customized extensions reflect voluntary new tags and are regarded as relevant to describe their specific situation. The aim of this paper is to investigate the determinants and value relevance of these extensions for market participants considering the new availability of interactive data from IFRS-filers. IFRS is a principles-based accounting regime and extensions rates are expected to be higher and more relevant based on early findings (Beerbaum, 2014). Those early findings can now – with the utilization of the new empirical data – become more substantiated and validated. Further analytical elaboration is now possible for the first time, given the larger data sets available and the novel computational power.

Studies on the advantages of XBRL for market participants are numerous but little is known about the mechanisms underlying the impact of taxonomy extensions and the practical nature of such extensions in the context of IFRS interactive filings. Similarly, our study is the first to focus on IFRS filers applying the IFRS Taxonomy, provide interactive filing and the first which is based on a large database of IFRS filers, as previous studies focused on US Taxonomy elements for each disclosure concept are not available, and thus the filer creates an extension element. Considering the US GAAP based literature GAAP (Chou and Chang, 2008, Debreceny et al., 2011, Hoitash and Hoitash, 2017, Li and Nwaeze, 2015), it is concluded that extensions without incorporating technical errors provide decision-useful information. However, if extensions are not correctly set-up – particularly when a semantically equivalent element already exists in the base taxonomy – extensions add no information content. Due to identified errors in interactive filings, critics express concerns that the reporting extensibility allowed under XBRL open taxonomy will reduce the possibility to compare companies to each other and financial disclosures increase their complexity and therefore complicates financial analysis. Proponents conclude that XBRL extensions will provide users with new and relevant information. Companies want to tell their specific story and reflect their competitive advantage and uniqueness. The results for later periods of XBRL adoption provide support for the SEC’s policy that

allows registrants to use XBRL extensions to increase users' understanding of the information in financial statements.

The focus of this study is on extensions and the analysis of correlations to other metrics. Prior research shows that the impact of XBRL adoption for market participants is important but the great majority of them considers XBRL implementation as a uniform process (i.e. adoption or not). However, this approach does not allow assessing how investors perceive information published by filers using XBRL's extensions. The results for later periods of XBRL adoption provide support for the SEC's policy that allows registrants to use XBRL extensions to increase users' understanding of the information in financial statements.

Since January 2009, when the Securities and Exchange Commission (SEC) issued rules on the submission of interactive filings applying the XBRL standard, a lot of articles have been prepared which describe the benefits of XBRL (Roohani et al., 2010). Those articles could only be based on interactive filings preparing financial statements under US GAAP. Since last year for the first time a larger number of companies' interactive filings became available, which also prepare their financial statement under International Financial Reporting Standards (IFRS).

Background of Accounting Quality and Accounting Complexity

Complexity is embedded into the concept of accounting quality (Iatridis, 2011). The term "accounting quality" needs, however, to be used carefully as it has different connotations and implications. The concept of accounting quality remains fuzzy. To this day it is unclear how an optimal output can be defined and what this optimal level for most of the accounting quality proxies is. Hence, it also remains unclear whether an increase (decrease) in the level of the accounting quality metric will necessarily lead to an increase (decrease) in what is supposed to be the (in fact unobservable) quality of accounting. To the knowledge of the authors, no theory clearly links the commonly used metrics to "true" accounting quality. A further problem is that several proxies for accounting quality exist and that it is yet not fully clear, which one is the most suitable. Further unclear questions are:

- (a) what is the connection or correlation between the different proxies,
- (b) whether and what kind of trade-offs between different proxies exist and
- (c) what conclusions about user's preferences can be drawn from earnings quality studies.

So far, there is almost no theoretical or model-based literature that would perform an assessment of earnings qualities with more granularity and of high practical relevance. Behavioral economics has offered ample evidence on the impact and relevance of complexity on the decision making quality (e.g., Ariely & Wertenbroch, 2002, Arrow, 1978, Ashraf, Karlan & Yin, 2006, Beshears, Choi, Laibson, Madrian & Sakong, 2011, Gaertner, 2009, Kaur, Kremer & Mullainathan, 2010, Ostrom, 1990, Sen, 1995, 1998, Thaler & Sunstein, 2008, Trope & Fishbach, 2000, 2004, Tversky & Shafir, 1992); but to this day no information is given for concrete implications of complexity in the digital accounting domain. The relationship between the different earnings quality measures is still rather unclear, implying that reliable estimates considering accounting quality might require controlling for other accounting qualities from an empirical point of view. This does, however, not imply accounting quality research, which would not have any impact on practice advice. A recent implementation is the SEC's attempt to automatically screen filings of all issuers and to calculate a risk score for potential fraudulent behavior based on accounting quality metrics. The Accounting Quality Model (AQM) – or “Robocop”, as the financial press tends to call it – automatically creates a risk score for all registrants within 24 hours after their electronic filings. A higher risk score makes the enforcement staff aware of the fact that a filer might be worth looking at in closer detail. Thereby, the system makes the SEC's inspections more efficient and effective.

Accounting quality can be addressed from an input and output perspective. Inputs relate to the quality of accounting standards and the quality of the reporting process. Outputs look at how useful the published reports are for economic decision making. According to IAS 1.9, the objective of financial statements is to provide information about the financial position, financial performance and cash flows of an entity that is useful to a wide range of users in making economic decisions. Financial statements shall present fairly the financial position, financial performance and cash flows of an entity. Fair presentation requires the faithful representation of the effects of transactions, other events and conditions in accordance with the definitions and recognition criteria for assets, liabilities, income and expenses set out in the Framework. IASB assumes that rigorous application of IFRS implies useful financial statements. IAS 1.17 consistently clarifies that in virtually all circumstances, an entity achieves a fair presentation by compliance with applicable IFRS.

IAS 8 sets out a hierarchy of authoritative guidance that management considers in the absence of an IFRS that specifically applies to an item. In

extremely rare circumstances it might happen that a firm concludes the application of IFRS would not result in a fair presentation. In such cases the entity shall depart from requirements that would violate a fair presentation if the relevant regulatory framework requires, or otherwise does not prohibit, such a departure. This overriding principle is set out in IAS 1.19, but is rarely used in practice.

There are two fundamental principles under which IFRS financial statements are prepared and both are relevant to accounting quality. Except cash flow statements, IFRS financial statements are prepared under accrual accounting (IAS 1.27).

Accrual accounting incorporates the effects of transactions and other events and circumstances on a reporting entity's economic resources and claims in the periods in which those effects occur, even if the resulting cash receipts and payments occur in a different period.

Going concern: Under this accounting concept the entity will continue to operate in the foreseeable future (i.e., at least within the next twelve months) and that there is no need to liquidate or curtail materially the scale of its operations (F.4.1).

The IASB Framework also sets out some qualitative characteristics of useful financial information. The two fundamental qualitative characteristics inherent to IFRS are "relevance" and "faithful representation" since the IASB assumes that useful information must be both relevant and faithfully represented (F.QC17).

Relevance: Relevant financial information enables of making a difference in the decisions made by investors (F.QC6).

Faithfulness: To be a perfectly faithful representation, a depiction would have three characteristics. It would be complete, neutral and not constitute any material errors (F.QC12).

Obviously, this constitutes a conflict considering relevance and faithful representation. However, it is the preparer's task to balance and find an optimal trade-off for this conflict with the aim to maximize decision usefulness. Besides objectives, with conflicting directions, there are also specific qualitative characteristics which restrict decision usefulness (F.QC19-34).

These include:

Comparability: Information is more useful if it can be compared with similar information about other entities and with similar information about the same entity for another period or another date.

Verifiability: Different knowledgeable and independent observers could reach consensus, although not necessarily complete agreement, that a particular depiction is a faithful representation.

Timeliness: Newer information might be more useful and should, thus, be reported in a timely fashion even when later disclosure could increase reliability.

Understandability: Information shall be presented in a way that users can access their content. The principle does, however, not suggest that complex information is allowed to remain unreported or would have to be reported in a way that users would not have to seek for advice if not competent to understand.

IAS 1 additionally contains a number of accounting principles which assure accounting quality from an input perspective is executed:

No offsetting allowed: An entity shall not offset assets and liabilities or income and expenses, unless required or permitted by a standard issued by the IASB. Prohibiting offsetting assures finer financial information because users can observe more than the net effect of certain transactions (IAS 1.32).

Focus on material aspects: An entity shall present separately items of a dissimilar nature or function unless they are immaterial (IAS 1.29). Information is material if omitting it or misstating it could influence decisions that users make on the basis of financial information about a specific reporting entity (F.QC11). Materiality is an ambivalent concept. On the one hand, it allows disregarding irrelevant information. On the other hand, it imposes the risk that information remains undisclosed due to the preparer's assumption of the information not being material.

Consistency across time: An entity shall retain and continue the presentation and classification of items in the financial statements regardless of any periods.

The three most used categories of complexity used in accounting research are operating, linguistic, and accounting-based complexity (Hoitash and Hoitash, 2017). Complex operations increase the difficulty to translate economic activities into accounting disclosures. Yet because detailed disclosures of firm operations are not widely available, researchers often select observable measures of operating complexity. The most common are the number of business and geographic segments and the existence of foreign operations. A higher number of business segments often suggests the presence of more complicated economic operations because segments typically have different products, services, processes, and/or customers and each segment often earns revenues and incurs expenses. In addition, because segments often transcend

industries, knowledge of accounting standards across industries is needed to disclose segment information. Similarly, companies with foreign operations or international segments are required to report and reconcile their overseas operations, further complicating the preparation of the financial reports. While these measures capture aspects of operating complexity that are likely linked to accounting complexity, they do not experience significant across- and within-firm variation and are not directly based on accounting disclosures.

ARC subsumes a portion of complexity that is captured by common operating complexity measures. Reportable segments data are captured by XBRL tags. Unlike a measure of the number of reported segments, ARC experiences greater variation as it fluctuates with the amount of disclosed segment information and not only with the number of segments disclosed. Similarly, accounting information that pertains to foreign operations is captured in greater detail by ARC. In addition, ARC also captures the disclosure of other accounting information (e.g., lease, derivative, inventory, and tax accounting) that is not captured by operating complexity measures.

Discussion

Globalization led to an intricate set of interactive relationships between individuals, organizations and states and to an unprecedented correlation of massive global systems causing systemic risk to increase exponential. Unprecedented global interaction possibilities have made communication more complex than ever before in history as the whole has different properties than the sum of its increasing diversified parts (Centeno et al., 2013). Acknowledging that Behavioral Economics revolutionized mainstream neoclassical economics, behavioral economics insights should further be used to analyze the digital economy in order to find strategies to improve human decision making in a complex economy world.

Future research may empirically try to consolidate how behavioral economics can improve markets. Stakeholder specific facets of behavioral sciences and the different scientific disciplines' approach towards digitalized economics could be outlined in the search for governance recommendations to regulate markets efficiently. Delineating the potential of behavioral economics to guide on the introduction of digitalization into our contemporary society portrays economics as a real-world relevant means to minimize societal downfalls and imbue ethics in the digitalized world economy (Puaschunder, 2018, 2019f).

Research extensions could address the evaluation of nudging and its influence on the stability of economic markets and digitalized systems. Depicting nudging during this unprecedented time of economic change and regulatory reform holds invaluable historic opportunities for leaders on how to strengthen society by nudges but also overcome unknown emergent risks within globalized markets. In its entirety, this paper serves as very first preliminary step targeted at bestowing market actors with key qualifications to lead and to follow regulatory guidelines and accounting standards strategically in a complex digitalizing world.

In these future research endeavors, scientists and practitioners are advised to also take a critical approach to the economic analysis of the corporation. By drawing from the historical foundations of political economy, a critical stance on behavioral sciences' use for guiding on corporate concerns could also be adopted as a heterodox spin. Behavioral Economics insights should be used for improving economic analyses to foster the accuracy and efficiency of corporate sustainability reporting. The analysis could thereby also take a heterodox economics stance in order to search for interdisciplinary improvement recommendations of the use of economics for the corporate world. Investigations should feature a broad variety of research methods and tools to conduct independent projects in a truly multi-methodological approach. Overall, all these endeavors will help gain invaluable information about the interaction of economic markets with the real-world economy with direct implications for corporate decision makers, governance experts and financial practitioners.

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