Pacioli's Lens: Through a Glass, Darkly

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Primary reference:

https://papers.ssrn.com

Sangster (2018) [*The Accounting Review*, 93(2): 299-314] argues that, in the first printed manual on double-entry

that requires a corresponding

contribution.

interpretation

DEB

Examples of accounts kept in DEB from around Italy (including in particular Florence and Genoa) have been traced back as far as about another 200 years

1955, 1956; Goldthwaite 2015). Today,

Pacioli

Sangster (2018) goes very significantly beyond well-

contribution (e.g. Yamey 1994a; Macve,

simplicity in the then-unrecognized axiomatic foundation of double entry that has been largely overlooked. The findings represent a paradigm shift in how we perceive Pacioli, his treatise, and double

rules

It has been recognised by historians of

in the *Summa* was innovative in generalising from individual problems and their numerical

approach a class of similar problems (Heeffer 2012).

But,

from repeated numerical examples that establish a generalizable pattern (as given in the example in Figure 1 on p.307 of Sangster 2018), rather

Sangster claims.

De Scripturis?

Moreover Sangster then further argues that Pacioli also adopted this approach

Structure of my argument

Drawing on generally accepted understandings of

and using simple logic, together with reviewing relevant literature on Pacioli and on the history of mathematics, I consider:

first the nature and role of axioms etc., then

noting their absence in his treatise on DEB;

concluding with an outline discussion of the

DEB in world history.

Axioms / Postulates / Theorems

-

applicable to

The Balance Sheet Equation: A-L=E

The Balance Sheet Equation itself might therefore be regarded as the fundamental *postulate* of DEB, so that, together with

A-L=E

Nevertheless, it has been argued (e.g. Macve 1996) that Pacioli had an *implicit* understanding of this logic as he begins his treatise by showing how to prepare

equity capital); then explains how transactions are to

debits is always equal to the total of the credits

explaining how to prepare a closing P&L and Balance Sheet from the resulting balances in the ledger.

So the underlying logic seems clear and Pacioli was familiar with Euclid and translated him into Latin in 1509.
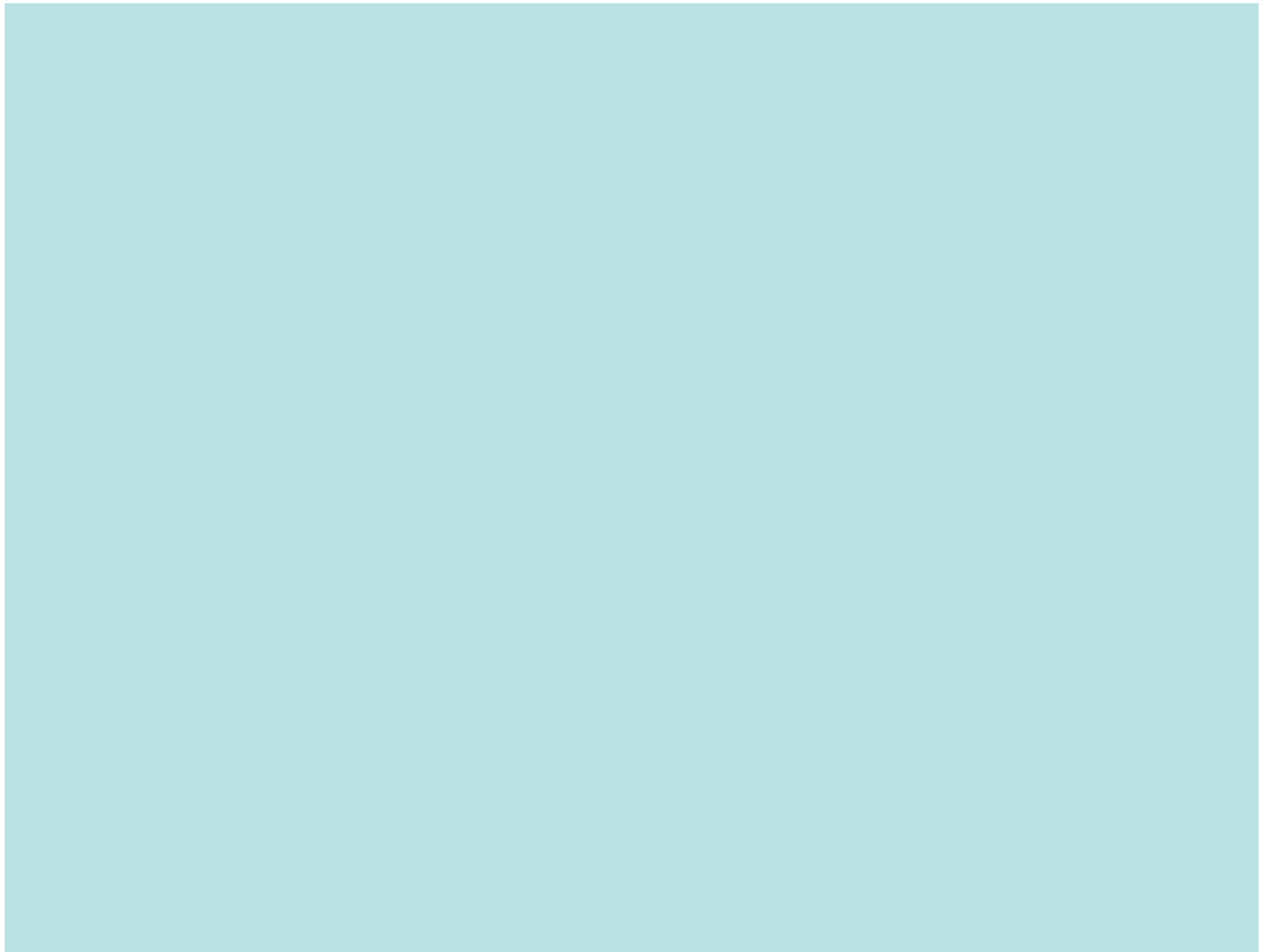
5 till Chapter 12? And they are not collected

They are a bewildering mixture of the

definitions, and several plausible but not
necessary propositions.
It is also unclear how it has been decided

is described by Sangster is that it only deals with *transactions* (e.g. sales, purchases,

correct bookkeeping treatment of *any* item one wishes to record, including accruals such as provisions for depreciation, for bad and doubtful debts, for pensions, for deferred taxes, and for all the other (often controversial) items that constitute the major problems in modern financial accounting.

And outside Venice actual Italian DEB practice reflected such accruals.

Sangster (2018, Figure 1) illustrates how *chiave*) in his exposition of algebra in the *Summa*. That example is taken from Heeffer (2012, 39). However, Heeffer comments:

without any argumentation except for

restructuring of abbacus problem solving methods is undoubtedly inspired by [t]his

So, as argued above, Pacioli does *not* rely on axiomatic algebra in formulating these so-

Summa,
when one turns to the *de Scripturis* itself one

Summary

respects:

Summa

in the *de Scripturis* to explain DEB.

Summa were axiomatic, Pacioli does not explain the rules for DEB in the *de Scripturis* by deriving them from axioms.

So what?

exposition of DEB (utilising Arabic numerals) is a reasonably useful mercantile appendage to the *Summa* rather than a derivation from its mathematics and in this respect is therefore similar to the (plagiarised) section on weights and

included (Yamey 1994a)

The lens through which to appreciate it is one that scans its location within the longer history of European and then North American accounting development and institutionalization; and one that contrasts this history with that of other cultures that developed significant mercantile economies.

How important is DEB?

The financial statements DEB produces are widely

and the state of its capital.

But these can be produced without processing within the fully integrated, cross-referenced structure of DEB.

Indigenous Chinese accounting, as recently found in surviving examples from the 16th century onwards (e.g. the records analysed in Yuan et al. 2017 and Yuan and Macve 2019), like other Eastern systems using traditional Chinese characters, did not have the indexed and page-numbered books that Pacioli recommends but did track assets, liabilities, equity and income.

Historical understanding can only be achieved by considering the context of the emergence, dissemination and institutionalization of DEB in the West and by putting it in comparative perspective with developments in the East, where further research can now be most valuably focussed (Dobie and McCollum-Oldroyd 2020).

Rather than further poring over Pacioli, the research importance of further collaborative study of China and its accounting history, alongside that of other Eastern economies, is clear in order to illuminate and inform the mainstream of

Thank you   please criticise and correct as much as possible!

Some Appendices

If   E2 is typically dividends it can equivalently be written as -

Ohlson 1995) is then:

$BV_t = BV_{t-1} + Y_t - D_t$ where:

BV_t is ending book value (i.e. A-L) and BV_{t-1} is opening book value for the period ended at time t,

Y_t E1),

and D_t E2).

a=b, then a+c = b+c; or equivalently, a-c = b-c; a+c-c = b; and a = b+c-c (the possible variant entries within DEB).

Note however that Hicks argued that this bookkeeping approach to *measuring capital and income* (which still underpins the Conceptual Frameworks of modern accounting standard setting bodies   e.g. Macve 1997   as well as modern financial analysis   e.g. Penman 2010) does not necessarily supply the most relevant information for business and investment decisions (Bromwich et al., 2010).

$_t$ can be expressed as (BV$_t$

) (e.g. Feltham and Ohlson 1995).