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The formation and use of a profit reserve at the end of the fourteenth century

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Abstract

This article analyses the earliest known use of reserve accounting in the late fourteenth century. It reveals the dual purpose of this reserve, the entries made, including those made when the reserve was utilized and when the remainder was written-back to be distributed to the owners in the following accounting period. The research method is archival, using logical–analytical modelling of a merchant's accounting records from 1392 to 1400. It finds that a reserve was initially an estimate of costs that had been incurred the amount of which was unclear, and that it was then extended to act as a suspense account to balance the ledger when errors in the double entries could not be identified. In doing so, this study also reveals changes made in how the entries were made to the reserve as bookkeepers sought more efficient ways to make them.

Keywords

Datini, double-entry bookkeeping, medieval accounting, merchandising account, reserve accounting

Introduction

> *As early as the fourteenth century the larger Italian mercantile and banking 'companies' even set aside reserves to take care of any contingencies or subsequent readjustments*. (de Roover, 1956: 116)

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Several studies have been conducted into early financial accounting practice following the emergence of double-entry bookkeeping in the thirteenth century (e.g. de Roover, 1944, 1956, 1958; Klimczak, 2013; Melis, 1962; Zerbi, 1952) and many have written about the content of account books, account entries and account reports, including Castellani (1952), Edler de Roover (1943), Goldthwaite (1968, 1985, 2009, 2015, 2018), Goldthwaite et al. (1995), Lane (1944, 1977), Lee (1977), Kuter et al. (2017, 2018), Ryabova (2018) and Usher (1914). However, most who have investigated these topics in the archives of Italy have been economic historians, historians, linguists or philologists, not accounting historians. This lack of involvement of accounting historians in studies of early accounting has been lamented by economic historians, including Frederic C. Lane (1944) and, more recently, by Richard Goldthwaite (2018). Both of them make the point that it would be extremely useful for them, and others, if this were to change. One of the aims of the study reported in this article is to address this gap in the literature.

While much has been written about medieval bookkeeping and accounting, the lack of involvement of accounting historians in the analysis of medieval account books has resulted in their analyses rarely being of the process or the specialist techniques of accounting, such as accruals, prepayments, depreciation and reserve creation. Among those who have attempted to fill this void is Raymond de Roover, whose work, primarily on the fourteenth and fifteenth century international banking enterprise of the Medici, includes references to specialist accounting adjustments of this type, but through the eyes of a business historian rather than those of an accounting historian.

In 1956, de Roover reported that there are several examples of bad debts being written off and a number of examples of accruals for unpaid salaries in Florentine account books from the fourteenth century, even in account books not maintained in double entry. But these adjusting entries were for known amounts rather than estimates. He also found an adjustment of a different nature in an account book from 1399 of the Datini partnership in Barcelona, to which he is referring in the quotation at the beginning of this article. It was for '*a charge of £80 for unpaid taxes and other unforeseen contingencies*' (de Roover, 1956: 144).

This adjustment was entered as a debit in the merchandise expense account (Datini Barcelona, 1397–1399b, c. 391v) and as a credit to a newly opened reserve account on carta 295r. The entry creating the reserve on carta 391v was,

> And merchandise expenses are debit on January 31 £80 of Barcelona[1] from which we made a *riserbo* [reserve] for *lelde* [tax] of Barcelona and bad debts and other expenses to balance this account in this book at c. 295. The *riserbo* account is credit.

The reserve account was then closed by transferring the balance as a credit to page six of the balance account, effectively a trial balance, prepared as a separate document (Datini Barcelona, 1397–1399a) and carried forward to the next ledger as a reserve. This entry created an expense to be included in the calculation of profit, which was calculated in the merchandise account, a forerunner of the profit and loss account. Despite the terminology used in the entry, this was not a reserve established for unknown future events, in the manner that, before adoption of IFRS, companies might create a repairs reserve or a general reserve. It was created for past transactions that had not yet been billed and for which the amount was not known: that is, it was closer to what we now call a provision, as opposed to a reserve. De Roover (1944) acknowledged this and described it as '*one of the earliest examples of accrual accounting to avoid overstatement of profits*' (p. 396). In a modern context, it was similar in form to an allowance for doubtful debts – an estimate of what might happen – rather than recognition of a specific debt by writing it off as 'bad'.

As mentioned above, the account book in which de Roover found this entry was the ledger for 1399 of the Barcelona branch of the Datini network. Francesco di Marco Datini (c. 1335–1410) was the head of a large trading network that operated in Italy, Spain and France between 1363 and his death in 1410. His headquarters was established in 1382, in Prato, 25 kilometres from Florence. From there, he monitored the activities of the managers of all his branches, through both frequent correspondence and a requirement for annual reports in the form of balance accounts listing the balances on all open accounts maintained by the branch. Over 100,000 business letters and approximately 500 account books have been preserved in Prato, and it is these records that form the primary source for this study.

This early practice of reserve accounting is the focus of this article. As we shall show, we have identified an earlier example of reserve accounting than the one identified by de Roover. It was also in the account books of a Datini branch, but in Pisa, not Barcelona. In fact, there was more than one such entry – there was a series across the life of that branch – but that first one is important, as it is the earliest known example of reserve accounting; and it was performed first in 1394 by the same accountant, Simone d'Andrea Bellandi, who 5 years later made the entry de Roover found in the Barcelona account books, illustrating one way in which accounting practice at that time was transferred from one place to another.

The primary contribution of this article lies in its revelation of how reserve accounting was first introduced, why, where, by whom, how the reserves created were utilized and, in particular, it is the first to describe and analyse the procedures adopted. The second contribution of this article is that it provides some details about medieval accounting techniques that may be of interest to medieval economic historians. In doing so, it seeks to address the criticism from that field concerning the lack of involvement in medieval accounting practice by accounting historians.

Prior literature on medieval reserve accounting

The topic of accruals and reserve accounting in medieval account books has been raised previously by Edler de Roover (1943), Littleton (1944) and Raymond de Roover (1956). Edler de Roover (1943: 70) shows that accrued interest receivable and accrued profits were included in the personal balance sheet (i.e. a statement of his affairs) from 1466 of Francesco Sassetti, business partner and manager to the Medici family of Florence, one of the largest international banking houses of the fifteenth century. She does not discuss these entries. Littleton (1944: 458) consulted with Edler de Roover about them. The first was *per la provedigione di tutto quest' anno* – 'the fee for this year', presumably on funds lent to, or invested by Sassetti in various Medici partnerships. The second was an estimate of distributable branch profits from within the Medici business accruing to him at that time.

Edler de Roover (1943) also found an entry for a reserve account balance of 1977 florins (f.) 22 *soldi*(s.) 1 *denaro*(d.) in the closing account for the Medici branch in Avignon in 1468. It was for contingencies. A new partnership was then formed and f. 1422 7s 1d of the reserve was carried forward to the new partnership. The remaining f. 555 15s was distributed to the partners along with the accumulated profits. From her analysis of the accounts of the company, she concluded that profits were usually determined every year but only occasionally were they distributed to the partners. When they were, a '*small balance was usually left undivided as a reserve for bad debts and other contingencies*' (Edler de Roover, 1943: 73).

As mentioned previously, Raymond de Roover (1956) found similar practices in the account books of the Datini company in Barcelona in 1399, which is what motivated us to discover whether

Datini had been making these adjustments for contingencies even earlier. And, if so, whether it would reveal what caused accountants to first introduce this concept to accounting practice.

Research method

The principal research method adopted in this study is archival. That is, it entails examining and critically analysing original sources that, in this case, are account books held in the State Archive of Prato. This research team has been working with this material for the past decade and many of the records have been recorded and linked to each other using logical–analytical modelling. This is a flowchart-based approach that we developed for the purpose of enabling entries in the account books to be traced visually between accounts and books and from page to page. It is described in more detail in Appendix 1.

By adopting this approach, we are able to see the entire accounting system, making entries and their sources clear in a way that is not possible if all that you have is the original set of account books. This enables us to consider each transaction in detail, trace its classification and so explain the bookkeeping and accounting methods adopted without possibility of misinterpretation. This approach represents a new paradigm in how to analyse and interpret accounting practice for periods when there was no concept of either a standard method or a unified approach to either financial recording or financial reporting.

In this article, we present (1) the bookkeeping method adopted by the accountant in Pisa, (2) how a reserve account was introduced and its purpose and (3) how the way the reserve account was used changed, particularly after the accountant who had introduced it moved to Barcelona. So far as we are aware, the entries in the account books included in this study have never previously been analysed.

The early accounting practice of reserves formation and use

After spending 32 years establishing himself in business in Avignon, France, Francesco Datini returned to Italy and opened a sole proprietorship in Pisa in November 1382. The business slowly developed into a partnership. The account books were closed and the overall profit was identified and distributed among the partners nine times before the company entered liquidation in 1400. There was no obvious reason for doing so other than that it provided an opportunity to distribute profits among the partners. After closing the Pisa company's first accounting period on 4 February 1383, only 96 days after it opened, the firm began to use double entry in all its account books, but the method was not standardized: some accounts were in the Venetian bilateral format with the debit entries opposite the credit entries on two facing pages, but some continued in the old vertical format where the debits were entered above the credit entries, or vice versa. Sometimes the debit and credit entries were mixed-up rather than in a sequence of all debits/credits followed by all credits/debits. These vertical paragraph accounts were labelled as 'mingled' by Martinelli (1974: 191). Raymond de Roover (1956) described this combination of bilateral and mingled accounts in Datini's ledger:

> In [Datini's ledger for 1383-1386,] the personal accounts for receivables and payables are in bilateral form, but merchandise expense, and profit-and-loss accounts continue to have the credit beneath instead of beside the debit. (p. 141)

The businesses Datini opened and closed in Pisa are shown in Table 1.

Table 1. Duration of each ledger in the Pisa businesses of Francesco di Marco Datini.

No.	Start date	Closing date	Days	%
Sole proprietor				
Before the official registration	01.11.1382	04.02.1383	96	1.4
After registration: 2 periods				
1	05.02.1383	19.08.1386	1291	19.2
2	20.08.1386	30.06.1392	2176	32.4
Total	9 years 8 months		3563	53.0
Partnership				
1	01.07.1392	13.07.1394	743	11.1
2	14.07.1394	01.08.1395	412	6.1
3	02.08.1395	16.11.1396	652	9.7
4	17.11.1396	24.11.1397	371	5.5
5	25.11.1397	15.08.1399	627	9.4
6	16.08.1399	25.07.1400	345	5.2
Total	8 years 25 days		3150	47.0
Total pre-liquidation	17 years 8 months 25 days		6713	100.0
The period of liquidation	26.07.1400	31.12.1410		
	10 years 5 months 5 days		3810	36.2
Total pre-liquidation	17 years 8 months 25 days		6713	63.8
In total	28 years 2 months		10,523	100.0

As we shall show in this article, Datini's company in Pisa was at the forefront in making significant progress in the development of its accounting system. Over time, the accounting practices became gradually more sophisticated and, as previously mentioned, they spread to Barcelona when the accountant moved there from Pisa.

Profit calculations revolved around a system whereby venture accounts were used for each item (or group of similar items) of merchandise. Once a venture was completed, the balances on these venture accounts were transferred as profits or losses to a merchandise account. At the end of each trading period, the merchandise account was closed. The balance was then carried forward to the next period. When the business ceased, accounting adjustments were made, followed by the distribution of profits among the partners.

Another procedure performed when a business partnership ended, which coincided with the closing of the ledger and the distribution of profits, was the preparation of a *bilancio del libro* or balance account (a trial balance) inside the ledger. It served as both the record of the closing balances in the old ledger and the device used to make the opening balance entries in the new ledger (Datini Pisa, 1394–1395). In addition, a list of *debitori e creditori* (the same balance account) was separately prepared and enclosed in a folder sent to Prato from the branch.

For the purposes of this article, we begin our analysis of the account books of Datini's company in Pisa in the period 1 July 1392 to 13 July 1394. It was at the end of this period that a reserve – the primary focus of this article – was created for the first time.

The bookkeeping method adopted by the accountant in Pisa

As mentioned above, at the centre of the bookkeeping system was the use of merchandise accounts.

The merchandise accounts. The first merchandise account of the 1392–1394 partnership was closed on pages 325v–326r of the ledger on 2 September 1393. The balance on the account represented the profit for the first year of the company, but no adjustments or distribution of profit was made. One day later, the balance of f. 655 s. 5 d. 6 *a oro*[2] was transferred to the credit of a new merchandise account on page 343r of the same ledger. This account served only as the location for this balance brought forward from the previous period. No other entries were made in it except for one made on the same day for profit of f. 27 s. 5 d. 2 *a oro* on one item that had been omitted when the merchandise account was closed on 2 September, giving a total profit for the first year of f. 682 s. 10 d. 8 *a oro*.

The merchandise account for the second year of the company was opened the following day on the same page as the one to which the balance from the previous year had been transferred: 343r. When no more space was available on the page, on 28 May 1394, the account was balanced and transferred to the account's final location on page 398r. The account was closed 2 months later, when the ledger for 1392–1394 was closed. At that time, the first year's profit of f. 682 s. 10 d. 8 *a oro* was transferred into the account.

Other entries in the final merchandise account included debit entries for leather lost, turpentine lost, a sugar purchase omitted, consignment insurance, expenses unrecorded in a previous period, maritime insurance, the balance on the workshop expenses account, impairment expenses on furniture, a slave's wages and an adjustment of an overstated balance on the account of one of the partners. Credit entries were for inventory held at the period end, income from venture accounts that had not been transferred to a merchandise account, the balance of the commission account, prepaid expenses and the balance on the account for exchange gains (primarily representing gains made on bills of exchange). There were also entries for the total balance of several cash accounts, unrecorded inventory and unrecorded commission; and the account also contained the first known example of a reserve being created out of pre-distribution profits, which is the main focus of the rest of this article.

Figure 1 presents an analytical model of the entries in this merchandise account showing the external link to entries in that account: the single-lined oval indicates the page in the ledger from which or to which an entry has been made; the double-lined oval indicates that an entry was made to a trial balance inside the ledger; and a rectangle indicates that an entry was made from or to a different book. For example, the one labelled 'E-406; c. 103R' is from the page 103r of the *Entrato e Uscita*, a book of original entry similar to a cashbook. The two outer columns show the book and page number where all the items listed in the inner two columns were recorded. The first three digits indicate the book involved. The number after the 'c' is the page number on which the entry was made. 'R' indicates the right-hand page and 'V' indicates the left hand page. Where the same number is used with both 'R' and 'V', this represents a single folio of the book where the front is labelled 'R' and the back is labelled, 'V'. 'M' indicates that the account book is the '*memoriale*'. 'CU' indicates entries made into the trial balance in the ledger. 'CE' indicates entries made from the trial balance into the new ledger.

The partnership in Pisa was between Datini's Florence company, the holding company for the group, and the manager of the business in Pisa, Manno d'Albizo degli Agli. Four of the accounts are shown in Figure 1: the personal account of Datini's partner, degli Agli; the reserve account; the final merchandise account; and Datini's partnership account: the Florence account.

The first entry on the credit side of the account of 459 florins 16 *soldi* 5 *denari* is the balance transferred from the second merchandise account for the year 1393–1394 (Datini Pisa, 1392−1394, c. 342v–343r.):

> Profit on merchandise **must have**[3] on the 28 of May f. 459 s. 16 d. 5 *a oro* for the balance of their account in this ledger at c. 342.

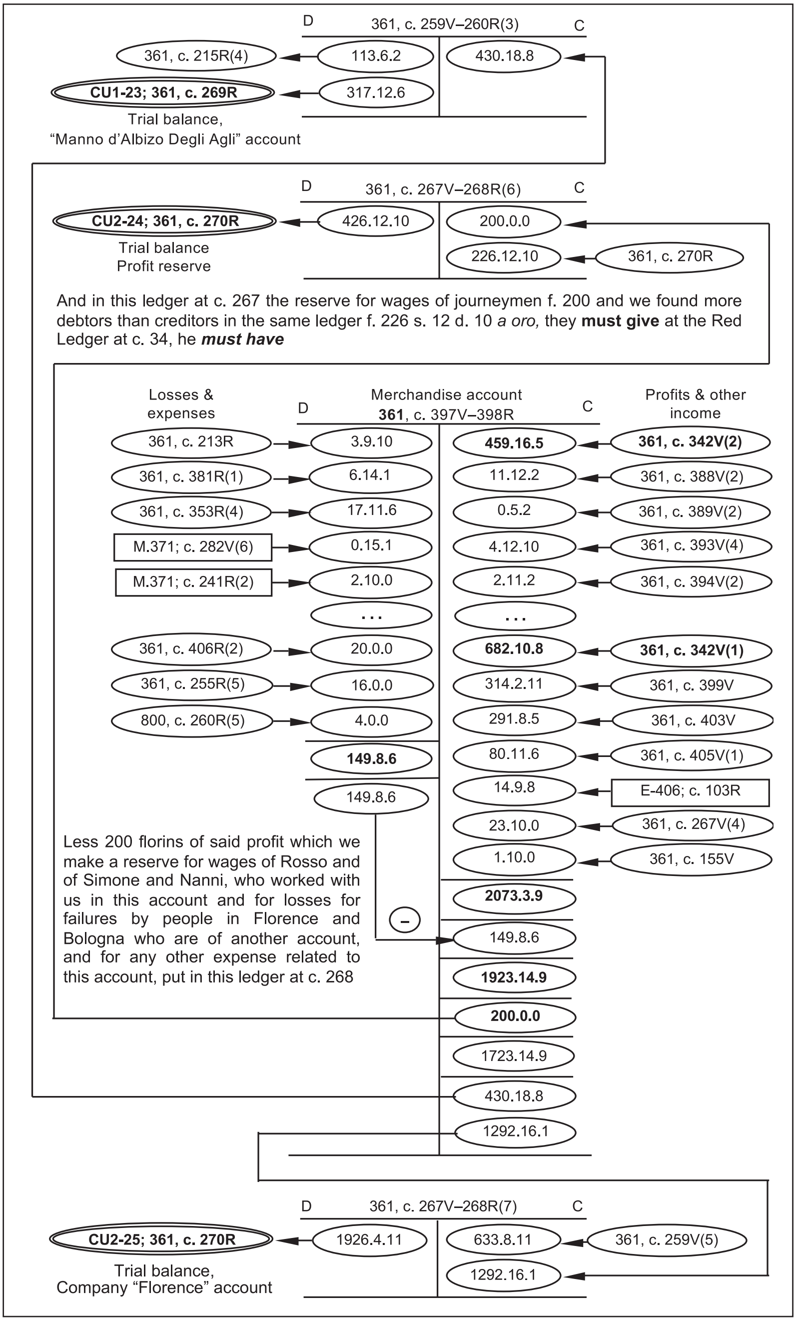

Figure 1. An analytical model tracing the sources of entries in the merchandise account for profits and losses of Datini’s company in Pisa in 1392–1394 (Datini Pisa, 1392–1394).

Balancing the merchandise account. The rest of the entries in this final merchandise account for 1393–1394 are for other expenses (debit entries) and gains (credit entries) arising during the period. Once they had all been entered, the total of the credit entries, as shown in Figure 1, was 2073 florins 3 *soldi* 3 *denari*. The total of the debit entries is much less: 149 florins 8 *soldi* 6 *denari*. But the balance of the account was not entered on that side. Instead, the debit total was transferred as a negative amount to the credit side and then subtracted from the total of the credit entries to arrive at the overall profit of 1923 florins 14 *soldi* and 9 *denari*.

The entry transferring the total of the debit entries to the credit side was,

> We had, as it can be seen on the opposite page, for losses. And there remains f. 1923 s. 14 d. 9 *a oro*. (Datini Pisa, 1392–1394, c. 398r)

This use of negative entries to balance an account was also used occasionally elsewhere in the ledger, reflecting a transition phase as the bookkeeper perfected his system of double entry.

How the reserve was utilized after its formation

As can be seen in Figure 1, the accountant then made a statement about the need to establish a reserve out of profit for wages and other expenses:

> Less 200 florins of said profit which we make a reserve for wages of Rosso and of Simone and Nanni, who worked with us in this account and for losses for failures by people in Florence and Bologna who are of another account, and for any other expense related to this account, put in this ledger at c. 268. (Datini Pisa, 1392–1394, c. 398r)

Below is a slightly abridged version of the credit entry opening the reserve account on page 268r:

> *Riserbo* (reserve) out of the profit made from 1 July 1392 until 13 July 1394 **must have** on this day f. 200 which we put in this book at c. 398 as the aforementioned profit **must give** for the aforementioned reserve that we calculated for the wage of Rosso di Francesco who stayed with us for 4 months and a half, and of Nanni di Piero Fano, relative of Manno, for 8 months, and of Simone d'Andrea for all the time that account lasted, and for the failures at Florence and Bologna and for many other expenses or mistakes we found in that account. (Datini Pisa, c. 267v–268r)

As shown in Figure 1, as with the treatment of the total of the debit entries, the accountant deducted the 200 florins for the reserve by placing it as a negative amount on the credit side of the merchandise account. This reduced the profit to 1723 florins 4 *soldi* 9 *denari*, which was then distributed to the two partners: f. 430 13s 8d to Manno d'Albizo degli Agli and f. 1292 16s 1d to Datini's Florence company, again as negative entries. The credit entry for the 200 florins was made to the reserve account on page 268r.

Entries to balance the ledger. In 1956, Raymond de Roover wrote that, '*frequently [the accountant] found it more convenient to eliminate [errors in the balance sheet that caused it not to balance] by posting [the errors] to profit and loss*' (p. 115). Doing what de Roover describes can inflate or deflate profits. This was *not* what was done by Datini's accountant.

When the credit balances in the trial balance exceeded the debit balances, he entered a debit for the difference in an account receivable in his own name and then reduced the balance on that account as the errors were detected. When the debit balances were greater than the credit balances, the accountant, who had been working for Datini since 1388, used a reserve account. Figure 1 shows an example of this: in 1394, the total of the debit balances was greater by 226 florins 12 *soldi* 10 *denari*. This was corrected by making an entry to the credit of the reserve account for that amount:

> And [reserve] **must have** on this day, as checking our account books we found more debtors than creditors, sum f. 226 12s 10d. (Datini Pisa, 1392–1394, c. 268r)

There was no contra entry. This was a one-sided (single) entry made to the reserve account so that the ledger would balance. Having made this entry in the reserve account, it was closed and the balance transferred to the trial balance to be transferred from there to the new ledger.

In both situations, the accounting treatment of the imbalance ensured that the profit shown in the merchandise account was available for distribution without any inflation or deflation for unexplained errors in the double entries made. These two approaches gave the accountant time to discover the source of the error(s) while ensuring that the partners do not receive more or less profit than was actually earned.

The reserve account, therefore, served two purposes:

1. It was used to retain profits in the company to meet unbilled current period expenses of which the amount was uncertain.
2. It served the purpose of a suspense account used in order to balance the ledger when the reason for the debit balances exceeding the credit balances was not known.

After closing the ledger for 1392–1394, the accountant moved from Pisa to Datini's partnership in Barcelona. His replacement continued to make similar adjustments during 1394–1395.

The reserve account in the new ledger: 14 July 1394 to 1 August 1395. In the new (Red) ledger, the reserve account was opened with the credit balance transferred from the old ledger of 426 florins 12 *soldi* 10 *denari*:

> Reserve made in the previous ledger for wages of workers and other expenses belonging to it **must have** on July 13 f. 426 s. 12 d. 10 *a oro* for which we first deducted 200 florins but then we found the account to be imbalanced from the debtor side. Francesco and Manno assigned them to us in the old account as in the White Ledger A at c. 270. (Red ledger, Carta 34r)

The details in the third and fourth of the five entries on the debit side of the account indicate that these two entries were to meet the expenses anticipated but for which the amounts were unknown when the previous ledger was closed. That is, for the primary reason that the reserve had been created: contingencies. The details in the other three entries indicate that they were made to correct errors in the accounts of creditors, the second reason for using a reserve account:

> Reserve made in the previous ledger must give on July 14 f. 2 for which we charged **by mistake** our partners of Genoa in the old ledger, and the balance is in this ledger at c. 14 where they must have. . .
>
> And must give on the aforementioned day f. 25 s. 16 d. 8 *a oro* for which we charged **by mistake** to Antonio di Filippo and Co. of Majorca just as many *reali* as in this ledger at c. 9 they must have. . .
>
> And must give on July 20 f. 2 s. 10 *a oro* for Stoldo that is for expenditures made by Stoldo for going and coming back and other expenses for his [. . .mule], he came to settle these accounts as in the *Uscita* B at c. 102 in two entries. . .
>
> And must give on September 18 f. 63 s. 6 d. 8 *a oro* for Simone d'Andrea from Prato's wage of $25^{1}/3$ months he stayed with us, at f. 30 per year as in this ledger at c. 21. . .
>
> And must give on September 23 f. 8 *d'oro* as we charged him **by mistake** in the White Book A at c. 190 in the account of Giovanni di Dino da Colle who must have in this ledger at c. 11. . . (Red ledger, Carta 33v)

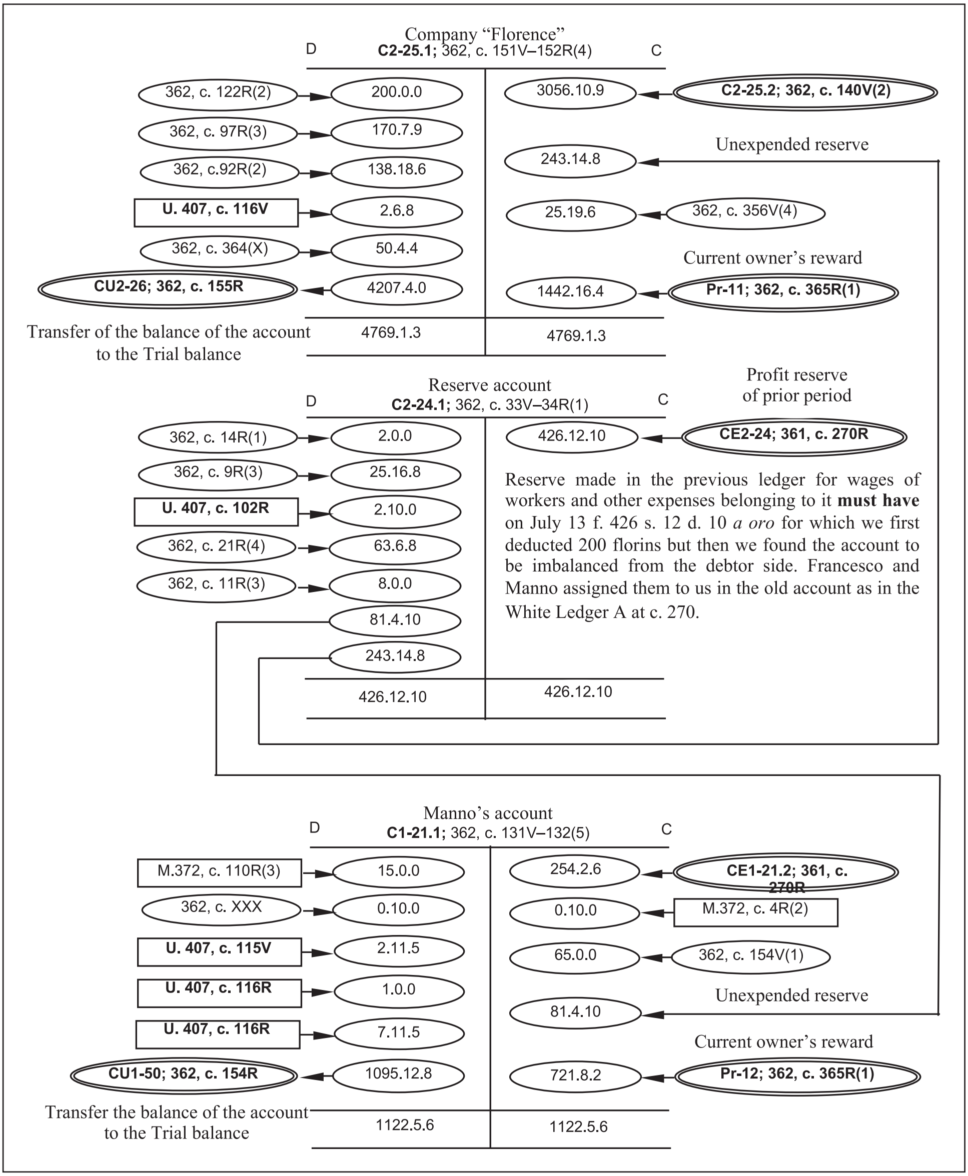

Figure 2. Utilization of the reserve established out of profit of the prior period in Datini's company in Pisa, 1394–1395 (Datini Pisa, 1394–1395).

These five entries totalled 101 florins 13 *soldi* and 4 *denari*, leaving a balance on the reserve account of 324 florins 19 *soldi* 6 *denari*. They can be seen in the reserve account shown in Figure 2. In the figure, 'U' indicates the entries being made from the expenditure (*uscita*) side of the *Entrata e Uscita* (income and expenditure) book.

Having made these entries, the reserve account was closed by transferring the balance to the partners according to the split indicated in their partnership agreement.[4]

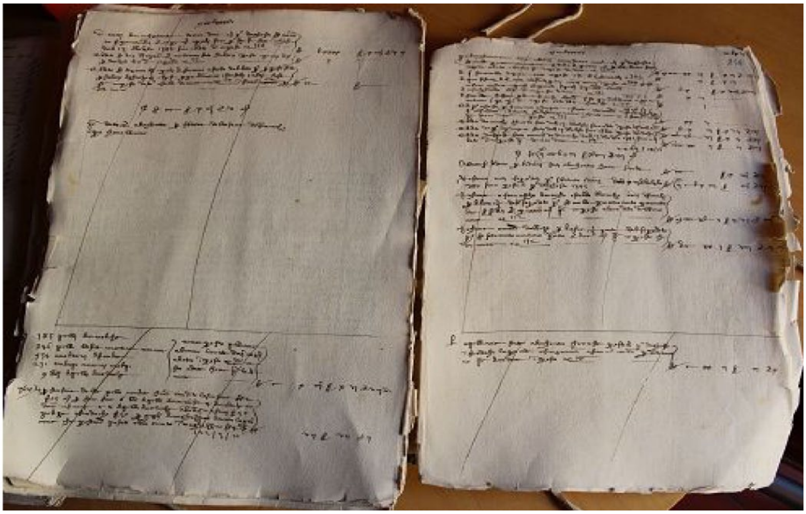

Figure 3. The merchandise account of Datini's company in Pisa, 1394–1395 (Datini Pisa, 1394–1395, c. 364V–365R(1)).[5]

As shown in Figure 2, one-quarter of the balance (81 florins 4 *soldi* 10 *denari*) was credited to the personal account of Manno d'Albizo (the manager in Pisa) and three-quarters (243 florins 14 *soldi* 8 *denari*) was credited to the account of Datini's Florence company. In doing so, the reserve did not impact the measure of performance of the new company, nor its balance sheet; and it was distributed to the partners only once it was confirmed how much of it was no longer required. The narratives of the two debit entries on carta 33v in the ledger closing the reserve account were,

> And [reserve] **must give** on August 1st f. 81 s. 4 d. 10 *a oro* for ¼ of f. 324 s. 19 d. 6, that is what this reserve account should still have, they are assigned to Manno d'Albizo himself who **must have** in this book at c. 132;

> And [reserve] **must give** on the aforementioned day f. 243 s. 14 d. 8 *a oro* for ¾ of f. 324 s. 19 d. 6 that is what this reserve account should still have, they are assigned to Francesco di Marco and Stoldo di Lorenzo who **must have** in this book at c. 152.

At the end of 1394–1395, a new reserve account was created, but in a different way from that used in 1392–1394.

How reserves were recorded in 1394–1395

Figure 3 presents the merchandise account of the company at the end of the 1394–1395 reporting period. It is the first of two accounts shown on these pages and is followed by a horizontal line. The second account occupies the final quarter of these pages.

In contrast to the previous period, when the transfer to reserves was entered as a negative amount on the credit side of the merchandise account, in the 1394–1395 ledger the new accountant

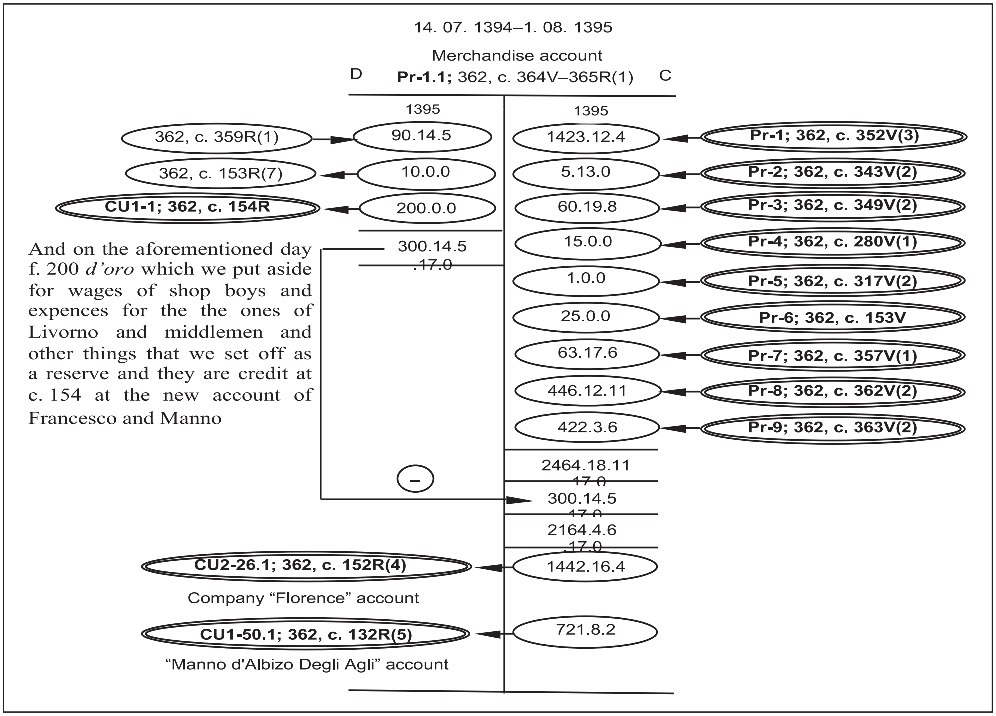

Figure 4. The merchandise account of Datini's company in Pisa (1394–1395), showing the creation of a reserve, and the subsequent distribution to the owners of the post-reserve profit (Datini Pisa, 1394–1395).

recorded the transfer by debiting the merchandise account. The entry was for 200 florins representing estimates for salaries, other anticipated costs, and mistakes, presumably in the amounts recorded for transactions rather than errors made in making entries in the ledger, for which a different approach was adopted.

The contra credit entry was also made in a different way. Instead of being posted to a reserve account, it was entered as the first item in the trial balance. The overall effect on the trial balance was the same as it would have been had a reserve account been opened. This amount was then posted from the trial balance into a reserve account in the new (black) ledger for the next period (1395–1396). The narrative of the credit entry to the trial balance read:

> Francesco di Marco and Manno d'Albizo and Co.[6] **must have** on the 1st of August 200 florins *a oro* which are for a reserve set aside from the gain on the merchandise account as in this ledger at c. 364 and that reserve was made for wages of the workers and for expenses for . . . middlemen and other expenses, and for mistakes we found. And this reserve **must have** in the Black Ledger at c. 63. (Datini Pisa, 1394–1395)

These entries into the merchandise account for 1394–1395 are illustrated in Figure 4. While the accountant used a debit entry rather than a negative entry to the credit of the account, he continued with the practice of deducting the debit total from the credit total by transferring it to the credit side of the account as a negative number. He also did so when distributing profit to the owners, as shown at the foot of Figure 4. The practice of making negative entries was discontinued thereafter and replaced by a standard bilateral format for all entries.

From this merchandise account, it appears that the amount transferred to the reserve is the 200 florins. However, an entry was also made in the trial balance for the difference between the two sides of the trial balance. On this occasion, the debtor balances exceeded the credit balances by 508 florins 11 *soldi* 10 *denari*. As before, a single entry was made directly to the trial balance.

These two amounts were then entered separately into the reserve account in the new ledger, for 1395–1396.

The reserve account for 1395–1396. The reserve account was opened on carta 63r of the new ledger. The credit side of the account contains the two entries transferred from the trial balance. The first entry was for the estimated 200 florins of salaries and other expenses. At the end of the entry it refers to the trial balance (balance account) in the previous (red) ledger:

> Reserve of the old ledger **must have** on August 2 f. 200 *d'oro*. We made the reserve out the profit made by the old account. It is for the wages of shop boys and brokerages and expenses . . . of Livorno that Francesco and Manno assigned to us in the old [balance] account as they **must have** in the Red Ledger B at c. 154.

The second credit entry on the account was for the error found in the trial balance. It also refers to the trial balance in the previous ledger:

> And [reserve] **must have** on this day f. 508 s. 11 d. 10 *a oro* because we found more debtors than creditors in the old [balance] account, so we credit this reserve account. We think that a mistake was made, so we will check the ledger again to find it. Francesco and Manno assigned it to us in the old [balance] account as they **must have** in the Red Ledger B at c. 157.

The movements in this reserve account are shown in Figure 5. It also shows that when the debit entries filled-up the remaining space on the page, it was closed and the balance of 661 florins 2 *soldi* 8 *denari* was transferred to a continuation of the reserve account on a new page (69r).

Many errors were detected in the 1394–1395 balances. As a result, the final entry on the debit side of the second account was to transfer the remaining credit balance (for f. 6 s. 0 d. 9) to page 95r. When that account was full, it was closed and the balance, which was now a debit (of f. 168 s. 9 d. 3), was transferred to page 171v. Further debit entries were made into the account, which was closed with a debit balance of f. 204 s. 14 d. 4. The contra entry for the closing entry was to the debit of the merchandise expenses on page 288v. Thus, while the reserve account had served its purpose, the amount set aside to create it had proved to be insufficient.

Not surprisingly, these same procedures were adopted when this ledger was closed in 1396: a reserve for wages and other expenses, this time for the greater amount of 300 florins. As before, it was created out of pre-distribution profits and posted to the credit of the trial balance from where it was entered into the next ledger, for 1396–1399. The merchandise account on cartas 283v–284r of the Black (nero) ledger is shown in Figure 6, and the diagram analysing movements into and out of the account are shown in Figure 7.

The entry on the account recording the reserve in the merchandise account was,

> And [merchandise] **must give** on this day f. 300 *d'oro* that we estimated as a reserve from this account for wages of shop boys, commissions and expenses of Livorno and other expenses [. . .] which weren't paid or entered in this ledger. Francesco and Manno **must have** to balance the accounts of the warehouse.

The reserve of 300 florins was entered directly as a credit on the second page of the trial balance (page 186r), and from there to the new ledger (Datini Pisa, 1396–1399, c. 54r).

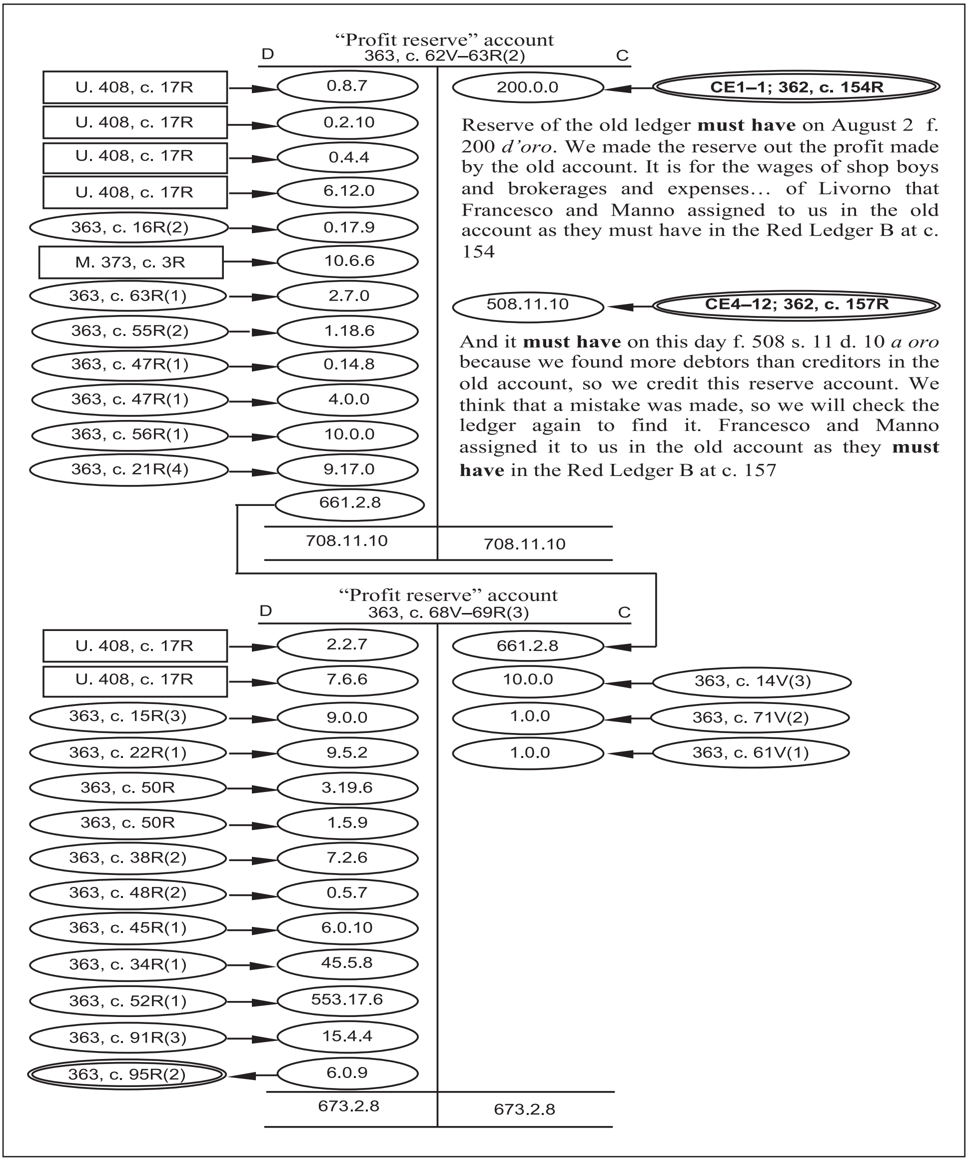

Figure 5. The first two accounts opened for the reserve created in 1395–1396 (Datini Pisa, 1395–1396, c. 62v–73r and 68v–69r).

As shown in Figure 7, this entry for the amount recorded in the reserve is shown as the last debit entry before the merchandise account balance is split between the partners, this time by debiting the account rather than as two negative entries on the credit side.

No entries are made to the trial balance for the difference between the totals of the debit and credit balances in the trial balance. This is because, this time, the total credits exceed the debits and the accountant looked for and found the error. The final entry on the debit side of the trial balance (Datini Pisa, 1395−1396, c. 186v–187r) states,

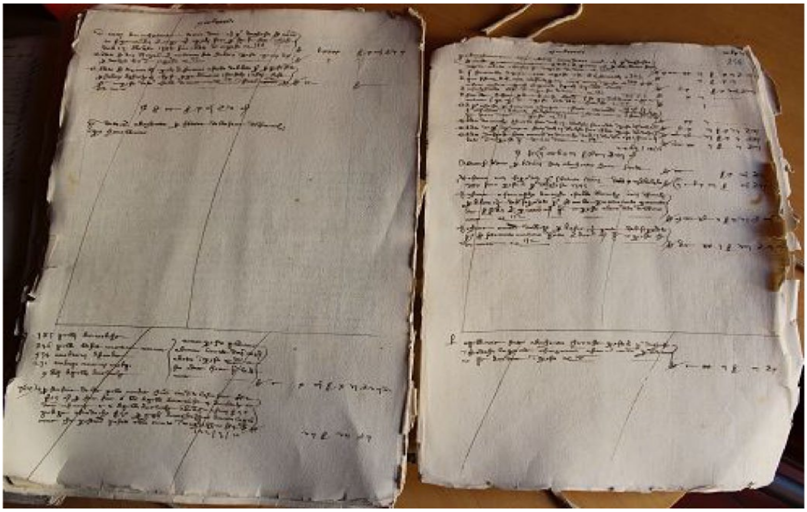

Figure 6. The merchandise account on pages 283v–284r of Datini's company in Pisa (1395–1396) and the formation of the reserve carried forward to the next ledger, for 1396–1399 (Datini Pisa, 1395–1396, c. 283v–284r(1)).[7]

and they **must give** as we make them as debtor for sheep skin and *avoltioni*[8] as in this ledger at c. 268, and in Ledger D at c. 227, f. 125 s. 9 d. 4.

The reserve account during 1396–1400. During 1396–1400, the balance on the reserve account brought forward from 1396–1399 was clearly thought to be sufficient and the reserve was used mainly for correction of errors. By the end of 1396–1397, the opening balance on the reserve account of 300 florins had been reduced to f. 136 s. 12 d. 3. This was then transferred into the trial balance from where it was brought forward into the reserve account opened for the beginning of the next accounting period: 1397–1399. At the end of that period, the balance remaining of f. 128 s. 16 d. 4 was again transferred to the trial balance and then into the new ledger for 1399–1400. Manno d'Albizo degli Agli died in 1400 bringing the partnership to an end. When the ledger was closed, the credit balance on the reserves account of f. 32 s. 7 d. 1 was transferred back to the merchandise account where it was combined with all the other gains and losses to arrive at the final profit for the business.

Discussion

This study has presented the earliest known examples of reserve accounting in the account books of Francesco di Marco Datini's partnership in Pisa (1392–1400). From the outset, the reserves created were viewed as temporary in nature. Their purpose was twofold: to meet expenses and liabilities incurred for which the amounts involved were unknown; and to act as the repository for a single entry adjustment that balanced the trial balance when the total of the debit balances was greater than the total of the credit balances. Both of these innovations had the effect of not overstating the profit for the accounting period, an early application of the prudence concept in a period where it is generally considered that accounting and financial reporting lacked sophistication.

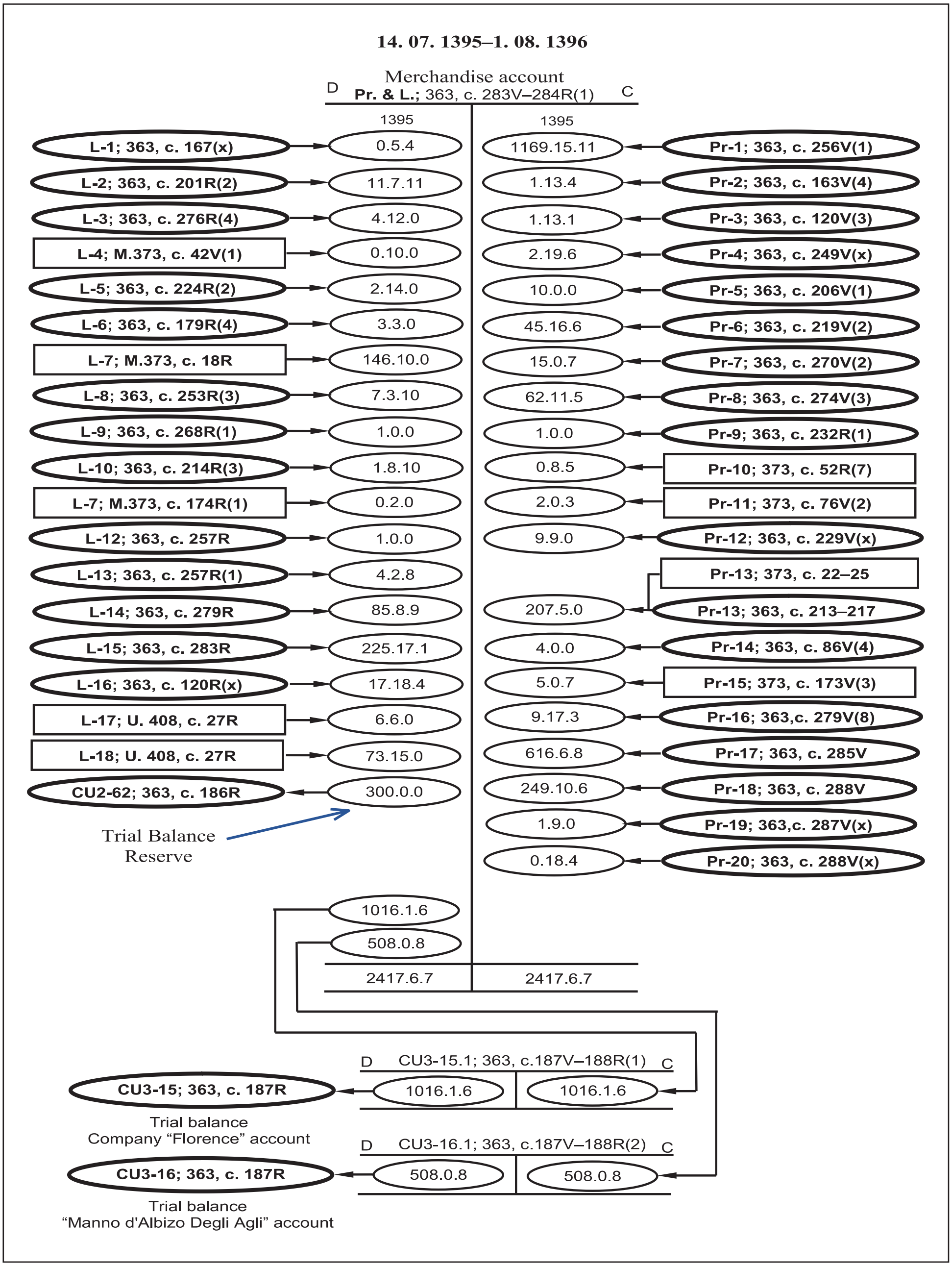

Figure 7. The Merchandise account of Datini’s company in Pisa (1395–1396) and formation of the Reserve to be carried forward to 1396–1397 (Datini Pisa, 1395–1396, c. 283v–284r(1)).

When the total of the credit balances in the trial balance were greater, the reserve account was not used. Instead, an account was opened with a debit balance in the accountant’s own name. He then set about identifying the error(s) that had caused the trial balance to fail to balance.

The reserve creation method used by Datini in 1394 involved the formation of a reserve account in the ledger. The accountant then moved to Barcelona and a short-cut was used by his replacement, placing the credit entry for the reserve account, not in an account of that name, but in the trial balance. It was not as transparent an approach as that adopted in 1392–1394, when the entry was to a reserve account. Purists today seeking appropriate accounts to be used for each entry might point to this as inappropriate practice. However, it maintained the double entry and had no impact on the overall balances. In addition, the amount transferred to the trial balance for the reserve was transferred into a reserve account in the new ledger at the beginning of the next period.

The reserve account was always used for the reasons it was introduced, with far more emphasis on error correction in the years following its first appearance in 1394. It is apparent from the vast increase in error correcting entries in the reserve account in later years that the new accountant was not as competent at completing all the double entries as his predecessor, who, in Barcelona in 1399, adopted a similar approach to reserve creation and the treatment of differences between the totals of the debits and credits in the trial balance. However, he did that, not in the way he had adopted in 1394, but in the way his successor did in Pisa in 1395, making the entry directly into the trial balance and not first into a reserve account. We can only speculate about why the creation of a reserve account in the current ledger was not considered a 'better' approach than making an entry in the trial balance. Perhaps it was considered that opening and then immediately closing a reserve account was redundant which, from a pragmatic perspective, it certainly was. Whatever the reason, it presents an intriguing glimpse of the reality of bookkeeping in a period when the double-entry method as we know it was still being developed.

Conclusion

The primary contribution of this article is its identification of how and why the practice of reserve accounting began and then developed. One surprising element of the reserve accounting revealed in this study was the sophistication of the process adopted in the treatment of errors identified from trial balances. This was surprising, not just because the assumption in the literature is that these were written-off to profit and loss, but also the fact that it is unlikely many fourteenth century merchants even realized they could use a list of balances to check that the entries in their ledgers may include errors – see, for example, Lane (1944), who did not believe Venetian merchants had developed their expertise in bookkeeping sufficiently to realize this in the mid-fifteenth century. Few would argue that it is remarkable that in the 1390s, Datini's accountant not only realized this, he recognized that simply writing-off such errors to profit and loss would artificially inflate or deflate their profits, something that could have been particularly costly to the remaining partners if incorrect amounts of profit were distributed at a time when partners were potentially about to change.

The use of logical–analytical modelling in this study enabled all entries to be mapped across the account books, linking them using flowcharts to demonstrate the completeness of the double-entry system. It is hoped that the clarity that use of logical–analytical modelling has brought to our study, and to this debate, will be recognized by other scholars with an interest in archival research and that they too will seek to use this approach in their archival studies.

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Notes

1. Moneys of account were used in all entries. These were primarily ‘ghost’ currencies for which most of the coinage did not exist. This was a necessary device in business and bookkeeping at that time. All entries in the monetary columns of a ledger were made in moneys of account (Goldthwaite, 2018). The money of account in Barcelona was Barcelona pounds: 1 *lliura* = 20 *sous*; 1 *sou* = 12 *diners.*
2. This is the money of account used in these entries: *fiorini a oro*. It comprised of florins, *soldi* and *denari* in the ratio, 1:20:12.
3. All entries presented in this article retain the original phrasing for debit (must give) and credit (must have).
4. The agreed distribution of 1:3 also applied to any profits made. It reflected the contribution to the business of the local manager, Manno d’Albizo, who received a quarter of the profits but only contributed one-eleventh of the capital invested in the company.
5. This image is printed with the permission of the Ministry of Heritage, Culture and Tourism, prot. No. 1346/28.13.10 dated 26 November 2013.
6. This was the name given to the trial balance, or balance account.
7. See Note 5.
8. The meaning of the word ‘*avoltioni*’ has been lost. It may be referring to the wrappings around the sheep skin.

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Appendix 1

Logical–analytical modelling

Logical–analytical modelling links all the transactions registered in all the account books for an entity in flowcharts. This can be done at any level, and is generally performed to generate diagrammatical presentations of the interaction and activity of an interconnected set of accounts. As an example of the extent of this approach, for this article, it has been used to illustrate the accounting system entries in Datini's company in Pisa from 1392 to 1394 through the following books:

- *Libro Grande Bianco A* (1392–1394)
- *Libro Grande Rosso B* (1392–1394)
- *Libro Grande Nero C* (1392–1394)

- *Libro Grande Giallo D* (1392–1394)
- *Libro Grande Nero E* (1399–1400)
- *Entrata e Uscita A* (1392–1394)
- *Memoriale A* (1392–1394)
- *Quaderno di Ricordanze–Mandate Di Balle A* (1392–1394)
- *Quaderno di Cassa–Spese Di Casa A* (1392–1394)
- *Quaderno di Spese Di Mercanzia A* (1392–1394)
- *Quaderno di Ricevute Di Balle A* (1392–1394)
- *Saldi di Ragione* (1392–1394)

This article presents some of the flowcharts developed in this project in Figures 1, 2, 4, 5, and 7.

Using this approach, the overall bookkeeping system of the company is modelled manually using flowcharts to follow the paths of all the entries, both forwards into the merchandise account and the trial balance, and backwards to the original entries and to the contra account where entries were entered when the original transaction was recorded. That is, it enables users to work backwards and forwards along the trails between books, accounts and individual entries, identifying both the accounts and the transactions that gave rise to the entries within them.

This approach makes it possible to identify the common patterns and the striking features of each entry that is being traced, and the bookkeeping and accounting practices that were in use, clarifying the process and highlighting deviations in practice that can then be identified, such as the creation of reserves identified in this study. Through this approach, the difficulties researchers face when trying to identify practice and innovation working solely from the account books is overcome.

This form of analysis of the accounting system and its comparison with other accounting systems by time, location, and types of ownership facilitates identification of the early steps taken that led to the development of modern accounting systems and practice.