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Interest in Medieval Accounts: Examples from England, 1272-1340

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Note on currencies: the £ symbol refers to English pounds sterling while *livres parisis* and *livres tournois* were currencies circulating in France. Each pound or *livre* contained twenty shillings, each of twelve pence. The mark was a unit of account, comprising 13s 4d or exactly two-thirds of one pound.

Abstract

The charging of interest for borrowing money, and the level at which it is charged, is of fundamental importance to the economy. Unfortunately, the study of the interest rates charged in the middle ages has been hampered by the diversity of terms and methods used by historians. This article seeks to establish a standardised methodology to calculate interest rates from historical sources. Hopefully, this will provide a firmer foundation for comparisons between regions and periods. It should also contribute towards the recent historical revision regarding medieval economic and financial development. The article is illustrated with case studies drawn from the credit arrangements of the English kings between 1272 and c.1340, and argues that changes in interest rates reflect contemporary perceptions of the credit worthiness of the English Crown.

The following article draws on research looking at the financial relationship between English kings and Italian merchant societies between 1272 and c.1340, focusing on loans advanced to the English crown. This is the medieval equivalent of modern sovereign debt or government borrowing, which has been the subject of extensive research in economic and financial academia.[1] In particular, economists have sought to develop reputational models of sovereign debt, according to which a government's access to credit and the interest rates charged for that credit depend on the perception of the reliability of that government. This is linked to an important debate over the reasons for the historical changes in the rates of interest charged to different governments at different times; most notably concerning the apparent decline in the rates charged to the English government after the 'Glorious Revolution' of 1688. In a seminal article, Douglass North and Barry Weingast argued that the new constitutional structure adopted after 1688, i.e. the replacement of a personal monarchy by a parliamentary monarchy, improved the credibility of the English government's commitment to repay its debts.[2] This model has since been applied to medieval Europe by Stephan Epstein and David Stasavage, with particular focus on whether city-states had better 'credible commitment' and thus could secure credit at lower rates of interest than monarchies/principalities.[3] In order to test the applicability of these models to the relationship between the three Edwards and their Italian creditors, it was first necessary to gather accurate data on the interest rates charged to the English kings. A preliminary survey of the range of interest rates cited in the secondary literature, however, revealed serious problems with the methodologies used by historians when calculating interest rates.

In addition to the specific question of government borrowing, interest rates also have a wider importance to the economy. In modern times, ready access to credit has enabled property ownership, a high standard of living and large governmental expenditure, while the manipulation of base interest rates by governments or central banks is used as a macroeconomic tool. The medieval world, by contrast, is popularly seen as a period of limited economic and financial development, where credit was scarce and interest rates were high.[4] In part, this has been explained in terms of the usury prohibition against charging interest on loans of money.[5] As a result, any loan would be

expensive to repay, thus having a negative knock on effect on the viability of business activity and placing indebted governments, nobles and religious institutions under pressure. According to economic theory, such a block on investment should have reduced economic growth. Today, most medieval historians would not recognise this depiction, as recent work has revised this pessimistic picture of the medieval economy considerably, identifying evidence of financial innovation and widespread access to credit.[6] A better understanding of the rates of interest actually charged in the middle ages therefore has the potential to contribute greatly to our knowledge of medieval financial and economic development, so long as those interest rates are accurately calculated.

Unfortunately, as mentioned above, the treatment of interest rates in the historiography is uneven. It seems that a combination of poor historical practice and a misunderstanding of how to calculate an interest rate, compounded by a lack of consistency in the methods and terminology used by historians, has led to the development of a number of misconceptions on the rates of interest prevalent during the middle ages. Furthermore, the analysis of medieval interest rates has not always been approached in a sufficiently nuanced way. Modern economic theory posits that the interest rates charged are, to a certain extent, dependent upon individual circumstance. Thus, a long term loan with collateral will be subject to a lower interest rate than unsecured borrowings. The context of any loan must therefore be taken into account when assessing the significance of the associated interest rate. This is especially important when constructing long-term indices of interest rates and when making comparisons between the rates charged to different types of government and across historical periods. This article will establish a method of calculating annual rates of interest in order to develop a standard term for future discussion, in the hope that a better understanding of some of the interest rates actually charged in medieval England will contribute to the recent revision of medieval financial practice and economic development. Although it will concentrate on examples drawn from mercantile loans advanced to the English crown in the later thirteenth and early fourteenth centuries, the method of calculating interest rates described in this article is equally applicable to all subject-areas and periods of history.

I

Perhaps surprisingly, there has been relatively little historical work on calculating the actual interest rates charged in practice. The standard work of reference is Sidney Homer's *History of Interest Rates*, first published in 1963. This was reissued in a revised fourth edition in 2005 (now edited by Richard Sylla), but the text and references of the section on late medieval interest rates are unchanged from the first edition, published in 1963.[7] However, the bulk of Homer and Sylla's work is concerned with modern finance and they state that their examples from the ancient and medieval periods are 'scraps and oddities' included 'to limber up the imagination and widen the perspective' and therefore should not be taken as directly comparable with modern data.[8] Historians, however, have not always been so circumspect in their use of these figures. For instance, three of the four interest rates quoted in Diana Wood's recent textbook on *Medieval Economic Thought* (published in 2002) are cited directly from Homer. Moreover, Wood concentrates on the highest interest rates (the average of those she mentions is 60% *per annum*).[9] A third source for medieval interest rates is the dataset of interest rates from the thirteenth through to the eighteenth century compiled by Stephan Epstein.[10]

The major problem with the treatment of medieval interest rates in the works mentioned above is that all of the examples that they cite are taken from secondary sources, including a large number drawn from the chapter on public credit in the third volume of the *Cambridge Economic History of Europe*, written by Edmund and Michael Fryde, published in 1953. Moreover, Fryde and Fryde's examples themselves are mostly derived from other secondary works.[11] As a result, many of the interest rates quoted stand at two or three removes from the original sources. This can make it difficult to trace the evidence for the stated interest rates, which proves to be of varying degrees of reliability. For example, Homer's citation of the interest rate of 80% *per annum* charged to Duke Frederick of Austria (and then quoted again by Wood) is taken from an un-referenced statement made in passing by the famed economist Joseph Schumpeter in his work on business cycles.[12] For these reasons, it is vital to return to the original sources and,

moreover, to use a consistent and economically correct method of calculating interest rates.

An alternate approach has looked at the cost of capital (in some ways related to the rate of interest) in medieval England, based on asset prices (grain) and the price of perpetual rents, as indications of the availability and price of credit in the long term. However, these figures are not directly comparable with loans to individuals or institutions because they do not involve default risk (i.e. the chance that the borrower will either refuse or be unable to repay the loan).[13] Instead, the following discussion will concentrate on public credit, or loans to medieval governments, especially on the few examples of interest rates charged to English kings in the thirteenth and fourteenth centuries to have been discussed in the historical literature. In particular, it will look at a series of interest rates calculated by Edmund Fryde for the reigns of Edwards I and III, how Fryde's figures have been interpreted by subsequent historians and the implications that this has had for the understanding of medieval credit and royal finance.

Edward I (1272-1307) was the first English king to enter into a systematic financial relationship with an Italian merchant society, namely the Ricciardi of Lucca. One interpretation is that the Ricciardi made loans to Edward against the security of the customs revenue from the export duties on wool. In fact, the relationship was more complicated than this and could better be described as similar to a modern current account incorporating extensive overdraft facilities.[14] There is no explicit reference in the government sources to the charging of interest by the Ricciardi, and Michael Prestwich has argued that 'the Ricciardi received little by way of financial reward for their services from the king. Their loans were not expensive for Edward'.[15] Richard Kaeuper, by contrast, who has looked at the relationship between Edward and the Ricciardi in the greatest detail, thought that it was inconceivable that the Ricciardi did not receive some form of profit from their loans.[16] As discussed below, an element of profit or interest was indeed included in the periodic accounts submitted by the Ricciardi, although it is difficult to estimate a precise interest rate given the number and complexity of the

transactions involved. In fact, it may be more appropriate to think of the Ricciardi profits as 'bank fees' rather than strictly-calculated interest on the outstanding balance.

The clearest indication of the charging of interest is found in an internal Ricciardi letter of 1295, in which they claimed 'damages' of 10,000 marks on a loan of 30,000 marks that they had advanced to Edmund of Lancaster, the king's brother, in 1293. Kaeuper is careful to state that 'this represents an interest charge of no less than 33-1/3 percent over a period of two years' and that therefore 'it is possible that they received as much as a third on the balance owed them'.[17] Epstein uses Kaeuper's discussion to calculate an annual compounded interest rate of 15.5%.[18] This figure is reasonably close to the interest rate of 14.1% implied in the repayment of a loan made to the king by Bonasius Bonante of Florence, to be examined in detail later in this article, and another of 14.4% paid to four Florentine merchant societies for a loan of £2,200 advanced in 1279 and repaid in 1280.[19] This compares favourably with the rate of 20% charged to the Italian city-state of Siena in 1290 and is only slightly higher than the risk-free rate of capital, assessed at 10-12% by Clark and Brunt and Cannon.[20] However, Edward's most recent biographer, Marc Morris, cites Kaeuper to the effect that 'the Riccardi probably charged interest at something like 33 per cent'.[21] The latter statement could easily be read as referring to an annual rate and this would have the effect of doubling the level of interest that may have been charged to Edward. In turn, this might lead historians to underestimate Edward's credit worthiness and overestimate the burden of his borrowing on the royal finances.

The financial system created by Edward and the Ricciardi worked successfully for more than twenty years until the outbreak of war between England and France in 1294. The Ricciardi found themselves unable to meet Edward's demands as their own assets were tied up in loans or trade and they were unable to secure interbank lending from their fellow merchant societies.[22] The collapse of the Ricciardi deprived Edward of access to ready credit and forced the king to resort to a variety of lenders at often less advantageous terms. The financing of the war against the French has been studied by Fryde, including Edward's recourse to Italian, Flemish and German moneylenders.[23] Although Fryde does

not calculate the interest charged on these loans, Prestwich has provided some figures in his edition of sources related to the constitutional crisis of 1297.[24] For example, on 3 October 1297 Edward borrowed 4,000 *livres tournois* from a group of Italian merchants from Asti. The loan agreement specified that Edward was to repay 4,300 *livres tournois* on 1 January 1298 or, if payment was not made by this date, 4,600 *livres tournois* on 1 April. The annualised rate of interest envisaged in this loan (calculated using the method set out by this article) was either 34.4% if repaid on the first date and 32.7% if repaid on the second. In fact, this debt was eventually repaid by the Frescobaldi of Florence, who had succeeded the Ricciardi as royal bankers, at a final cost to the king of 5,140 *livres tournois*.[25] Prestwich states that 'the rate of interest works out at 28.5 per cent, or approximately 42 per cent p.a.'.[26] Here, Prestwich clearly distinguishes between total and annualised interest and his figures are broadly correct, although according to our method, the latter figure should be revised to 46.1% *per annum*. In another example from this period, to be discussed further below, Edward had to pay an interest rate equivalent to nearly 150% per annum for a short-term loan from Albisso Fifanti, an Italian merchant. These rates are much higher than those charged by the Ricciardi before 1294, and demonstrate the financial straits in which Edward found himself at this time.

The most detailed examination of lending to an English king can be found in Fryde's study of 'Loans to the English crown, 1328-1331'.[27] This is based on a series of accounts submitted by the Bardi of Florence in February 1332, listing all the payments made by them on the king's behalf between January 1328 and October 1331, as well as several sums promised to the Bardi as *dona* (gifts).[28] The use of *dona* was one method of paying interest on a debt without incurring the appearance of usury. In total, the Bardi advanced the king £42,000 over this period and were promised gifts worth an additional £11,000. Fryde used this to estimate the level of interest expected by the Bardi and came up with the figure of 26%.[29] However, Fryde's terminology has proved confusing. The figure cited by Fryde refers to the total profit made by the Bardi over the period between August 1328 and October 1331 rather than an annualised rate. The calculation of such an annualised figure is greatly complicated by the fact that the loans were provided at different times within this three year period and not all of the gifts promised had been

paid at the time of the final account. Kaeuper quotes this figure in the following form: 'E. B. Fryde has shown that the firm of the Bardi collected about 26% on its advances to Edward III' and Wood that 'this amounted to an interest rate of 26 per cent'.[30] Although neither Wood nor Kaeuper explicitly describe this as an annual rate of interest, their discussion is at least open to that interpretation. Unfortunately, when compiling his set of data on interest rates charged on public debt, Epstein does specifically cite Fryde's figure of 26% as an annual rate of interest.[31] Since this figure of 26% is one of only three figures used by Epstein for the interest rates charged to monarchs during the early fourteenth century, this may have implications for the reliability of his wider arguments about changes in interest rates over time.

Fryde also calculated interest rates for several loans made to Edward III (1327-1377) during the early years of what was to become the Hundred Years War. Between July 1338 and February 1340, Edward III was in the Low Countries and desperately trying to raise the funds to meet his commitments to his continental allies. In particular, Fryde discusses a sizeable loan of £6,000 made to Edward by a consortium of merchants and money-lenders from Malines in November 1338. Edward finally cleared this debt in September 1341, but only after handing over a total of £12,000. In Fryde's words, these payments raised 'the rate of interest to exactly 100%'.[32] It seems that Fryde is again referring to the total return on the initial advance rather than to an annual rate of interest. Using the data collected by Fryde and taking into account the time that it took to repay the loan, we can calculate an effective interest rate of 41.4% *per annum*.[33] Although lower than Fryde's figure, this is still a higher rate than an English king might usually expect to pay, perhaps reflecting the political situation and growing doubts over Edward's credit worthiness. However, it was far from the worst deal that Edward found himself forced to accept. The second example concerns a more modest and shorter-term loan advanced by John le Bachiler of Antwerp. Fryde states that 'on a loan of £540 advanced for two months he received £60 of interest (11%)'.[34] Again, Fryde is giving the total return on the loan without taking into account the length of time over which it was repaid. If this figure is annualised, the interest rate paid works out at 66.7% *per annum*, six times higher than that given by Fryde.[35] The key point is that Fryde's figures exactly

reverse the rate of interest charged on these two loans: the long-term loan had a lower annual rate of interest but eventually returned a greater profit whereas the short-term loan charged a much higher annualised rate of interest but over a much shorter period of time, meaning that the monetary return was correspondingly lower.

As should be clear from the above examples, a major part of the confusion over medieval interest rates arises from the ambiguous use of terms by historians, which is then exacerbated when subsequent historians fail to grasp these distinctions. In particular, some of the historians reading Fryde have confused the interest rate (generally taken as an annualised figure) with the total return or profit on the loan over the whole period. It should be stressed that Fryde himself was aware of this distinction, and on occasion gives annualised figures, but his failure to make it absolutely clear when he is referring to total profit and when he is referring to annualised figures can, and indeed has, led other historians into error.

In the cases discussed above, the rates of interest charged to the English kings between 1272 and 1340 could be as low as 15% or as high as 150%. This degree of variation makes it very difficult to generalise about medieval interest rates. It is therefore important to distinguish between the various factors that could influence the interest rate charged; such as whether the loan was short-term or long-term, or whether it was secured against a pledge or a specified source of income or if it was unsecured. Furthermore, the default risk and the urgency of the need for the money also affected the rates demanded. This means that interest rates reflect both the lender's assessment of the credit worthiness of the borrower and, at the same time, the desperation of the borrower's need for credit. The evidence of interest rates can thus be used, in combination with other sources, to shed light on the wider financial situation in which the English kings found themselves at various times.

II

Before we can begin to use interest rates as evidence for economic trends or government finances, however, it is necessary to calculate those interest rates accurately. As discussed above, the lack of consistency in the methodology and terminology used by historians has undermined previous work on this topic and this article will now set out a standard method of calculating historical interest rates. The following discussion is divided into two parts. The first outlines the basic method of calculating interest rates and the minimum information needed to do so. The second considers how to identify the necessary data from the historical sources. Once the relevant data have been extracted, these can then be used to calculate the rate of interest implied.

There is no universally accepted definition of an interest rate and there are an enormous variety of different ways of calculating rates.[36] Broadly, 'interest' represents the amount paid on savings deposits or charged on a loan. The modern definition is therefore very similar to the medieval canon law definition that 'whatsoever is exacted beyond the principal is usury'.[37] An interest rate is the extra amount paid expressed as a fraction of the principal sum deposited or borrowed. Some of the examples discussed above give total interest charges over the whole term of the loan, but it is more usual to calculate interest rates as annual figures. Interest rates are crucially important in modern finance and underlie the calculations of the fair values of an array of financial instruments including bonds, equities and derivatives, and researchers in finance have expended considerable efforts in finding appropriate methodologies for determining the interest rates implied by the prices of financial assets or to be used for valuing those assets. Interest rates are determined by two key tenets of financial economics: first, that money has time value and, second, that for investors to take risks, they will require compensation. In spite of the moral restrictions imposed by the developing doctrine of usury, in practice these tenets were just as important in the determination of interest rates during the medieval period as they are today.

The (positive) time value of money implies that, all else being equal, a pound today is preferred to a pound tomorrow. This arises for at least three reasons: first, people

have positive time preference (that is, they desire immediate rather than postponed gratification); second, a given sum will generally be worth less the further in the future it is received due to the effect of inflation (although this was less significant in the middle ages than today); third, cashflows are typically more uncertain the further into the future they are to be received. That money has time value implies, importantly, that the calculation of an interest rate must take into account the timing of any intermediate payments and also the effect of compounding, which is the interest received in subsequent years on the interest paid in previous years. The effect of compounding is that a relatively small loan, if left unpaid, can roll into a much larger debt. It is debatable whether medieval lenders actually compounded interest, but we include the effect of compounding in our calculations to make the methodology consistent with current practice, and to make the resultant figures comparable with later data on interest rates.[38] Compounding can be calculated at any frequency, for instance on a daily, weekly or monthly basis, but the method employed here uses annual compounding.

The approach that is used to determine the interest rates on the loans essentially works by calculating the rate that would set the present value of the sum of the interest payments and of the repayments to the value of the loan. Thus the time value of money is accounted for by measuring all the cashflows in terms of what they would have been worth at the time of the loan, so that all payments in the formula are included on a like-for-like basis. The formula works with years (and fractions of years) as the unit of time and therefore the rate that emerges is automatically an annualised one. The general formula for a loan of L made now with a final repayment of F in T years (T need not be a whole number) and N interest payments of P_1, P_2, P_N at times T_1, T_2, …, T_N is shown in equation (1) below.

$$L = \left(\sum_{i=1}^{N} \frac{P_i}{(1+r)^{T_i}} \right) + \frac{F}{(1+r)^{T}} \qquad (1)$$

The minimum data required in order to calculate an accurate interest rate are therefore:

1) the amount of the initial loan (L)

2) the amount(s) of the final repayment (F) and of any intermediate repayments (P)

3) the date of the initial loan

4) the date(s) of the final repayment and of any intermediate repayments. The different values of T are calculated by deducting 3) from 4)

Note also that this formula is sufficiently flexible that it can handle interest or other intermediate payments that do not occur at regular intervals. Of course, a loan may also be advanced in installments, and a slightly generalised version of this formula can be used in such situations. In such cases, it is also necessary to know the values and dates of all these intermediate payments. The interest rate, r, must be calculated using a numerical procedure; this can be done in a spreadsheet or using the historical interest rate calculator developed during the current project and accessible online.[39] Provided that the sum of the interest payments and eventual repayment of the loan (or part thereof) are greater than the original amount borrowed and that there are no additional payments from the lender to the borrower, this approach will yield a unique positive interest rate.

The general formula above calculates compounded interest on an annual basis, so that from the second year interest is paid on the accrued interest from the first year as well as on the principal. However, this means that an adjustment to the calculated interest rate is needed to attain annually compounded rates for debts with a maturity of less than one year. This is shown below in equation (2).

$$r' = \frac{(1+r)^T - 1}{T} \qquad (2)$$

where T is the term of the loan expressed as a fraction of a year, r is the interest rate (expressed as a proportion rather than a percentage) obtained from equation (1), and r' is the annually compounded rate.

In order to use this method, of course, it is necessary to identify and extract the relevant data from medieval sources. However, there are particular problems, both practical and theoretical, in calculating medieval interest rates that result from the nature

of the evidence. Most significantly, the prohibition of usury forced lenders and borrowers to find ways of disguising the payment of interest and the historian has to penetrate beyond these fictions to discover the real financial transactions. Sometimes, indeed, it is not possible to recover the required information from the sources, either where the documentation is incomplete or when those involved have done too good a job of covering their tracks. In general, there were three main methods of disguising interest used in medieval sources. This article will now examine these three methods and indicate how they can be disentangled from the sources.

The most theologically sound method of claiming interest was as compensation for damages incurred by the lender as a result of the loan. In fact the modern term interest derives from the medieval Latin *interesse* meaning 'compensation for damages'.[40] Loan agreements often included a clause stating the penalty to be imposed in case of late repayment.[41] In Italian and Cahorsin loans of the thirteenth century this was often set at one mark for every ten marks of the principal every two months.[42] This is equivalent to a non-compounded annual rate of 60%.[43] In such cases, damages were calculated from the date set for repayment and it was less justifiable to claim interest from the start of a loan. This could be easily circumvented by setting an unrealistically early date for repayment, in the knowledge that this would not be met and that interest ('damages') could therefore be levied with a clearer conscience.[44] Alternatively, the lender could submit claims for specific damages. For example, the Frescobaldi wrote to Edward I in 1302 listing the various losses they had suffered as a result of their lending to the English king and these sums were later allowed against their account with Edward II.[45] To what extent these were fictional claims to disguise interest rather than real losses is difficult to assess without access to the Frescobaldi's own account books. Another theological dispute concerned whether the damages should cover only positive losses resulting from the loan, or if it should also include what was termed *lucrans cessens*, meaning the potential profit that the lender could have expected to make if he had retained the principal in his own hands. Indeed, Paul Brand, in his investigation of the concept of 'lawful interest' as indicated by the damages assessed by the royal courts in cases of debt, found that the chief justice Ralph de Hengham justified the damages awarded in one case as 'that which

he [the lender] could have gained using his discretion from the said 100s over the said six years'.[46]

The second method of disguising interest was for the borrower to grant a gift of money to the lender as a voluntary expression of gratitude for the lender's support. As mentioned above, Edward III granted gifts worth £11,000 to the Bardi while receiving loans totalling £42,000.[47] This was theologically legitimate so long as there was no intentional connection between the gift and the loan.[48] So if the lender made a loan with the expectation of receiving a financial gift, or a borrower offered his creditor a gift with the aim of securing the extension of the current loan or obtaining a further loan, then this sin of intention would render the transaction usurious. In practical terms, gifts function in a similar way to damages or penalties in that they are additional payments made on top of the repayment of the principal. In fact, it is sometimes difficult to distinguish in the sources between a gift granted for good service and a payment made as compensation for losses incurred in the king's service.

The third, and perhaps most interesting, tactic is the use of 'creative accounting' to conceal interest payments. This was typically done by overstating the amount of the loan received. For example, according to Matthew Paris, on his deathbed Robert Grosseteste, bishop of Lincoln, criticised the practices of the Italian merchants (described as the Pope's merchants or money-changers). Grosseteste stated that it would cost £100 to borrow 100 marks (£66 13s 4d) for one year (a simple interest rate of 50% *per annum*) from the Italians. The recipient, despite having received only 100 marks, would have to seal a document recognising that they had received £100 as a loan to be repaid at the end of one year.[49] The difference between the sum actually received and that recognised as being received provided the creditor with his interest. In many cases, only the recognition of the debt survives and it is therefore simply impossible to quantify the amount of interest that might have been concealed using such methods.[50] However, where full accounts survive, including records of the sums actually received in addition to those stated to have been paid, it is possible to assess the level of interest by comparing the two figures.[51] This is the case for the English kings in the middle ages, since a large number

of Exchequer sources have survived covering both money received and spent by the government.

The 'Credit Finance' project has developed what could be termed a 'follow the money' methodology to reconstruct the relationship between the Crown and its creditors from these royal documents.[52] This is facilitated by the credit/discharge accounting system used by the medieval Exchequer.[53] The purpose of this system was to audit the accounts of the receivers or disbursers of the king's monies with the aim of either clearing their balances or establishing how much they owed to the king or vice versa. The constant necessity to balance both sides of the account makes it difficult to hide interest payments. If the recipient of the loan, usually the keeper of the king's wardrobe, was charged with a larger sum than he actually received, then this would leave the accountant in deficit to the king and personally liable for the fictional shortfall. Similarly, if the king sought to disguise an interest payment by, for example, understating the amount of money repaid to the lender out of royal revenue then this would also leave the officer accounting for that revenue in deficit. The accounts could only be balanced if the initial receipts were recorded accurately or if the accountant was allowed a fictional discharge against his account. A detailed study of the royal financial records can identify such discrepancies and thus provide the figures necessary to calculate implied rates of interest. This analysis also enables the calculation of the actual interest rate paid, rather than the rate specified or assumed in the loan agreements (and even where no rate is stated).

A large-scale example of the massaging of figures to produce a predetermined outcome can be found in the audits of the accounts of the Ricciardi with Edward I in 1276 and 1279. In both cases, the king was left owing a suspiciously round sum to the Ricciardi, namely £13,333 13s 4d (or exactly 20,000 marks) in 1276 and £23,000 in 1279.[54] It seems likely that the Ricciardi and the king had agreed on a reasonable figure to cover the Ricciardi's costs and leave them in profit. In order to justify this within the Exchequer system of accounts, it was necessary for the payments made by the Ricciardi to exceed their receipts by exactly the figures agreed. In the case of 1279, the Exchequer clerks can be caught in the act of 'cooking the books'. The 1279 account follows the

standard format, first listing all the Ricciardi credits and then all the Ricciardi discharges. The total received by the Ricciardi was £178,478 19½d, while their expenditure and allowances listed in the account come to £189,797 19s 6d. Thus the actual Ricciardi surplus can be calculated at £11,319 17s 10½d. This meant that, in order to reach the 'correct' figure of £23,000, the Exchequer clerks had to either reduce the Ricciardi receipts or inflate their expenses. They seem to have chosen the latter course but, fortunately for us, the clerk responsible for the account muddled his sums. When calculating the total advanced by the Ricciardi to the king, he deducted the agreed £23,000 from the total Ricciardi receipts, instead of adding it, thus making a total of £155,478 19 ½d for expenditure by the Ricciardi. As a result, the Ricciardi appeared to owe £23,000 to the king. This mistake was corrected and the 'right' figure of £201,478 19½d supplied below. This is simply the most egregious example of a practice that must have been widespread.

On a smaller scale, the wardrobe account submitted by John de Droxford for the twenty-fifth year of Edward's reign records the receipt of a loan of £300 sterling from Albisso Fifanti and Jannoro de Mikele, merchants of Florence, secured against a pledge of royal jewels.[55] According to the more detailed account in the wardrobe book, the king actually paid £34 5s 8d sterling 'To Albisso de Fifanti, merchant of Lombardy, for a loan of 930 *livres parisis* that he made to the king from the feast of St Michael until the feast of All Saints in the present year [29 September to 1 November]'.[56] This case serves to illustrate the mathematical abilities of the merchants and Exchequer clerks, even using roman numerals. The exchange rate used by the Exchequer at that time was £1 sterling to 3 *livres* 10s *parisis*. The 930 *livres parisis* converts to £265 14s 3½d sterling, and this figure, when added to the £34 5s 8½d sterling paid for the use of the money, exactly equals the £300 sterling of the pipe roll account. It should also be noted that the annualised rate of interest charged by Fifanti, as calculated using the method described above, is equivalent to 145.3%, telling evidence of the dire situation in which Edward found himself. Similar tricks were used when repaying the loan to the king made by Bonasius Bonante, to be discussed at length shortly.

A more fundamental problem is dating. Although the king might issue a writ of *liberate* on a certain day ordering the payment of a sum of money, this does not necessarily mean that any money was handed over on this date. In the case study discussed below, Bonante and his fellows had to wait over two years before the writs of *liberate* (TNA class C 62) that they had received were honoured in full. The Exchequer recorded the discharge of each writ of liberate in a series of chronological or single-column issue rolls (TNA E 403), compiled for the Michaelmas (October to March/April) and Easter (March/April to September) terms of each regnal year.[57] However, before the reforms of 1326, these discharges were not dated and so it is difficult to pin down an exact date for repayments.[58] Moreover, large payments were rarely made in one instalment but more typically in several parcels at different times. The Exchequer clerks kept track of such payments in the memoranda of issue rolls (also TNA E 403) but, as with the chronological issue rolls, we do not have precise dates for each entry. A related issue is that the king often assigned repayments to be made by a royal officer or from a specific source of income and, again, it is sometimes difficult to assign a date to such payments or even to verify that they were made at all. In such cases, the best that can be done is to narrow down the possible date range as far as possible.

A final problem faced by any historical study is that of incomplete information. Although a remarkable amount of evidence has survived from the medieval English government, particularly from the Exchequer, there are still gaps in the record series. For example, when the king took out a loan, he would issue a letter to the creditor acknowledging his debt. Once this loan was repaid, these letters obligatory would be returned to the king.[59] A few of these returned letters can be found in the archives, identified by v-shaped cuts (to mark the cancellation of the instrument while retaining its legibility), but only a small proportion of such original instruments survive today.[60] Likewise, the royal government issued thousands of writs each year, containing administrative orders, but again few of these original writs have survived. For instance, one way in which the king could repay his creditors was by sending a writ of *liberate* to the treasurer and chamberlains of the Exchequer, ordering them to pay so much money out of the royal treasury to the stated beneficiary. In addition, payments could be made by

assignment to a royal official, such as a sheriff or one of the collectors of customs in the larger ports. In either case, very few of these original writs or tallies of assignment are still extant. Instead, the historian has to rely on the enrolled copies of these documents that were kept by the Chancery and Exchequer. Most of these are unprinted and have to be consulted in the National Archives. There are no indexes to such records and relevant entries can only be identified through the laborious process of reading each document membrane by membrane.

III

Despite the limitations of the historical data, they should not preclude the attempt to assess royal finances and the rates of interest charged to the king. A single case study will now be examined, showing step-by-step how the relevant data can be identified and extracted from the historical sources, and then how that data can be used to calculate an accurate annualised rate of interest. The selected example was chosen first because the necessary data in terms of payments and dates can be extracted from the sources but also because it combines two of the methods for disguising interest payments, namely the use of gifts and creative accounting.

The future Edward I had set out on crusade to the Holy Land in 1270. His father, Henry III, died in November 1272, while Edward was returning from Acre. Unlike previous kings, however, Edward's claim to the throne was not under challenge and so he did not have to hurry back to England.[61] On his return journey, Edward visited the papal curia. He seems to have spent almost three months with the pope between February and April 1273, mostly at Orvieto. This prolonged stay involved Edward in numerous expenses without access to the normal revenues of his English kingdom. As a result, the king looked to a number of Italian merchant societies for credit. The largest contributions were made by the Ricciardi of Lucca, Edward's future bankers, followed by the Scali of Florence and the Scotti of Piacenza.[62] A certain Bonasius Bonante of Florence and his fellows also advanced the king money. Relatively little is known about Bonasius, but he was one of a group of Florentine merchants who shared the collection of the wool

customs in Ireland with the Ricciardi before he was murdered by 'malefactores and disturbers of the king's peace'.[63] This later involvement in royal service suggests that Bonasius may have advanced Edward money as a means of gaining entry into English markets.

According to the account submitted by the keeper of the king's wardrobe, Philip of Willoughby, Bonasius provided the king with a *prest* (loan) of 3,675 *livres tournois*, valued at £918 15s sterling (at the standard rate of exchange used in Exchequer calculations at this time of £1 sterling to 4 *livres tournois*). The royal order for repayment, namely a writ of *liberate* issued on 24 November 1273 at Bayonne, specifies that Bonasius loaned this money to the king at the papal court, and so a date range of 5 February, when Edward arrived in Rome, to 30 April 1273, the last day on which he is known to have been at Orvieto, can be assigned.[64] This writ of *liberate* also states that the sum to be repaid was £1,000 sterling, or 4,000 *livres tournois*. This obviously includes an element of interest beyond the money received by the wardrobe, namely £81 5s sterling. This is probably an example of creative accounting, exaggerating the stated value of the loan in order to cover interest payments without giving the appearance of usury. These two sources supply all the data needed to calculate the rate of interest as envisaged by this order, namely the values and dates or date ranges for both the initial loan and the envisaged repayment. This is shown in equations (3) and (4) below:

$$918.75 = \frac{1000.00}{(1+r)^{0.683}} \qquad (3)$$

r as calculated from equation (3) is 13.2%, but this figure needs to be adjusted using equation (2) in order to incorporate annual compounding.

$$r' = \frac{(1+0.1327)^{0.683} - 1}{0.683} \qquad (4)$$

These calculations suggest that the annual rate of interest (r'), as initially agreed between the king and Bonasius, was 12.9%. This has been calculated using the mid-point of the date range for the initial loan, namely 18 March. However, it is possible to

compensate for the uncertainty about the precise date on which this loan was advanced using sensitivity testing. This works by factoring into the above equation the minimum and maximum possible date ranges for the length of the loan. This provides a spread of between 11.0%, if it is assumed that the loan was taken out at the earliest possible date, namely 5 February, and 15.6%, assuming that the loan was taken out at the last possible date, namely 30 April.

However, this writ of *liberate* was not honoured immediately. In fact, it was not cleared for more than two years. Fortunately, the series of payments made to Bonasius can be tracked through the records of the Exchequer. The first recorded repayment was made in Michaelmas term 1273-4, when Bonasius received 500 marks in part payment of a writ for £1,000 (i.e. the writ of *liberate* issued on 24 November 1273).[65] The next year he received a further payment, from John de Lovetot and Geoffrey de Newbold, royal keepers of the vacant bishopric of Durham. Interestingly, there is some ambiguity about this payment. The issue roll records the sum paid by the keepers as 500m, but the allowance for this payment given to Lovetot and Newbold, as well as the accounts they submitted for their custody of the bishopric, state that they paid £453 13s 4d (680 marks) to Bonasius.[66] Although Bonasius seems to have received the larger sum, it was necessary to use these two different figures in order to balance the two sets of accounts. It therefore provides another example of 'creative accounting'. The outstanding 500m (according to the Exchequer calculations) was paid before Saturday the eve of Pentecost in the Easter term of the fourth year of Edward's reign (23 May 1276), when the debt was finally cleared.[67] In addition, Bonasius received two gifts, the first of 50m (£33 6s 8d), authorised by a writ of 15 October 1274, and the second of 100m (£66 13s 4d), authorised by a writ of 7 January 1275.[68] These repayments are shown in table 1 below.

INSERT TABLE 1

In total, therefore, Bonasius received £1220 on an initial loan of £918 15s. Expressing the total value of the repayments received by Bonasius as a fraction of the initial loan amount, in the same way as in the examples from Fryde discussed above, yields a total interest charge of 32.82%. Since the loan was outstanding for around three

years, however, this figure greatly overstates the annualised rate of interest. This data can be used with equation (1) introduced above to calculate an exact interest rate, taking into account the time value of money:

$$918.75 = \frac{333.33}{(1+r)^{0.70}} + \frac{33.33}{(1+r)^{1.58}} + \frac{66.67}{(1+r)^{1.80}} + \frac{453.67}{(1+r)^{2.78}} + \frac{333.33}{(1+r)^{3.12}} \quad (5)$$

Solving equation (5) yields an annualised interest rate of 14.1%. This figure correctly takes into account the fact that each payment was made on a different date and the effect of compounding. As seen above, there is a degree of uncertainty regarding the precise dates on which the loan was taken out and on which repayments were made, but repeating the sensitivity testing described above reveals a range of 12.6% to 15.2% *per annum*. The final interest rate as actually paid is thus reasonably close to the interest rate envisaged in the original writ of 24 November 1273. This suggests that the exchequer clerks and Bonasius had some idea both of an acceptable level of interest and, more interestingly, how to work out the additional payments needed to maintain this rate of interest as the length of time over which the loan was outstanding increased.

IV

This article has highlighted some of the misunderstandings that have resulted from imprecise use of terms by historians, most notably the failure to distinguish clearly between annualised rates and total interest charges. The first point to stress therefore is the importance of using correct and standardised terminology when discussing medieval interest rates. A precise definition of interest has also been suggested, as the extra amount paid above the principal of a loan, expressed as a percentage of the principal and over a period of time, in this case on an annual basis. Finally, this article has described an accurate and consistent method for identifying and extracting relevant data from historical sources and provided an equation to calculate a compounded rate of interest. This method holds good even for complicated transactions in which money was loaned and repaid at various and irregular points over a period of time. Hopefully this will

provide a firmer foundation for subsequent discussions of medieval interest rates and also facilitate comparisons with the rates of interest charged in other periods.

Interest rates can also provide an insight into contemporary perceptions. In modern economics, money lenders are likely to demand higher interest payments from borrowers who are regarded as possessing greater credit risk (i.e., a higher probability of non-payment of interest or principal). In modern times, sovereigns are usually thought to be of lower risk than either individual or corporate borrowers; the debt of the world's largest and most stable economies, such as that of the US, is often thought to be virtually risk-free, so that short term US interest rates are often taken as a proxy for the risk-free rate of interest that is required as an input to numerous financial formulae. This was not necessarily the case in the medieval period. A creditor could pursue a private debtor through the royal courts, but had no legal remedy against the monarch themselves. Given this, it has been argued that an indebted ruler may have been tempted to default on his debts. The possibility of sovereign default may have driven up the cost of government borrowing, especially at times of crisis. Modern economists have sought to explain these variations in the willingness of financiers to lend to governments and in the interest rates charged by establishing a reputational model of sovereign borrowing.

The rates of interest charged to the English kings between 1272 and 1340 can therefore serve as an indication of the 'credit rating' of the English government during this period. From the examples above, the rates of interest charged could vary dramatically, from around 15% to nearly 150% *per annum*. This does not mean that the rates charged were random or irrational, but rather that they have to be interpreted within the context of the changing circumstances of the king and the merchants. During peaceful times with no extraordinary demands on royal revenues, the king could benefit from low rates of interest. In particular, the English kings entered into long-term relationships with certain merchant societies, namely the Ricciardi of Lucca up to 1294, the Frescobaldi of Florence c.1299 to 1311 and the Bardi, also of Florence, until c.1340, as part of which royal debts were secured against income from export customs. During such periods, interest could be charged at around 15% *per annum*, although, in addition to this, these

societies could leverage royal favour to advance their private business affairs in England. In good times, the interest charged on royal debts was only slightly higher than less risky investments in perpetual rents and assets, suggesting that the English crown was considered to be a credible borrower. Moreover, it seems as though the ordinary borrowing of the English kings did not place an intolerable strain on the royal finances. By contrast, when such established relationships failed during periods of war and financial pressure, then the kings had to seek short-term loans from individuals or associations with whom the English crown did not enjoy a continuing relationship and who did not have extensive interests in England. In addition to dramatically higher rates of interest, such lenders also demanded pledges such as the crown jewels or hostages, including prominent nobles and members of the royal family.[69] Even so, and although the myth that the English kings were serial breakers of Italian banks lingers on, the most detailed recent studies have shown that the English kings did not default on their sovereign debts.[70]

This article has concentrated on examples drawn from loans to the English crown by international merchants but the method of calculating interest rates itself can be applied to other areas, such as the extension of credit within the manor. Hopefully, the adoption of a standardised method and terminology for discussing interest rates will facilitate comparisons between the rates of interest charged to different people and in different periods. Of course, in the medieval world, unlike in modern economies, there was no standard or base rate of interest. The substantial fluctuation in the rates of interest charged, depending on the particular circumstances of the borrower and the lender as well as the nature and amount of the loan, must also be taken into account when interpreting the significance of the rates charged and when constructing and utilising indices of long-term interest rates. That said, if used with care, the evidence of interest rates can contribute to a better understanding of the medieval economy, although we should not overstate the case, particularly in comparison to the modern world.

Table 1: The repayment of Bonasius Bonante's loan to Edward I

	Date Range	Payment from Bonasius to Edward I	Payment from Edward I to Bonasius
Initial loan	5/2/1273 to 30/4/1273	£918 15s	
First repayment	24/11/1273 to 30/3/1274		£333 13s 4d
First gift	15/10/1274		£33 6s 8d
Second repayment	28/12/1274		£453 13s 4d
Second gift	7/1/1275		£66 13s 4d
Final repayment	5/4/1276 to 23/5/1276		£333 13s 4d
TOTALS		£918 15s	£1220

[1] The classic article on the determinants of sovereign credit ratings and the determinants of sovereign bond yields for modern economies is R. Cantor and F. Packer, 'Determinants and Impacts of Sovereign Credit Ratings', *Journal of Fixed Income*, vi (1996), 76-91. For a recent historical analysis, see also the tripartite classification of governments into stalwarts, fair-weather borrowers and 'lemons' in M. Tomz, *Reputation and International Cooperation: Sovereign Debt Across Three Centuries* (Princeton, 2007).

[2] D. C. North and B. R. Weingast, 'Constitutions and Commitment: The Evolution of Institutions Governing Public Choice in Seventeenth-Century England', *Journal of Economic History*, xlix (1989), 803-832.

[3] S. R. Epstein, *Freedom and Growth: the Rise of States and Markets in Europe, 1300-1750* (2000) [hereafter Epstein, *Freedom and Growth*]; D. Stasavage, 'Cities, Constitutions, and Sovereign Borrowing in Europe, 1274–1785', *International Organization*, lxi (2007), 489–525.

[4] In the nineteenth century, Bruno Hildebrand and his followers saw the middle ages as a distinct epoch distinguished from modern economy by the absence of credit. For a debunking of this theory, see M. M. Postan, 'Credit in Medieval Trade', *Economic History Review*, i (1928), 234-8. However, echoes of these older views can still be found in more popular or non-specialist works, for example in P. L. Bernstein, *Against the Gods: the Remarkable History of Risk* (New York, 1996), pp.19-36.

[5] The best introductions to the theological and intellectual underpinnings of usury are J. T. Noonan, *The Scholastic Analysis of Usury* (Cambridge, MA, 1957) [hereafter Noonan, *Scholastic Analysis of Usury*]; J. Gilchrist, *The Church and Economic Activity in the Middle Ages* (1969), pp. 62-76; J. Le Goff**,** *Your Money or Your Life: Economy and Religion in the Middle Ages* (New York, 1988); and O. Langholm, *Economics in the Medieval Schools: Wealth, Exchange, Value, Money and Usury according to the Paris Theological Tradition 1200-1350* (Leiden, 1992). The practical implementation of these precepts is discussed in R. H. Helmholz, 'Usury and the Medieval Church Courts', *Speculum*, lxi (1986), 364-80; E. S. Tan, 'An Empty Shell? Rethinking the Usury Laws in Medieval Europe', *Journal of Legal History*, xxiii (2002), 177-96; and G. Seabourne, *Royal Regulation of Loans and Sales in Medieval England* (Woodbridge, 2003), pp. 25-69.

[6] For financial innovation, see the examples of forward contracts in wool (A. R. Bell, C. Brooks and P. Dryburgh, *The English wool market, c.1230-1327* (Cambridge, 2007) [hereafter Bell, Brooks and Dryburgh, *English Wool Market*], pp. 25-6) and monastic annuities (A. R. Bell and C. Sutcliffe, 'Valuing Medieval Annuities: Were Corrodies Underpriced?', ICMA Centre Discussion Papers in Finance 2007, DP2007-15, available at SSRN: http://ssrn.com/abstract=1030857). For the engagement of peasants and lords with the market, see G. Richardson, 'What Protected Peasants Best? Markets, Risk, Efficiency and Medieval English Agriculture', *Research in Economic History*, xxi (2003), 299–356; and D. Stone, *Decision-Making in Medieval Agriculture* (Oxford, 2005). There is an extensive and expanding literature focusing on credit relations at the village level, examined most recently in C. D. Briggs, *Credit and Village Society in Fourteenth-Century England* (Oxford, 2009), pp.1-12. However, partly because of the nature of the source material, this has tended to concentrate on questions about the availability of credit and the identities of creditors and debtors rather than on calculating the precise rates at which interest was charged (ibid., pp.74-9).

[7] S. Homer and R. Sylla, *A History of Interest Rates* (4th ed., Hoboken, NJ, 2005) [hereafter Homer and Sylla, *History of Interest Rates*], pp. 87-111.

[8] Homer and Sylla, *History of Interest Rates*, pp. 5-6.

[9] D. Wood, *Medieval Economic Thought* (Cambridge, 2002) [hereafter Wood, *Medieval Economic Thought*], pp. 185. In part, this may reflect selection bias. Homer himself warned that 'Princely loans, as recorded by historians, tended to very high interest rates, perhaps in part because high rates are selected for mention', see Homer and Sylla, *History of Interest Rates*, p. 97.
[10] Epstein, *Freedom and Growth*, Table 2.1: Nominal interest rates on public debt in Europe, c.1270-1750, pp. 20-23.
[11] E. B. Fryde and M. M. Fryde, 'Public Credit, with Special Reference to North-Western Europe' [hereafter Fryde and Fryde, 'Public Credit'], in *Cambridge Economic History of Europe, III: Economic Organisation and Policies in the Middle Ages*, ed. M. M. Postan (Cambridge, 1963), pp. 436, 483, 488, 512, 532, 538, 551.
[12] J. A. Schumpeter, *Business Cycles: a Theoretical, Historical, and Statistical Analysis of the Capitalist Process* (2 vols., New York, 1939), ii. 615. Homer and Sylla, *History of Interest Rates*, erroneously cites page 617.
[13] McCloskey and Nash calculated an interest rate of over 20% based on grain prices, see D. N. McClosky and J. Nash, 'Corn at Interest: the Extent and Cost of Grain Storage in Medieval England', *American Economic Review*, lxxiv (1984), 182-6. However, these figures have been challenged by Brunt and Cannon, who argue that McCloskey and Nash's calculations are flawed and that the rate of interest implicit in grain prices should be reduced to 12%, see L. Brunt and E. Cannon, 'A Grain of Truth in Medieval Interest Rates? Re-examining the McCloskey-Nash Hypothesis', Working paper, University of Bristol, 14. Accessed on 5 December 2008 online at: http://www.efm.bris.ac.uk/ecesc/Articles/mn.pdf. Gregory Clark has studied the cost of capital implicit in prices paid for perpetual rents and has suggested a figure of around 10% for the thirteenth and first half of the fourteenth centuries, see G. Clark, 'The Cost of Capital and Medieval Economic Technique', *Explorations in Economic History*, xxv (1988) [hereafter Clark, 'Cost of capital'], 269-76. A recent study has looked at the rates of interest implicit in forward contracts for wool entered into by English monasteries with Italian merchants and found median interest rates of 18-22% (Bell, Brooks and Dryburgh, *English Wool Market*], pp. 138-143).
[14] M. Prestwich, *Edward I* (1988) [hereafter Prestwich, *Edward I*], pp. 99-100. However, Kaeuper gives a more accurate description of the 'Ricciardi system' according to which the Ricciardi managed certain sources of royal income for the king, most notably the wool custom, and in return would disburse money by royal order, which could come from sums they had already collected or could anticipate the collection of such monies (R. W. Kaeuper, *Bankers to the Crown: the Riccardi of Lucca and Edward I* (Princeton, NJ, 1973) [hereafter Kaeuper, *Bankers to the crown*], pp. 79-83).
[15] Prestwich, *Edward I*, pp. 239-41.
[16] Kaeuper, *Bankers to the Crown*, pp. 118-9.
[17] Kaeuper, *Bankers to the Crown*, pp. 120-1.
[18] Epstein, *Freedom and Growth*, p. 23.
[19] In the second example, on 28th April 1279, representatives of four Florentine merchant societies paid £2,200 to the Ricciardi, which the king was to repay in London at Michaelmas (29th September) (*Calendar of Patent Rolls 1272-1281* (1901), p. 311). This debt was not repaid in full on time, and there is a later order, issued on 5th November 1280 to the keepers of the exchange of London, to pay £1,250 sterling to the same representatives in order to clear a debt of £2,500 (ibid., p. 401). It is possible to confirm that these two orders refer to the same transaction because the latter order states that this money was received on 28 April 1279. So, in total the king repaid £2,500 on an initial loan of £2,200. Although the loan was outstanding for 18 months, half of the debt had been repaid at an unknown earlier time. Making the assumption that this earlier repayment was made at Michaelmas 1279 and using the equation set out below, produces an interest rate of 14.4%.

[20] For Siena, see W. M. Bowsky, *The Finance of the Commune of Siena, 1287-1355* (Oxford, 1970), pp. 203, 340-1. For the cost of capital, see the works cited above in note 13.
[21] M. Morris, *A Great and Terrible King: Edward I and the Forging of Britain* (2008), pp. 123-4.
[22] Kaeuper, *Bankers to the Crown*, pp. 209-27. See also I. del Punta, 'Il Fallimento della Compagnia Ricciardi alla Fine del Secolo XIII: un Caso Esemplare', *Archivio Storico Italiano*, dxcii (2002), 221-68. For a recent summary of the events of 1294, including comparisons to the 'Credit Crunch' of 2007/8, see A. R. Bell, C. Brooks and T. K. Moore, 'Credit Crunch in the Middle Ages', *The Historian: the Magazine of the Historical Association*, c (Winter 2008), 6-13.
[23] E. B. Fryde, 'Financial Resources of Edward I in the Netherlands, 1294-8: Main Problems and some Comparisons with Edward III in 1337-40'. *Revue Belge de Philologie et d'Histoire*, xl (1962) [hereafter Fryde, 'Financial Resources of Edward I'], 1174-8.
[24] *Documents Illustrating the Crisis of 1297-98 in England*, ed. M. Prestwich, (London, 1980) [hereafter *Crisis of 1297-98*], p. 35.
[25] *Crisis of 1297-98*, pp. 194-7.
[26] *Crisis of 1297-98*, p. 197 n.1.
[27] E. B. Fryde, 'Loans to the English Crown 1328-31', *English Historical Review*, lxx (1955) [hereafter Fryde, 'Loans to the English Crown'], 198-211.
[28] For the first surviving view of account, dating from April 1331, see The National Archives (TNA) E 101/127/27; for a list of loans advanced by the Bardi drawn up in July 1331, see TNA E 101/127/12; and for the final account *circa* October 1331, see TNA E 101/127/26.
[29] Fryde, 'Loans to the English Crown', 209-11.
[30] Kaeuper, *Bankers to the Crown*, pp. 118-19; Wood, *Medieval Economic Thought*, p. 187.
[31] Epstein, *Freedom and Growth*, p. 23. In fact, Epstein and Wood do not take this figure from the more detailed discussion in Fryde's article cited above, but from the chapter in the *Cambridge Economic History of Europe*, co-written by Fryde, and in which Fryde quotes his own figure without direct attribution of the original article (Fryde and Fryde, 'Public Credit', 456).
[32] E. B. Fryde, 'Financial Resources of Edward III in the Netherlands, 1338-40', *Revue Belge de Philologie et d'Histoire*, xlv (1967) [hereafter Fryde, 'Financial Resources of Edward III'], 1155.
[33] This is based on the data given by Fryde in Table B, no.10a (Fryde, 'Financial Resources of Edward III', 1203).
[34] Fryde, 'Financial Resources of Edward III', 1189.
[35] This is based on the data given by Fryde in Table B, no.11 (Fryde, 'Financial Resources of Edward III', 1204).
[36] For the latest economic writing on the theory of interest rates, see A. J. G. Cairns, *Interest Rate Models: an Introduction* (Princeton, NJ, 2004).
[37] Gratian, *Decretum, pars secundi, causa* 14 *questio* 3 *capitulo* 4, in *Corpus Iuris Canonici*, ed. A. L. Richter and A. Friedberg (2 vols., Leipzig), i. 735.
[38] For an example of the effective compounding of debt, see M. Mate, 'The Indebtedness of Canterbury Cathedral Priory 1215-95', *Ec. HR*, New Series, xxvi (1973), 188. In 1260 the monks owed a society of Siennese merchants 435 marks, but rolled this debt over, signing a new agreement recognising that they owed 500 marks to be paid in one year's time. In 1261 they were still unable to repay this debt, and consequently entered into a new contract, recognising that they owed 575 marks (an effective rate of 15% compounded *per annum*). At the same time, the monks also extended a loan from Florentine merchants at an equivalent compounded rate of 14% *per annum*. In addition to this implicit understanding of compounding, Goetzmann suggests that Fibonacci (1170-1240) in his *Liber Abaci* gave worked examples showing the difference between annual and quarterly compound interest and provided a methodology to calculate net present values (W. M. Goetzmann, 'Fibonacci and the Financial Revolution', *The Origins of Value: The*

Financial Innovations that Created Modern Financial Markets, ed. W.M. Goetzmann and K. Geert Rouwenhorst (Oxford, 2005), pp. 133, 135-6).

[39] This online historical interest rate calculator (developed with the technical assistance of Suo Chen and André Mansi) is available, with instructions on its use, at http://www.icmacentre.ac.uk/medievalcredit

[40] "Interest, *n.*[10a]", *The Oxford English Dictionary* (2nd ed., Oxford, 1989). *OED Online*, Oxford University Press, 4th Dec. 2008 http://dictionary.oed.com/cgi/entry/50119008

[41] For the most detailed discussion of such penalties in the English experience, see J. Biancalana, 'Contractual Penalties in the King's Court, 1260-1360', *Cambridge Law Journal*, lxiv (2005), 221-31.

[42] For example see *Calendar of Patent Rolls 1247-1258* (1908), pp. 562-3. This was also standard in loans made to private individuals or bodies, such as the prior of Lewes in 1273 (the initial loan agreement was recounted in a subsequent dispute in TNA JUST 1/914, m.3). Such arrangements attracted the ire of Matthew Paris (*Matthei Parisiensis monachi Sancti Albani Chronica Majora*, ed. H . R. Luard (7 vols., London, 1872-83) [hereafter Matthew Paris, *Chronica Majora*], iii. 328-31).

[43] In fact the calculation is more complicated than this and it is necessary to take into account the date on which the loan was due to be repaid and that on which it was finally cleared. For instance, if the loan was due to be repaid in six months, these penalty charges would only apply from the seventh month onwards. If this loan was repaid in full after one year, therefore, it would have incurred only three sets of penalty clauses (not six) and thus the actual rate of interest would be closer to 30% than to 60% *per annum*.

[44] Although in strict terms, the intentional nature of the theological definition of usury would also class such transactions as usurious. As Duns Scotus put it, if the lender would prefer late repayment with damages to prompt repayment without damages, then the contract must be usurious (Johannis Duns Scoti, *Opera Omnia* (26 vols., Paris, 1891-5), xviii. 293).

[45] For example, TNA SC 1/47/120 and SC 8/47/2343. This is discussed by Fryde, 'Financial Resources of Edward I', 1175-6.

[46] P. Brand, 'Aspects of the law of debt, 1189-1307', in *Credit and Debt in Medieval England, c. 1180-1350*, ed. P. R. Schofield and N. J. Mayhew (Oxford, 2002), 33.

[47] For more examples of gifts, see E. B. Fryde, 'Materials for the Study of Edward III's Credit Operation, 1327-48 [parts I and II]', *Bulletin of the Institute of Historical Research*, xxii (1949) [hereafter Fryde, 'Credit Operation [parts I and II]'], 118-20.

[48] Noonan, *Scholastic Analysis of Usury*, pp. 104-5; Wood, *Medieval Economic Thought*, pp. 186-7.

[49] Matthew Paris, *Chronica Majora*, v. 404-5. 'Grosseteste' goes on to note, reportedly still on his deathbed, that it is better to borrow from the Jews, who would charge interest by the week, than from the papal merchants. For Matthew's prejudices against the pope and foreigners, see R. Vaughan, *Matthew Paris* (Cambridge, 1958), pp. 140-3. Vaughan also notes that 'on several occasions he [Matthew] uses Grosseteste as a mouthpiece for airing his own prejudices, especially against the papacy' (ibid., p. 149).

[50] See Wood, *Medieval Economic Thought*, p. 187. However, it should be noted here that Wood seems to misunderstand the nature of the 'fictitious loans' encountered in the later medieval receipt rolls and studied by G. L. Harriss, 'Fictitious loans', *Ec. HR*, New Series, viii (1955), 187-99.

[51] For more examples, see Fryde, 'Credit Operation [parts I and II]', 121-2.

[52] The best account of the relevant royal records in the fourteenth century can be found in Fryde, 'Credit Operation [parts I and II]', 105-38; and idem, 'Materials for the Study of Edward III's Credit Operation, 1327-48 [parts III, IV and V]', *BIHR*, xxiii (1950), 1-30. However, Fryde's

account is less applicable to the thirteenth century, for which the liberate rolls play a more important role.
[53] For a general discussion of medieval accounting, see M. Chatfield, *History of Accounting Thought* (New York, 1974), 19-31; S. M. Jack, 'An Historical Defence of Single-Entry Book-Keeping', *Abacus*, ii (1966), 137-58.
[54] For the audit of 1276 see *Calendar of Patent Rolls 1272-1281* (1901), pp. 131-2; and for that of 1279 see TNA E 101/126/1.
[55] TNA E 372/144, r.25 m.1.
[56] British Library Additional Manuscript 7965, fo.29.
[57] The dates of these terms varied each year depending on the date of Easter.
[58] For a discussion of the changing structure of the issue rolls, see Fryde, 'Credit Operation [parts I and II]', 107, 123.
[59] Many royal orders for repayment of debts end with the clause that the deliverer of the money should 'receive from him [the creditor] the letters patent testifying to this loan'. This example is taken from a writ of 5 November 1275 ordering the repayment of a loan made by brother Joseph de Chauncy, see TNA E 403/1238, m.1.
[60] The cancelled letters patent are collected in TNA class C 266, especially C 266/2 and /3. Other cancelled letters relating to foreign merchants survive in the Exchequer accounts various in the files TNA E 101/127/30 and /33.
[61] For Edward's return journey, see F. M. Powicke, *Henry III and the Lord Edward: the Community of the Realm in the Thirteenth Century* (2 vols., Oxford, 1947), ii. 606-16, and Prestwich, *Edward I*, pp. 82-5.
[62] These loans were listed in the account of the keeper of the king's wardrobe, see TNA E 372/121, r.22 m.1d.
[63] *Calendar of Fine Rolls 1272-1307* (1911), p. 60; *Calendar of Close Rolls 1272-1279* (1900), pp. 375, 376. See also Kaeuper, *Bankers to the Crown*, pp. 49, 159-60.
[64] TNA E 403/1238, m.1. This writ of liberate was not entered in the Liberate roll kept by the chancery, probably because it was issued in Gascony while the chancery remained in England. For the dates of Edward's sojourn at the papal court, see *Itinerary of Edward I, part I: 1272-1290*, ed. E. W. Safford, *List and index society*, ciii (1974), pp. 8-13. However, this itinerary places the king at Orvieto as late as 6 June, but this seems to be an error, since he was at Le Mont Cenis in Savoy on the following day. Edward's last plausible appearance at Orvieto was on 30 April and he must have left shortly after this date, because he had reached Reggio nell'Emilia by 20 May (Prestwich, *Edward I*, p. 83). It would be feasible for the king and his party to have made this journey of around 200 miles in a week, but since Edward was in no rush and he may have fallen ill after leaving the papal court, it is likely that the journey would have taken significantly longer (*Calendar of Entries in the Papal Registers Relating to Great Britain and Ireland* (19 vols., London and Dublin, 1893-1998), i. 446).
[65] TNA E 403/22, m.1.
[66] For the allowance to Lovetot and Newbold, see TNA C 62/51, m.12; and for their account as keepers of the vacant bishopric of Durham, see TNA E 372/118, r.18 m.1d.
[67] TNA E 403/34, m.1 and E 403/1238, m.1.
[68] TNA C 62/50, m.2; C 62/51, m.12. The latter sum was paid after 13 January 1275 (E 403/27, m.3 and E 403/1235, m.3).
[69] Fryde, 'Financial Resources of Edward I', 1178; and idem, 'Financial Resources of Edward III', 1176, 1179-81.
[70] Kaeuper, *Bankers to the crown*, pp. 248-51; *idem*, 'The Frescobaldi of Florence and the English Crown', *Studies in Medieval and Renaissance History*, x (1973), 72-92; E. S. Hunt, *The Medieval Super-Companies: a Study of the Peruzzi Company of Florence* (Cambridge, 1994), p. 245.