Abstract

The rise of wage labour is considered one of the indicators for the transitional nature of the late medieval economy in Northwest Europe and the emergence of capitalism. It is not surprising therefore, that wage labour has attracted the interest of many economic historians. There has been particular interest in wage levels, creating long time series of wage levels in various parts of medieval Europe. Regional variations of these wage levels are often studied to research (labour) market integration.

While such time series are incredibly informative, they are not an indicator of the number of people that worked for wages in a particular area, and to what extent wage labourers were fully or partially dependent on the income from wages. Recently, an alternative indicator was proposed for how many people worked for wages in a certain country. This indicator is the level of small denomination coins per capita, worth a daily wage or less.

In this study, I will examine to what extent small coin evidence, both archaeological coin finds as well as coin production figures, can be used to study both spatial and temporal variation in wage labour in late medieval England and Wales; and which intermediary steps
are necessary to come to such an evaluation. The spatial component is added at the end of
the paper and will be addressed in the presentation in more detail. The paper below is meant
as an accompanying piece that contains the steps taken to come to detailed monetisation
levels in medieval England and Wales over the course of several centuries.

Introduction

The idea behind using the availability of coins as a proxy for the presence of wage labour is
quite simple and elegant, and was further developed in recent years by Jan Lucassen.¹ It builds
on the premise that the availability of ‘a substantial stock of currencies per capita in
circulation, consisting of denominations equalling the value of one hour or less of waged work’
in particular areas of the world can be used as an indicator for the presence of wage labour in
those areas. In areas where the per capita stock of these coins of small denominations is five
to ten times the prevailing wage level of a skilled worker, Lucassen argues, a level of ‘deep
monetisation’ is reached.² The advantages of this approach are twofold. First, it offers a new,
consistent method to compare different regions of the world over time and space. Second, it
can be used to study areas of the world for which little or no data is available on the size of
the group of wage earners in society.

While Jan Lucassen has applied the method to various countries or larger regions in
Europe and Asia, there is no restriction on the geographical level of analysis, as long as a
meaningful number of coins in circulation per capita can be calculated. In this paper, I will use

proletarization. Possible links, India 1200-1900’ (Noida: V.V. Giri National Labour Institute 2014); J.M.W.G.
spatial and temporal spread of archaeological coin finds in medieval England and Wales to reconstruct local spatial and temporal patterns of deep monetisation levels. I will focus on the coins minted between 1180, when the English coinage was reformed and the short-cross penny was introduced, and 1660. Finders of coins produced after that year are no longer obliged to register their finds with the government. The proposed methodology can act as a case study for other regions in the world.

**Coin Finds and Production Figures**

In order to reconstruct the spatial and temporal patterns of the level of monetisation in a particular region, in this case medieval England and Wales, we need to combine a number of datasets and variables. The basis for further analysis are the archaeological coin finds. Not all coins that were in circulation can of course be recovered through archaeological surveys. The metal of coins can be – and often is – reused for all kind of purposes, including the production of new coins. Coins that were not reused or brought back into circulation, may have been hoarded or lost. Of these coin hoards and coin losses, only a fraction will have been found – and only a fraction of those will have been registered. We have to rely on the ability and willingness of archaeologists and detectorists to find and record coin losses.

In countries that both allow the finder to keep his coin finds (after registration), and in which a good system for registering the findings is in place, there are great possibilities for researchers to use the coin finds evidence for socioeconomic and labour history. Such laws and registration systems are for instance in place in the Netherlands (the NUMIS database),³ but the most advanced and user-friendly system at the moment is the **Portable Antiquities**

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Scheme (PAS) that registers archaeological finds – including coins – for England and Wales.\textsuperscript{4} Currently there are over 500,000 individual coins registered, mostly dating from the Iron Age to the mid-seventeenth century\textsuperscript{5}, as well as almost 1,000 coin hoards. On a daily average, 60 to 70 coins are added to the database.

Most of these coins have spatial coordinates attached to their records, but only 165,000 of these coordinates are publicly available. The spatial coordinates of the majority of the records is concealed, to prohibit treasure hunters scanning the area for further artefacts. In such cases, often only a parish or field name is recorded that can cover a couple of square kilometres. For the purpose of this research, the publicly available data of the Portable Antiquities Scheme was cleaned extensively and enhanced with an estimation of the spatial coordinates – when absent. Wrong or missing delimiters were fixed, the spelling of geographical names was harmonized, just like the names and estimated production dates of the coins. The values of the denominations were harmonized wherever possible. In the end, our adjusted dataset includes precise or approximate locations for 91\% of all coin finds, a significant increase from the publicly available coordinates.\textsuperscript{6} This means that there is a substantial spatial coverage, that will make further analysis possible.

\textsuperscript{5} There is no obligation to report coin finds that were produced after 1660, so there is only a limited amount of modern coins included in the database.
\textsuperscript{6} All records that carried information on the parish or field or area name in which the coin was found, were given coordinates. Some coordinates are therefore not precise find locations, but center points of parishes. In those case in which only a district or county name is available, the spatial coordinates are only used for county or district aggregates.
For the short period between 1279 and 1351 it is possible to get some indication of the survival rate for each denomination of medieval English coinage (Figure 1 and Table 1). For this

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This includes the – more frequently minted – half noble and quarter noble. Based on the coin finds of 1279–1351, on average out of each pound sterling, around 7.63 gold coins were minted. This includes 0.72 full nobles (9% – or 24% per lb.), 2.20 half nobles (29% – or 37% per lb.), and 4.71 quarter nobles (62% – or 39% per lb.). Since the production figures for all three types of gold nobles are aggregated and presented in pounds sterling, we had to transpose the coin finds to pounds first and then make the calculations.

The production figures are available in: Allen, *Mints and Money*, 410–415. Undefined and foreign coinage of this period that was recovered is not included.
purpose and because not all coin finds can be dated precisely, any date spans of the coins (e.g. 1307–27) are adjusted, where each year within this span is given a value of one divided by the total span length: in this example each year gets a value of 1/21, or 0.0476. This allows us to aggregate the year spans without producing duplicate counts.

It seems that gold coins are a little bit less likely to be retrieved than silver coins — possibly because gold coins are more likely to be reused and less likely to be lost due to their high value. One in 47,000 gold nobles, including half nobles and quarter nobles, is retrieved. For pennies and farthings, roughly around one in every 20,000 to 35,000 coins produced is reported in the Portable Antiquities Scheme database. The halfpennies show a slightly different picture, with a particular high survival rate between 1292 and 1330. This probably means that either the production figures for halfpennies are underreported, or the dates reported in the PAS are incorrect. For the moment, a survival rate of one in 31.197 for small silver coins (the average for all farthings, halfpennies, and pennies combined) seems reasonable to us, especially as the survival rate does not vary that much throughout the period 1279–1351. Perhaps this figure can be further specified in the future, specifically regarding whether this survival rate changes over longer periods of time (which is presumably a relevant factor).

**Length of Circulation Period**

One of the other ways of interpreting this survival rate figure — which also adds temporal depth — is by linking it to the length of the period a particular coin was in circulation. In order to determine the per capita stock of coinage in circulation, we need to determine how long coins remained in circulation since they were minted. In his study of the deep monetisation levels in the Netherlands, Jan Lucassen used a ‘half-life’ of fifty years for copper coins —
meaning that as a ‘rule-of-thumb’ after fifty years, half of the coins produced were removed from circulation due to losses, hoarding, melting, and reminting. For silver and gold coins, which may have been more prone to hoarding and melting, this half-life may have been shorter. Lucassen mentions examples of twenty to thirty years. From the composition of medieval English coin hoards, it becomes clear that it is not unusual to have pennies included that were up to 150 years old at the time the coin hoard was created. Using the survival rate of thirteenth- and fourteenth-century coins we calculated earlier and a ‘half-life’ of fifty years, we can draw a hypothetical survival rate below (Figure 2). The rate decreases exponentially, with 1.5% per year.

Figure 2. Hypothetical survival rate for medieval small coins. The area in grey is used to calculate the estimated number of coins in circulation at any given point.

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To apply this survival rate on the coin finds, we use the available coins dated in one particular year (Figure 3) and combine these with all coins in the hundred years previous to that year. This is done proportionally, using the expected loss of 1.5% per year (compare Figure 2). Although after hundred years, still around 20% of the coins may be kept in circulation according to the hypothetical survival rate above, the calculations are topped at hundred years for simplicity. The end results are presented in Figure 4.
Figure 4. Estimated number of small coins in circulation (in pennies) per capita (topped at hundred years after production). The figures are based on the coin finds in the PAS database.

Population Figures

For the moment, I have used the national and county estimates for the population of England prepared by Broadberry et al. These were interpolated to produce yearly estimates. The population of Wales was added by adding 7% to the population of England.

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**Wage Levels and Hours Worked**

Currently, I have used the nominal wage levels for skilled craft workers gathered by Gregory Clark.\(^{14}\) Furthermore, for now, I have not taken into account changing patterns in the number of work hours in a day. For the calculation, I presume there are eight work hours in a day, as most wage series state the daily wage only. This also allows for good comparisons with the deep monetisation levels created by Jan Lucassen for the Netherlands and several countries in Europe and Asia.\(^{15}\)

Due to the rising absolute wage levels in England from the thirteenth to the seventeenth century, ever so often new coin denominations fall into the category of coins worth an hourly wage or less. These coins are listed in Table 2.

The wage level between 1066 and 1209, the earliest year included by Gregory Clark, is estimated to be static and the wage level in 1209 is used for all years. While this was most certainly not the reality, it will not influence the deep monetisation levels too much, as farthings, the only coin that matches the wage level of 1209, appear in this period in small numbers – and in the form of a penny cut in quarters – only.

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\(^{15}\) Lucassen, ‘Deep Monetisation: the Case of the Netherlands’; Lucassen, ‘Deep Monetisation in Eurasia’.
Figure 5. Nominal daily wage of a skilled craft worker.

<table>
<thead>
<tr>
<th>Period</th>
<th>Largest available denomination equalling hourly wage</th>
</tr>
</thead>
<tbody>
<tr>
<td>[1066]–1357</td>
<td>¼ d. (Cut farthing); Farthing (<em>introduced</em> 1216–47)</td>
</tr>
<tr>
<td>1358–1559</td>
<td>½ d. (Cut halfpenny); Halfpenny (<em>introduced</em> 1216–47)</td>
</tr>
<tr>
<td>1560–1616</td>
<td>1 d. Penny; Threepence (<em>introduced</em> 1561–82)</td>
</tr>
<tr>
<td>1617–1651</td>
<td>1 ½ d. Threepence (<em>introduced</em> 1561–82)</td>
</tr>
<tr>
<td>1652–1660</td>
<td>2 d. Halfgroat or twopence</td>
</tr>
</tbody>
</table>

Table 2: Largest available denominations in circulation equalling an hourly wage.

Deep and medium monetisation levels: yearly estimates and spatial patterns

To calculate the deep (and medium) monetisation levels, the figures in Figure 4 are divided by the typical nominal wage level of a skilled worker in England, either by hour (deep monetisation) or by day (medium monetisation). The end result is presented in Figure 6. Quite pronounced are the three shifts around 1350–55 (coinciding with the Black Death), 1550–60
(mid-Tudor crisis), and 1650–55; each time followed by long but slowly decreasing levels of deep monetisation. All three volatile periods are associated with either sudden or more slowly developing rising nominal wage levels, causing new denominations to be included in the calculations (see Figures 7 (deep) and 8 (medium)). Immediate population changes, affecting the per capita numbers, play a role as well, particularly of course after the Black Death.

It is also possible to calculate regional, county estimates for the deep and medium monetisation levels. Here we have to combine the county population estimates by Broadberry et al. with the spatial data of the coin finds gathered by the Portable Antiquities Scheme or added by my own. It builds on the presumption that coins minted often in London or Canterbury end up circulating, either immediately after production or more slowly through use and payments, in regions with the highest demand for that type of coin. The results are presented in Figures 9 to 11.

The hypothesis that I wish to test is that regions with high rates of wage labour are characterised by high demand of small denomination coins. If correct, this means that spatial and temporal patterns in deep monetisation levels can be used to estimate the number of people working for wages in a particular time, at least for rural areas. Indeed, areas we know have had relative high wage labour rates in the Middle Ages, such as Norfolk, Suffolk, and Lincolnshire, generally show high deep monetisation levels (Figure 10). The exercise is particularly useful for the many regions of medieval England where such rates are completely unclear.16

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16 Some rural wage labour rates for England, including references to literature, are listed by Bas van Bavel: B.J.P. van Bavel, ‘Rural wage labour in the sixteenth-century Low Countries: an assessment of the importance and nature of wage labour in the countryside of Holland, Guelders and Flanders’, Continuity and Change 21 (2006) 37–72, there 38 (note 2).
In the coming year, I want to contextualise the outcomes of this paper, both in the economic, monetary, and labour history of the British Isles, as well as adding comparisons to other regions in the world. I will focus particularly on the reasons monetisation levels change over time, and the possibilities of using these levels as a proxy for the presence of wage labour. It might also be possible to help further define and/or sharpen the definition and premises of ‘deep’ and ‘medium’ monetisation levels.

*Deep monetisation* = ‘regular’ coin availability (valued one-hour wage skilled worker or less) per capita. ‘Regular’ is approximated by Jan Lucassen as 5 to 10 times the value of the prevailing hourly wage.

*Medium monetisation* = ‘regular’ coin availability (valued full or half daily average wage skilled worker) per capita

*Figure 6. Monetisation levels in England and Wales, based on coin finds reported in the PAS database.*
Figure 7. Dissection of the deep monetisation level, per denomination.

Figure 8. Dissection of the medium monetisation levels per denomination.
Figure 9. Deep monetisation levels (in absolute figures) for the years 1086, 1290, 1377, and 1600 (from the top left, clockwise).
Figure 10. Deep monetisation levels (relative to the other regions) for the years 1086, 1290, 1377, and 1600 (from the top left, clockwise).
Figure 11. Medium monetisation levels (relative to the other regions) for the years 1086, 1290, 1377, and 1600 (from the top left, clockwise).
Figure 12. Ratio of Medium to Deep Monetisation Levels for the years 1086, 1290, 1377, and 1600 (from the top left, clockwise).