# Payment Speed and Timeliness for UK Small & Micro Businesses

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SMART DATA FOUNDRY

Sage

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# 1. Executive Summary

Analysis of some 58 million sales invoices[1] from over 100,000 Small and Micro Businesses (SMBs) from 2010–2021 shows:

- Overall payment speed and timeliness (on-time payment) have improved very significantly since 2010 and have continued to do so in recent times.
- The average time for an invoice to be paid in our sample has reduced from c. 81 days in 2010 to c. 44 days in 2019 and c. 36 days in 2020–2021.
- A significant driver of reduced average payment times is a steep decline in extremely slow payments. From 2010–2013, 11% of payments took over 90 days and those had an average time to payment of 219 days. In 2020–2021, only 5% of payments took over 90 days, and those had a materially lower average payment time of 177 days.
- There has also been a dramatic reduction in the problem of *late* payment of invoices over that period, as measured by two components:
  - The *proportion* of invoices paid late (after the due date) has seen a moderate but steady decline from c. 47% in 2010–2013 to 40% in 2020–2021.
  - The *degree* of lateness has fallen materially, with the average *lateness* of late invoices falling from over 100 days overdue in 2010–2013 to under 30 days overdue in 2021–2021.
- In 2020–2021, the average business in our sample carried approximately £22k of outstanding late payments at any point in time, which is almost as much as the typical total of outstanding *non*-late payments for those businesses. Said another way:

  *for a typical business, almost half of outstanding invoices (by value) are overdue.*

- Geographic variation in speed and lateness of payments has reduced, with almost all regions of the UK having seen improvements in both factors, and the gap between the best and worst regions declining.
- Improvements in both payment speed and timeliness have been seen across most industry sectors (based on SIC codes for small corporate entities), though there remains more difference between the best and worst sectors than across geographic regions.
- A standard metric for assessing payment speed is *Days Sales Outstanding* (DSOs), which measures the average amount of time it takes for £1 of non-cash sales to be paid. From our data, DSOs averaged around 45 days in 2010–2013, and this has fallen to about 22 days in 2020–2021, representing a 50% reduction.

[1] Supplied by Sage Accounting UK to Smart Data Foundry, on a de-identified basis, and processed in a secure data safe haven

- Using a similar methodology to DSOs, we can estimate *Days Sales Late* (DSLs). These measure the average number of days *overdue* a typical £1 of non-cash sales is, with invoices paid on-time measured as being 0-days late. From our data, DSLs averaged around 30 days in 2010–2013, and this has fallen to about 12 days in 2020–2021, representing a 60% reduction.

These findings run counter to the prevailing gloomy narrative about payment speeds in the UK, but on reflection should probably not be a surprise. Through digitization, invoicing has moved from being

- paper-based;
- sent though postal mail and settled by cheque;
- cleared over 4–5 working days;

to being mainly

- electronically produced;
- issued and paid over the internet;
- cleared in times measured in minutes.

Do not underestimate all the steps involved in paper-based invoicing, each with potential for delay. Sending involves creating the invoice, printing, stuffing into an envelope, franking or stamping, and taking to a post box. Then there's the delivery time. The recipient then has to open the mail, process it, write a cheque, stuff an envelope, frank or stamp it, take it to a postbox, and send it. Then the postal service has to deliver. On receipt, the mail has to be opened and the cheque taken to the bank to be cashed. It all adds up.

Combine these changes with the increased ease of invoicing, tracking, reporting, prioritising, and chasing up of late payments and it would take a dramatically deteriorating underlying situation for the overall trends not to be positive. Additionally, successive governments have focused on payment speed as a key issue, setting up the Office of the Small Business Commissioner in 2016, which manages the Prompt Payment Code (PPC). This is a voluntary initiative designed to encourage better payment practices and swift payment. As of now, the PPC has more than 3,900 signatories.

While these findings are encouraging, they should not be misinterpreted as suggesting that no problems remain.

- It is still the case that some 40% of credit sales invoices are not paid on the agreed invoice terms (with about 12% being over 30 days beyond terms).
- Some 12% of invoices take over 60 days to be paid (irrespective of payment terms).
- These results apply directly and fully only to the Sage customers whose data we have analysed. While there are presumably similar benefits for users of other electronic accounting software, many firms do not use such software, relying instead on manual accounts, invoicing, and chasing up of payments. Indeed, many small businesses still, at the end of the financial year, hand over the proverbial shoebox of receipts and invoices to an accountant, who reconciles them. It seems likely payments speeds will have improved less for those firms.

As far as we are aware, this is the largest analysis of UK small business invoice payment speeds published to date, both in terms of the number of firms and invoices analysed, and the breadth of analysis conducted. There is evidence that much has improved; but there remains plenty of scope for further increases in payment speed and bearing down on the problem of late payments.

 

# 2. Data

This project is based on data supplied by Sage Accounting to Smart Data Foundry (SDF), on a de-identified[1] basis for the sole purpose of analysing late and slow payments.

Key points about the data:

- Sage supplied data from a subset of its product offerings (Accounting Plus, Accounting Standard and Start) targeted at smaller UK businesses—a mix of sole traders and corporate entities (Limited companies, Partnerships, etc.)
- SDF has (all) sales invoices for c. 110,000 Sage customers over the period 2010 to 2022—some 58 million invoices in total. The volume is large enough to give robust statistics even in early years (e.g. c. 63,000 in 2010) and rises significantly in 2018 as shown in Figure 2.1.
- SDF also has some limited descriptive data about the companies, including the type of corporate entity and geographic location (through a partial postcode). For most corporate entities, we also have the first two digits of the Standard Industry Category code (SIC code) as recorded at Companies House. Because we have their sales invoices, we also know the revenue for each company, which we use as a measure of size.
- For invoices, we know the invoice issue date, the due date, the amount, and the actual payment date or dates. We can also identify, for each Sage customer, which invoices are issued to the same client, but we cannot identify the same client across *different* Sage customers, and we do not know the identities of either Sage's customers or their customers' customers.

[1] The data has been "adequately anonymised" by Sage, is transferred using strong encryption, is stored and processed in Smart Data Foundry's Data Safe Haven (operated by EPCC at University of Edinburgh), is subject to strong information governance and is worked on only by accredited, vetted researchers. Only aggregates such as are shown here are published and Smart Data Foundry has agreed not to try to identify any businesses in the data provided.

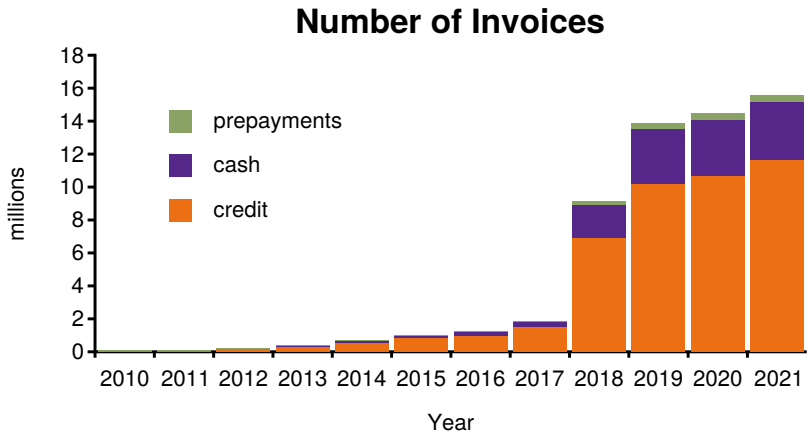


**Figure 2.1: Number of Sales Invoices by Year**

The orange blocks show credit invoices—defined here as those for which credit is offered and at least 1 day of credit is used; this is probably the most relevant quantity. Prepayments, cash payments, and invoices for which credit is offered but not used account for just over 25% of all invoices, shown in purple and green. The purple blocks show cash invoices and unused-credit invoices (those for which the payment date and the invoice date are the same). The green blocks show prepayments (invoices for which the payment date precedes the invoice date). Although the bulk of the data is from 2018 to 2021, even in 2010 the volume was over 63,000, so statistically meaningful.

 

# 3. Initial Insights

## 3.1 Terminology

In this report, we are studying two related but distinct problems:

- *payment speed*—how long it takes for a (credit) invoice to be paid, irrespective of payment terms;
- *payment lateness*—for late invoices, how long after the due date an invoice is paid. We use *timeliness* as a shorthand for *on-time payment,* and use the terms *late* and *overdue* interchangeably to describe invoices paid after the due date.

We quantify both payment speed and payment lateness in days. For overdue invoices, the number of days late describes the number of days an invoice is overdue when finally paid, i.e. the total payment time is the payment term (in days) *plus* the number of days late.

When invoices are paid in multiple parts (which is comparatively rare, at about 3.75% of invoices), we consider the invoice paid only when the final payment has been made. (For reference, when invoices are paid in parts, the median time between the first and last payment is 25 days, and the mean time is 61 days. Both figures have fallen steadily over time.)

We have excluded invoices that have not been paid from this analysis, i.e., we consider unpaid invoices and bad debt to be a separate problem from payment speed and timeliness, though they are obviously related.

We classify invoices as prepayments, cash or credit as follows:

- *prepayments* are invoices for which the payment date precedes the invoice date.
- *cash* invoices consist of non-credit sales, including invoices for which credit is offered but where payment is made the same day. (We cannot distinguish between actual cash transactions and non-cash invoices issued with zero-day terms.)
- *credit* invoices are those for which the payment date is after the invoice date, even if the invoice has zero-day terms.

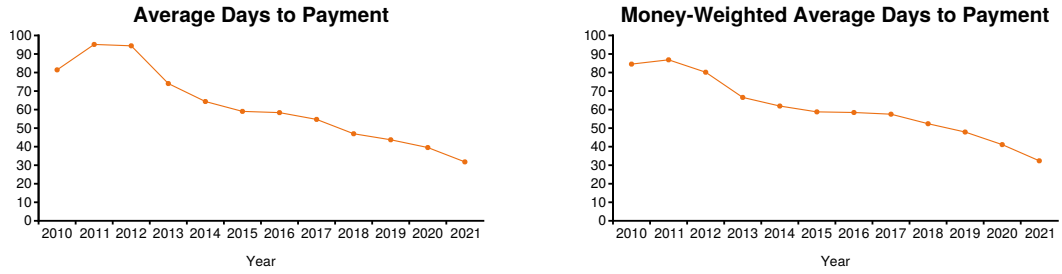


**Figure 3.1: Payment Speed by Year (Credit Invoices)**

## 3.2 Payment Speed

Figure 3.1 shows the overall change in payment speed from 2010 to 2021. The left figure shows the average payment speed of credit invoices while the figure on the right shows the speed weighted by invoice size. In effect, the graph on the right shows how long it takes for the average pound invoiced to be paid.

The graphs show the payment times for credit invoices, as defined.[1] From 2012, there is a clear and sharp downward trend which continues right until the present, seeing average payment times for credit invoices falling from over 80 days in 2010–2013 to around 40 days in 2020–2021.[2]

Note that the 2021 point may be slightly artificially low because of censoring (see section 3.7). Note also that 95% confidence intervals (not shown) are not materially larger than the markers used to show points, even for 2010, where the volume is lowest, so we do not believe statistical noise is affecting the patterns seen to any material degree.

When weighted by invoice size (right-hand graph), we see a similar but smoother decline in the average time a pound takes to get paid for credit invoices, from around 80 days in 2010–2013 to around 40 days in 2020–2021. Again, confidence intervals, if shown, would never be materially larger than the markers used for data points.

Figure 3.2 shows median days to payment, which inevitably moves much more slowly than the mean (shown previously). The much faster decline in payment times when including non-credit payments clearly indicates more immediate payment, whether this is an actual move to more cash sales (perhaps driven by more online commerce) or simply more businesses settling immediately, facilitated by electronic payments and effective zero clearing times.

The right-graph in Figure 3.3 shows that median payment terms for credit invoices have been steady at 30 days for all time and the mean term for credit invoices (left-graph) has fallen only very slightly from 29.5 days in 2010–2013 to 27.5 days in 2020–2021.

[1] those for which payment time is at least a day

[2] Throughout this report when we say "2020–2021", we in fact mean the second half of 2020 and the first half of 2021, which we shorten merely for brevity. We avoid using the second half of 2021 for comparison because there is some censoring of the full outcomes for those invoices in our data, due to the last available date for analysis being February 2022, by which time some 2021H2 invoices were still unpaid.

 

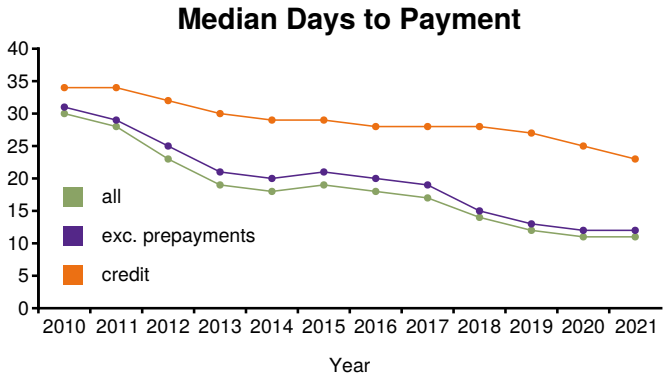


**Figure 3.2: Median Payment Speed**

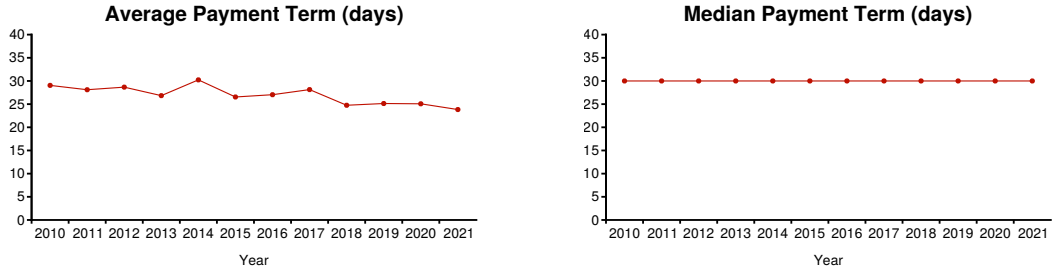


**Figure 3.3: Median Payment Speed and Median Payment Terms**

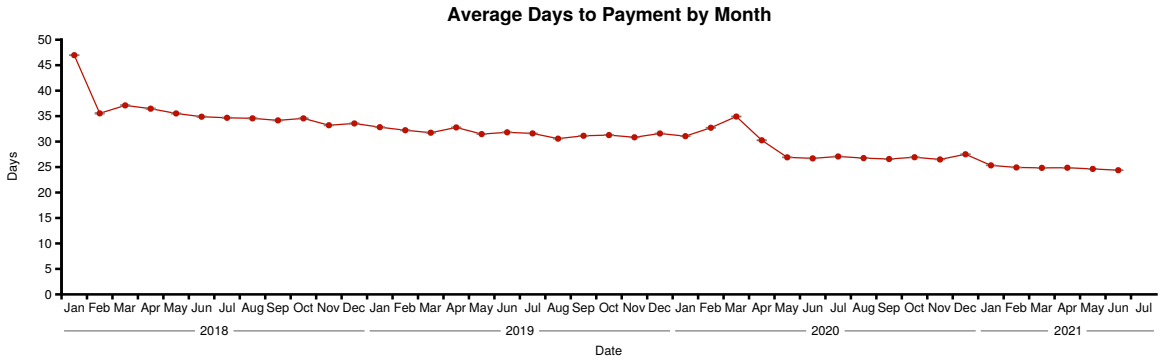


**Figure 3.4: Payment Speed by Month**

Figure 3.4 zooms into the period from 2018, showing the monthly pattern. We stop this graph in mid-2021 because of the impact of censoring on long payment times in the second half of 2021 (see section 3.7). Notice the small but pronounced uptick in payment times around the first COVID-19 lockdown (March 2020), but also how the line quickly returns to trend. There is a similar, smaller bump around the Christmas 2020 lockdown.

 

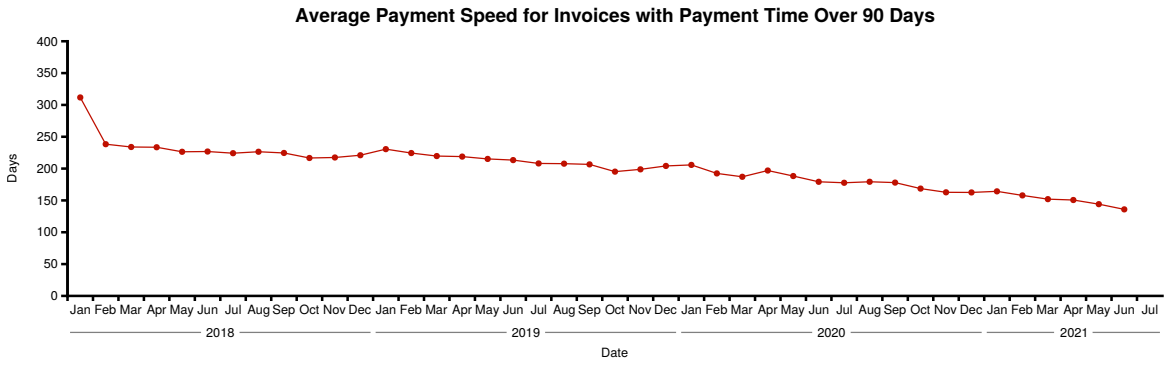


**Figure 3.5: Payment Speed for Slow Payments**

As we have already commented, a large driver of shortening payment times is a reduction in really slow payments. Figure 3.5 looks only at invoices taking over 90 days to be paid. We see a gradual but very consistent decline in the time taken for these really slow payments from an average of over 250 days at the start to more like 150 by mid-2021. (By definition, the lowest possible value for this figure is 91 days, since we are focusing only on payments over 90 days old.)

 

### 3.2.1 Invoice Speed Breakdown

The graphs in Figures 3.6 and 3.7 illustrate the progression of invoice payment speed over time. Over 20% of invoices were taking over 60 days before 2014, and this had declined to around 12.5% in 2020–2021, with over 90 days falling from c. 12% to c. 6% over the same period. During this period, payments within 10 days increased from c. 37% to c. 49%.

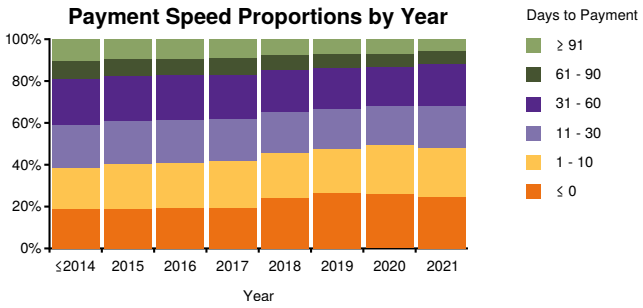


**Figure 3.6: Invoice Speed Breakdown by Year**

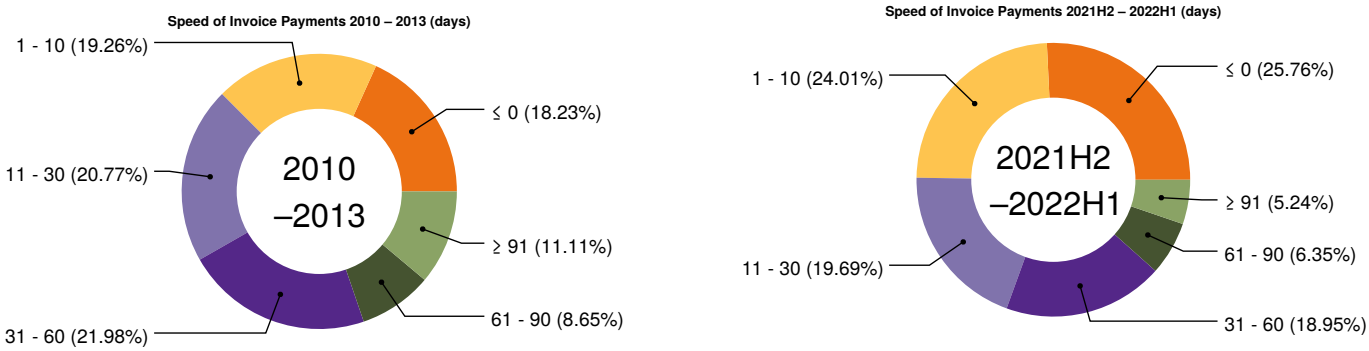


**Figure 3.7: Speed of Invoice Payments over Time**

### 3.2.2 Invoice Speed as a Function of Payment Amount

We investigated the relationship between invoice size and speed, with the results illustrated in Figure 3.8. Clearly, the fastest payment times are associated with smaller invoices, with the average size for invoices paid immediately or early being around £700, rising to more like £1,100 for invoices paid in 1–10 days and peaking at around £1,350 for those in the 11–30 day range. It's interesting that invoices taking longer than 30 days are slightly smaller on average, which may indicate a naturally more diligent chasing up of larger invoices by issuers.

 

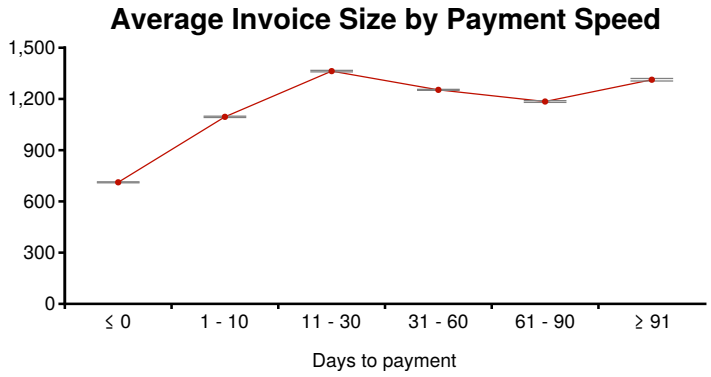


**Figure 3.8: Speed of Invoice Payments over Time**

### 3.2.3 Days Sales Outstanding

Days Sales Outstanding is a way of characterising the average time it takes for a pound invoiced to be paid.

When analysis is conducted retrospectively, as here, we can do a more direct and granular calculation of how long credit invoices take to be paid. If we weight invoices by size when calculating payment times, we can compute something that might be called a "micro-" version of the calculation, which we called $\mu$DSOs.

Although the exact numbers are slightly different, the two calculations produce broadly similar trends. There is more noise in the conventional DSO calculation, probably because as companies are added to the sample it is hard to keep the revenue estimate consistent. That also, in all likelihood, explains why things settle down when the volume is larger and the number of companies more consistent beyond 2018. The conventional DSO calculation is consistently higher than the more granular $\mu$DSO calculation, even though we have removed invoices that are ultimately written off from the calculation to make it more similar to the $\mu$DSO calculation. We believe the $\mu$DSO calculation to be more accurate, and it is certainly much more stable, showing a rather consistent downward trend over a decade.

The more accurate ($\mu$DSO) calculation shows average payment time for invoices declining from around 40–50 days in 2011-2013 to just over 20 days in 2021.

**NOTE:** For the DSO analysis in this section, and the rest of the analyses in this report, we have capped payment times at 365 days. This only affects about 1% of invoices we analysed, and we believe removes some artefacts from the analysis, many of which may be due to errors in accounts or accounts being used for test purposes.

 

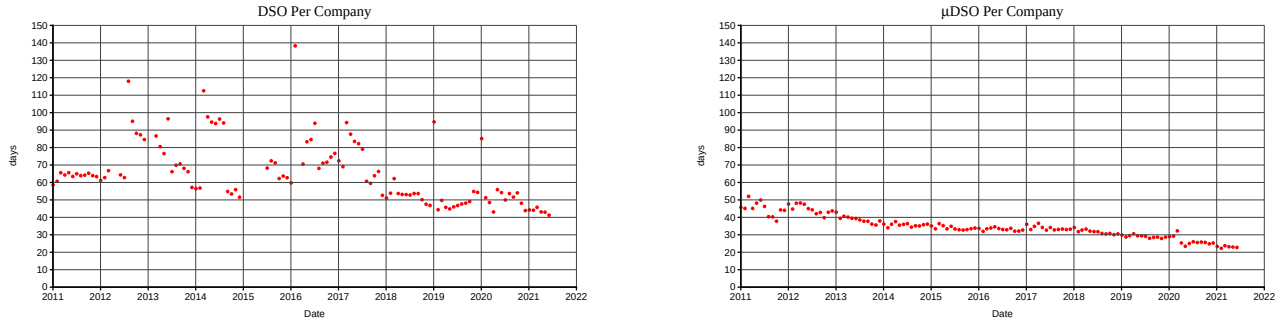


**Figure 3.9: DSO. Left: DSO per company. Right: $\mu$DSO per company**

## 3.3 Late Payments

Restricting attention to late invoices only, Figure 3.10 shows a steady decline in the time for late invoices to be paid after the due date, from around 45 days in early 2018 to just over 30 by the middle of 2021. Again, there is a noticeable but modest uptick around the COVID-19 lockdowns in March and December 2020, but again the line returns to trend quickly.

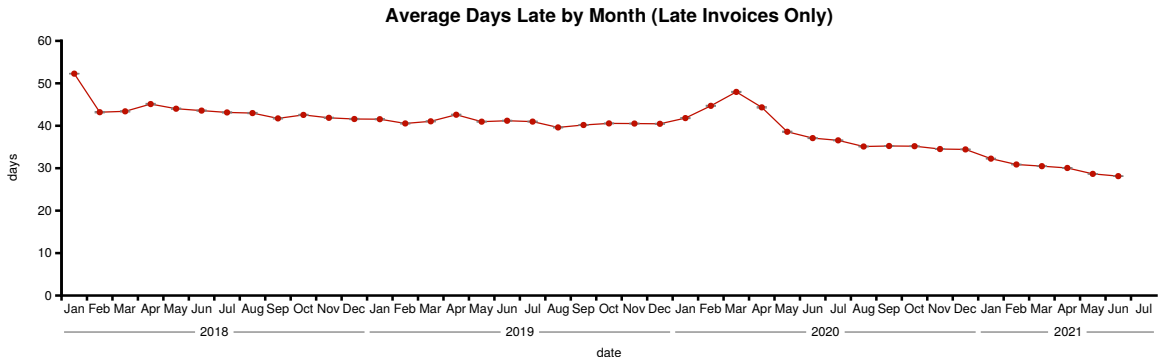


**Figure 3.10: Days Overdue for Late Invoices by Month**

The proportion of invoices paid late has fallen from c. 48% in 2010–2013 to more like 41% in 2020–2021—a modest, though welcome, decline. While the proportion of invoices paid late (Figure 3.11) is falling gradually, the degree of lateness has fallen dramatically, with the average number of days overdue for late invoices falling from 107 days in 2010–2013 to around 38 days in 2020–2021.

Figures 3.12 and 3.13 show that, in fact, the main driver of the drop in lateness is a reduction in the degree of lateness rather than the proportion of invoices paid late. In particular, in the earlier years of our data (2010–2013), the proportions of invoices over 90 days late was c. 8.3%, with a fair number over one year late, whereas by 2020–2021 this had fallen to c. 3.9%, with only a tiny number over 180 days. Similarly, the proportion over 60 days late (including 90+ days) has fallen from about 12% in the earlier period to c. 6% in 2020–2021. Similarly, the proportion paid no more

 

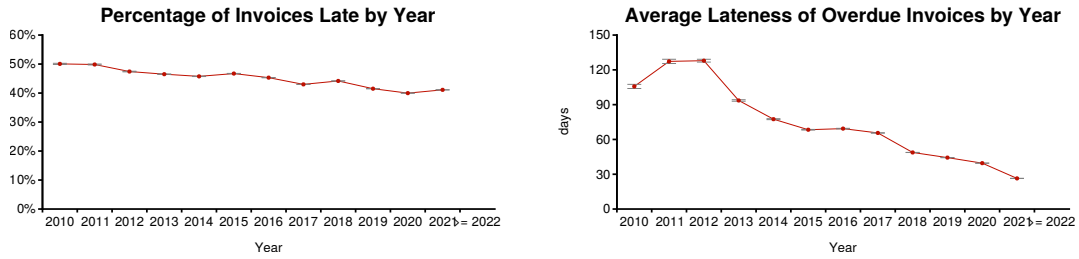


**Figure 3.11: Proportion of Invoices Paid Late By Year; Average Days Past Due Date of Late Invoices By Year**

than 10 days late has risen from c. 65% in the earlier period to nearly 75% in 2020-2021.

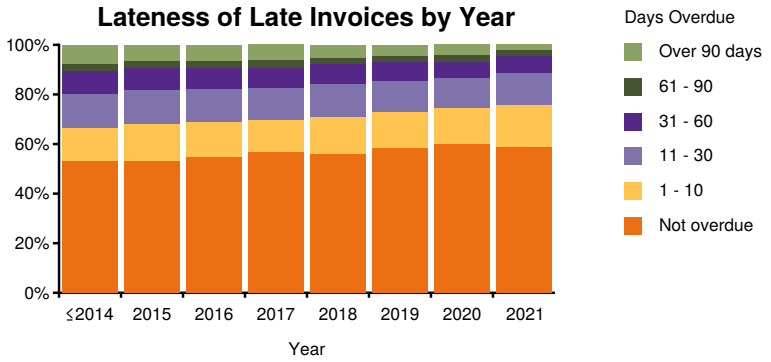


**Figure 3.12: Overdueness of Late Invoices by Year**

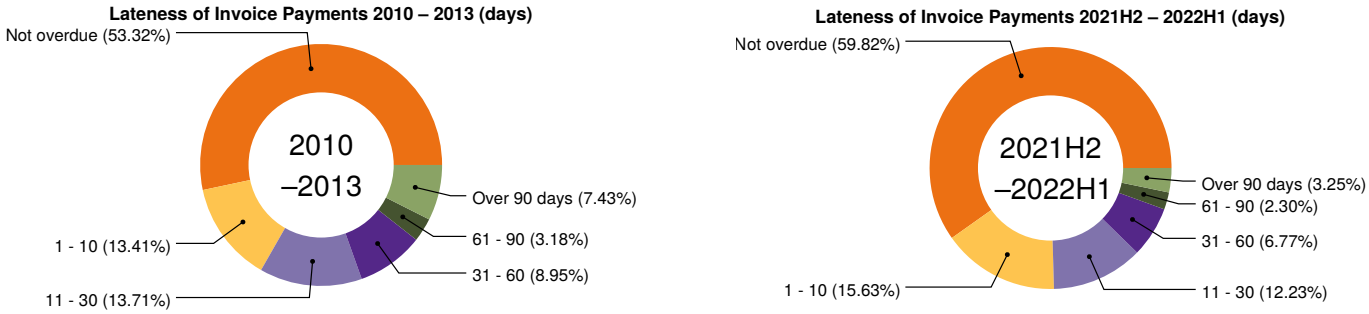


**Figure 3.13: Overdueness of Invoices for Late Invoices over Time**

 

### 3.3.1 Days Sales Late

Days Sales Late is a way of characterising the average number of days late each pound invoiced is at the point when it is paid.

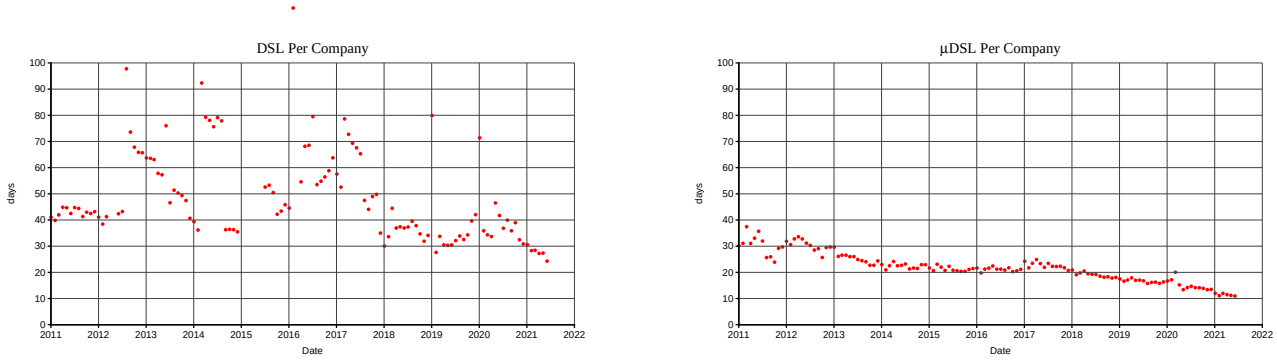


**Figure 3.14: Days Sales Late. Left: DSL per company. Right: $\mu$DSL per company**

Figure 3.14 shows the "macro" DSL calculation, on the left, and a more stable, accurate "micro" version on the right. Again, the macro calculation is noisier, more affected by changing populations of companies and, in our opinion, less reliable than the much smoother "micro" calculation.

The $\mu$DSL plot (right-hand figure) shows the average lateness of a pound invoiced falling from around 30 days in 2010–2012 to barely over 10 days in 2021—a very material reduction.

## 3.4 Quantifying the Impact of Late Payments

It is natural to wish to quantify the impact of late payments on small businesses. A common approach to this is to measure the volume of late payments across some group or sample of SMB companies and then to scale this up to the number of SMBs in the UK. This approach always produces an extremely large aggregate total (many billions of pounds), but this figure is not very meaningful or useful. To start with, it ignores the *degree* of lateness (which we have seen has declined steeply over time). It also fails to state the actual *cost* to businesses or to put it in any context (e.g. the level of billing for the small businesses).

We seek to illuminate the impact of late payments in four ways:

(a) by calculating the average amount of late payments per company in our sample over time,
(b) by doing a sample calculation of the cost of financing this level of late payments,
(c) by relating the late amount to the amount of credit a company intends to offer,
(d) by relating the late amount to non-late payments.

Figure 3.15 shows the average level of late payments across our base during each month from 2011–2021. The size and composition of the sample has, of course, changed over time, and there has been inflation and growth, but the average company has carried around £20,000 late payments over the whole time period studied—a little higher, at about £25,000 in 2011, then more like

 

£18,000 around 2015, gently rising again to around £22,000 in more recent years.

The cost of financing late payments will, of course, be different for different companies. In the best cases, it may simply be interest foregone, while in other cases companies will have to borrow at rates that will vary widely for different businesses as a function of inflation, interest rate and other factors. Using a notional 10% cost of financing, we see that the typical company, carrying about £22,000 of late payments at any time in 2021, might pay £2,200 to finance that.

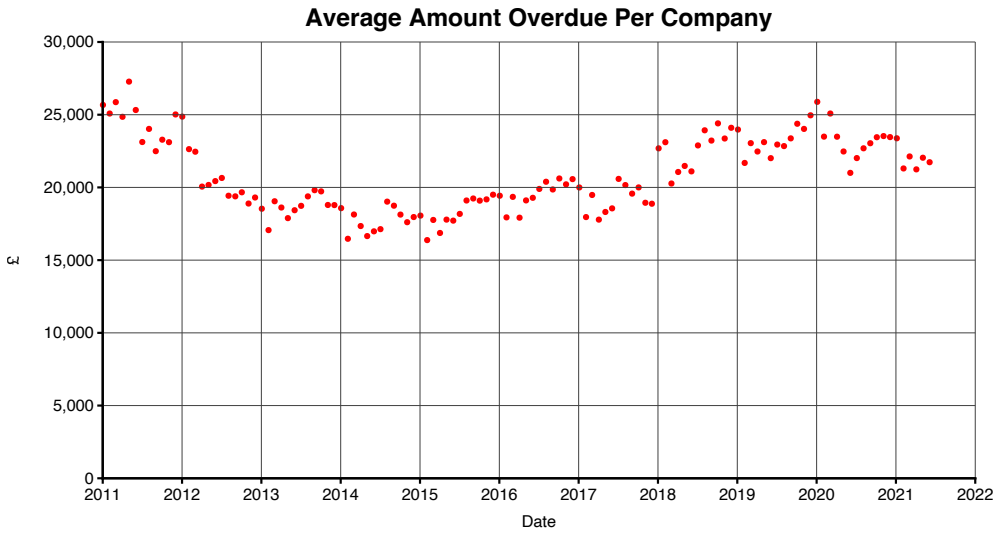


**Figure 3.15: Average Amount Overdue Per Company (2011–2021)**

Late payments can only occur for non-cash transactions, i.e. for credit invoices. Many (most) businesses do some billing by issuing invoices with credit terms (most often 30-day terms), or in a minority of cases with 0-days payment terms. We have computed for each business in our sample, at each point time, the total amount of intended credit it has extended (i.e. the total value of invoices issued but not yet due) and calculated the ratio of the overdue (late) invoices to this level of intended credit (non-overdue invoices). This is shown in Figure 3.16. Although there is some noise, there is a fairly consistent overall pattern of decline here, with the ratio of the total late payments to the level of intended credit falling from about a little over 1.0 (100%) in 2011–2012 to more like 0.7 (70%) in recent times.

As an illustration, suppose we have a small business that invoices £10,000 at the end of each month on 30-day terms. If all its customers paid on time (or early), the maximum level of debtors it would normally have would be £10,000.[3] Because of late payments, the amount outstanding was more than double that—around £21,000 in 2011–2012—and even in recent years is still about 70% higher—at around £17,000.

We can also compare the value of late payments to the actual value of non-late outstanding invoices. The actual value is lower because some invoices are paid early (before the due date); indeed, we

[3] Of course, most businesses are more variable even than this, and even in this case there might be a few days at the start of April, when invoices from February and March were both outstanding.

 

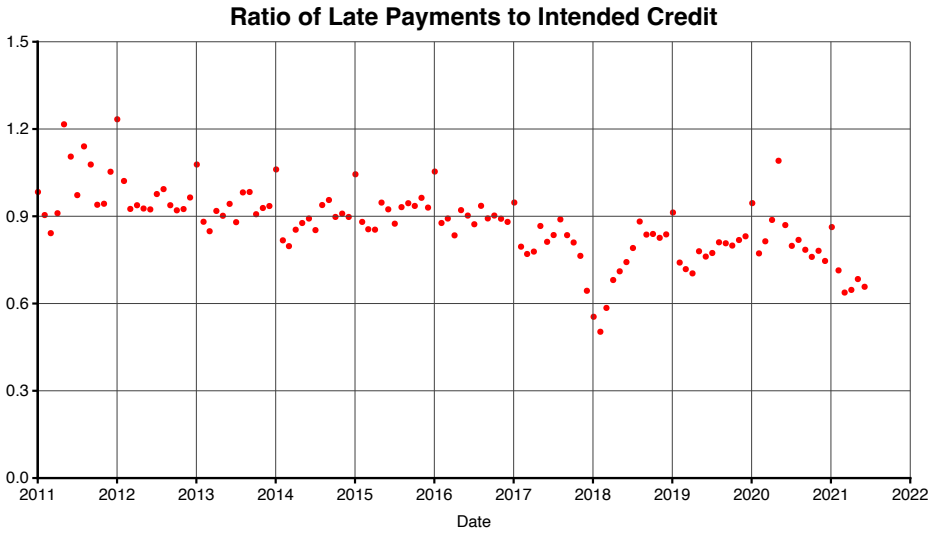


**Figure 3.16: Ratio of Late Payments to Intended Credit (2010–2021)**

**NOTE:** The dip on the graph at the end of 2017 and start of 2018 is an artefact connected with the significant increase in customer numbers in our sample at that time. We have tried to perform the calculation in a way that minimizes this artefact, but cannot entirely eliminate it.

have seen payment times coming down. Naturally, this ratio is higher than when we compare to intended credit, having been about 1.3 (130%) in 2011–2012 and more recently having declined to just over 1.0 (100%). (We see the same artefact in late 2017 and early 2018, which we are confident is a result of the increase in our sample size.)

 

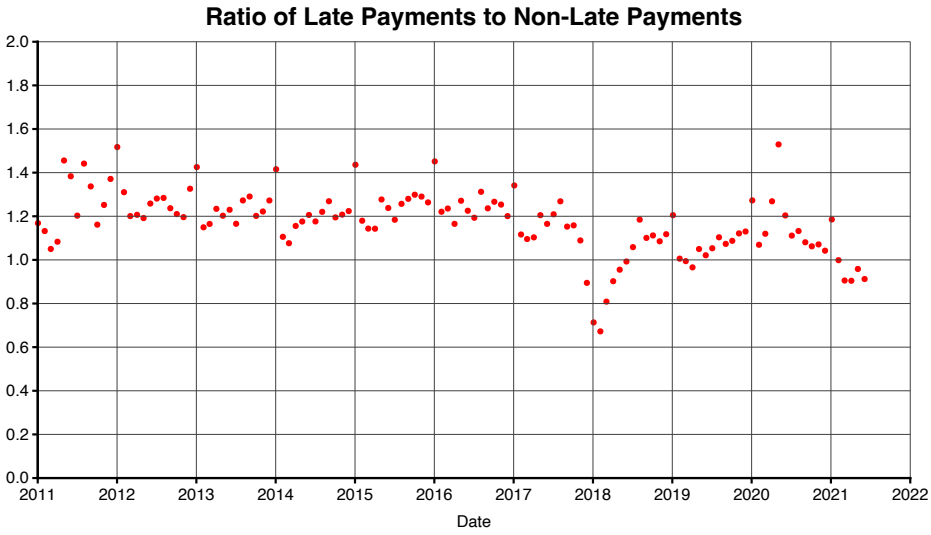


**Figure 3.17: Ratio of Late Payments to Non-Late Payments(2010–2021)**

## 3.5 Geographic Variations

There is naturally interest in geographic variations in payment speed and payment lateness. As part of the data supplied by Sage, we have a partial postcode for each company, allowing us to locate companies in a UK geographic region. There is a degree of approximation here in that some companies use a registered office as a business address, which may be that of a lawyer, accountant, company secretary, company director or even a Post Office box, rather than the trading location of the company, and we have no way to distinguish these cases. Nevertheless, we assume that where these effects occur, they will often cancel out and not represent a material systematic error, though it may slightly exaggerate London and the South East.

### 3.5.1 Geographic Variations in Slow Payments

Figure 3.18 shows how average[4] payment speed varied across the UK regions in the early period studied (left: 2010–2013) and more recently (right: 2020–2021). Figure 3.19 shows numerically, and as a heatmap, the changes in average[5] payment terms varied by region. The couple of quarters shown will exhibit some censoring (section 3.7), pulling down our estimates, but we believe they are fairly reliable until 2021Q2.

Some obvious features in the picture:

- In both the early period (2010–2013) and the more recent period (2020–2021), there is significant variation in average payment times across different regions of the UK, with Northern

[4] mean
[5] mean

 

Ireland having particularly slow payments in both periods. It should, however, be noted that Northern Ireland has also seen average payment times fall dramatically (from c. 65 days in the early period to 39 days in the later period).

- In the early period, payment times are noticeably slower in some areas (Northern Ireland, Scotland, West Midlands, West of England and London) than elsewhere, and are fastest in the South East (e.g. South East, 37 days vs. Scotland, 50 days.)
- By 2020–2021, average payment times have come down in all regions, and the disparity between regions has also diminished, at least in terms of the difference in the number of days to payment.[6] In 2020–2021, for example, average payment speed is essentially between 22 and 28 days in all regions except Northern Ireland, where it is c. 39 days, still a very significant improvement on the 65 days in the early 2010s.

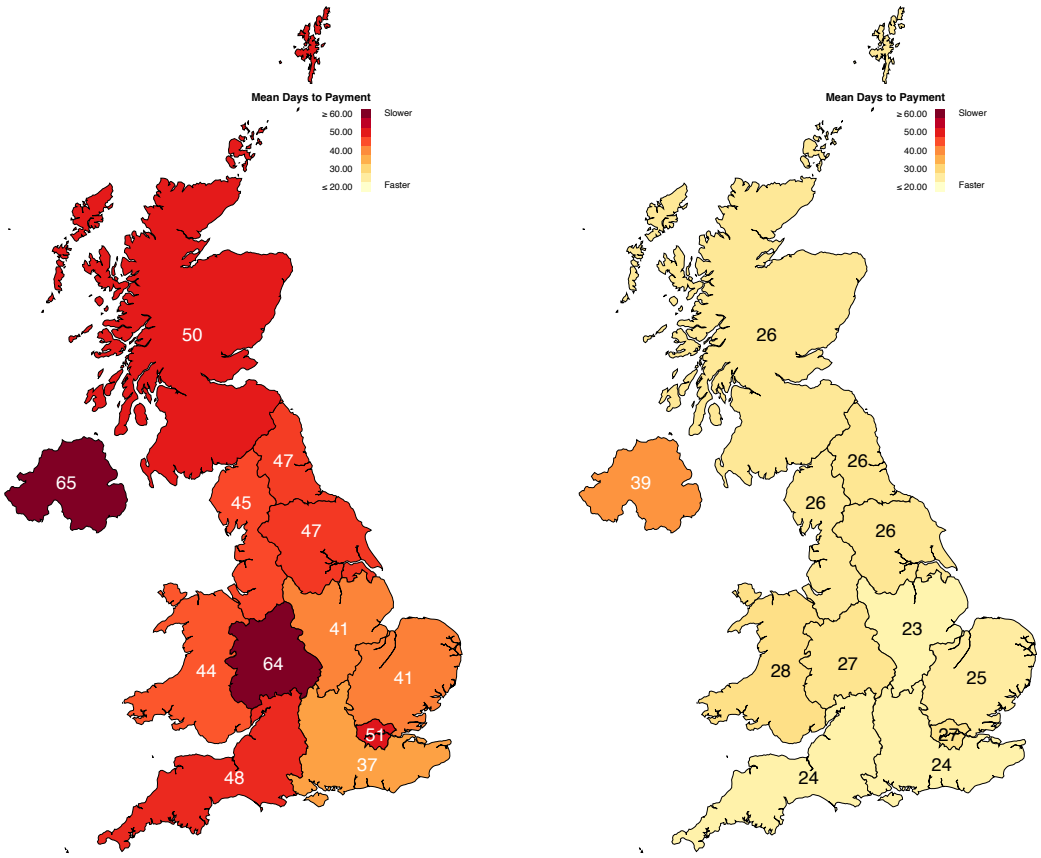


**Figure 3.18: Payment Speed by Region. Left: 2010–2013 Right: 2020–2021**

[6]The ratios of payment speeds have changed less.

 

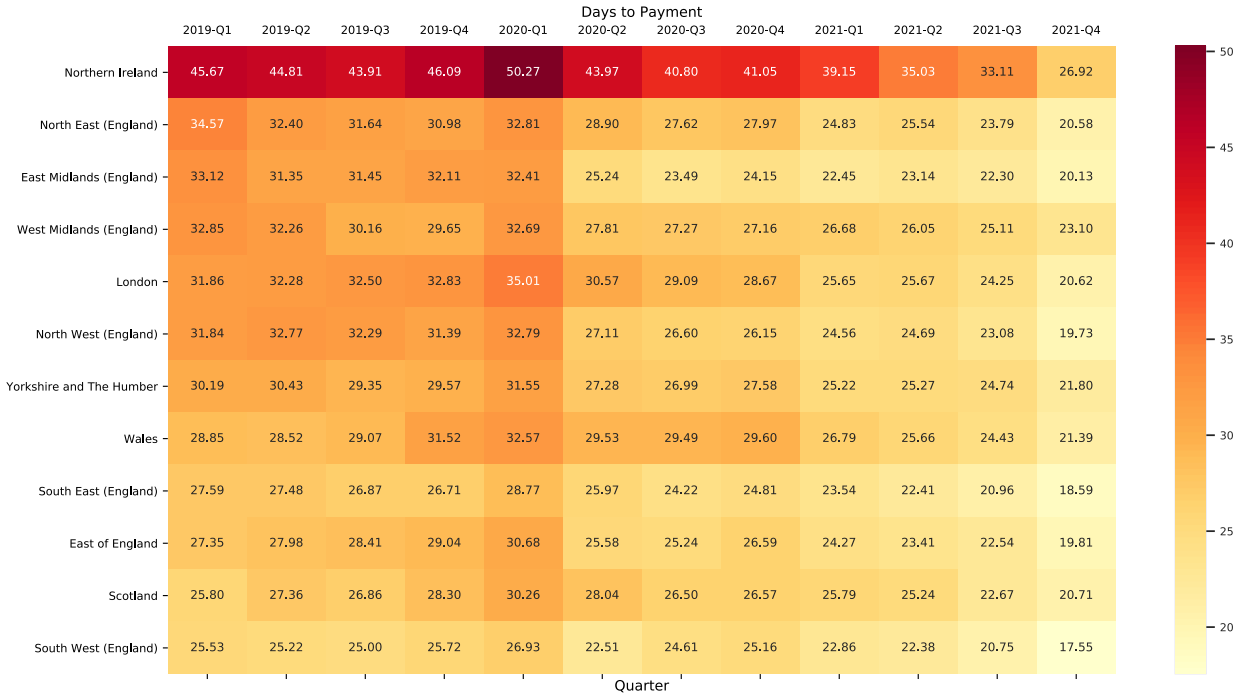


**Figure 3.19: Payment Speed by Region by Quarter (2019–2021)**

### 3.5.2 Geographic Variations in Late Payments

Looking at late payments only, and focusing on the degree of lateness (i.e. the number of days past the due date a payment is made), we show the same breakdowns as for geographic variations in slow payments. Figure 3.20 shows the variation in lateness across UK regions in the same early period (left, 2010–2013) and the same more recent period (right, 2020–2021). Figure 3.21 shows a heatmap with data for the same 12 quarters from 2019 to 2021, again with the last two being materially affected by censoring effects (see section 3.7).

Again, some clear patterns emerge. Directionally, lateness of late invoices shows similar patterns across regions and time as speed of payments of all invoices. Northern Ireland has the latest payments, and Wales, western parts of England and London generally have later payments than some easterly parts of England. Again, all regions show marked declines in lateness of payments, and some convergence between the earlier and later periods, across the country.

By 2021Q3, all regions outside NI show average lateness of overdue invoices in the 27–31 range, with NI at just under 40 days.

 

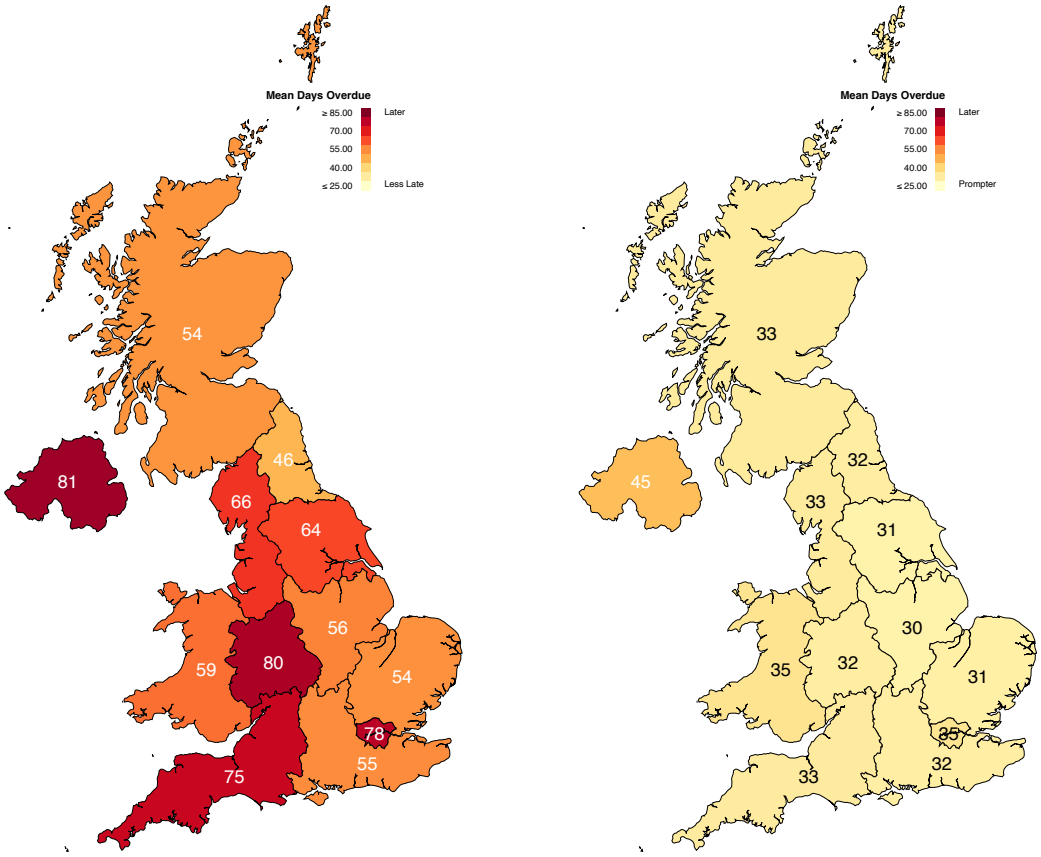


**Figure 3.20: Lateness by Region. Left: 2010–2013 Right: 2020–2021**

 

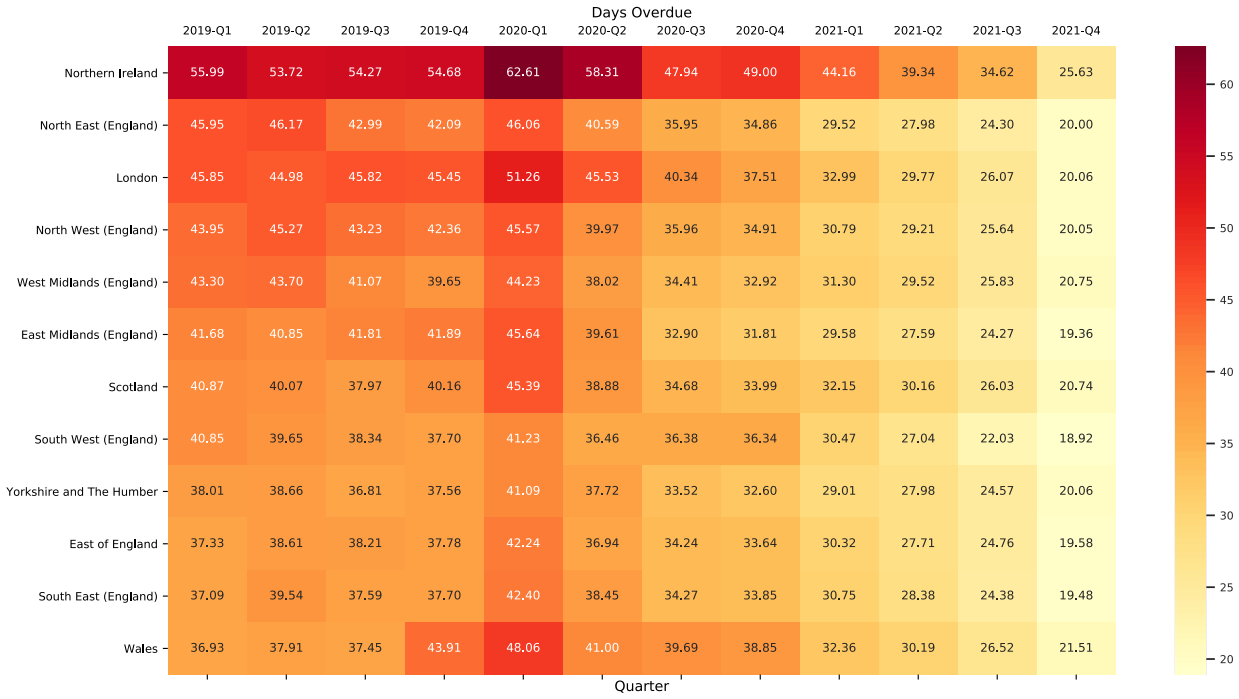


**Figure 3.21: Lateness by Region by Quarter (2019–2021)**

 

## 3.6 Industry Variations

As with geography, there is some interest in analysing variations by industry sector. For corporate entities,[7] representing about 42% of our sample by number of companies, 44% by number of invoices and 50% by aggregate invoice value, Sage was able to look up the Standard Industry Category (SIC) code for the company, and included the first two digits of this in the data we used. SIC categories are self-assigned by companies when they are registered, and can (and, in principle, should) be updated each year when an annual return is completed. In fact, companies can assign up to four (ranked) SIC codes, though most (around 85%) assign only one and they are rarely updated.

Despite these limitations, the SIC code provides a useful way to understand something about variation across industry sectors. The SIC code is hierarchical, and the first two digits represent 91 distinct *divisions*, which then combine at the top level of the hierarchy into 21 *sections,* which are industry segments we have used. (Different sections have different numbers of divisions, varying from one to 24).

The schematic maps in Figure 3.22 show the 21 sections in the SIC-code hierarchy, from A (Agriculture) to U (Extraterritorial), with each square making up the section representing a division. We have many fewer companies in the 2010–2013 data and have not calculated payment speed where the volume of data is low, both because error bars would be too large and to avoid inferences about particular businesses; those sectors are coloured grey. We see the Construction (section F), Arts, Entertainment & Recreation (R) and Education (P) sectors having slower payment times in that early period of our study.

By 2020–2021, payment average times again have come down in all sectors where we had meaningful data in the early period, with Public Administration (section O), Transport & Storage (H) and Quarrying (B) exhibiting the slowest payments.

Figure 3.23 shows the progression by quarter from 2019 to 2021, with positive progress in most sectors apparent other than Accommodation and Food—section I—which is low anyway, Public Administration (O), and Electricity, Gas, Steam & Air Conditioning (D). Again, censoring will have pulled the values down in the last couple of quarters in 2021 (the right-hand two columns), but by 2021-Q2 most sectors saw average payments speeds in the 20–30 day range. The Households sector (T), consisting of two divisions, 97 (Activities of households as employers of domestic personnel) and 98 (Undifferentiated goods and services—producing activities of private households for own use), has some very high payment times in the early period, but accounts for relatively few companies (about 0.3% of our sample) and was driven primarily by a small number of extremely late payments. Payment times in this sector have come down to more reasonable levels more recently.

[7] businesses registered at Companies House

 

### 3.6.1 Industry Variations in Slow Payments

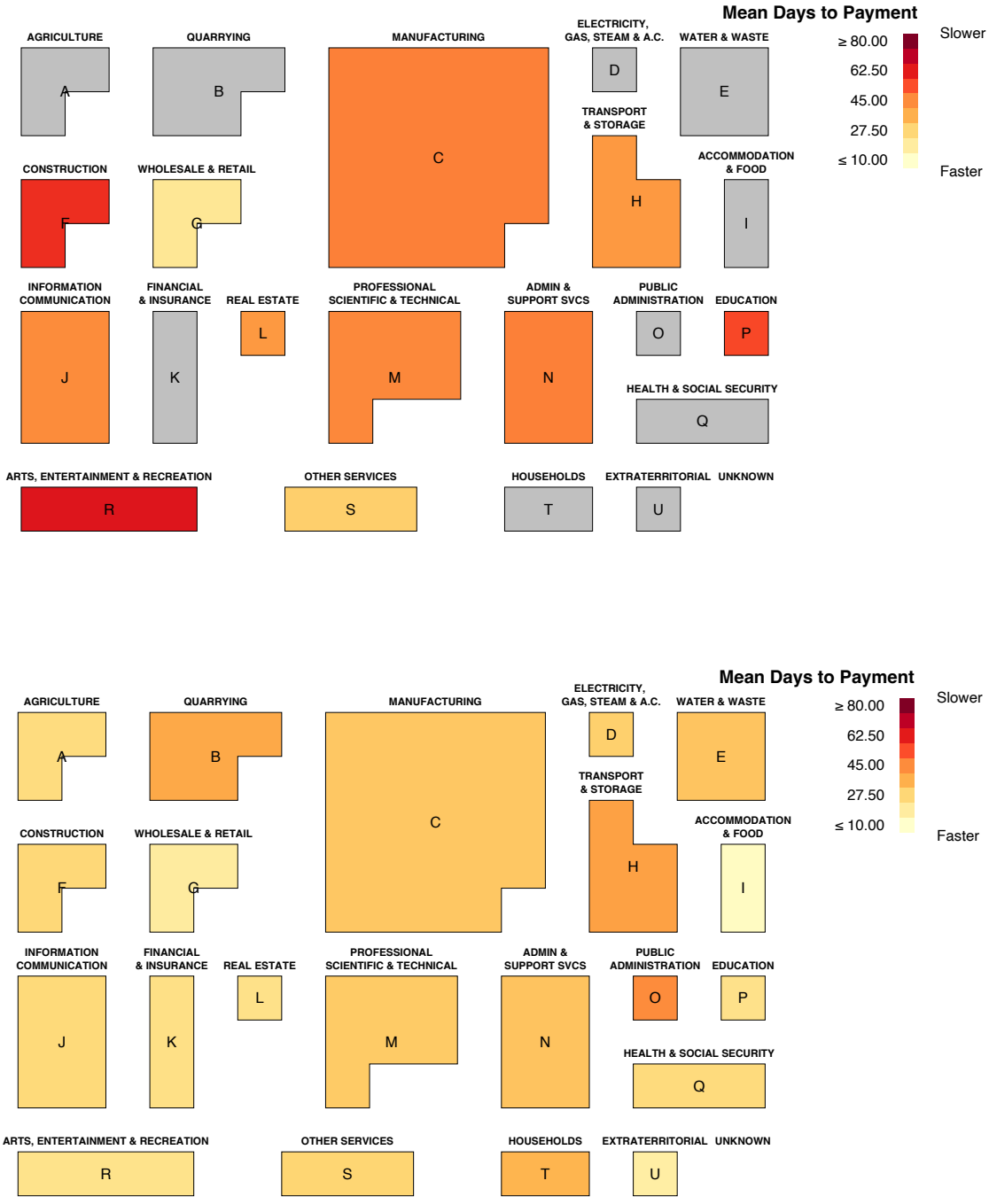





**Figure 3.22: Payment Speed by Sector. Left: 2010–2013 Right: 2020–2021**

 

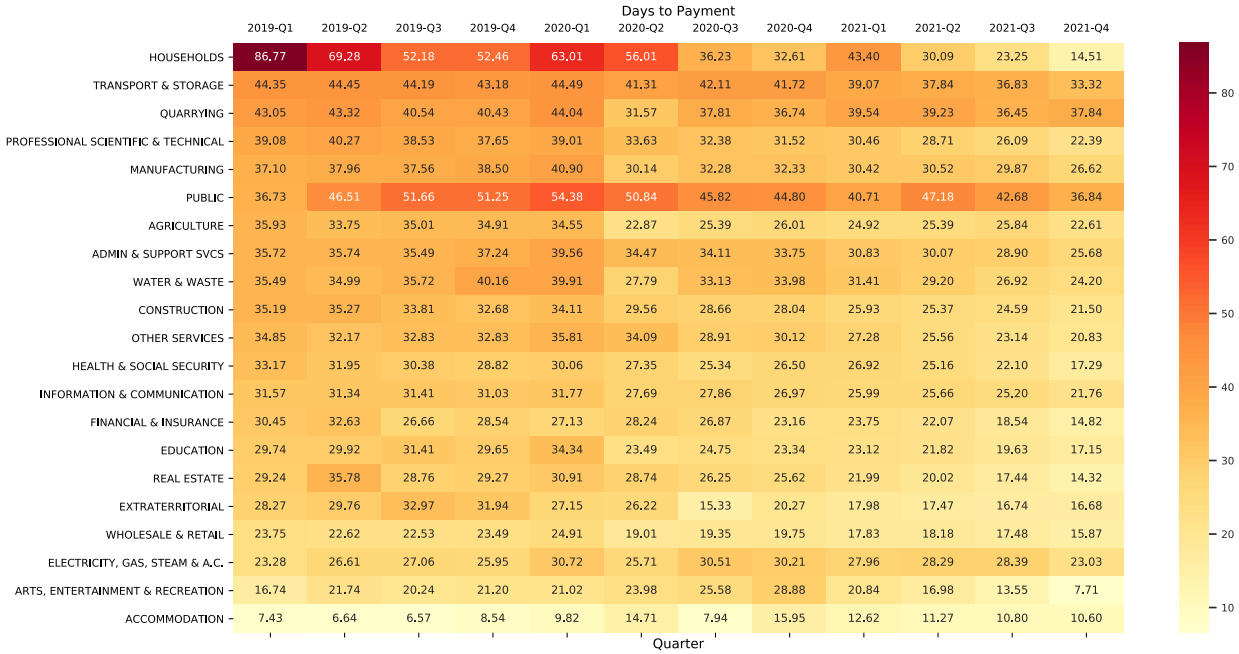


**Figure 3.23: Payment Speed by Sector by Quarter (2019–2021)**

### 3.6.2 Industry Variations in Late Payments

Focusing on lateness of payments by sector, again the patterns are broadly similar, with declines in late payments between the early period (2010–2013) and more recent times (2020–2021), as seen in Figures 3.24 and 3.25. Again, by 2021Q2, most sectors see lateness of late payments in the 25–30 day range, with a couple of outliers including Households and Public Administration.

## 3.7 Censoring Effects

Statistical censoring occurs when only partial data is available, leading to inaccurate estimates, and it is particularly problematical when the missing data is non-random.[8]

We have (all) invoices Sage was able to provide with invoice dates from 2010 to 2021, and information about payments until mid-February 2022. While we could record payment times up to 10 years for invoices from 2011, clearly for an invoice issued on 31st December 2021, the maximum payment date we could measure was about 6 weeks (if it was paid in the middle of February 2022). We have not included invoices not yet paid, so this depresses the average value for 2021, particularly for invoices from the last quarter. We believe this is a small effect. It is possible there is also an inverse and corresponding (and more significant) issue with censoring of payments for earlier years. If Sage removes invoices from clients after they leave (for reasons such as privacy, confidentiality, data minimization, security, disk storage or cost), our data will contain only those customers from the early 2010s who have remained active Sage customers for nearly a decade. Clearly, those customers may be atypical in various ways. Even more clearly, companies that went bust will not be among those. To the extent that late and slow payments may be a driver

[8] more precisely, when it is has a different distribution from the main data

 

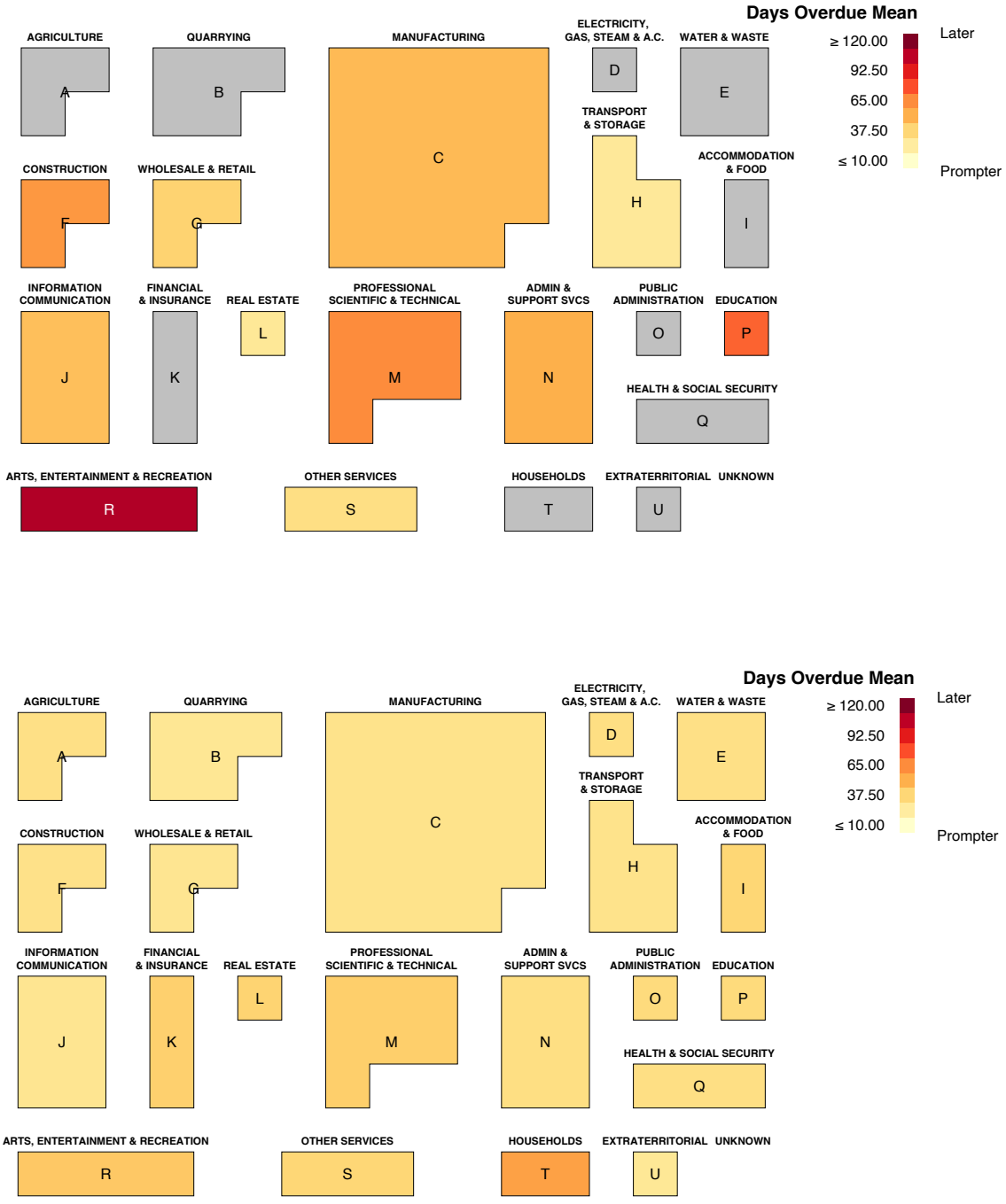


**Figure 3.24: Lateness by Sector. Left: 2010–2013 Right: 2020–2021**

of business failure, this is directly relevant to the outcomes we are studying. *Prima facie,* however, we would expect that to the extent that late and slow payments drive business failure, that would reduce the average slowness and lateness of payment from earlier years, because the businesses with slower/later payments, and correspondingly higher failure rates, would have been removed from the dataset at a higher rate than those surviving.

 

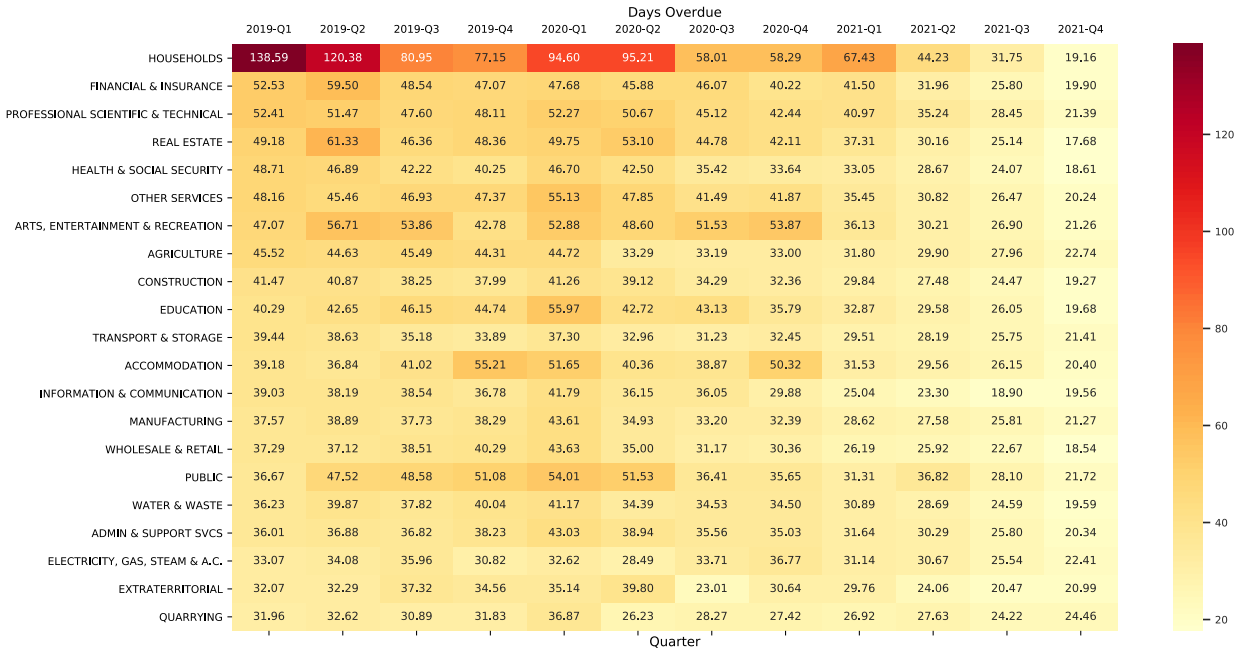


**Figure 3.25: Lateness by Sector by Quarter (2019–2021)**

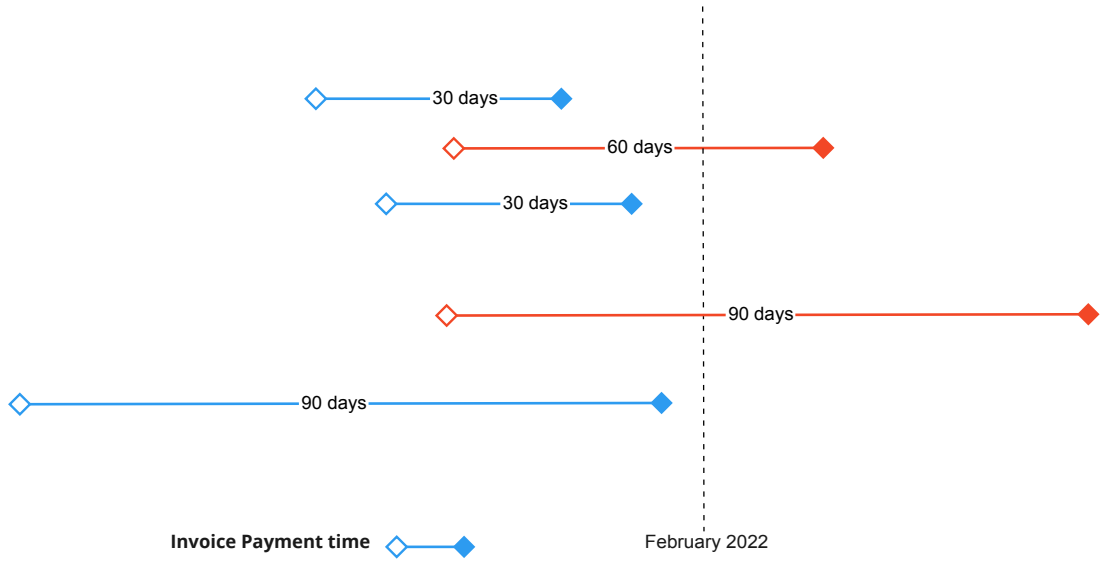


**Figure 3.26: Censoring effect**

Whereas invoices issued long ago (blue) will have their time to payment recorded in the data, even if they took a long time to be paid, invoices issued towards the end of our data will have unknown payment times if they are slow (red).

 

# 4. Technology

## The main reasons for slow and late payments

Sage data indicates that, over the last decade, the time to payment for Small and Micro Businesses (SMBs) was reduced by more than half. What role did technology play in this improvement? And can we count on technology to improve things further?

We spoke to ten experts in the field, ranging from executives in established providers of electronic and cloud accounting software to Fintech CEOs to serial entrepreneurs plotting their next venture.

Historically, it has been challenging for SMBs to chase payments. Owners care about relationships with key customers and are often reluctant to charge penalties or take legal action. If owners do consider legal action, the process for enforcing claims is slow and expensive.

The main reasons for slow or late payment can be grouped broadly into four categories:

1. *Inability to pay.* Some customers are simply unable to make payment, either due to temporary setbacks leading to financial stress, bad cash flow planning, or even insolvency. This situation is exacerbated by the knock-on effect of SMBs not being paid on time and then being unable to pay their creditors on time and so forth.
2. *Culture.* Some customers deliberately pay late to manage their own cash flow and use creditors as an "interest free loan" to finance their operations or expansion. Some simply do not pay attention or do not have proper oversight of amounts due and regularly pay late. Over the last decade, with the advent of social media, there has been public reaction to deliberate late payers and especially larger businesses are more aware of their image and less likely to engage in this practice. In addition, the Office of the Small Business Commissioner (OSBC) was set up by government to protect small businesses and help them get paid faster. However, the Prompt Payment Code (PPC) and any other framework overseen by the OSBC is voluntary and requires businesses to be signatories.
3. *Bureaucracy.* Paper-based systems using batch processing (e.g., monthly payment), interspersed with break points where human judgement is required, are slow and often unreliable. Many well-established larger organisations intend to make payment within a reasonable timeframe but are let down by their antiquated systems. To make matters worse, in the absence of regulatory or legal requirements, the business case to replace procurement systems, or to invest in new technology, is lacking, since an organisation would invest scarce capital to make cash flow worse. The UK Government expects public sector organisations to pay suppliers within 30 days, but the UK currently does not have any payment regulation, unlike in the EU where

businesses are required to pay outstanding invoices within 60 days if they are private enterprises and 30 days if they are public authorities according to the EU Late Payment Directive.

4. *Quality of invoicing.* SMBs themselves are also partly to blame for late payment, as invoices could be issued late (or in a batch once per month) and sent through the post. Also, slow payment is sometimes caused by inaccurate or incomplete invoices which causes queries that must be resolved through human intervention, often in the context of the inefficient systems mentioned under point 3 above.

Over the last decade, technological advances have played a substantial role in reducing the impact of all four of these broad categories of reasons for slow or late payment.

## What has happened: how technology has shortened the path to cash for SMBs over the last decade

### Technology is ever-more Accessible

A large number of technology solutions to reduce the time to payment, often in the form of cloud accounting solutions, emerged over the last decade. A 2022 Sage publication found that 8 out of 10 SMBs rely on technology to start, survive, and grow. According to the Kalifa Review in 2021, approximately 19% of all Fintechs in the UK are in the payments industry—the second largest area within Fintech.

The specific solutions available should be seen against the backdrop of the development of a base layer of enabling innovation. The internet, digital payments, standardized open banking APIs, POS systems and accessible machine learning have all enabled software-as-a-service (SaaS) solutions that SMBs can both afford and easily implement.

Mobile phones enable the use of technology anywhere. The small screen interface required developers to make solutions simpler, which, in turn, further increased accessibility.

### Technology has accelerated the invoicing process

Historically, many SMBs were slow to issue invoices. They were prepared manually in batches and sent by post. Today, SMB owners can issue an invoice in real time through email or SMS, from their mobile phones as soon as transactions are concluded.

The development of digital invoicing tools as a component of accounting software has played an important role in improving the consistency and quality of invoicing. The software is readily accessible from mobile phones and can effortlessly be integrated into other business management software, further streamlining the process. Payment times are improved by removing human error, significantly improving the consistency and quality of generated invoices.

Automated invoicing solutions have become pervasive and exist either as standalone applications or as an element of commercial or cloud accounting software. Workflow solutions allow for automated reporting on and management of unpaid invoices, and processing payments accurately.

Specific solutions for cash-flow management also exist (e.g., Futrli, from Sage—software that

 

provides cash-flow forecasting that also helps SMBs focus on customers that consistently pay late or assessing the impact of shortening payment terms).

Micro businesses often employ cash accounting and use their current account as a ledger. This has become easier as more transaction data is displayed on electronic bank statements. Banks have therefore started to incorporate invoicing and other accounting features in current accounts, which means that micro businesses can perform their accounting, cash flow management, and even filing digital tax returns through their banking application.

For B2C and B2B businesses, invoice solutions now exist where a customer can simply "click to pay" on an invoice, making it easy to pay on the spot. A digital invoice, typically sent by email, can contain a button which is linked to a payment method set up by the supplier, such as Stripe or PayPal. Offering this kind of payment option has unfortunately also led to authorized push-payment fraud, where fraudsters impersonate a business and demand payment through what resembles legitimate invoices.

## Technology plays a key role in persuading customers to pay on time

Once the invoice has been issued and the payment date approaches, SMBs can automate the process of encouraging the customer to pay—known as the dunning process. Several Fintechs have built solutions to automate emails, SMS messages and other communications to customers. This relieves the SMB owner of manual work and improves the often-inconsistent approach to chasing slow payers (often driven by emotion and current cash flow requirements). Many of these solutions ensure that the original invoice and other key documentation are sent along with reminder notices, which plays a helpful role if the debt moves into litigation, as the documentation trail is captured and time-stamped.

Accounting software has played a pivotal role in accelerating the dunning process, as programs now enable users to keep track of client status and automate the process by sending out periodic reminders. This is useful for micro-businesses as it removes the human element of chasing up clients, which historically has been a major hurdle in chasing payments as SMBs are wary of protecting client relationships. For larger SMBs, there exist Accounts Payable (AP) solutions integrated into accounting platforms, which businesses can utilize to manage large volumes of invoices across different suppliers.

In an interesting development, a Fintech (Saltare) turned the dunning process around: they offer customers the option of offering early payment in exchange for a discount. A customer can, for example, make an electronic offer to its creditor to pay in seven days instead of thirty in return for a 1% discount on the invoice. The creditor then has the option to accept or reject the offer, depending on its own cash flow requirements. There are also platforms that provide conventional early payment services to SMBs as well as negotiating discounts for their customers, e.g., Taulia and PrimeRevenue.

For the collections process, there now exist providers such as Know-It, Atradius Collections, Master Collections, and Hilton-Baird Collection Services who can easily manage the process for SMBs in a responsible and brand-aligned way. Improvements in workflow, automation and access to data have enabled collections providers to price this service at an accessible level for SMBs where, historically, economies of scale excluded SMBs from cost-effective options.

 

Brodmin is addressing the cultural issue of late payments by providing a platform where SMBs can report unpaid invoices and consistent late payers. Customers will be more inclined to pay if they know there is a possibility that they can be reported for late payments which may affect their ability to obtain credit.

## Technology has accelerated the payments process

With the advent of digital commerce, a growing proportion of B2C business is conducted online where payment is typically required upfront, which either eliminates the problem of unpaid accounts or shifts it to card issuers. MasterCard, Visa, PayPal, Stripe, and others have made online payment reliable, safe, and easy.

Mobile payment technologies, such as Apple Pay and Google Pay, have further streamlined the payment process, both online and offline, by eliminating the need to enter card information or to present a physical card. Solutions like Square made it easier for even the smallest vendors to accept credit card payments on the spot. These methods of payment have drastically reduced the time between the decision to pay and the actual payment, which previously constituted a good portion of late payment time (e.g., writing a cheque, sending it via post, cashing it, and waiting for the bank to release funds).

For both B2C and B2B business, having a payment method on file—which can be verified through a penny test—also plays an important role in allowing SMBs to extract payment automatically on the due date. Similarly, banks make it easy today for customers to save payment information and make recurring payments without having to re-enter data.

The UK's Faster Payments Service ensures that payments happen almost instantly. This contrasts to BACS payments (direct debits and credits) which could take up to three days to clear. Furthermore, some UK businesses still pay by cheque, which takes more time (printing, putting in evelopes, posting, transit, delivery, processing by recipient, depositing and then clearing by banks). The improvement in payment times during the pandemic is probably due to businesses that used cheques resorting to online payment services to minimize physical contact.

A recent development in open banking, known as Variable Recurring Payments (VRP), enables customers to consent to a third-party deducting a variable amount from their account with specified intervals on behalf of an SMB. VRPs are more secure, cheaper, faster, and less prone to error than typical direct debit or card payments and could, over time, partly or fully replace direct debit payments. GoCardless, for example, utilizes "pull-based payment collection" to allow customers to authorise SMBs to make deductions directly from their bank accounts.

## Innovation in invoice financing

For invoice insurance and factoring, SMBs now have vastly more options. In the past finance companies often required "full book" insurance (insuring all the invoices a business issues) which is costly and time-consuming. Today, given improvements in data accessibility and management, single invoices can be financed, insured, or factored using simple devices such as mobile phones at low cost. Companies are emerging that provide APIs that allow financing or insurance companies to access SMBs' accounting and commerce platforms and open banking data (with their consent). This data can be extracted in a standardised format and allows healthy SMBs to use their data to

 

obtain better terms.

Companies such as Nimbla, InvoiceInsure, and Allianz offer single invoice insurance, whereas Novuna, MarketFinance, HSBC, Lloyds, and various other banks offer invoice financing services.

## Trends likely to have an impact in the next five years

### Increasing integration

Open banking and access to other financial data through APIs allow data to be accumulated from disparate sources to create joined-up workflows. This will allow processes to become increasingly automated and streamlined. For example, invoices can contain payment links that ensure the correct reference accompanies the payment message, and that, once paid, this reference can be extracted from the bank and used to update the accounting system, marking the invoice as paid and reconciling the cash deposit in the bank account instantaneously.

### Reducing risk

For B2B business, it is already much easier for SMBs to obtain credit information on potential customers before granting credit. Fintechs such as Know-it and Creditsafe interface with larger credit reference agencies, Companies House, The Gazette and other sources of business data. They now sell credit insights on demand to SMBs, who can buy a handful instead of paying for expensive subscriptions to information services. SMBs can use this information to monitor their existing customers and credit-check potential customers. These services often include notifications of changes in customer behaviour and fraud alerts.

### Leveraging machine learning

Machine learning can be used to optimize reminders. Artificial intelligence systems drawing on big data analytics could learn the optimal date and time to send out a reminder to a customer. The system could also customise the content of the reminder, varying the tone of the message and using either carrots or sticks, depending on the customer.

Innovative Fintechs have started experimenting with carrots and sticks and the impact on the path to cash for SMBs (e.g., in a reminder a business may offer a discount for early payment, or politely refer to charging penalties for late payment, or even allude to reporting a customer to credit reference agencies.) These kinds of solutions also extend to collections, where they can be used to humanize the process and protect the brand of the SMB.

Machine learning could also be used for the implementation of invoice factoring and financing. Using performance metrics for different customers, AI could learn if it is optimal for an invoice to be factored or financed during any part of the process.

Big data solutions are furthering advancement in payment fraud detection. Payment fraud is an ideal application of machine learning due to the sheer volume of data generated by consumer and business transactions. Artificially intelligent systems processing millions of payments could immediately

 

detect and flag unusual transactions based on the slightest discrepancy. Regular advancements in the field will be imperative to counteract the growing frequency and sophistication of fraudulent activities.

## Adopting Industry-Specific Software

An emerging trend is for the development and adoption of industry-specific solutions that offer specialized accounting functionality and applications. Vendors of such software are familiar with each particular business sector and can offer support tailored to a company's needs. For example, Sage offers Brightpearl, a management system for retail businesses that includes financial management functionality.

## Using Smart Contracts

Smart contracts can perform certain functions automatically if predefined conditions are met (e.g., the contract could automatically generate an invoice once a service is provided and extract payment when the invoice becomes due). Blockchain, and its security features, is an integral part of smart contracts. Although this technology has not yet been integrated into any large-scale payment or accounting platforms in the UK, it is interesting to note that the UK Law Commission has deemed them to be enforceable under UK law.

## Enforcing Compliance through Lawtech

Lawtech (Legal Technology) is the use of automation and technology to support and facilitate legal processes and services. Lawtech is growing rapidly in the UK and, by 2020, the industry had attracted more than £650 million of investment. Almost 70% of SMBs have had at least one commercial dispute and 72% of those disputes were related to payment issues. Disputes cost SMBs £11.6 billion each year in England and Wales alone according to the Federation of Small Businesses.

LawtechUK, a government-backed initiative established to support the transformation of the UK legal sector through technology, for the benefit of society and the economy, recently oversaw the design of a proof of concept for an online dispute resolution platform for SMBs.

The idea is that the platform will operate on three layers, with the first two layers entirely technology-driven. The first layer is a triage stage where the platform determines, via a set of questions, whether the dispute is viable for the platform. The second layer engages the parties in an AI-enabled dispute resolution process, involving interactions with both parties to determine the root cause of non-payment, and using behavioural nudging to encourage and support settlement, which will also be documented by the platform. The third layer involves human interaction via mediation or mini-arbitration based on the information and documents uploaded by the parties. Parties can select a mediator from a panel provided by the platform. Outcomes through layers two and three of the platform would be contractually binding on both parties.

Once built, the platform can be integrated into invoicing and accounting tools, enabling push-button dispute resolution.

 

The expectation is that most cases will be resolved in layer two, with a few requiring human intervention in layer three. A small number of cases will still require courts to be involved to enforce decisions if not honoured. It is here where the most innovative aspect of the proof of concept comes into play. Throughout the process, data is captured and a case file is automatically created that, at the end, could be injected into the HM Courts and Tribunals enforcement system through transfer of the data file.

Eventually, it is envisaged that there could be an accreditation process of dispute resolution platforms, overseen by the courts, and that the outcomes of their processes would be structured as court orders, further facilitating enforcement.

The simplicity, reduced cost and speed of enforcing claims should serve as a deterrent to non-payers, which should increase the efficiency of the process without involving the courts in most cases.

# What SMBs Can Do Today

## Adopting Digital Tools

The most obvious problem today is that not all SMBs have adopted digital tools, which means they do not have access to most of the technological advancements discussed above. Based on a 2022 Sage report, the two main factors holding back SMBs from more investment in technology are fears over return on investment and lack of awareness of the right solutions.

An obvious first step for an SMB to improve its cash flow is to digitize its invoicing and payments processes, which can now be done easily and cheaply.

 

# 5. Appendix

## 5.1 Days Sales Late

In much the same way as we can use DSOs and $\mu$DSOs to quantify speed of payments, we can calculate analogous figures that we might call *Days Sales Late* (DSLs) and $\mu$DSLs to quantify lateness of payments. The natural "macro" way to estimate DSLs is

$$\text{DSL} = \text{Overdue Accounts Receivable} \times \frac{365}{\text{Annual Revenue (credit invoices)}}, \tag{5.1}$$

which estimates the number of days late that the average pound invoiced on credit terms is at a point in time (treating early and on-time payments as simply *not late,* so that early payments do not reduce average lateness, any more than other on-time payments).

As with DSOs, if we are performing retrospective analysis, we can also compute the average lateness of a pound directly, again treating early payments and on-time payments as being 0 days late (thus not allowing early payments to offset late payments). So the $\mu$DSL calculation is simply a weighted average of the number of days late of invoices, with invoice amount being used as the weight.

## 5.2 Days Sales Outstanding

Perhaps the most common way of measuring payment speed in businesses is using a measure called *Days Sales Outstanding* (so-called DSOs).

DSOs give a point estimate of the average time a pound invoiced takes to get paid, based on current outstanding invoices (accounts receivable). They are most commonly defined as something like:

$$\text{DSO} = \text{Accounts Receivable} \times \frac{365}{\text{Annual Revenue (credit invoices)}}. \tag{5.2}$$

Annual revenue can be replaced by revenue over some other period, in which case 365 is replaced with the number of days in that period (e.g. quarterly revenue and 90 or 91 days). The reason

it's usually formulated this way is that it allows a snapshot to be taken of the speed of currently outstanding payments. Unfortunately, DSOs calculated this way can fluctuate wildly as invoices are paid, and become less meaningful for businesses that are growing, shrinking, or have very lumpy sales (that is, invoice levels that vary a lot from month to month). DSOs also include invoices that end up being written off, which may or may not be regarded as a problem for this estimate.

 